CAPITA

Wellhouse Lane - Barnet
Highway and Pedestrian Assessment

31st March 2014

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Project No: GC/001825 Doc Ref: GC/001825 March 2014 Rev:

Client: London Borough of Barnet
Issue Date: 31st March 2014

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Highway and Pedestrian Assessment

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Issue Record

Rev	Date	Description/Comments	Author/Prepared by:	Approved for Issue by:

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Appendices

1. Introduction and Background

1.1 This document is an initial report on the assessment of the highway and pedestrian concerns at the Wellhouse Lane, Wood Street and Queens Road junction.

1.2 Capita were commissioned by the London Borough of Barnet in January 2014 to investigate pedestrian and highway issues at the existing staggered 4 arm priority junction of A4111 Wood Street, Wellhouse Lane and Queens Road.

1.3 Barnet LB have provided a basic sketch plan of a potential scheme (Drg No 60689 Feasi). This initial scheme basically creates a new flare by widening the Wellhouse Lane approach to Wood Street, incorporates a central traffic island to assist pedestrians and general footway / footpath enhancements.

1.4 There are general concerns in regards pedestrian movements in the area and also traffic safety and flow at the location, a brief list of possible options were submitted by the client in an email dated 10th January 2014, namely:

a. Kerb up-stand improvements to the bus stops on Wood Street
b. Improvements (possible raised table) at Queens Road / Wood St junction.
c. Carriageway widening on Wellhouse Lane to increase capacity and accommodate a refuge.
d. Kerb re-alignment and radius tightening to left turning movements out of Wood Street (into Wellhouse Lane).
e. Review the necessity of the existing pedestrian refuge on Wood Street at its junction with Wellhouse Lane.
f. New footway construction and re-routing through the green area.
g. Shrub-bed and landscape enhancements within the green.
h. New controlled (possibly zebra) crossing on Wellhouse Lane, including limited section of guardrail.

1.5 Wellhouse Lane serves the hospital complex (including an A and E department) and is a link to the Elmbank Drive residential area. It is noted that there has been a recent increase in “activity” at the nearby hospital complex, with an associated increase in car parking with the provision of an additional 200 spaces.

1.6 The junction itself is an unusual layout 4 arm “staggered” junction with the southern arm (Wellhouse Lane) at an acute approach angle. The area to the southwest of the junction is owned by Barnet Open Spaces (custodians of the green) and minimal impact on that area is desirable.

1.7 The existing junction is uncontrolled, and includes a narrow right turn holding lane into Wellhouse Lane. It is noted that the carriageway markings themselves are faint, and the right turn lane is seldom used as a result of both its poor markings and the frequent over run by traffic in the opposite direction. This is caused by vehicles from Wellhouse Lane encroaching beyond the give way marking as they struggle to emerge from the junction. A zebra crossing is located on the A4111 Wood Street (between Wellhouse Lane and Queens Road) immediately east of Queens Road.

1.8 Queens Road is a residential area and also the main access road to the Queen Elizabeth Boys School, with approx 1200 pupils, many of which travel to school via coach from a wide catchment area. This generates some traffic congestion issues at the start and end of the school day. Queens Road also serves a small industrial estate.

1.9 The main (east / west) road through the junction is the A411 Wood Street, which lies on what is commonly referred to as the London Strategic Route Network (SRN). As such any improvements that are undertaken will require support from TfL.

1.10 Wellhouse Lane serves the hospital complex (including an A and E department) and is a link to the Elmbank Drive residential area.

1.11 It is noted that the TfL (London Mayor's) aspiration is to de-signalise junctions within London as far as is reasonably possible. This issue may impede options to improve this location, unless traffic signal testing clearly demonstrates significantly superior congestion improvements and bus journey times.

1.12 Bus stops for east / west movements are located along Wood Street (just west of the Queens Road junction) while a bus "terminus" exists in the vicinity of the hospital, with some 200 buses a day travelling through the junction from this area.

1.13 The study has included a topographical survey of the area, along with traffic counts which have been utilised in regards Arcady and Picady assessment of potential junction improvements. It is to be noted that the location of the zebra crossing and the stagger of the junction created problems when running these two programs. Advice as to the best methods of running the programs was sought from TRL and the junction was modelled to the best capability within the constraints of the programs.

1.14 Accident records have been extracted from the London Personal Injury Accident (PIA) database for the 5 year period preceding the commission.

1.15 This report is an initial study of the location aimed at identifying possible remedial measures to improve both vehicle movements and the safety and convenience of all other highway users.

1.16 This report is a summary of the findings of the "feasibility study" based on initial research and plans. Detailed design should be carried out of any options considered desirable by the highway authority. The proposals have only been developed to a stage that enables approximate cost estimates, an assessment of their viability and benefits, and impact on the highway and adjacent land.

1.17 The report is a live document, whereby frequent consultation with the client has enabled the work to develop along more specific lines.

2. Initial Observations

2.1 There are numerous issues noted during site visits and from photographs and use of "Google Maps", which combined can complicate pedestrian and traffic movements. The following is a basic summary of the main points of concern.

2.2 There are substantial numbers of pedestrians crossing Wood Street at most times of the day, generated by both the school and hospital, as well as the location of the bus stops. While the zebra crossing itself serves to assist these pedestrian movements, at peak pedestrian times it does impede traffic flow.

2.3 The zebra crossing appears well used, however its location immediately east of the Queens Road junction creates conflicts with vehicles emerging from Queens Road. It is important that any changes to the area are seen to emphasise (in regards crossing facilities) pedestrian priority over turning vehicles out of the side road. The situation is worsened by the limited visibility for vehicles emerging from Queens Road as a result of the property boundary hedge at that location.

2.4 It is noted that the existing zebra crossing, being well used, offers vehicles emerging from Queens Road opportunities to do so when traffic stops for pedestrians on the crossing, provided east bound traffic does not obstruct their movements.

2.5 Apart from the zebra crossing, there are minimal delays to through traffic on Wood Street. However vehicles emerging from Wellhouse Lane experience difficulties due to the high traffic flow on the main road (Wood Street), this causes driver frustration with vehicles frequently edging out from the junction blocking Wood Street westbound traffic and the right turn lane (see Fig 2.1 below) as they wait an opportunity to merge with the eastbound traffic flow.

Fig 2.1 – Right Turning Traffic Edging out of Wellhouse Lane.

2.6 There is a traffic island located on Wood Street to the east of the Wellhouse Lane junction, positioned approximately 45 metres east of the zebra crossing. Drop kerbs are provided (but no tactile paving) that assists pedestrians to cross at that point. The island also offers some "shelter" to any vehicle waiting to turn right into Wellhouse Lane.

2.7 It is noted that large vehicles, in particular buses, experience difficulties when turning right out of Wellhouse Lane due to the location of the existing traffic island on Wood Street. This often means that large vehicles either overhang or mount the opposite footway. (Fig 2.2 below)

Fig 2.2 – Right Turning Bus out of Wellhouse Lane

2.8 The existing road layout was tested using the computer program "Autotrack" and it is evident that vehicles emerging from Wellhouse Lane and turning right "can" do so without over running the footway as previous item. It is considered that drivers tend to stay too tight to the right hand side of the approach which impedes their turning movements slightly.

2.9 The island is closer to the Wellhouse Lane junction than is desirable, but cannot be moved a little further away from the junction due to the position of driveways to properties.

2.10 The existing traffic island on Wood Street (to the east of Wellhouse Lane) offers an uncontrolled pedestrian crossing facility, it also assist as a traffic calming feature in advance of the junction and the zebra crossing, whilst offering some shelter to vehicles waiting to turn right into Wellhouse Lane (in the existing narrow right turn lane).

2.11 It is considered that while vehicles (mainly buses) turning right out of Wellhouse Lane frequently over run the adjacent footway, which is obviously undesirable. The fact that the turning movement has been shown it can be carried out safely, along with the benefits the island provides suggest that if no highway improvements are carried out in the vicinity, it would be best to retain the island. It is also anticipated that several junction alterations proposed in this assessment will impact on the island differently.

2.12 It is noted that pedestrian desire lines do not appear to match the footpaths in the vicinity of and across the green space, as seen by substantial wear on the grass itself. Pedestrians appear to frequently cross the grass area diagonally rather than stay on the surfaced footpaths, and are then faced by steps to the northern footway on Wellhouse Lane (fig 2.3). At this location the northern footway, on the eastern side of Wellhouse Lane, terminates and pedestrians are then required to cross Wellhouse Lane at that point or walk in a southbound direction on the carriageway, until there is a gap in the traffic to cross the road towards the hospital complex. It is noted that visibility to and for pedestrians here is obstructed by the hedge line fronting the private house (number 2) on Wellhouse Lane in that area, which overhangs the highway verge.

Fig 2.3 – Worn Grass Area and Poor Standard Steps

2.13 While a study of accidents in the 5 years preceding 31st October 2013 is included as part of this study, it is known that on the day before the topographic survey of the location, a child using the zebra crossing was struck by a car that failed to stop in time. The severity / extent of the child's injuries are unknown.

2.14 Traffic flows appear manageable, however it is noted that as many as 23 buses an hour turn left into or right out of Wellhouse Lane. Hence any delays to the timetable service will seriously impede bus service reliability and reduce customer confidence.

2.15 Autotrack testing was carried out (for large vehicles) on all turning movements for the existing highway layout. Those causing concern are:

a. Left turns out of Wellhouse Lane, where the vehicle needs to travel across the opposing traffic lane.
b. Left turns into Queens Road, again where the vehicle is required to use the opposing traffic lane, and is unable to proceed if any vehicles are stationary at the give way line (waiting to leave Queens Road).
c. Left turns out of Queens Road, where the vehicle needs to travel across both the right turn lane and opposing traffic lane.

2.16 All options will include provision of new pedestrian facilities (drop kerb / tactile paving) at suitable locations or enhancement of existing provision, while signal controlled options will include cycle advance stop lines.

2.17 It is noted that the bus stops on Wellhouse Lane are recent installations; while both bus stops on Wood Street are long established.

2.18 It is noted that vehicles experience difficulties entering and leaving Queens Road at peak times. While no initial evidence exists, it may be the case that to avoid this "rat running" occurs along Argyle Road and Granville Road. The use of such residential roads for rat running can have significant impacts with regards to highway safety.

2.19 It is noted that various options, in particular those which incorporate vertical deflection (raised tables) and traffic signal controls, will require early discussions with TfL and bus service operators. These options may face delays in implementation due to these consultations.

2.20 It is also noted that TfL document BP2/05 generally supports the use of mini-roundabouts, provided that buses are not faced by the need to overrun raised central sections, and single rather than multiple use. This document also states that speed tables are acceptable if no other measure is suitable.

2.21 TfL document BP1/06 offers guidance on accessible bus stop design standards.

2.22 A key point considered within this study is desire of the Lord Mayor, TfL and the London Boroughs to keep pedestrians safe and to make the area more accessible for those with physical and visual impairments. The aim is to deliver a more comfortable, convenient, direct and easily understood pedestrian environment as well as enhancements to improve safety for all users of the highway.

3. Accident History

3.1 Accident records for the 5 year period 1/11/2008 to 31/10/2013 have been studied in the vicinity of the junction. During this time 7 "personal injury" type accidents have been recorded, their "basic" details are as follows:

a. May 2009 — A pedestrian crossing Wood Street mid way between the eastbound and westbound bus stops stepped out and was struck by a car.
b. May 2010 — At a point east of Wellhouse Lane junction, a car travelling eastbound wished to park on the opposite side of the carriageway and struck a westbound vehicle.
c. December 2010 — Unclear road markings and poor surfacing caused a vehicle turning right in to Queens road to collide with a vehicle travelling eastbound on Wood Street.
d. December 2010 — A vehicle turning right in to Queens Road to collide with a vehicle travelling eastbound on Wood Street.
e. January 2012 — A car pulled out of Wellhouse Lane and collided with a motorcycle on Wood Street.
f. June 2012 — A car turning right into Wellhouse Lane crossed into a vehicle travelling westbound on Wood street, and also impacted on a vehicle behind it.
g. August 2012 — A car on Wood Street stopped to allow a bus to turn right from Wellhouse Lane into Wood Street, the bus then struck a cyclist that overtook the stationary car.

3.2 The 7 accidents caused 7 personal injuries, of which 2 were considered serious and 5 slight. From the above brief summary, there does not appear to be any specific "major" accident concerns, however it is noted that 5 of the 7 accidents involved turning movements. It is therefore considered that the two junctions (Queens Road and Wellhouse Lane with Wood Street) would both benefit from an improved layout.

3.3 It is noted that accident "b." above infers that the condition of the carriageway / road markings in 2010 were substandard and contributory to the accident. It is noted from current photographs that the condition of the existing carriageway markings and surfacing is still poor. As such it is recommended that if no junction improvements are carried out the area is at least resurfaced and the road markings replaced.

3.4 Additionally for the same 5 year period accidents along Wood Street, between the Queens Road junction and a point mid way between Argyle Road and Kings Road were considered. During this time 5 accidents have occurred, their "basic" details are as follows:

a. October 2009 — A pedestrian was sweeping the road (Wood Street – 142m east of Argyle Rd) and was struck by a passing car.
b. August 2010 — At a point 50m east of Argyle Rd junction, a car travelling westbound struck a parked vehicle on same side of the carriageway.
c. December 2010 — At a point 150m east of Argyle Rd junction, a car travelling eastbound struck a parked vehicle on opposite side of the carriageway.
d. August 2012 — At the Wood Street / Argyle Rd junction, a motorist travelling on Wood Street fell asleep, lost control and collided with a pedestrian.

e. May 2013 A vehicle emerging from Argyle Rd struck a motorcycle travelling eastwards on Wood Street..

3.5 The 5 accidents caused 5 personal injuries, of which 1 was considered serious and 4 slight.

3.6 From the above brief summary, there does not appear to be any specific “major” accident concerns, however it is noted that 3 of the 5 accidents were just east of Argyle Road, where the carriageway is straight but the width restricted by the parking bay on the southern kerb line. There is minimal opportunity to widen the highway to improve this situation, although a study could be carried out if desired by the highway authority.

3.7 As previously stated the day before the topographic survey of the location, a child crossing the zebra crossing was struck by a car that failed to stop in time. The severity / extent of the child’s injuries are unknown. There is concern over the location of the crossing close to the Queens Road junction and sited between the two junctions, this may lead to motorists failing to notice pedestrians on the crossing as they negotiate a very busy area. It is suggested that some kind of “calming feature may enhance safety on the crossing.

4. Proposed Junction Improvements General Details

4.1 The study initially concentrated on improvements to the main cause of concerns in regards traffic movements. These mainly relate to traffic emerging from Wellhouse Lane, in particular traffic turning right and also, at peak times, vehicles emerging from Queens Road.

4.2 The original Barnet proposal (as Drg 60689) has been tested using Picardy, (refer to the Technical Report contained within the appendices to this document). There were difficulties in modelling the junction because of the staggered configuration and location of the existing and proposed zebra crossing as described in Technical Note 1. Interestingly, predominantly due to the small number of left turning vehicles, it is noted that provision of the flare will not have any benefit to the junction performance.

4.3 Numerous junction alternatives were considered to improve the location, including a 4 arm roundabout, single and double mini roundabouts, traffic signal controls and basic improvements (slight widening) to the existing layout, as well as relocation of the zebra crossing and bus stops. A series of 8 basic sketch plans were submitted to the client on 26th February 2014, as follows:

- G/0/5 Option 1 - Mini Roundabout
- G/0/6 Option 2 - Mini Roundabout
- G/0/8 Option 4 - Traffic Signals
- G/0/9 Option 5 - Protected Right Turns
- G/0/10 Option 6 - Junction Plateau
- G/0/11 Option 7 - Traffic Signals
- G/0/12 Option 8 - One Way System
- G/0/13 Option 9 - Twin Mini Roundabouts

4.4 All options apart from option 8 would include enhanced landscaping / footpaths in the area of the green space. The options can sometimes be used in tandem with each other and a very basic summary of each is as follows:

4.5 **Option 1. Single mini roundabout at head of Wellhouse Lane**
Can substantially assist traffic emerging from Wellhouse Lane, existing island / crossing to the east can be retained (upgraded with tactile paving), zebra to the west can either be retained or relocated to the west of Queens Road. A new zebra on Wellhouse Lane will be located to tie in with footways across the park area. Small islands will be required on the eastern and southern approaches to the roundabout.

4.6 **Option 2.Single mini roundabout as option 1 but with a short right turn facility into Queens Road**
Requires the Wood Street zebra to be located to the west of Queens Rd and subsequent relocation of the bus stops.

4.7 **Option 4. Traffic Signals, at the head of Wellhouse lane**

This option would likely incorporate pedestrian crossings, on one or all arms. It will obviously greatly improve traffic flows emerging from Wellhouse Lane and also pedestrian facilities. The plan is basic, indicates stop line on Wellhouse Lane set too far back into junction. This would be modified when we have details of flows / signal performance, while cycle facilities will be investigated / introduced. The signals will not include signalisation of Queens Road, but the introduction of yellow box markings in that area will improve opportunities for traffic to emerge.

4.8 **Option 5. Simple T junctions, but minor widening to Wood Street to enable right turn lanes into Wellhouse AND Queens Rd**

Wood St Zebra relocated westwards. This option offers minimal benefits to Wellhouse emerging traffic. Existing traffic island to the east (on Wood St) can remain.

4.9 **Option 6. Junction plateau**

The original Barnet proposal (April 2013) included a raised “table” across the mouth of Queens Road to reduce dominance by cars and ease pedestrian movements. Option 6 proposes the raised area extends throughout the junction, including the zebra area, with the raised area a maximum 75mm high incorporating ramps of maximum gradient of 1 in 20. The “table would extend 18.0metres to enable bus passenger comfort. This is intended to calm traffic in regards turning movements and the pedestrian crossing and to assist pedestrians in all directions. It is considered that it will offer (by slowing traffic from the west) some assistance to traffic emerging from Wellhouse Lane.

4.10 **Option 7. Traffic signal controls**

This option cuts through the park area substantially, to create a 4 arm traffic signal controlled junction. The remaining park area will need to be greatly enhanced by landscaping to compensate for the loss of green space. It is anticipated that substantial benefits to all highway users will result. Again the plan provided is basic and facilities for cyclists etc will be considered at a later date if the scheme is progressed. The highway fronting numbers 3 and 5 Wellhouse Lane is left as a “service road” / turning area. It may be the case that a “slip road” from Wood Street to Wellhouse Lane could be created (avoiding the signals) dependent on flows, either for all highway users or buses or just cyclists.

4.11 **Option 8. One Way System**

From autotracks it appears that left turn into and out of Queens Road is very difficult, larger vehicles in particular needing the full width of the carriageway, while right turning traffic (waiting to turn) into Queens Road can cause obstructions to the Wellhouse Lane junction (through tailbacks). This option involves the prohibition of right turn into Queens Road, with traffic travelling further west and turning right into Argyle Road, via a new right turn lane, and proceeding through Granville Road to Queens Road. Both Argyle road and Granville Road would become one way, as would the lower section of Queens Road.

4.12 **Option 9. Twin mini roundabouts**

This repeats option 2 with its associated benefits to traffic emerging from Wellhouse Lane, but includes an additional mini roundabout at Queens Road. The zebra crossing will be relocated to the west of Queens Road, a new pathway would then be created across the green area to link to the zebra on Wellhouse Lane. With this option large vehicles turning left from Queens Road can do so more easily. Left turning movements into Queens Road for the larger vehicles would still encroach into the opposing lane (Large vehicles only), although it will be better than

currently exists. The kerb build out in that area (for deflection – hatched red) would be an "over run".

4.13 To sum up, the above 8 options submitted to the client were basic sketch plans to enable advance comments. Note numbering sequence omits "Option 3" as this was too similar to another option.

4.14 **Client Option. Drg No 60689 Feasi**
The option presented by the client during the commission of the scheme is a simple realignment of the kerbline on the Wellhouse Lane approach to enable an improved flare on the approach. The proposal also includes a slight build out to the south eastern footway and a central island on the Wellhouse Lane to assist pedestrians crossing the mouth of the junction. Some landscaping of the green space has been included, while a "raised table" was proposed across the mouth of Queens Road.

4.15 The existing Wellhouse Lane junction was tested using Picady, and retested with the additional flare, as per Drg no 60689 Feasi. The results were identical, with tail backs of 12 vehicles on Wellhouse Lane during the pm peak. Hence the physical improvements suggested in this (original client) option do not improve traffic flow, although it would assist buses emerge in relation to the conflict they currently experience with the Wood Street traffic island. The costs of the option are thus not reflected in the benefits, if the issue of conflict with the traffic island was all that was needed to be overcome the island could be removed / relocated. Hence it is suggested that this original option is not progressed further.

4.16 To sum up, the above 8 options submitted to the client were basic sketch plans to enable advance comments. Note numbering sequence omits "Option 3" as this was too similar to another option.

4.17 Where appropriate Linsig, Arcady and Picady testing has been carried out to ascertain the options viability. It is to be noted that such testing is compromised by the difficulties in modelling the staggered 4 arm existing layout, with a zebra crossing between two of the arms, plus a further crossing proposed on Wellhouse Lane. Advice as to the best methods was sought from TRL and these methods used in the assessments.

5. Client Response from Initial Options

5.1 While each junction alternative was considered to improve the location, standard practices within the Barnet and London areas, together with concerns over the loss of green open spaces has resulted in the following distinct observations and scheme summary from the client.

5.2 Due to land ownership complications, it's imperative to look those options (1, 2, 4, 5 & 6) that require a minimal transfer of land from Barnet Open Spaces who are the custodians of the green. But still any of these still require a protracted negotiation with Open Spaces and therefore I have to insist, as a trade-off, to include landscape enhancement proposals to the green as otherwise they won't agree.

5.3 Further, the A411 Wood Street lies on what is commonly referred to as the London Strategic Route Network (SRN) meaning any improvements that we undertake require support from TfL. The signalisation option (Option 4) unless it demonstrates a significantly superior congestion improvement and bus journey times, I am tempted to discount it straightaway on the grounds it contradicts the TfL (London Mayor's) aspiration to de-signalise junctions within London as far as is reasonably possible. Besides, in terms of cost it is likely to be unattractive anyway, this is exacerbated by the rather complicated formula that TfL use to bill Barnet for the maintenance of all new signal equipment.

5.4 1, 2 & 5 are similar but options 2 & 5 may fail to gain the support of TfL as it proposes to relocate the bus stops and may make the nearest such facility exceed the 400m threshold spacing.

5.5 Option 6, although the raised table possibility came from me, the client's approach at the moment does not favour vertical or horizontal deflection features. This may sound weird but Option 6 might be seen as setting a precedent which may cause problems in the absence of a formal policy shift through democratic process.

5.6 Moving forward, and assuming this is contained within available budget, I would therefore suggest the following:

Option 1 is developed further to incorporate:

- landscaping and associated cosmetic improvements to the green area.
- Ensure the design discourages pedestrians\school kids from using undesignated footpaths across the green.
- Design to provide a more direct route for pedestrians from areas to the west of Queens Road who may wish to access the Hospital or Bus services on Wellhouse Lane.
- Ensure design discourages j-walking south-west of proposed zebra crossing on Wellhouse Lane.
- Provide a costing.
- Include how it affects or impacts on congestion, journey times etc compared to 'do nothing' option.

Include a new option which is basically a variation of, and caters for pedestrians and **contains all the principles for, Option 1 above but does not include junction (traffic) improvements:**

- Provide a costing

5.7 We will then use these two options to open negotiations with both Barnet Open Spaces and Transport for London. As soon as you are able to next week, could you confirm the projected 'design fee' spend profile as I need to report the figures owing to the year drawing to a close.

5.8 In regards to the one way option (Option 8). Since it is as you say could be promoted as a stand-alone, I thought at face value it is attractive. However before I comment further, I need to ascertain a couple of points and also test the idea to the residents' reps who live along Granville Road to see what they think because the option means commercial traffic (from industrial estate at end of Queens Rd) and school buses will be displaced to their road (QEII Boys is a very popular and big school excess of 1200 boys with an unusually wider catchment area and has lots of coaches bringing the boys from all over the southeast each day).

5.9 Subsequently the client has reinstated Option 6 (Junction Plateau) and also the amendments to the east bound Wood street bus stop.

5.10 In summary we are to follow up on:

- Option 1 – Mini Roundabout, renamed as Option 10
- Option 6 – Junction Plateau.
- Option 8 – One Way System
- Option 11 – New option to cater for pedestrians only.
- Option 12 – remedial measures to Wood Street bus stops.

5.11 We will also complete Option 4 (basic traffic signals) to indicate costs and benefits such a scheme could offer. A landscaping proposal is also being produced.

6. Details of Proposed Options

Option 10 – Mini Roundabout at head of Wellhouse Lane (Refer to drawing G/0/14)

6.1 As stated in para 4.4 above, the mini roundabout is intended to assist all turning movements. Mini roundabouts are generally designed to TD 54/07 standards, and are often used at existing priority junctions to redistribute queues and delays within the highway system. It is accepted that in some instances, particularly where space is limited, mini roundabouts can achieve greater capacity than other junction types. They are usually a compact, low-cost solution to traffic problems.

6.2 Three arm mini roundabouts are considered to be a relatively safe option in most situations.

6.3 A similar junction is located on Wood Street at its junction with Union Street, 370 metres east of Wellhouse Lane. Generally speaking consistently similar junctions along a road are seen as good practise.

6.4 The current layout for the proposed mini roundabout at Wellhouse Lane will comprise a three arm arrangement of approximately 17.0m ICD and 4.0m white painted central island (not domed). This layout indicates the minimum encroachment into the green spaces.

6.5 Small “splitter” type traffic islands would be located on both Wood Street approaches as both these allow motorists an easy path to overrun the centre island.

6.6 Generally the layout can be designed to the relevant standards.

6.7 An Arcady appraisal of the layout indicates some concern over capacity at peak times. It is normally accepted that the RFC (Ratio of Flow to Capacity) should not exceed 0.85. While during the majority of the day this is achieved, at peak periods this is exceeded, as table 6.1 below, for Wood Street eastbound traffic in the a.m peak and Wood Street west bound traffic in the p.m. peak.

Table 6.1: A411 Wood Street/Wellhouse Lane ARCADY Mini-roundabout Assessment Summary

Arm	AM Peak Hour			PM Peak Hour		
	RFC	Queues (Vehs)	Ave. Delay (Mins per Veh)	RFC	Queues (Vehs.)	Ave. Delay (Mins per Veh)
A - A411 Wood Street (east)	0.980	16.9	1.184	0.738	2.7	0.246
B - Wellhouse Lane	0.352	0.5	0.221	0.676	2.0	0.395
C - A411 Wood Street (west)	0.857	5.4	0.481	1.030	26.6	1.932

6.8 Full details of the Arcady assessment are contained in Technical Report contained within Appendix A of this document.

6.9 The Arcady report indicates high sensitivity to geometric standards being amended. It is considered that the two RFC’s over 0.85 in the table above could be improved during detailed design of the option. However this will entail some increased loss of green space, and as this is

considered undesirable further preliminary alignment modifications were not carried out at this stage. Detailed design will achieve the optimum solution for the layout.

6.10 It can be seen that the mini roundabout option, whilst introducing delays to the Wood Street through traffic, will greatly improve the Wellhouse Lane traffic movements, enabling public transport to and from the hospital to become more reliable.

6.11 The mini roundabout layout will not worsen the access issues to the existing residential property at 114 Wood Street, where the vehicle access has been tested using autotrack.

7. Option 6, Junction Plateau – Queens Road / Wood Street

Refer to drawing G/0/10

7.1 The original Barnet proposal (Drg No 60689 Feasi.) included a “raised table” across the mouth of Queens Road to reduce dominance by cars / assist pedestrian movements.

7.2 The layout as sketched on the clients plan would regrettably not function, since the required “ramps” would set the raised area back into the junction by at least 1.5metres, although the option could be amended and revised appropriately.

7.3 As detailed the raised crossing point would calm traffic entering and leaving Queens Road, and may help resolve concerns over vehicles turning left out of Queens Road conflicting with pedestrians on the crossing.

7.4 Capita are suggesting that the option is expanded such that the entire junction is “raised” by up to 75mm to create a plateau or table. TfL advice note BP2/05 suggest that such features are acceptable on bus routes, but should generally only be used at key locations such as schools and shopping areas. It is considered that the close proximity to both the QE school and the hospital , together with the busy pedestrian crossing on Wood Street and adjacent bus stops would justify such a facility.

7.5 The intentions of this option are to calm traffic in the vicinity of the zebra crossing and in regards turning movements at the Queens Road junction. Slowing through traffic on Wood Street would also assist traffic emerging from Wellhouse Lane.

7.6 The proposal as shown on Drg G/0/10 is basic to indicate the likely extent, it would satisfy TfL requirements in regards height, ramp gradient and length and can be installed as a stand alone feature or part of any of the other proposals put forward in this report. Actual details of the proposal would be drawn up following consultations with the client, emergency services, bus operators and TfL.

8. Option 8, One Way System

Refer to drawing G/0/12

8.1 It is noted from site visits that there are numerous issues with turning vehicles into and out of Queens Road, particularly at the start and end of the school day when a large number of school buses travel through this junction.

8.2 As it currently stands, large vehicles are unable to turn into Queens Road from Wood Street (particularly from the west) when other vehicles are stationary at the give way line while waiting to emerge from Queens Road. Large vehicles are also unable to turn left out of Queens Road without encroaching into the opposing traffic lane on Wood Street.

8.3 The issues raised in the previous item create delays to through traffic on Wood Street and tail backs also impede the Wellhouse Lane junction.

8.4 It is possible that known delays at the head of Queens Road may create a “rat run” through Granville Road and Argyle Road.

8.5 The three roads affected by the one way system are residential, traffic for the Queens Road industrial estate and the Queen Elizabeths school will also be affected by the proposed “diversion”. Both Argyle Road and Granville Road are wide residential streets, with parking along both sides of the road. While there may be objections to the creation of the one way system, there will in the main be benefits to all users of the highway.

8.6 The proposal indicated on Drg G/0/12 suggests a one way system that would remove traffic turning into Queens Road and the delays that movement creates at Wellhouse Lane.

8.7 To enable the system to function a right turn lane into Argyle Road would be created by removal of a section of parking bay and minor widening of the carriageway.

8.8 There are numerous positives in the proposed one way system, which are as follows:

a. Removal of difficulties traffic turning into Queens Road currently experience.
b. Removal of delays at Queens Road and Wellhouse Lane caused by vehicles slowing / waiting to enter Queens Road.
c. Remove the difficult left turn from Granville Rd into Queens Road.
d. Improve the left turn movement out of Queens Road, and reduce conflict with Zebra crossing.
e. Ease pedestrian crossing movements at the mouth of Queens Road.
f. Remove “rat run” through Argyle Road / Granville Road.
g. Improve access to / from school at start / end of school day by easing turning movements.

8.9 The proposed one way system is relatively low cost, offers multiple benefits and could be introduced in isolation or combined with other proposals. It is possible that residents on Granville Road and Argyle Road would be apprehensive in regards this system, and conversely it is probable that residents on Queens Road south would benefit and welcome the system.

8.10 As para 5.8 of this report, the client intends to consult with (local) residential representatives to determine their views on the proposed one way system. We have not yet received feedback on the consultation.

9. Option 11, Pedestrian Improvements

Refer to drawing G/0/15

9.1 As requested by the client, a simple “pedestrian only” improvement option has been investigated. This is presented on drawing G/0/15.

9.2 The proposals (in technical format) entail enhancement of pedestrian facilities as follows:

a. Provision of a zebra crossing on Wellhouse Lane.
b. New tactile paving at the traffic island on Wood Street.
c. Tactile paving / drop kerbs at the Queens Road junction.
d. A new pedestrian link across the green area towards the new zebra crossing to deter walking across the grass.
e. Minor enhancement to the existing footpaths across the grassed area.
f. A ramped (DDA compliant) link from the existing western footpath to Wellhouse Lane.

9.3 The proposals will assist pedestrian movements especially in regards crossing of Wellhouse Lane, while reducing the likelyhood of pedestrians crossing the grassed area.

9.4 Following an assessment of the proposals by a landscaping specialist the proposed “ramp” (item 9.2 f. above) has regrettably had to be discounted as it had too great an impact on the roots of the adjacent trees. Hence the need to create an enhanced footpath across the centre of the green area to offer a more attractive (to pedestrians) route between Wood Street west and Wellhouse Lane.

9.5 This option is considered the minimum desirable to improve pedestrian facilities, but will not improve vehicle movements nor safety of pedestrians using the Wood Street crossing.

10. Option 12, Bus Stops

Refer to drawing G/0/17

10.1 There are two recently installed / improved bus stops located on Wellhouse Lane in the vicinity of the hospital as a terminus. These are in good condition and serve around 200 buses in a 12 hour period. The two stops in the vicinity of the hospital are accessed via drop kerbs and tactile paving, as per the authorities standards. It is noted however that the one tactile paving installation directs pedestrians towards a lighting column. It is considered that this is unsafe for the visually impaired and while the area is located away from the junction being appraised, it is recommended that the said column is relocated. See Fig 10.1 below.

Fig 10.1 – Lighting Column Obstructing Pedestrian Movements on Wellhouse Lane

Fig 10.2 – Eastbound Bus Stop on Wood Street

10.2 The two bus stops on Wood Street are well established and appear to be well used. It is noted that both include shelters with “perch seats” within a narrow footway area. It is not known if any regular constraints to passing pedestrians are caused by waiting passengers, but this could be the case. Unfortunately there are no opportunities to widen the footways in the vicinity of the stops to overcome this issue without impeding traffic flows.

10.3 From available photographs, both stops would benefit from enhancement of the bus cage road markings.

10.4 It is noted (as photo Fig 10.2 above) that the footway to the rear of the east bound stop is bordered by the adjacent properties garden and hedge line, where soil appears to spill onto the footway, this could create a slip hazard in wet weather within this narrow footway area. It is suggested that some kind of retaining structure (kerbs or edgings) be installed at the rear of the footway to prevent soil spillage and to highlight the footway boundary.

10.5 It is noted that passenger movements at the east bound bus stop arwe constrained by the shelter, bus flag post and litter bin, together with the adjacent driveway (photo above). It is considered that the bin and post could be relocated to ease passenger movements.

10.6 Both the Wood Street bus stops have kerbed upstands below the Barnet LB standard of 140mm, which is the desired height within TfL guidlines. To ease access to / from the buses it is suggested that sections of kerbs and footways in the region of the stops be replaced in order to provide a standard upstand and enhance footway surfacing.

10.7 The standard clear footway area to enable deployment of a bus ramp and turning movement of a wheelchair is 1500mm by 1500mm. It is also recommended that street furniture is not placed within 20m upstream of the bus flag. There are numerous issues at the eastbound bus stop, which are as follows:

a. Fig 8.1 of BP1/06 requires 2.0m between the shelter and flag, the distance provided is approximately 1.5m.
b. The standards require the bus boarder to the centre door to be located between 2 and 6 metres from the flag (4 and 8 metres from the shelter).
c. From the photograph above it can be seen that the eastbound bus stop is substandard, in both available width for ramp deployment and the positioning of the bin. At this bus stop the centre door boarding area includes the drop kerbs to the driveway.
d. It is suggested that the eastbound bus stop be relocated to a more suitable position.

10.8 Details of the proposed modifications to the bus stops are indicated on drawing G/0/15.

10.9 It is recommended that the above alterations to the east and west bound bus stops are introduced independent of any decision in regards junction and footway improvements.

11. Landscaping to Open Spaces

Refer to Drawing G/0/18, and Materials Palette

11.1 The client has requested that landscape enhancement proposals to the green be investigated. Capita have utilised a landscape architect to create a proposed scheme that will enhance the existing area, reduce the desire to walk across the open spaces (grass wear and tear) and compensate for any proposed highway works.

11.2 The drawing attached to this report offers an attractive option that can be introduced irrespective of any highway option(s) the client decides to progress. Examples of potential materials etc are contained within Fig 1, Materials Palette in the Appendix to this report.

11.3 As stated in para 9.4 above, consideration was given to create a ramped link from the existing western footpath to the Wellhouse Lane footway. This would create a DDA compliant facility to avoid the existing steps. Unfortunately the impact on the relatively shallow excavations to create this ramp would be too great on the root system of the adjacent trees. The ramp is therefore not considered appropriate, in its place the steps will be reconstructed at an appropriate standard to ease pedestrian movements and new handrails erected either side of the steps.

11.4 The proposals indicated on the drawing (G/0/18) are intended to be used on any of the proposed highway improvements in the area.

11.5 It is noted that the proposals include the removal of 3 No existing trees. The number of trees to be removed has been kept to the minimum. These trees are relatively small and generally “short lived” varieties. Their removal will allow the proposals to work more effectively by opening up the green space closer to the junction and to the east of the proposed new footpath. We have proposed planting a further 3 semi mature flowering trees to the west of the path, to offset this loss and provide a more cohesive overall design. In addition, one of the 3 trees proposed for removal is close to and may obscure visibility to the zebra crossing, furthermore, its roots would also be affected by the new footway alignment.

11.6 The existing timber posts surrounding the green area are in a relatively poor condition, they are being replaced with new low maintenance steel bollards to the east of the path and by 900mm high black painted steel estate fencing. This fencing is intended to discourage errant walking across the grassed area.

11.7 The cost of the landscaping totals £55,000. However this is broken down as soft landscaping £14k, hard landscaping (paving, fencing, gazebo etc) £29k, initial maintenance £7k and a £5k contingency. A detailed proposal should be developed in conjunction with relevant Barnet officers before any detailed design is progressed.

12. Option 4, Traffic Signals

Refer to Drawing G/0/8

12.1 The client has suggested that due to complex finance issues with TfL and the Lord Mayors proposal to de-signalise junctions in London, this option should be discounted unless it can demonstrate significantly superior impact on congestion and bus journey times.

12.2 The above comment arrived after some modelling work had started, as such this was continued / completed in order to appraise the option against those other options listed above.

12.3 Appendix B of this document contains a brief summary of the LinSig findings. These basically indicate that signalisation of the existing junction layout would function over capacity unless a right turn lane into Wellhouse Lane was incorporated into the signalisation. Introduction of the right turn lane as indicated on drawing G/0/8 enables the scheme to function within capacity.

12.4 The key results of the LinSig analysis are shown in Table 12.1 below.

Table 12.1 Results of LinSig Analysis

Link	Road	A.M. Peak Period		P.M. Peak Period	
		Deg. Sat (%)	Mean Maximum Queue (pcu)	Deg. Sat (%)	Mean Maximum Queue (pcu)
1/1	A411 Wood Street Left Ahead	75.2	17.2	68.4	13.8
2/1	Wellhouse Lane Right Left	71.9	5.2	79.0	8.9
3/1	A411 Wood Street Ahead Right	66.3	12.4	82.3	18.4
Practical Reserve Capacity (PRC)		**19.7%**		**9.4%**	

12.5 The signals will be designed to incorporate pedestrian and cycling friendly aspects on all arms. Thus the existing zebra crossing would be removed, as would the delays and safety concerns that it currently creates. It is accepted that some delay to east / west traffic flows will be created by the introduction of signals but these are likely to be minimal.

12.6 Pedestrians crossing Wood Street currently on the line of the zebra facility may also face some delays while waiting for the traffic lights to allow them to cross.

12.7 The provision of crossing facilities on all arms of the junction would assist in the aim of creating a safer, more comfortable and legible pedestrian environment, reducing potential conflict risks, especially in regards the existing zebra crossing and vehicles emerging from Queens Road. The facility would be more accessible for those with visual impairments, and the option to introduce “countdown” timers on the crossing points is viable.

12.8 The provision of advanced stop lines (ASL’s) at the approaches would benefit cyclists. As would the reduced congestion on Wellhouse Lane and improvements to the difficult turning movements that presently create a safety issue for cyclists. ASLs are accepted to provide the best overall technique (for improving cycle safety at signal controlled junctions) while having little effect on other road users. ASLs are widely used at signal controlled junctions and provide

the cyclist with both priority and protection. Proposed changes to the TSRGD will allow greater flexibility in the design of ASL's while also enabling ASL's to be introduced without lead in lanes.

12.9 Provision of signals at the head of Wellhouse Lane will greatly improve traffic flows on Wellhouse Lane, improve safety of pedestrians and create a layout that will be easily understood by all highway users. No obvious delays to through traffic (on Wood Street) will entail.

12.10 The provision of signals will greatly assist bus journey reliability.

12.11 A cause for concern that cannot be factored in to the assessment is the potential blocking of the junction by vehicles waiting to turn right in to Queens Road causing tail backs. While no evidence of such an issue arose in site visits it is a possible concern. The proposed use of yellow box markings across the face of Queens Road mean it would clear reasonably quickly. A short right turn lane (into Queens Rd) is indicated on the drawing to help to overcome this.

12.12 A combination of the one way system (Option 8) with the traffic signals would remove the risk raised in the previous item completely and enable the right turn lane in to Wellhouse Lane to be extended further west.

12.13 While it is noted that traffic signals oppose the TfL desire to "de-signalise" junctions, they would assist the aim to encourage cycling in Outer London by reducing congestion on Wellhouse lane, improve turning movements throughout the junction and control vehicle speeds along Wood Street. Signalisation will also help tackle fear of traffic by creating a better and safer junction arrangement.

12.14 The proposed ASLs are accepted to provide the best overall safety technique (for cyclists) while having little effect on other road users. ASLs are widely used at signal controlled junctions and provide the cyclist with both priority and protection. New proposals within the Traffic Sign Regulations suggest the introduction of ASL's without the current lead in lane, a layout already successfully in use in both London and the rest of the UK.

12.15 The LinSig analysis should be fine tuned following discussions with Barnet if this option is favoured for progression to detailed design. This would ensure that the agreed layout is accurately modelled. The option will of course need to proceed through various stages in accordance with TfL procedures for traffic signal design.

12.16 It is to be noted that the option has the minimal impact on the existing green open spaces, being constructed mainly within the existing highway boundary. However, it would still be desirable to introduce a landscaping option.

13. Summary of Proposals

Table 13.1 - comparison of Options

Option. Description. Cost.	Benefits	Summary of benefits
Option 10 Mini Rbt £121k	Improves traffic flows on Wellhouse Lane, improves bus reliability, calms traffic on Wood Street, retains existing zebra crossing, improves pedestrian movements, easily understood by motorists.	Improves traffic flows Improves bus reliability Better pedestrian safety Good safety record
Option 6 Table junction £70k	Calms traffic in area of junction and zebra, assists pedestrian movements, offers only slight assistance to traffic emerging from Wellhouse Lane.	Calms traffic Improves safety Better pedestrian safety
Option 8 One Way System £42k	Removes turning problems at Queens Road, reduces conflict risks, removes tailbacks across Wellhouse Lane, easily understood by motorists, greater benefits outweigh objections from Argyle / Granville Road residents.	Removes tailbacks Safer turning manoeuvres Easier left turning
Option 11 Pedestrian improvements £44k	Helps pedestrians somewhat, does not remove risk of conflict on zebra crossing with traffic emerging from Queens Rd.	Improves pedestrian safety
Option 12 Bus Stop upgrade £13k	Enhances bus stop provision in line with relevant standards, relocates bus stop slightly further from Queens Rd junction which can improve visibility issues.	Improves public transport DDA compliant
Option 4 Traffic Signals £ 226K	Greatly improves traffic flows and works within capacity at all times. Improves safety for all road users, including pedestrians and cyclists. The option is mainly within the existing highway so has minimal impact on the green spaces. Enhances pedestrian crossing options, reduces risks. May help to encourage cycle use.	Improves traffic flows Improves bus reliability Best for pedestrian safety Controlled pedestrian crossings Good safety record Benefits for cyclists Minimal impact on green spaces
Landscaping £55k	It is proposed that the “green space” located to the west of the Wellhouse Lane junction be enhanced as part of any proposals in the area. The plan included within this report is intended as an initial discussion point for consultation with Barnet Green Space representatives. The option can be used irrespective of which highway / pedestrian option is taken forward. New benches provided to enhance enjoyment of the area.	More attractive green space Removes desire line across grassed areas Provides link between controlled crossings encouraging their use.

13.1 As indicated in this report and summarised in Table 13.1 above, there are multiple options that will enhance the locality in terms of all highway users. Certain options can be carried out together to maximise benefits. If funding was limited they could also be introduced in phases.

13.2 It is recommended that the proposals presented within this report are considered by the client and preferred options chosen. These should then be developed in more detailed and consultations held with all relevant parties, including TfL, emergency services, Barnet Council staff and any community councils.

13.3 As most "options" are "stand alone", it is considered that packages of measures should be combined in order to achieve optimum benefits. These can then be introduced all at one time or in phases, as and when funding became available.

13.4 It is to be noted that some options may overlap, thus if combined as part of packages some costs savings may be anticipated.

Table 13.2 – Potential Packages

Package A	**Package B**	**Package C**
Mini roundabout	Traffic signals	Pedestrian improvements
One way system	One way system	Bus stop improvements
Bus stop improvements	Bus stop improvements	Landscaping
Landscaping	Landscaping	Junction plateau
Total cost:- £231k	Total cost:- £336k	Total cost:- £182k

13.5 In response to para 1.3 of this report (issues originally raised by the client). The general concerns are repeated below with a basic response in italics:

a. Kerb up-stand improvements to the bus stops on Wood Street – *refer to section 10 and drawing G/0/15.*
b) Improvements (possible raised table) at Queens Road / Wood St junction. – *refer to section 7 and drawing G/0/10.*
c) Carriageway widening on Wellhouse Lane to increase capacity and accommodate a refuge. – *refer to para's 4.2, 4.6 and 4.7, drawing 60689 Feasi*.
d) Kerb re-alignment and radius tightening to left turning movements out of Wood Street (into Wellhouse Lane). – *refer to para's 4.2, 4.6 and 4.7, drawing 60689 Feasi*.
e) Review the necessity of the existing pedestrian refuge on Wood Street at its junction with Wellhouse Lane. – *refer to para's 2.6 to 2.11*.
f) New footway construction and re-routing through the green area. – *refer to section 9 and drawing G/0/15, and section 11 and drawing G/0/18*.
g) Shrub-bed and landscape enhancements within the green. – *refer to section 11 and drawing G/0/18*.
h) New controlled (possibly zebra) crossing on Wellhouse Lane, including limited section of guardrail. – *all improvements include provision of a zebra crossing on Wellhouse Lane (except traffic signal option), the need for provision of guardrail will be determined at detailed design stage*.

14. Conclusions

14.1 It is accepted that the Wellhouse Lane / Wood Street junction is over capacity, with some safety concerns. It is suggested that either option 10 (mini roundabout) or option 4 (traffic signals) be introduced. Both would improve safety, traffic flows and public transport reliability.

14.2 Independent of which of the two key junction options raised above are taken forward, and to maximise benefits for all highway users, it is suggested that they also be combined with options 8 (one way), 12 (bus stop enhancements) and some form of landscaping option.

14.3 If no highway works are carried out within the near future it is strongly recommended that the condition of the existing surfacing and carriageway markings are looked at and any remedial measures carried out as maintenance. This is particularly important from a safety perspective (refer to para 3.1 (c) above).

Appendix A Technical Report Picady and Arcady, Mini Roundabout Junction Capacity Assessments

Technical Note

A411 Wood Street/Wellhouse Lane/Queens Road, Barnet

PICADY and ARCADY (Mini-Roundabout) Junction Capacity Assessments

1. Introduction

1.1 Capita was commissioned by Barnet London Borough to undertake a feasibility of the design of an amended staggered priority junction at A411 Wood Street and Wellhouse Lane, as shown in drawing number 60689 and contained in **Appendix 1** of this Technical Note. The proposal includes a new zebra crossing on Wellhouse Lane, on the pedestrian desire line from Queens Road to Barnet Hospital. Also, the proposal includes the addition of a flare on Wellhouse Lane on the approach to Wood Street. The commission included a capacity assessment using the TRL PICADY software.

1.2 As a result of modelling the staggered junction and the indicative PICADY capacity assessment results indicate that the junction would be operating significantly above capacity. Subsequently, an option for a mini-roundabout at the existing priority junction at the A411 Wood Street/Wellhouse Lane of has been developed by Capita and has also been assessed using ARCADY.

2. Traffic Surveys and Observations

2.1 Manual traffic turning counts, queue length surveys and pedestrian counts were undertaken on Tuesday 28th January 2014 from 07:00 to 19:00. The results are contained in the following Appendices:

- **Appendix 2**. Manual traffic turning counts
- **Appendix 3**. Queue length surveys
- **Appendix 4**. Pedestrian counts including pedestrians per minute calculations

2.2 The following observations were proved by the survey team that are relevant to the design proposals and this assessment:

a) Buses emerging from Wellhouse Lane and turning right infringed onto the opposite footpath on Wood Street, this was due in part to the position of the central island.
b) Cars emerging from Wellhouse Lane turning right would sometimes wait in the middle of Wood Street for the traffic to let them into the stream of traffic. It is noted that this both obstructs westbound traffic and prevents vehicles pulling in to the existing right turn lane to Wellhouse Lane.
c) A child was struck at the zebra crossing, the day before the survey, on Monday 27th January 2014 due to a motorist failing to stop.
d) There was conflict between pedestrians using the zebra and vehicles emerging from Queens Road, especially at the start and end of the school day.
e) Queues did not take long to clear, the main problem was at the end of the school day on leg 1 (Queens Road) and during the PM peak on leg 3 (Wellhouse Lane).
f) Desire lines for pedestrians were to the west of Queens Road and through the 'green' area.

2.3 With regard to Point C, a collision analysis, that may indicate existing safety issues, was not included as part of this commission. With regard to Point B, the abuse of the give-way line at Wellhouse Lane indicates abnormal driver behaviour that PICADY would be incapable of modelling.

3 Traffic Generation

3.1 Information was provided in the form of a Supplementary Note provided as written by Waterman Boreham dated 29th August 2012 (see **Appendix 5**) with regards to a new 200 space car park to be provided as part of the extension to Barnet Hospital. Examination of the information provided has determined that the additional car parking is required particularly for the off-peak network period of approximately 10:00 to 16:00 and that during this period of the additional 200 parking spaces, 85 will be free. Subsequently there is no evidence that the addition 200 car park spaces would attract any additional new demand during the network peak hours that should be included in the junction capacity assessment.

4. PICADY Assessment

4.1 TRL Ltd. PICADY (priority junctions) is the industry standard software package for modelling traffic flows at priority junctions. The PICADY results provide the Ratio to Flow Capacity (RFC), which indicates how a junction is operating. An RFC no more than 0.85 is conventionally taken to indicate that there is sufficient spare capacity, an RFC above 0.85 indicates that capacity problems may occur and an RFC approaching or above 1.0 indicates that capacity is likely to be exceeded and remedial action is likely to be required. The queues that occur are indicative of any capacity problems.

4.2 The junction to be assessed is a staggered priority junction with distances of 28.5m between junction edges and 40m between junction centres. There as a presently a zebra crossing between the two minor roads to the east of, and immediately adjacent to, Queens Road.

4.3 The junction was input into PICADY as a priority 4-arm priority junction including the base traffic survey turning data with the existing zebra crossing on Wood Street and both the proposed zebra crossing and the addition of the flare on Wellhouse lane. The pedestrian counts were converted to pedestrian per minute, for 15-minute interval, over the modelling period. As described in paragraph 2.3 there is abnormal driver behaviour of vehicle exiting Wellhouse Lane beyond the modelling capabilities that would potentially reduce the actual numbers of vehicles queuing on Wellhouse Lane.

4.4 The PICADY run failed and, after consolation with TRL, the failure was as a result of the existing pedestrian crossing on Wood Street being outside of the models range of data and calculations i.e. the location of the zebra is significantly below standard and cannot be modelled as included within the existing staggered junction arrangement.

4.5 Examination of the traffic data showed that there was very little interaction of traffic movements between the two minor arms with only 1 vehicle travelling between each minor arm in both the AM and PM peak hours. The total number of vehicles passing through the junction is 1662 during the AM peak hour and 1713 in the PM peak hour. Similarly, over the 12-hour survey period of the total

number of vehicles passing through the junction was 17,232 vehicles and of these 57 (0.33%) travelled between the two minor arms.

4.6 Further discussion with TRL concluded that modelling the eastern side of the junction as a simple priority junction and including the two crossings was the next available option.

4.7 Once again the PICADY run failed due to the models inability to include the existing crossing due to its proximity to the minor arm and when modelling the right tuning traffic from Wood Street into Wellhouse Lane as blocking the traffic proceeding straight on (eastwards).

4.8 Further discussion with TRL concluded that in order to arrive at indicative estimate of capacity, as a result of the PICADY assessment, the parameter for "right turning traffic blocks back" should not be used in this instance.

4.9 Subsequently, the results of the AM and PM peak hour PICADY results with the proposed zebra crossing on Wellhouse Road and increased flare for the base year 2014 are summarised in **Table 4.9** and the results are contained in **Appendix 6.** It should be noted that PICADY cannot model exit blocking that is likely to occur during peak periods.

Table 4.9. PICADY Junction Assessment, Base Year 2014 with Increased Flare and Proposed Zebra Crossing

Movement	Description	AM Peak Hour		PM Peak Hour	
		RFC	Qs	RFC	Qs
B-C	Wellhouse Lane to Wood Road west	*	34.4	*	74.3
B-A	Wellhouse Lane to Wood Road east	**	150.0	**	318.0
C-A	Wood Road west to Wood Road east	0.415	0.6	0.446	0.8
C-B	Wood Road west to Wellhouse Lane	0.451	0.8	0.45	0.8

* *"Warning" entry capacities in certain time segments are dominated by the pedestrian crossing*

** *"Warning" the entry capacity of at least one stream has become zero during the period modelled*

4.10 The above warnings are explained in the PICADY manual as shown below:

"Warning" entry capacities in certain time segments are dominated by the pedestrian crossing

Where pedestrian crossings are modelled, this warning message is given if the junction entry capacity on any arm is greater than the capacity off the crossing on that arm. This is usually the results of high pedestrian flows. In such circumstances the crossing totally dominates the junction entry. This probably indicates unsatisfactory operation of the junction, and measures such as segregation of pedestrians from traffic may be appropriate.

"Warning" the entry capacity of at least one stream has become zero during the period modelled

This warning message is printed if the entry capacity of any traffic stream becomes zero during the modelled period. By implication the user has a junction that is probably unworkable: the value for delay may have exceeded the output format.

4.11 The results show queues of 392.3 on Wellhouse lane in the PM peak hour. It should be noted that the maximum queues modelled exceed the actual number of vehicles turning left from Wellhouse Lane for the 1 hour surveyed as the model builds a profile based on 90 minutes, with 15 minutes each side of the peak hour calculated within the model.

4.12 **Table 4.12** summarises the results of the queue length survey.

Table 4.12. Queue Length Survey Summary

Description	AM Peak Hour 07:15-08:15			PM Peak Hour 17:00-18:00		
	Qs caused by right turns	Qs caused by pedestrians on zebra crossing	**Total Ave Q.**	Qs caused by right turns	Qs caused by pedestrians on zebra crossing	**Total Ave Q.**
Arm 1 Queens Road	-	-	**1.42**	-	-	**22:09**
Arm 2 A411 Wood Street east	1.68	0.68	**2.36**	7	0	**7.00**
Arm 3 Wellhouse Lane	-	-	**3.02**	-	-	**11.93**
Arm 4 A411 Wood Street west	0.83	5.17	**6.00**	2.50	3.17	**5.67**

4.13 It is clear that the actual queues that presently occur and the impact, including the proposals, cannot be reflected accurately in the model. **Table 4.9** indicates that there are presently queues of a degree that would indicate that the junction has capacity problems that would by exacerbated by any further constraint on vehicle flow.

4.14 As a check on the potential improvement in capacity of the proposals the increased flare on Wellhouse Lane was excluded and the model was re-run. The results were exactly the same as model with the fare included demonstrating that, with the limitations as described in the PICADY assessment; there is no measurable capacity benefit by providing the flare. This is understandable as there are negligible left turns out of Wellhouse Lane i.e. 25 vehicles AM, 53 vehicles PM and 639 during a 12-hour period.

5. Mini-roundabout Assessment (ARCADY)

5.1 As a result of modelling the staggered junction and the indicative PICADY capacity assessment results indicate that the junction would be operating significantly above capacity. Subsequently, an option for a mini-roundabout at the existing priority junction at the A411 Wood Street/Wellhouse Lane of has been developed by Capita and has also been assessed using ARCADY.

5.2 The mini-roundabout design proposed (see **Appendix 7**) maximises capacity whilst minimising encroachment into the green open space to the south west of the junction as it is understood that Barnet London Borough wish to retain as much of this area as is possible whilst improving the operation of the junction. The ARCADY assessments of the junction are based on the proposed geometry of the junction as shown in **Appendix 7.** The ARCADY output for the AM and PM peak hours is contained in **Appendix 8** and the results are summarised in **Table 5.2**.

Table 5.2. A411 Wood Street/Wellhouse Lane ARCADY Mini-roundabout Assessment Summary

Arm	AM Peak Hour			PM Peak Hour		
	RFC	Queues (Vehs.)	Ave. Delay (Mins per Veh.)	RFC	Queues (Vehs.)	Ave. Delay (Mins per Veh.)
A - A411 Wood Street (east)	0.980	16.9	1.184	0.738	2.7	0.246
B - Wellhouse Lane	0.352	0.5	0.221	0.676	2.0	0.395
C - A411 Wood Street (west)	0.857	5.4	0.481	1.030	26.6	1.932

5.3 As with the PICADY analysis it should be noted that ARCADY cannot model exit blocking that is likely to occur during peak periods.

5.4 The results show that the junction is operating above capacity on the A411 Wood Street eastern arm in the AM peak hour with a RFC of 0.980, queues of 16.9 and average delays of 1.184 minutes per vehicle and on the A411 Wood Street western arm in the PM peak hour with average a RFC of 1.030, queues of 26.6 and average delays of 1.932 minutes per vehicle.

5.5 Sensitivity tests undertaken in arriving at the proposed design identified that the junction was sensitive to minor changes up to the geometry increases to arrive at the results in **Table 5.2**. Further tests showed that there would have to be more significant increases to the entry width and flare length on both the eastern and western arms of the A4111 Wood Street to gain any further capacity.

5.6 The results summarised in **Table 5.2** for the ARCADY assessment are not directly comparable to the PICADY results summarised in **Table 4.9.** This is due to the problems experienced in modelling the junction as a priority junction with crossings on two arms and the subsequent reliability of the capacity assessment as explained in this Technical Note. Nevertheless, based on the indicative results overall, it is apparent that a mini-roundabout option is likely to provide improved capacity in relation to the existing or modified priority junction whilst retaining the existing zebra crossings on the A411 Wood Street and with the addition of a new zebra crossing on Wellhouse Lane.

6. Conclusions

6.1 This Technical Note describes the limitations of modelling the junction proposals using PICADY within the details the modelling constraints and reported the indicative results. There is anecdotal information that there is abnormal driver behaviour as right turning vehicles enter Wood Street to force a gap in traffic, which is beyond modelling capabilities.

6.2 With advice from TRL a model has been produced of the 3-arm priority A411 Wood Street/Wellhouse Lane 3-arm priority junction by excluding the A411 Wood Road/Queens Road interaction with the junction overall. The indicative results show that the junction, which is likely to be presently at capacity in peak periods, is likely to be adversely affected by the proposals. The inclusion of a flare on Wellhouse Lane does not increase capacity in the peak hours due to the small number of left turns being dominated by the right turns.

6.3 Due to indicative capacity results of the PICADY analysis of the existing and improved A411 Wood Street/Wellhouse Lane priority junction an option for a mini-roundabout has been developed by Capita. Based on the indicative results overall, it is apparent that a mini-roundabout option is likely to provide improved capacity, in relation to the existing or modified priority junction, whilst retaining the existing zebra on Wood Street, providing a new zebra crossing on Wellhouse Lane and minimising encroachment onto the green open space to the southwest of the junction.

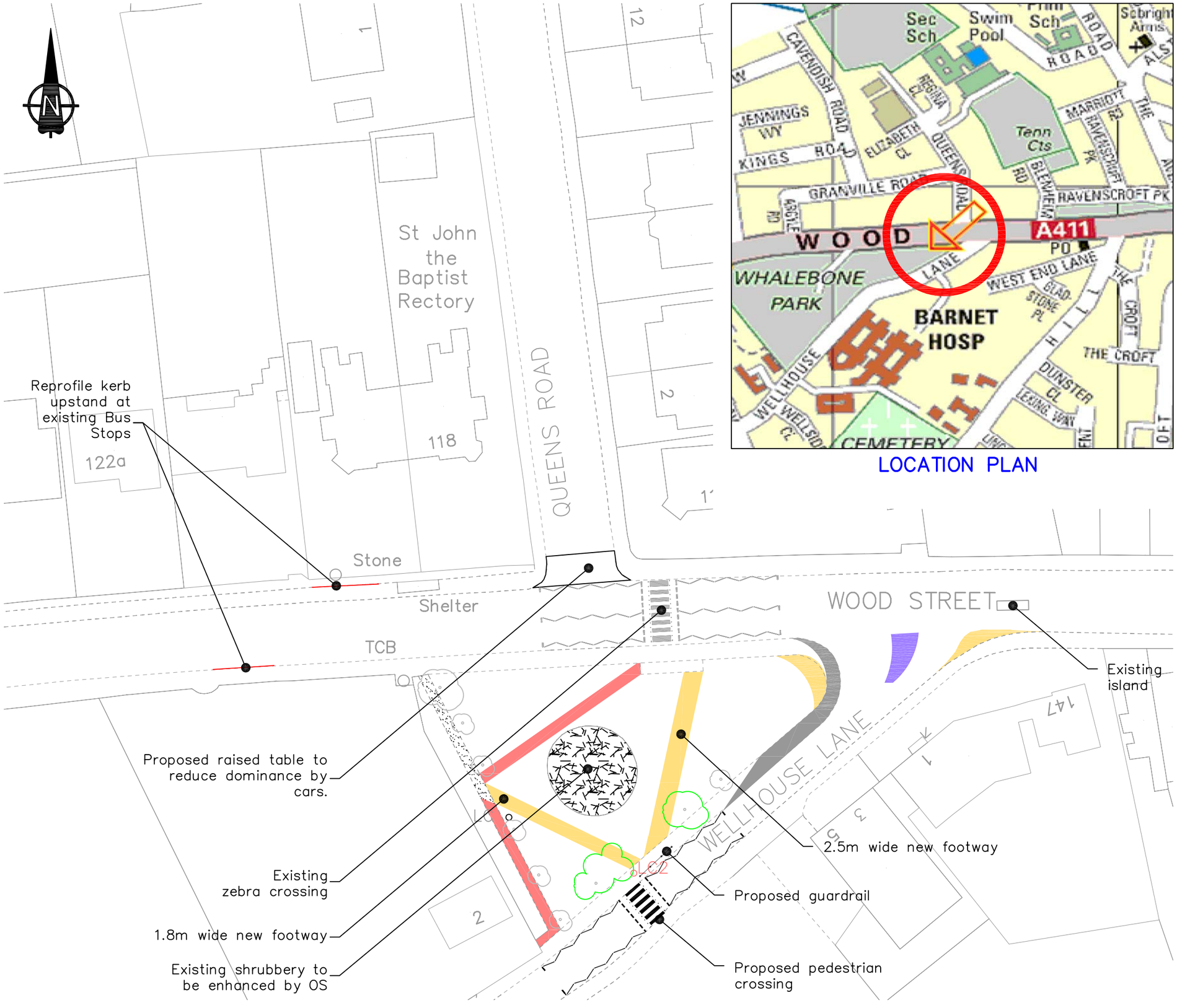
6.4 The advice has been sought from a Capita traffic signals engineer on the likely outcome of providing a pelican crossing as an alternative to a zebra crossing and the view is that this is likely to have the same detrimental impact on capacity as described in this Technical Note.

6.5 There is anecdotal information of safety issues at the junction and collision analysis has not been included that may identify existing safety problems. A child was struck at the zebra crossing, the day before the traffic survey, on Monday 27th January 2014.

6.6 Buses emerging from Wellhouse Lane and turning right were observed as infringing onto the opposite footpath on Wood Street, this was due in part to the position of the central island. This may suggest that the existing Island is position within the turning radii of large vehicles. Tracking of this movement has been undertaken and is included in the mini-roundabout design.

Appendix 1

Proposed Staggered Priority Junction Design



LOCATION PLAN

NOTES:

1. Not to scale. This drawing should not be scaled.

KEY

- Trim lower tree branches
- LC2 ○ Lighting column to relocate
- Convert to grassed verge
- Footway to be retained
- Proposed new carriageway
- Proposed new footway
- Proposed new island

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X	Xxx XX	Add notes	XX
Revision and Date		Description	Initial

Pam Wharfe
Director of Place

London Borough of Barnet,
Building 4
North London Business Park
Oakleigh Road South
London N11 1NP
Tel. (020) 8359 2000

BARNET
LONDON BOROUGH
Design Team

SCHEME:

Wellhouse Lane / A411 Wood Street

TITLE:

Junction & Pedestrian Safety Improvements Feasibility

Scales:	Date:
AS SHOWN	xx/04/13

Initiated:	Drawn:	Checked
LW	TN	-

DRAWING NO: 60689 Feasi

Acad Ref. -

Appendix 2

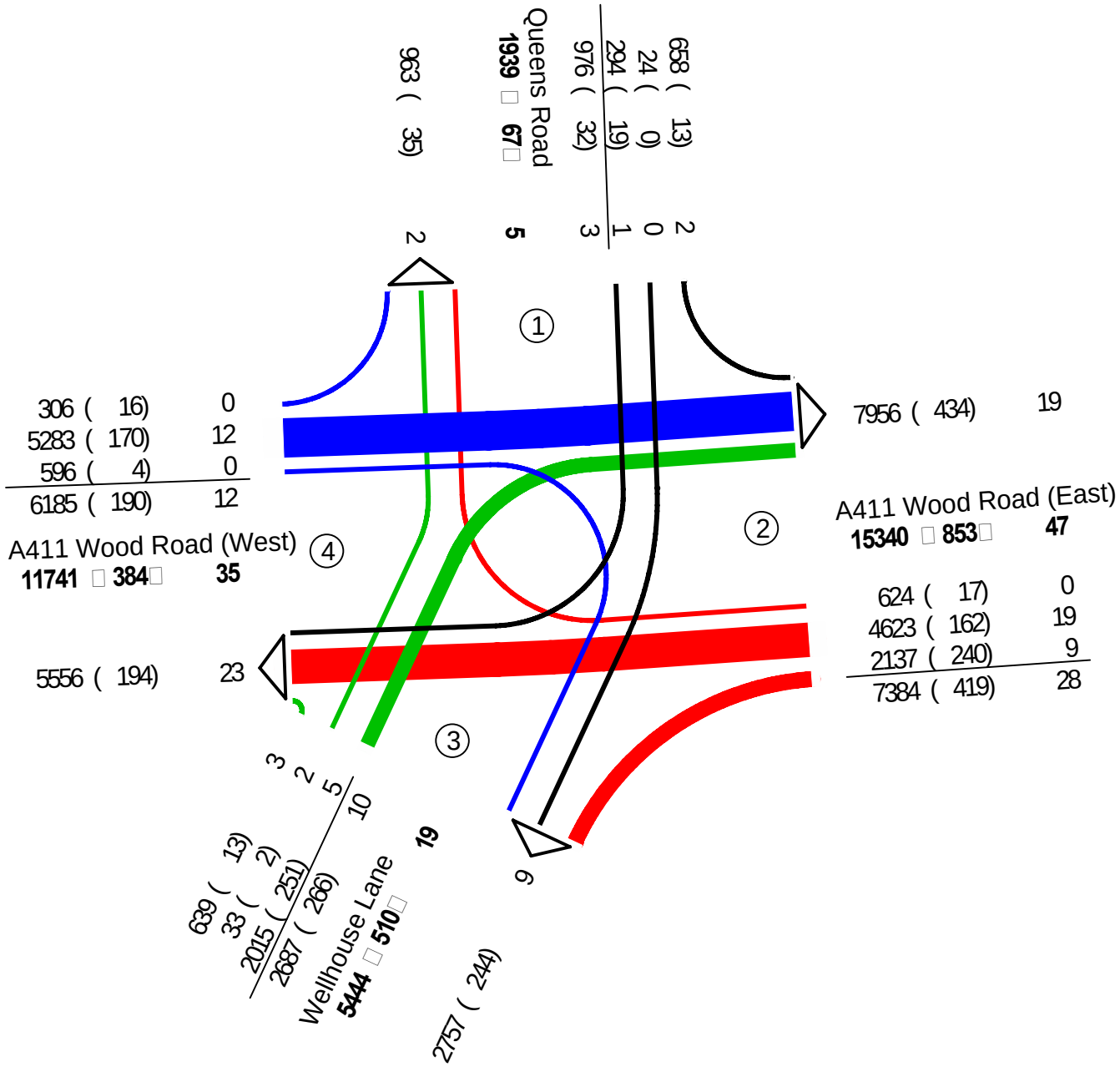
Manual Traffic Turning Counts


Plan of Junction Count
Queens Road
1
A411 Wood Street to A1000
2
4
3
A411 Wood Street to A1
Wellhouse Lane
Image © 2014 Bluesky
Barnet Hospital
12 Hour junction count at A411, Wood Street/ Wellhouse Lane. Tuesday 28/01/2004

A411 Wood Road
site : bar
place : Barnet
date : Tuesday, 28/01/2014
block : 07:00 - 19:00 hrs

1 Queens Road
2 A411 Wood Road (East)
3 Wellhouse Lane
4 A411 Wood Road (West)

Job No. GC1825



□□□□□V□□□□

Tot=Car + LGV + HGV + Bus + MCL

HGV=HGV + Bus

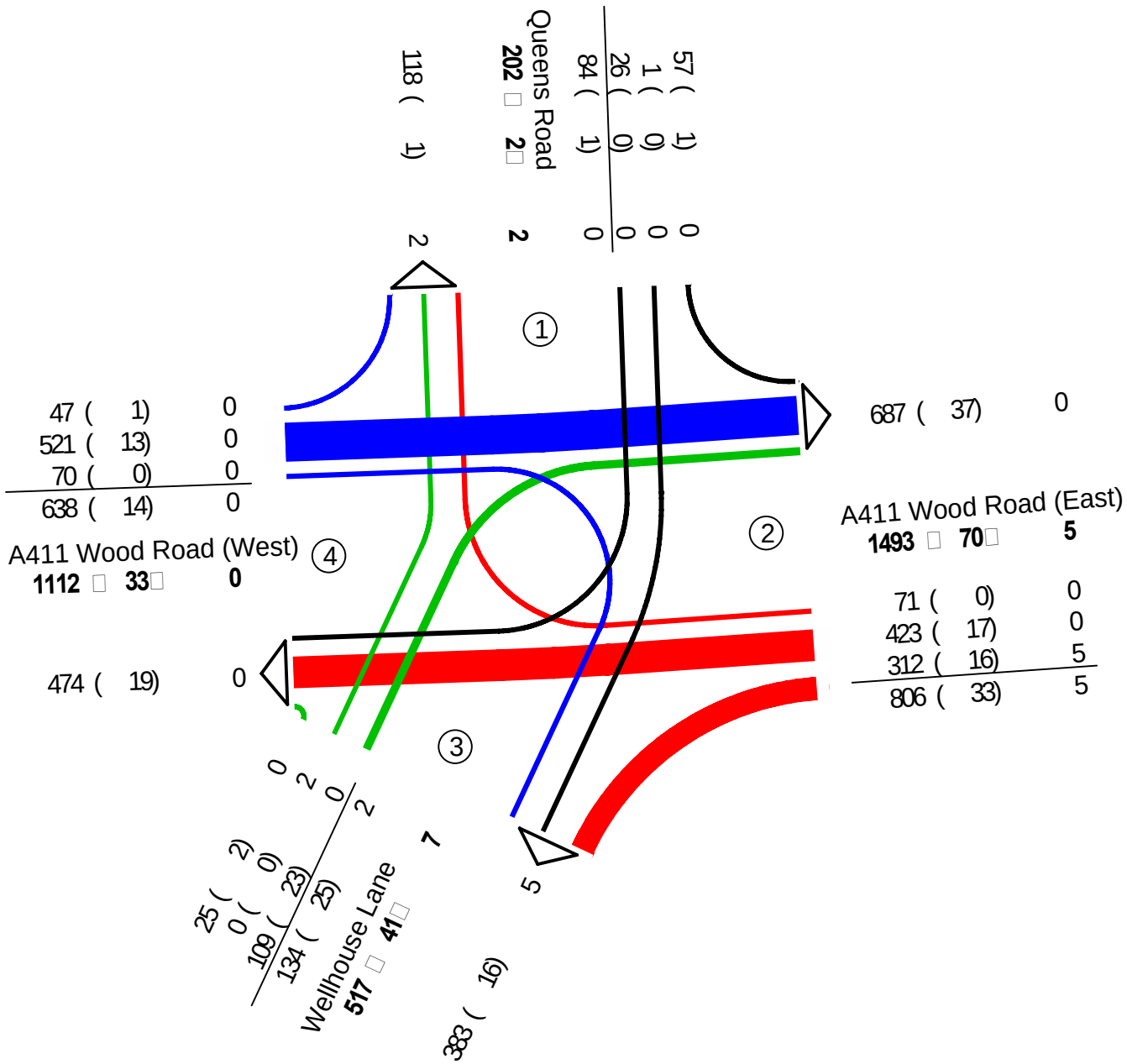
CYC=Cyc

0 4000 8000 □□□

A411 Wood Road
site : bar
place : Barnet
date : Tuesday, 28/01/2014
block : 07:00 - 12:00 hrs
peak-hour : 07:15 - 08:15 hrs

1 Queens Road
2 A411 Wood Road (East)
3 Wellhouse Lane
4 A411 Wood Road (West)

Job No. GC1825



V

Tot=Car + LGV + HGV + Bus + MCL

HGV=HGV + Bus

CYC=Cyc

0 400 800

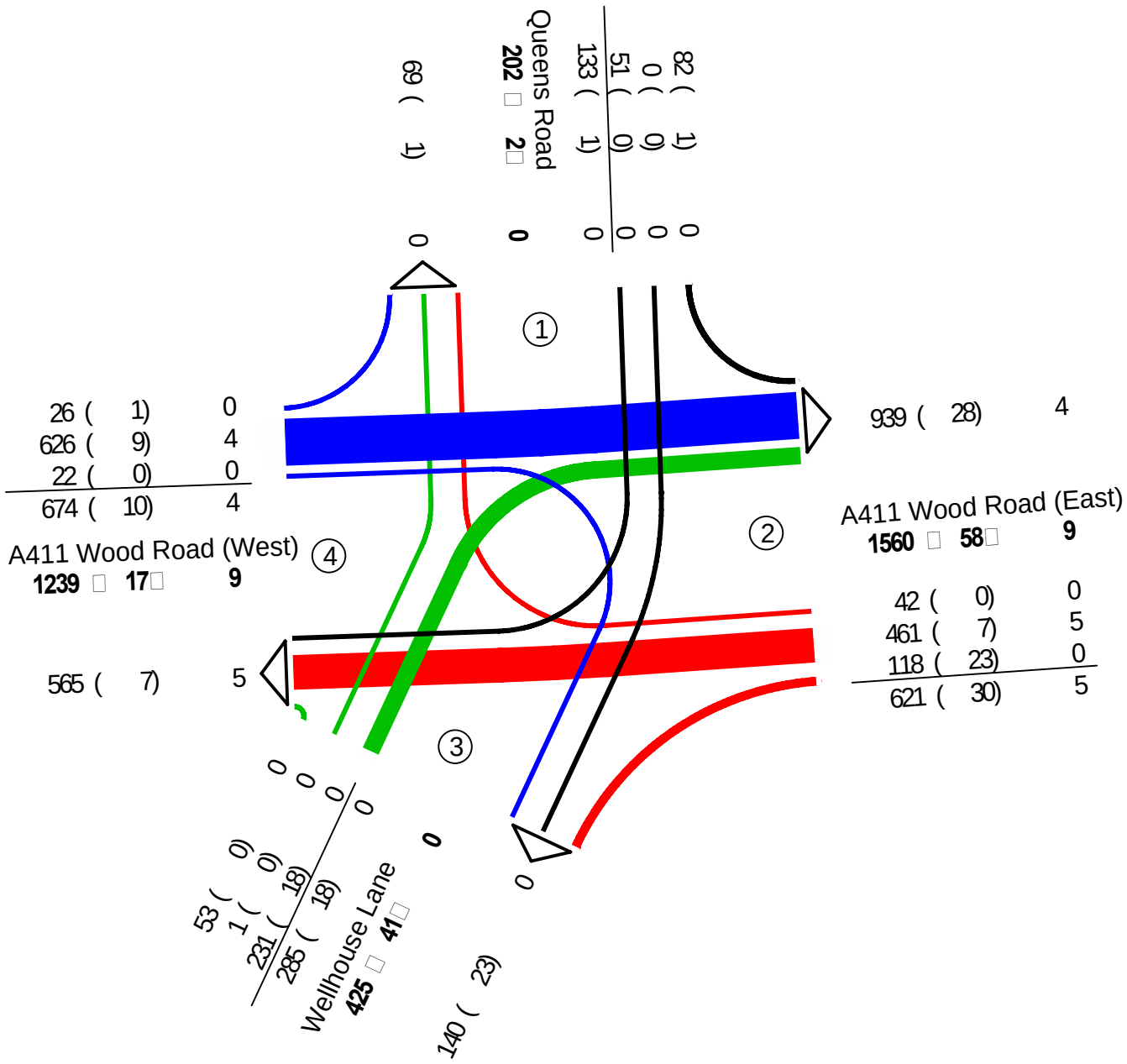
Schuh & Co. GmbH
Goethestrasse 17, D-82110 Germering

Glamorgan Engineering Consultancy
Taff's Well, Cardiff CF15 7GE

A411 Wood Road
site : bar
place : Barnet
date : Tuesday, 28/01/2014
block : 12:00 - 19:00 hrs
peak-hour : 17:00 - 18:00 hrs

1 Queens Road
2 A411 Wood Road (East)
3 Wellhouse Lane
4 A411 Wood Road (West)

Job No. GC1825



□□□□□**V**□□□□

Tot=Car + LGV + HGV + Bus + MCL

HGV=HGV + Bus

CYC=Cyc

0 400 800 □□□

A411 Wood Street/Queens Road/Wellhouse Lane, Barnet

12 Queens Road -> A411 Wood Road (East) | Tuesday 28/01/2014

	Car	LGV	HGV	Bus	Motorcycle	Cyclist	Total
7:00- 7:15	8	1	0	0	0	1	9
7:15- 7:30	16	1	1	0	1	0	19
7:30- 7:45	8	2	0	0	0	0	10
7:45- 8:00	11	0	0	0	0	0	11
7:00- 8:00 hour	**43**	**4**	**1**	**0**	**1**	**1**	**49**
8:00- 8:15	17	0	0	0	0	0	17
8:15- 8:30	18	3	0	1	0	1	22
8:30- 8:45	28	1	0	0	0	0	29
8:45- 9:00	6	0	1	0	0	0	7
8:00- 9:00 hour	**69**	**4**	**1**	**1**	**0**	**1**	**75**
9:00- 9:15	10	1	1	0	0	0	12
9:15- 9:30	8	2	1	0	0	0	11
9:30- 9:45	8	0	0	0	0	0	8
9:45-10:00	8	0	0	0	0	0	8
9:00-10:00 hour	**34**	**3**	**2**	**0**	**0**	**0**	**39**
10:00-10:15	4	3	0	0	0	0	7
10:15-10:30	5	2	0	0	0	0	7
10:30-10:45	7	2	1	0	0	0	10
10:45-11:00	7	3	1	0	0	0	11
10:00-11:00 hour	**23**	**10**	**2**	**0**	**0**	**0**	**35**
11:00-11:15	7	1	0	0	0	0	8
11:15-11:30	6	2	2	0	0	0	10
11:30-11:45	7	2	1	0	0	0	10
11:45-12:00	15	0	0	0	0	0	15
11:00-12:00 hour	**35**	**5**	**3**	**0**	**0**	**0**	**43**
12:00-12:15	8	1	0	0	0	0	9
12:15-12:30	6	3	0	0	0	0	9
12:30-12:45	8	6	0	0	0	0	14
12:45-13:00	12	2	0	0	0	0	14
12:00-13:00 hour	**34**	**12**	**0**	**0**	**0**	**0**	**46**
13:00-13:15	6	1	0	0	0	0	7
13:15-13:30	13	0	0	0	0	0	13
13:30-13:45	6	0	0	0	0	0	6
13:45-14:00	4	1	0	0	0	0	5
13:00-14:00 hour	**29**	**2**	**0**	**0**	**0**	**0**	**31**
14:00-14:15	10	1	0	0	0	0	11
14:15-14:30	8	2	0	0	0	0	10
14:30-14:45	9	0	0	0	0	0	9
14:45-15:00	7	0	1	0	0	0	8
14:00-15:00 hour	**34**	**3**	**1**	**0**	**0**	**0**	**38**
15:00-15:15	15	3	0	0	0	0	18
15:15-15:30	8	2	0	0	0	0	10
15:30-15:45	16	0	0	0	0	0	16
15:45-16:00	30	2	0	0	0	0	32
15:00-16:00 hour	**69**	**7**	**0**	**0**	**0**	**0**	**76**
16:00-16:15	21	7	1	0	0	0	29
16:15-16:30	11	0	0	0	0	0	11
16:30-16:45	25	0	0	0	0	0	25
16:45-17:00	24	3	0	0	0	0	27
16:00-17:00 hour	**81**	**10**	**1**	**0**	**0**	**0**	**92**
17:00-17:15	32	2	0	0	0	0	34
17:15-17:30	22	1	0	1	0	0	24
17:30-17:45	19	1	0	0	0	0	20
17:45-18:00	4	0	0	0	0	0	4
17:00-18:00 hour	**77**	**4**	**0**	**1**	**0**	**0**	**82**
18:00-18:15	16	1	0	0	0	0	17
18:15-18:30	7	1	0	0	0	0	8
18:30-18:45	13	0	0	0	0	0	13
18:45-19:00	13	1	0	0	0	0	14
18:00-19:00 hour	**49**	**3**	**0**	**0**	**0**	**0**	**52**
total	**577**	**67**	**11**	**2**	**1**	**2**	**658**

A411 Wood Street/Queens Road/Wellhouse Lane, Barnet

13 Queens Road -> Wellhouse Lane | | | Tuesday 28/01/2014 |

	Car	LGV	HGV	Bus	Motorcycle	Cyclist	Total
7:00- 7:15	0	0	0	0	0	0	0
7:15- 7:30	1	0	0	0	0	0	1
7:30- 7:45	0	0	0	0	0	0	0
7:45- 8:00	0	0	0	0	0	0	0
7:00- 8:00 hour	**1**	**0**	**0**	**0**	**0**	**0**	**1**
8:00- 8:15	0	0	0	0	0	0	0
8:15- 8:30	1	0	0	0	0	0	1
8:30- 8:45	1	0	0	0	0	0	1
8:45- 9:00	1	0	0	0	0	0	1
8:00- 9:00 hour	**3**	**0**	**0**	**0**	**0**	**0**	**3**
9:00- 9:15	0	0	0	0	0	0	0
9:15- 9:30	1	1	0	0	0	0	2
9:30- 9:45	0	0	0	0	0	0	0
9:45-10:00	0	1	0	0	0	0	1
9:00-10:00 hour	**1**	**2**	**0**	**0**	**0**	**0**	**3**
10:00-10:15	0	0	0	0	0	0	0
10:15-10:30	1	0	0	0	0	0	1
10:30-10:45	0	0	0	0	0	0	0
10:45-11:00	0	0	0	0	0	0	0
10:00-11:00 hour	**1**	**0**	**0**	**0**	**0**	**0**	**1**
11:00-11:15	1	0	0	0	0	0	1
11:15-11:30	1	0	0	0	3	0	4
11:30-11:45	1	0	0	0	0	0	1
11:45-12:00	1	0	0	0	0	0	1
11:00-12:00 hour	**4**	**0**	**0**	**0**	**3**	**0**	**7**
12:00-12:15	0	0	0	0	0	0	0
12:15-12:30	0	0	0	0	0	0	0
12:30-12:45	0	0	0	0	0	0	0
12:45-13:00	0	0	0	0	0	0	0
12:00-13:00 hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**
13:00-13:15	0	0	0	0	0	0	0
13:15-13:30	0	0	0	0	0	0	0
13:30-13:45	0	0	0	0	0	0	0
13:45-14:00	0	0	0	0	0	0	0
13:00-14:00 hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**
14:00-14:15	2	0	0	0	0	0	2
14:15-14:30	1	1	0	0	0	0	2
14:30-14:45	3	0	0	0	0	0	3
14:45-15:00	2	0	0	0	0	0	2
14:00-15:00 hour	**8**	**1**	**0**	**0**	**0**	**0**	**9**
15:00-15:15	0	0	0	0	0	0	0
15:15-15:30	0	0	0	0	0	0	0
15:30-15:45	0	0	0	0	0	0	0
15:45-16:00	0	0	0	0	0	0	0
15:00-16:00 hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**
16:00-16:15	0	0	0	0	0	0	0
16:15-16:30	0	0	0	0	0	0	0
16:30-16:45	0	0	0	0	0	0	0
16:45-17:00	0	0	0	0	0	0	0
16:00-17:00 hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**
17:00-17:15	0	0	0	0	0	0	0
17:15-17:30	0	0	0	0	0	0	0
17:30-17:45	0	0	0	0	0	0	0
17:45-18:00	0	0	0	0	0	0	0
17:00-18:00 hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**
18:00-18:15	0	0	0	0	0	0	0
18:15-18:30	0	0	0	0	0	0	0
18:30-18:45	0	0	0	0	0	0	0
18:45-19:00	0	0	0	0	0	0	0
18:00-19:00 hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**
total	**18**	**3**	**0**	**0**	**3**	**0**	**24**

A411 Wood Street/Queens Road/Wellhouse Lane, Barnet

14 Queens Road -> A411 Wood Road (West) | Tuesday 28/01/2014

	Car	LGV	HGV	Bus	Motorcycle	Cyclist	Total
7:00- 7:15	4	1	0	0	0	0	5
7:15- 7:30	7	1	0	0	0	0	8
7:30- 7:45	9	0	0	0	0	0	9
7:45- 8:00	4	0	0	0	0	0	4
7:00- 8:00 hour	**24**	**2**	**0**	**0**	**0**	**0**	**26**
8:00- 8:15	5	0	0	0	0	0	5
8:15- 8:30	8	1	0	3	0	0	12
8:30- 8:45	9	0	0	2	0	0	11
8:45- 9:00	4	0	0	2	0	0	6
8:00- 9:00 hour	**26**	**1**	**0**	**7**	**0**	**0**	**34**
9:00- 9:15	5	0	0	1	0	0	6
9:15- 9:30	1	0	0	0	0	0	1
9:30- 9:45	4	0	0	0	0	0	4
9:45-10:00	4	2	0	0	0	0	6
9:00-10:00 hour	**14**	**2**	**0**	**1**	**0**	**0**	**17**
10:00-10:15	3	1	0	0	0	0	4
10:15-10:30	0	0	0	0	0	0	0
10:30-10:45	3	2	0	0	0	0	5
10:45-11:00	1	0	0	0	0	0	1
10:00-11:00 hour	**7**	**3**	**0**	**0**	**0**	**0**	**10**
11:00-11:15	0	1	0	0	0	0	1
11:15-11:30	1	1	0	0	0	0	2
11:30-11:45	2	2	0	0	0	0	4
11:45-12:00	3	0	1	0	0	0	4
11:00-12:00 hour	**6**	**4**	**1**	**0**	**0**	**0**	**11**
12:00-12:15	0	1	0	0	0	0	1
12:15-12:30	3	0	0	0	0	0	3
12:30-12:45	3	2	0	0	0	0	5
12:45-13:00	6	0	0	0	0	0	6
12:00-13:00 hour	**12**	**3**	**0**	**0**	**0**	**0**	**15**
13:00-13:15	0	0	0	0	0	0	0
13:15-13:30	6	2	0	0	0	0	8
13:30-13:45	1	1	0	0	0	0	2
13:45-14:00	0	0	0	0	0	0	0
13:00-14:00 hour	**7**	**3**	**0**	**0**	**0**	**0**	**10**
14:00-14:15	2	0	0	0	0	0	2
14:15-14:30	5	2	0	0	0	0	7
14:30-14:45	4	0	1	0	0	0	5
14:45-15:00	6	0	0	0	0	0	6
14:00-15:00 hour	**17**	**2**	**1**	**0**	**0**	**0**	**20**
15:00-15:15	2	0	0	0	0	0	2
15:15-15:30	0	0	0	0	0	0	0
15:30-15:45	7	1	0	1	0	1	9
15:45-16:00	10	2	0	8	0	0	20
15:00-16:00 hour	**19**	**3**	**0**	**9**	**0**	**1**	**31**
16:00-16:15	5	2	0	0	0	0	7
16:15-16:30	9	1	0	0	0	0	10
16:30-16:45	29	0	0	0	0	0	29
16:45-17:00	9	1	0	0	0	0	10
16:00-17:00 hour	**52**	**4**	**0**	**0**	**0**	**0**	**56**
17:00-17:15	29	1	0	0	0	0	30
17:15-17:30	8	0	0	0	0	0	8
17:30-17:45	10	1	0	0	0	0	11
17:45-18:00	2	0	0	0	0	0	2
17:00-18:00 hour	**49**	**2**	**0**	**0**	**0**	**0**	**51**
18:00-18:15	7	0	0	0	0	0	7
18:15-18:30	2	1	0	0	0	0	3
18:30-18:45	3	0	0	0	0	0	3
18:45-19:00	0	0	0	0	0	0	0
18:00-19:00 hour	**12**	**1**	**0**	**0**	**0**	**0**	**13**
total	**245**	**30**	**2**	**17**	**0**	**1**	**294**

A411 Wood Street/Queens Road/Wellhouse Lane, Barnet

21 A411 Wood Road (East) -> Queens Road | Tuesday 28/01/2014

	Car	LGV	HGV	Bus	Motorcycle	Cyclist	Total
7:00- 7:15	3	2	1	0	0	0	6
7:15- 7:30	18	0	0	0	0	0	18
7:30- 7:45	11	1	0	0	1	0	13
7:45- 8:00	16	0	0	0	0	0	16
7:00- 8:00 hour	**48**	**3**	**1**	**0**	**1**	**0**	**53**
8:00- 8:15	24	0	0	0	0	0	24
8:15- 8:30	29	2	0	1	0	0	32
8:30- 8:45	37	0	0	0	1	0	38
8:45- 9:00	9	0	0	0	0	0	9
8:00- 9:00 hour	**99**	**2**	**0**	**1**	**1**	**0**	**103**
9:00- 9:15	14	2	0	0	0	0	16
9:15- 9:30	9	3	0	0	0	0	12
9:30- 9:45	8	0	0	0	0	0	8
9:45-10:00	13	3	0	0	0	0	16
9:00-10:00 hour	**44**	**8**	**0**	**0**	**0**	**0**	**52**
10:00-10:15	19	2	1	3	0	0	25
10:15-10:30	11	0	0	1	0	0	12
10:30-10:45	1	1	0	0	0	0	2
10:45-11:00	6	1	0	0	0	0	7
10:00-11:00 hour	**37**	**4**	**1**	**4**	**0**	**0**	**46**
11:00-11:15	2	1	0	0	0	0	3
11:15-11:30	4	1	0	0	0	0	5
11:30-11:45	4	5	0	0	0	0	9
11:45-12:00	4	1	1	0	0	0	6
11:00-12:00 hour	**14**	**8**	**1**	**0**	**0**	**0**	**23**
12:00-12:15	3	6	0	0	0	0	9
12:15-12:30	1	1	0	0	0	0	2
12:30-12:45	7	2	0	1	0	0	10
12:45-13:00	4	0	0	1	0	0	5
12:00-13:00 hour	**15**	**9**	**0**	**2**	**0**	**0**	**26**
13:00-13:15	13	0	0	0	0	0	13
13:15-13:30	9	0	0	0	0	0	9
13:30-13:45	10	2	0	0	0	0	12
13:45-14:00	8	1	0	0	0	0	9
13:00-14:00 hour	**40**	**3**	**0**	**0**	**0**	**0**	**43**
14:00-14:15	8	2	0	0	0	0	10
14:15-14:30	4	1	0	0	0	0	5
14:30-14:45	9	0	0	0	0	0	9
14:45-15:00	13	3	0	2	0	0	18
14:00-15:00 hour	**34**	**6**	**0**	**2**	**0**	**0**	**42**
15:00-15:15	9	0	0	0	0	0	9
15:15-15:30	13	1	0	1	0	0	15
15:30-15:45	15	0	0	0	0	0	15
15:45-16:00	23	2	0	0	0	0	25
15:00-16:00 hour	**60**	**3**	**0**	**1**	**0**	**0**	**64**
16:00-16:15	10	1	0	1	0	0	12
16:15-16:30	8	0	0	0	0	0	8
16:30-16:45	17	6	0	0	0	0	23
16:45-17:00	12	2	0	1	0	0	15
16:00-17:00 hour	**47**	**9**	**0**	**2**	**0**	**0**	**58**
17:00-17:15	9	0	0	0	0	0	9
17:15-17:30	8	0	0	0	0	0	8
17:30-17:45	8	2	0	0	0	0	10
17:45-18:00	15	0	0	0	0	0	15
17:00-18:00 hour	**40**	**2**	**0**	**0**	**0**	**0**	**42**
18:00-18:15	10	0	1	0	0	0	11
18:15-18:30	31	3	1	0	0	0	35
18:30-18:45	15	0	0	0	2	0	17
18:45-19:00	8	1	0	0	0	0	9
18:00-19:00 hour	**64**	**4**	**2**	**0**	**2**	**0**	**72**
total	**542**	**61**	**5**	**12**	**4**	**0**	**624**

A411 Wood Street/Queens Road/Wellhouse Lane, Barnet

23 A411 Wood Road (East) -> Wellhouse Lane | Tuesday 28/01/2014

	Car	LGV	HGV	Bus	Motorcycle	Cyclist	Total
7:00- 7:15	34	2	0	5	0	1	41
7:15- 7:30	83	2	1	5	0	1	91
7:30- 7:45	46	2	0	4	0	0	52
7:45- 8:00	87	4	0	2	1	2	94
7:00- 8:00 hour	**250**	**10**	**1**	**16**	**1**	**4**	**278**
8:00- 8:15	70	1	0	4	0	2	75
8:15- 8:30	49	2	1	3	1	0	56
8:30- 8:45	69	5	0	4	0	1	78
8:45- 9:00	90	5	0	4	1	0	100
8:00- 9:00 hour	**278**	**13**	**1**	**15**	**2**	**3**	**309**
9:00- 9:15	78	2	0	3	0	0	83
9:15- 9:30	48	2	1	4	1	0	56
9:30- 9:45	38	3	1	2	0	1	44
9:45-10:00	23	1	0	2	0	0	26
9:00-10:00 hour	**187**	**8**	**2**	**11**	**1**	**1**	**209**
10:00-10:15	25	0	0	1	0	0	26
10:15-10:30	29	5	1	4	0	0	39
10:30-10:45	28	7	1	4	1	0	41
10:45-11:00	40	8	3	5	0	0	56
10:00-11:00 hour	**122**	**20**	**5**	**14**	**1**	**0**	**162**
11:00-11:15	23	2	1	3	0	0	29
11:15-11:30	33	6	3	3	2	0	47
11:30-11:45	29	2	2	5	0	0	38
11:45-12:00	25	3	1	5	2	0	36
11:00-12:00 hour	**110**	**13**	**7**	**16**	**4**	**0**	**150**
12:00-12:15	32	6	0	8	1	0	47
12:15-12:30	35	2	0	4	0	0	41
12:30-12:45	37	4	0	3	0	0	44
12:45-13:00	22	4	0	4	0	0	30
12:00-13:00 hour	**126**	**16**	**0**	**19**	**1**	**0**	**162**
13:00-13:15	21	0	0	7	0	0	28
13:15-13:30	36	2	0	5	0	0	43
13:30-13:45	35	2	0	5	1	0	43
13:45-14:00	44	5	0	4	0	0	53
13:00-14:00 hour	**136**	**9**	**0**	**21**	**1**	**0**	**167**
14:00-14:15	44	4	1	5	0	1	54
14:15-14:30	42	3	0	5	0	0	50
14:30-14:45	39	5	0	6	0	0	50
14:45-15:00	35	2	1	5	0	0	43
14:00-15:00 hour	**160**	**14**	**2**	**21**	**0**	**1**	**197**
15:00-15:15	32	4	2	5	0	0	43
15:15-15:30	23	1	0	2	0	0	26
15:30-15:45	27	3	1	6	0	0	37
15:45-16:00	44	1	0	6	0	0	51
15:00-16:00 hour	**126**	**9**	**3**	**19**	**0**	**0**	**157**
16:00-16:15	32	1	2	3	0	0	38
16:15-16:30	18	1	2	4	0	0	25
16:30-16:45	18	1	2	4	0	0	25
16:45-17:00	12	1	1	3	1	0	18
16:00-17:00 hour	**80**	**4**	**7**	**14**	**1**	**0**	**106**
17:00-17:15	20	0	1	3	1	0	25
17:15-17:30	32	3	1	5	0	0	41
17:30-17:45	12	3	2	4	0	0	21
17:45-18:00	24	0	4	3	0	0	31
17:00-18:00 hour	**88**	**6**	**8**	**15**	**1**	**0**	**118**
18:00-18:15	27	2	0	5	0	0	34
18:15-18:30	22	2	3	6	0	0	33
18:30-18:45	23	0	0	4	0	0	27
18:45-19:00	20	3	1	4	0	0	28
18:00-19:00 hour	**92**	**7**	**4**	**19**	**0**	**0**	**122**
total	**1755**	**129**	**40**	**200**	**13**	**9**	**2137**

A411 Wood Street/Queens Road/Wellhouse Lane, Barnet

24 A411 Wood Road (East) -> A411 Wood Road (West) | Tuesday 28/01/2014

	Car	LGV	HGV	Bus	Motorcycle	Cyclist	Total
7:00- 7:15	83	18	0	1	0	2	102
7:15- 7:30	100	15	0	1	3	0	119
7:30- 7:45	101	9	0	4	1	0	115
7:45- 8:00	87	3	1	5	1	0	97
7:00- 8:00 hour	**371**	**45**	**1**	**11**	**5**	**2**	**433**
8:00- 8:15	83	3	2	4	0	0	92
8:15- 8:30	32	4	0	2	0	1	38
8:30- 8:45	84	12	0	6	1	0	103
8:45- 9:00	84	7	2	0	2	1	95
8:00- 9:00 hour	**283**	**26**	**4**	**12**	**3**	**2**	**328**
9:00- 9:15	93	15	0	3	1	1	112
9:15- 9:30	87	12	4	3	1	3	107
9:30- 9:45	75	14	0	1	0	0	90
9:45-10:00	64	13	0	1	0	0	78
9:00-10:00 hour	**319**	**54**	**4**	**8**	**2**	**4**	**387**
10:00-10:15	62	11	0	3	1	0	77
10:15-10:30	74	13	1	1	0	0	89
10:30-10:45	53	21	1	1	4	1	80
10:45-11:00	51	20	3	0	1	0	75
10:00-11:00 hour	**240**	**65**	**5**	**5**	**6**	**1**	**321**
11:00-11:15	57	17	2	3	3	0	82
11:15-11:30	72	21	2	1	0	1	96
11:30-11:45	77	11	4	2	0	0	94
11:45-12:00	86	17	3	1	1	0	108
11:00-12:00 hour	**292**	**66**	**11**	**7**	**4**	**1**	**380**
12:00-12:15	74	17	2	2	0	0	95
12:15-12:30	81	10	1	2	0	1	94
12:30-12:45	59	11	0	2	1	0	73
12:45-13:00	66	17	2	4	0	0	89
12:00-13:00 hour	**280**	**55**	**5**	**10**	**1**	**1**	**351**
13:00-13:15	86	14	2	2	0	0	104
13:15-13:30	72	15	1	2	0	0	90
13:30-13:45	65	12	0	3	0	0	80
13:45-14:00	70	11	0	1	0	0	82
13:00-14:00 hour	**293**	**52**	**3**	**8**	**0**	**0**	**356**
14:00-14:15	90	16	0	1	0	0	107
14:15-14:30	68	12	2	3	0	2	85
14:30-14:45	73	7	0	2	1	0	83
14:45-15:00	72	14	2	4	0	0	92
14:00-15:00 hour	**303**	**49**	**4**	**10**	**1**	**2**	**367**
15:00-15:15	99	6	3	3	0	0	111
15:15-15:30	67	18	0	3	0	0	88
15:30-15:45	86	12	6	4	1	0	109
15:45-16:00	75	18	1	4	1	0	99
15:00-16:00 hour	**327**	**54**	**10**	**14**	**2**	**0**	**407**
16:00-16:15	86	5	3	2	2	0	98
16:15-16:30	69	12	4	3	0	0	88
16:30-16:45	111	18	0	2	0	0	131
16:45-17:00	70	13	0	3	0	0	86
16:00-17:00 hour	**336**	**48**	**7**	**10**	**2**	**0**	**403**
17:00-17:15	111	8	1	2	0	0	122
17:15-17:30	90	6	1	1	1	2	99
17:30-17:45	90	13	0	1	0	3	104
17:45-18:00	131	3	1	0	1	0	136
17:00-18:00 hour	**422**	**30**	**3**	**4**	**2**	**5**	**461**
18:00-18:15	114	7	0	2	1	0	124
18:15-18:30	106	11	0	2	3	0	122
18:30-18:45	98	9	0	1	0	0	108
18:45-19:00	69	3	0	1	2	1	75
18:00-19:00 hour	**387**	**30**	**0**	**6**	**6**	**1**	**429**
total	**3853**	**574**	**57**	**105**	**34**	**19**	**4623**

A411 Wood Street/Queens Road/Wellhouse Lane, Barnet

31 Wellhouse Lane -> Queens Road | Tuesday 28/01/2014

	Car	LGV	HGV	Bus	Motorcycle	Cyclist	Total
7:00- 7:15	1	0	0	0	0	0	1
7:15- 7:30	0	0	0	0	0	0	0
7:30- 7:45	0	0	0	0	0	1	0
7:45- 8:00	0	0	0	0	0	1	0
7:00- 8:00 hour	**1**	**0**	**0**	**0**	**0**	**2**	**1**
8:00- 8:15	0	0	0	0	0	0	0
8:15- 8:30	0	0	0	0	0	0	0
8:30- 8:45	2	0	0	0	0	0	2
8:45- 9:00	3	0	0	0	0	0	3
8:00- 9:00 hour	**5**	**0**	**0**	**0**	**0**	**0**	**5**
9:00- 9:15	1	0	0	0	0	0	1
9:15- 9:30	0	0	0	0	0	0	0
9:30- 9:45	0	1	0	0	0	0	1
9:45-10:00	1	0	0	0	0	0	1
9:00-10:00 hour	**2**	**1**	**0**	**0**	**0**	**0**	**3**
10:00-10:15	0	0	0	0	0	0	0
10:15-10:30	0	0	0	0	0	0	0
10:30-10:45	0	0	0	0	0	0	0
10:45-11:00	0	0	0	0	0	0	0
10:00-11:00 hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**
11:00-11:15	0	0	0	0	0	0	0
11:15-11:30	3	0	0	0	0	0	3
11:30-11:45	0	0	0	0	0	0	0
11:45-12:00	1	0	0	2	0	0	3
11:00-12:00 hour	**4**	**0**	**0**	**2**	**0**	**0**	**6**
12:00-12:15	0	0	0	0	0	0	0
12:15-12:30	0	0	0	0	0	0	0
12:30-12:45	0	0	0	0	0	0	0
12:45-13:00	0	0	0	0	0	0	0
12:00-13:00 hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**
13:00-13:15	0	0	0	0	0	0	0
13:15-13:30	2	0	0	0	0	0	2
13:30-13:45	1	0	0	0	0	0	1
13:45-14:00	3	0	0	0	0	0	3
13:00-14:00 hour	**6**	**0**	**0**	**0**	**0**	**0**	**6**
14:00-14:15	4	0	0	0	0	0	4
14:15-14:30	1	0	0	0	0	0	1
14:30-14:45	0	0	0	0	0	0	0
14:45-15:00	3	0	0	0	0	0	3
14:00-15:00 hour	**8**	**0**	**0**	**0**	**0**	**0**	**8**
15:00-15:15	1	0	0	0	0	0	1
15:15-15:30	1	0	0	0	0	0	1
15:30-15:45	1	0	0	0	0	0	1
15:45-16:00	0	0	0	0	0	0	0
15:00-16:00 hour	**3**	**0**	**0**	**0**	**0**	**0**	**3**
16:00-16:15	0	0	0	0	0	0	0
16:15-16:30	0	0	0	0	0	0	0
16:30-16:45	0	0	0	0	0	0	0
16:45-17:00	0	0	0	0	0	0	0
16:00-17:00 hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**
17:00-17:15	0	0	0	0	0	0	0
17:15-17:30	1	0	0	0	0	0	1
17:30-17:45	0	0	0	0	0	0	0
17:45-18:00	0	0	0	0	0	0	0
17:00-18:00 hour	**1**	**0**	**0**	**0**	**0**	**0**	**1**
18:00-18:15	0	0	0	0	0	0	0
18:15-18:30	0	0	0	0	0	0	0
18:30-18:45	0	0	0	0	0	0	0
18:45-19:00	0	0	0	0	0	0	0
18:00-19:00 hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**
total	**30**	**1**	**0**	**2**	**0**	**2**	**33**

A411 Wood Street/Queens Road/Wellhouse Lane, Barnet

32 Wellhouse Lane -> A411 Wood Road (East) | Tuesday 28/01/2014

	Car	LGV	HGV	Bus	Motorcycle	Cyclist	Total
7:00- 7:15	6	1	0	2	1	0	10
7:15- 7:30	14	1	1	6	0	0	22
7:30- 7:45	14	1	2	4	0	0	21
7:45- 8:00	18	3	2	2	0	0	25
7:00- 8:00 hour	**52**	**6**	**5**	**14**	**1**	**0**	**78**
8:00- 8:15	31	4	1	5	0	0	41
8:15- 8:30	27	1	0	3	0	0	31
8:30- 8:45	21	1	1	4	0	0	27
8:45- 9:00	21	3	1	4	0	0	29
8:00- 9:00 hour	**100**	**9**	**3**	**16**	**0**	**0**	**128**
9:00- 9:15	25	3	0	3	0	0	31
9:15- 9:30	23	2	2	6	0	0	33
9:30- 9:45	22	6	2	3	0	0	33
9:45-10:00	25	2	1	6	0	0	34
9:00-10:00 hour	**95**	**13**	**5**	**18**	**0**	**0**	**131**
10:00-10:15	31	2	0	6	0	1	39
10:15-10:30	29	3	3	3	0	0	38
10:30-10:45	34	3	2	5	0	0	44
10:45-11:00	39	4	1	4	0	0	48
10:00-11:00 hour	**133**	**12**	**6**	**18**	**0**	**1**	**169**
11:00-11:15	30	3	1	4	0	0	38
11:15-11:30	43	1	0	4	0	0	48
11:30-11:45	26	7	1	3	1	0	38
11:45-12:00	45	4	2	5	1	0	57
11:00-12:00 hour	**144**	**15**	**4**	**16**	**2**	**0**	**181**
12:00-12:15	39	6	0	5	2	0	52
12:15-12:30	32	4	0	4	1	0	41
12:30-12:45	30	4	5	5	0	0	44
12:45-13:00	39	5	0	4	1	0	49
12:00-13:00 hour	**140**	**19**	**5**	**18**	**4**	**0**	**186**
13:00-13:15	37	4	1	3	0	1	45
13:15-13:30	28	3	0	5	1	0	37
13:30-13:45	23	3	0	4	0	0	30
13:45-14:00	28	2	0	5	1	0	36
13:00-14:00 hour	**116**	**12**	**1**	**17**	**2**	**1**	**148**
14:00-14:15	30	4	1	6	0	1	41
14:15-14:30	37	2	3	5	0	0	47
14:30-14:45	37	2	2	6	0	0	47
14:45-15:00	38	6	4	6	1	0	55
14:00-15:00 hour	**142**	**14**	**10**	**23**	**1**	**1**	**190**
15:00-15:15	29	2	1	6	0	0	38
15:15-15:30	38	6	1	6	1	0	52
15:30-15:45	38	5	0	4	0	0	47
15:45-16:00	52	3	1	2	0	0	58
15:00-16:00 hour	**157**	**16**	**3**	**18**	**1**	**0**	**195**
16:00-16:15	62	2	0	6	0	0	70
16:15-16:30	58	4	0	4	0	0	66
16:30-16:45	49	1	0	3	1	0	54
16:45-17:00	60	3	0	3	0	1	66
16:00-17:00 hour	**229**	**10**	**0**	**16**	**1**	**1**	**256**
17:00-17:15	58	6	1	3	0	0	68
17:15-17:30	60	0	0	3	0	0	63
17:30-17:45	58	0	1	2	1	0	62
17:45-18:00	30	0	1	7	0	0	38
17:00-18:00 hour	**206**	**6**	**3**	**15**	**1**	**0**	**231**
18:00-18:15	35	3	0	4	0	1	42
18:15-18:30	23	2	0	4	0	0	29
18:30-18:45	28	1	0	6	0	0	35
18:45-19:00	11	2	0	3	0	0	16
18:00-19:00 hour	**97**	**8**	**0**	**17**	**0**	**1**	**122**
total	**1611**	**140**	**45**	**206**	**13**	**5**	**2015**

A411 Wood Street/Queens Road/Wellhouse Lane, Barnet

34 Wellhouse Lane -> A411 Wood Road (West) | Tuesday 28/01/2014

	Car	LGV	HGV	Bus	Motorcycle	Cyclist	Total
7:00- 7:15	3	2	0	0	0	0	5
7:15- 7:30	5	0	0	0	0	0	5
7:30- 7:45	6	2	0	0	0	0	8
7:45- 8:00	6	0	1	0	0	0	7
7:00- 8:00 hour	**20**	**4**	**1**	**0**	**0**	**0**	**25**
8:00- 8:15	4	0	1	0	0	0	5
8:15- 8:30	5	0	0	0	0	0	5
8:30- 8:45	4	2	0	0	0	0	6
8:45- 9:00	7	1	0	0	1	0	9
8:00- 9:00 hour	**20**	**3**	**1**	**0**	**1**	**0**	**25**
9:00- 9:15	8	0	0	0	0	0	8
9:15- 9:30	9	0	0	0	0	0	9
9:30- 9:45	12	0	0	0	0	1	12
9:45-10:00	11	0	0	0	0	0	11
9:00-10:00 hour	**40**	**0**	**0**	**0**	**0**	**1**	**40**
10:00-10:15	14	1	0	0	0	0	15
10:15-10:30	9	1	1	0	0	0	11
10:30-10:45	11	1	0	0	1	0	13
10:45-11:00	14	0	0	0	0	0	14
10:00-11:00 hour	**48**	**3**	**1**	**0**	**1**	**0**	**53**
11:00-11:15	17	2	0	0	0	0	19
11:15-11:30	21	1	1	0	0	0	23
11:30-11:45	16	1	0	0	0	0	17
11:45-12:00	21	1	0	0	0	0	22
11:00-12:00 hour	**75**	**5**	**1**	**0**	**0**	**0**	**81**
12:00-12:15	11	0	1	1	1	0	14
12:15-12:30	13	1	0	0	0	0	14
12:30-12:45	9	2	0	0	0	0	11
12:45-13:00	13	1	0	0	0	0	14
12:00-13:00 hour	**46**	**4**	**1**	**1**	**1**	**0**	**53**
13:00-13:15	15	3	0	0	0	0	18
13:15-13:30	14	0	0	0	0	0	14
13:30-13:45	13	0	0	0	0	0	13
13:45-14:00	11	0	1	0	0	0	12
13:00-14:00 hour	**53**	**3**	**1**	**0**	**0**	**0**	**57**
14:00-14:15	12	2	2	0	0	0	16
14:15-14:30	14	0	1	0	0	0	15
14:30-14:45	13	1	1	0	0	0	15
14:45-15:00	12	0	1	0	0	0	13
14:00-15:00 hour	**51**	**3**	**5**	**0**	**0**	**0**	**59**
15:00-15:15	12	0	0	0	0	0	12
15:15-15:30	8	2	0	0	0	0	10
15:30-15:45	16	2	0	0	0	0	18
15:45-16:00	12	1	0	0	0	1	13
15:00-16:00 hour	**48**	**5**	**0**	**0**	**0**	**1**	**53**
16:00-16:15	19	0	0	0	0	0	19
16:15-16:30	29	1	0	0	0	1	30
16:30-16:45	19	0	0	0	0	0	19
16:45-17:00	17	2	0	0	0	0	19
16:00-17:00 hour	**84**	**3**	**0**	**0**	**0**	**1**	**87**
17:00-17:15	9	0	0	0	0	0	9
17:15-17:30	14	0	0	0	0	0	14
17:30-17:45	15	0	0	0	0	0	15
17:45-18:00	15	0	0	0	0	0	15
17:00-18:00 hour	**53**	**0**	**0**	**0**	**0**	**0**	**53**
18:00-18:15	20	0	0	0	0	0	20
18:15-18:30	17	1	1	0	0	0	19
18:30-18:45	10	0	0	0	0	0	10
18:45-19:00	4	0	0	0	0	0	4
18:00-19:00 hour	**51**	**1**	**1**	**0**	**0**	**0**	**53**
total	**589**	**34**	**12**	**1**	**3**	**3**	**639**

A411 Wood Street/Queens Road/Wellhouse Lane, Barnet

41 A411 Wood Road (West) -> Queens Road | Tuesday 28/01/2014

	Car	LGV	HGV	Bus	Motorcycle	Cyclist	Total
7:00- 7:15	5	0	0	0	0	0	5
7:15- 7:30	14	1	0	0	0	0	15
7:30- 7:45	8	2	0	0	0	0	10
7:45- 8:00	11	0	1	0	0	0	12
7:00- 8:00 hour	**38**	**3**	**1**	**0**	**0**	**0**	**42**
8:00- 8:15	9	1	0	0	0	0	10
8:15- 8:30	6	0	0	1	0	0	7
8:30- 8:45	10	1	0	2	0	0	13
8:45- 9:00	9	1	0	1	0	0	11
8:00- 9:00 hour	**34**	**3**	**0**	**4**	**0**	**0**	**41**
9:00- 9:15	10	0	0	0	0	0	10
9:15- 9:30	5	0	0	0	0	0	5
9:30- 9:45	6	0	0	0	0	0	6
9:45-10:00	5	1	1	0	0	0	7
9:00-10:00 hour	**26**	**1**	**1**	**0**	**0**	**0**	**28**
10:00-10:15	2	1	0	0	0	0	3
10:15-10:30	4	0	0	0	0	0	4
10:30-10:45	2	1	0	0	0	0	3
10:45-11:00	4	1	0	0	0	0	5
10:00-11:00 hour	**12**	**3**	**0**	**0**	**0**	**0**	**15**
11:00-11:15	1	1	1	0	0	0	3
11:15-11:30	2	0	1	0	0	0	3
11:30-11:45	1	0	0	0	0	0	1
11:45-12:00	5	0	0	0	0	0	5
11:00-12:00 hour	**9**	**1**	**2**	**0**	**0**	**0**	**12**
12:00-12:15	1	1	0	0	0	0	2
12:15-12:30	1	1	0	0	0	0	2
12:30-12:45	2	0	0	0	0	0	2
12:45-13:00	1	0	0	0	0	0	1
12:00-13:00 hour	**5**	**2**	**0**	**0**	**0**	**0**	**7**
13:00-13:15	2	1	0	0	0	0	3
13:15-13:30	5	2	0	0	0	0	7
13:30-13:45	2	0	0	0	0	0	2
13:45-14:00	5	0	0	0	0	0	5
13:00-14:00 hour	**14**	**3**	**0**	**0**	**0**	**0**	**17**
14:00-14:15	3	1	0	0	0	0	4
14:15-14:30	4	0	0	0	0	0	4
14:30-14:45	9	0	0	0	0	0	9
14:45-15:00	4	0	0	0	0	0	4
14:00-15:00 hour	**20**	**1**	**0**	**0**	**0**	**0**	**21**
15:00-15:15	6	0	0	0	0	0	6
15:15-15:30	6	2	0	4	0	0	12
15:30-15:45	5	1	0	3	0	0	9
15:45-16:00	3	0	0	0	0	0	3
15:00-16:00 hour	**20**	**3**	**0**	**7**	**0**	**0**	**30**
16:00-16:15	5	0	0	0	0	0	5
16:15-16:30	16	0	0	0	0	0	16
16:30-16:45	13	0	0	0	0	0	13
16:45-17:00	10	0	0	0	0	0	10
16:00-17:00 hour	**44**	**0**	**0**	**0**	**0**	**0**	**44**
17:00-17:15	12	1	0	0	0	0	13
17:15-17:30	4	0	0	0	0	0	4
17:30-17:45	6	0	0	0	0	0	6
17:45-18:00	2	0	0	1	0	0	3
17:00-18:00 hour	**24**	**1**	**0**	**1**	**0**	**0**	**26**
18:00-18:15	2	0	0	0	0	0	2
18:15-18:30	12	4	0	0	0	0	16
18:30-18:45	0	0	0	0	0	0	0
18:45-19:00	4	1	0	0	0	0	5
18:00-19:00 hour	**18**	**5**	**0**	**0**	**0**	**0**	**23**
total	**264**	**26**	**4**	**12**	**0**	**0**	**306**

A411 Wood Street/Queens Road/Wellhouse Lane, Barnet

42 A411 Wood Road (West) -> A411 Wood Road (East) | Tuesday 28/01/2014

	Car	LGV	HGV	Bus	Motorcycle	Cyclist	Total
7:00- 7:15	69	23	3	2	3	0	100
7:15- 7:30	76	24	0	0	0	0	100
7:30- 7:45	129	15	1	1	1	0	147
7:45- 8:00	129	18	2	2	2	0	153
7:00- 8:00 hour	**403**	**80**	**6**	**5**	**6**	**0**	**500**
8:00- 8:15	100	14	1	6	0	0	121
8:15- 8:30	86	10	2	4	1	0	103
8:30- 8:45	85	9	3	1	1	0	99
8:45- 9:00	90	11	2	1	3	0	107
8:00- 9:00 hour	**361**	**44**	**8**	**12**	**5**	**0**	**430**
9:00- 9:15	109	10	3	0	1	0	123
9:15- 9:30	90	8	5	1	1	0	105
9:30- 9:45	86	19	6	1	0	0	112
9:45-10:00	80	17	4	2	0	0	103
9:00-10:00 hour	**365**	**54**	**18**	**4**	**2**	**0**	**443**
10:00-10:15	79	18	2	0	1	1	100
10:15-10:30	104	16	2	4	1	0	127
10:30-10:45	72	9	4	1	2	0	88
10:45-11:00	63	15	1	3	1	0	83
10:00-11:00 hour	**318**	**58**	**9**	**8**	**5**	**1**	**398**
11:00-11:15	60	14	1	1	2	0	78
11:15-11:30	77	9	0	2	0	1	88
11:30-11:45	74	11	4	1	1	0	91
11:45-12:00	82	18	5	2	1	0	108
11:00-12:00 hour	**293**	**52**	**10**	**6**	**4**	**1**	**365**
12:00-12:15	63	17	0	1	0	0	81
12:15-12:30	81	10	2	2	1	0	96
12:30-12:45	62	8	4	1	1	1	76
12:45-13:00	97	11	0	3	0	0	111
12:00-13:00 hour	**303**	**46**	**6**	**7**	**2**	**1**	**364**
13:00-13:15	58	18	2	1	1	0	80
13:15-13:30	75	10	1	3	0	0	89
13:30-13:45	61	10	0	0	0	1	71
13:45-14:00	83	18	1	1	1	0	104
13:00-14:00 hour	**277**	**56**	**4**	**5**	**2**	**1**	**344**
14:00-14:15	69	17	2	2	0	0	90
14:15-14:30	85	8	2	3	1	0	99
14:30-14:45	72	11	3	0	0	0	86
14:45-15:00	112	7	1	2	1	1	123
14:00-15:00 hour	**338**	**43**	**8**	**7**	**2**	**1**	**398**
15:00-15:15	77	17	0	4	1	0	99
15:15-15:30	101	25	1	2	1	0	130
15:30-15:45	73	17	4	0	2	0	96
15:45-16:00	97	12	0	6	0	0	115
15:00-16:00 hour	**348**	**71**	**5**	**12**	**4**	**0**	**440**
16:00-16:15	85	16	0	0	1	1	102
16:15-16:30	92	24	2	2	1	1	121
16:30-16:45	83	18	0	4	1	0	106
16:45-17:00	120	11	0	5	3	0	139
16:00-17:00 hour	**380**	**69**	**2**	**11**	**6**	**2**	**468**
17:00-17:15	108	11	1	1	1	1	122
17:15-17:30	151	10	0	2	1	0	164
17:30-17:45	155	12	0	1	4	2	172
17:45-18:00	150	14	1	3	0	1	168
17:00-18:00 hour	**564**	**47**	**2**	**7**	**6**	**4**	**626**
18:00-18:15	130	10	1	2	0	0	143
18:15-18:30	107	9	0	1	1	1	118
18:30-18:45	108	15	1	2	2	0	128
18:45-19:00	106	10	0	1	1	0	118
18:00-19:00 hour	**451**	**44**	**2**	**6**	**4**	**1**	**507**
total	**4401**	**664**	**80**	**90**	**48**	**12**	**5283**

A411 Wood Street/Queens Road/Wellhouse Lane, Barnet

43 A411 Wood Road (West) -> Wellhouse Lane | Tuesday 28/01/2014

	Car	LGV	HGV	Bus	Motorcycle	Cyclist	Total
7:00- 7:15	11	0	1	0	0	0	12
7:15- 7:30	14	0	0	0	0	0	14
7:30- 7:45	20	0	0	0	0	0	20
7:45- 8:00	22	1	0	0	0	0	23
7:00- 8:00 hour	**67**	**1**	**1**	**0**	**0**	**0**	**69**
8:00- 8:15	13	0	0	0	0	0	13
8:15- 8:30	5	0	0	0	0	0	5
8:30- 8:45	12	0	0	0	0	0	12
8:45- 9:00	23	1	0	0	0	0	24
8:00- 9:00 hour	**53**	**1**	**0**	**0**	**0**	**0**	**54**
9:00- 9:15	26	1	0	0	0	0	27
9:15- 9:30	23	0	0	0	0	0	23
9:30- 9:45	14	0	0	0	0	0	14
9:45-10:00	15	0	0	0	0	0	15
9:00-10:00 hour	**78**	**1**	**0**	**0**	**0**	**0**	**79**
10:00-10:15	10	0	0	0	0	0	10
10:15-10:30	20	0	2	0	0	0	22
10:30-10:45	17	0	0	0	0	0	17
10:45-11:00	13	1	0	0	0	0	14
10:00-11:00 hour	**60**	**1**	**2**	**0**	**0**	**0**	**63**
11:00-11:15	13	1	0	0	0	0	14
11:15-11:30	11	1	0	0	0	0	12
11:30-11:45	16	0	0	0	0	0	16
11:45-12:00	7	0	0	0	0	0	7
11:00-12:00 hour	**47**	**2**	**0**	**0**	**0**	**0**	**49**
12:00-12:15	10	2	0	0	0	0	12
12:15-12:30	8	0	0	0	0	0	8
12:30-12:45	8	2	0	0	0	0	10
12:45-13:00	12	2	0	0	0	0	14
12:00-13:00 hour	**38**	**6**	**0**	**0**	**0**	**0**	**44**
13:00-13:15	12	1	0	0	0	0	13
13:15-13:30	12	0	1	0	0	0	13
13:30-13:45	13	0	0	0	0	0	13
13:45-14:00	15	1	0	0	0	0	16
13:00-14:00 hour	**52**	**2**	**1**	**0**	**0**	**0**	**55**
14:00-14:15	15	1	0	0	0	0	16
14:15-14:30	15	0	0	0	0	0	15
14:30-14:45	10	1	0	0	0	0	11
14:45-15:00	12	1	0	0	0	0	13
14:00-15:00 hour	**52**	**3**	**0**	**0**	**0**	**0**	**55**
15:00-15:15	5	1	0	0	0	0	6
15:15-15:30	14	2	0	0	0	0	16
15:30-15:45	16	0	0	0	0	0	16
15:45-16:00	12	0	0	0	0	0	12
15:00-16:00 hour	**47**	**3**	**0**	**0**	**0**	**0**	**50**
16:00-16:15	10	0	0	0	0	0	10
16:15-16:30	9	2	0	0	0	0	11
16:30-16:45	11	0	0	0	0	0	11
16:45-17:00	7	1	0	0	0	0	8
16:00-17:00 hour	**37**	**3**	**0**	**0**	**0**	**0**	**40**
17:00-17:15	5	0	0	0	0	0	5
17:15-17:30	4	0	0	0	0	0	4
17:30-17:45	3	1	0	0	0	0	4
17:45-18:00	7	2	0	0	0	0	9
17:00-18:00 hour	**19**	**3**	**0**	**0**	**0**	**0**	**22**
18:00-18:15	2	0	0	0	0	0	2
18:15-18:30	3	0	0	0	0	0	3
18:30-18:45	2	4	0	0	0	0	6
18:45-19:00	5	0	0	0	0	0	5
18:00-19:00 hour	**12**	**4**	**0**	**0**	**0**	**0**	**16**
total	**562**	**30**	**4**	**0**	**0**	**0**	**596**

Appendix 3

Queue Length Surveys


Queue length survey on legs 1 and 4
Queens Road
1
Count queues on leg 1 whenever they occur
A411 Wood Street to A1000
Count queues on leg 4
a: when vehicles turn right
b: when vehicles are waiting due to zebra crossing
4
2
3
A411 Wood Street to A1
Wellhouse Lane
Image © 2014 Bluesky
Barnet Hospital
12 Hour queue count at A411, Wood Street/ Wellhouse Lane. Tuesday 28/01/2004


Queue length survey on legs 2 and 3
Queens Road
1
Count queues on leg 2
a: when vehicles turn right
b: when vehicles are waiting due to zebra crossing
A411 Wood Street to A1000
2
4
3
A411 Wood Street to A1
Count queues on leg 3 whenever they occur
Wellhouse Lane
Image © 2014 Bluesky
Barnet Hospital
12 Hour queue count at A411, Wood Street/ Wellhouse Lane. Tuesday 28/01/2004

Queue Length Su rvey Count □□□ max □□ um queue l□□□□□ eve ry □ □□□□□ when □□□□ occ □r.

□□□□: Barnet T□□ es □: 07.00 - 19.00 hrs Job No . GC1825-01

□ □□□: Tuesday 28/01/13 Su rveyo r: dw/tl/sw

□□□□: Queens Road, Barnet L □g: 1

□□□ □	Queues on Queens □□□d	□□□ □	Qu □ues on Queens □□□d	□□□ □	Queue □ on Queens □□□d	Time	Queue □ on Queens □□□d
07:03	1	08:36	1	16:02	4	17:29	4
07:04	1	08:37	5	16:03	2	17:31	4
07:08	1	08:38	2	16:13	2	18:23	3
07:11	1	08:39	2	16:24	2	18:30	2
07:15	1	08:40	1	16:26	2	18:33	2
07:20	1	08:44	2	16:28	3	18:38	2
07:25	1	08:47	2	16:29	2	18:50	2
07:34	1	08:48	3	16:30	4		
07:38	3	09:08	2	16:31	7		
07:39	1	09:21	2	16:32	8		
07:45	2	09:43	2	16:33	7		
07:47	1	09:49	3	16:34	5		
07:51	1	09:55	2	16:35	6		
07:53	2	10:00	2	16:38	3		
07:54	1	10:39	2	16:39	4		
07:57	2	11:40	2	16:40	3		
07:59	2	11:55	3	16:41	2		
08:01	2	12:55	4	16:42	2		
08:03	1	13:23	3	16:44	2		
07:08	1	14:09	3	16:45	3		
08:09	2	14:38	2	16:46	4		
08:12	1	14:52	2	16:50	2		
08:14	1	15:03	2	16:51	2		
08:15	1	15:40	4	16:55	2		
08:16	1	15:41	2	16:58	2		
08:17	2	15:42	3	17:00	6		
08:18	1	15:43	4	17:01	3		
08:19	3	15:44	6	17:04	5		
08:20	2	15:45	5	17:07	9		
08:22	1	15:46	8	17:10	10		
08:23	3	15:47	5	17:12	14		
08:24	1	15:48	3	17:14	6		
08:31	6	15:55	4	17:15	7		
08:33	4	15:59	3	17:19	3		
08:34	1	16:00	2	17:22	2		
08:35	2			17:28	4		

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□□□□□	Barnet	□□□ □□□	07.00 - 19.00 hrs	□□□ □□.	GC1825-01
□ □□□□□	Tuesday 28/01/13	□□r□□□□r□	ts/ss		
□□□□□	A411 Wood Street (EAST), Barnet			□□□□	2

□□□ □	□□□□□□□□□□□□ □□□□□d □□ r□□□□ □□r□□r□ □□□□□ □ □□□□□ □□□d	□□□□□□□□□□□□ □□□□□d □□ □□d□□□r□□□□ □□ □□□□r□ □r□□□□□	□□□ □	□□□□□□□□□□□□ □□□□□d □□ r□□□□ □□r□□r□ □□□□□ □ □□□□□ □□□d	□□□□□□□□□□□□ □□□□□d □□ □□d□□□r□□□□ □□ □□□□r□ □r□□□□□	□□□ □	□□□□□□□□□□□□ □□□□□d □□ r□□□□ □□r□□r□ □□□□□ □ □□□□□ □□□d	□□□□□□□□□□□□ □□□□□d □□ □□d□□□r□□□□ □□ □□□□r□ □r□□□□□
07:08	0	1	08:34	0	5	15:41	0	4
07:10	1	0	08:35	5	0	15:42	2	0
07:16	5	0	08:36	10	0	15:45	0	4
07:18	0	2	08:37	0	5	15:46	4	0
07:22	2	1	08:38	6	4	15:49	about 20 vehicles caused by buses turning from Que	
07:27	4	0	08:39	0	2	15:51	3	0
07:30	2	0	08:40	1	0	15:53	0	3
07:31	0	1	08:44	0	1	15:54	0	6
07:34	0	3	08:47	1	1	15:56	5	5
07:35	3	0	08:51	1	0	17:23	7	0
07:39	1	0	08:52	5	0	18:40	4	0
07:42	2	0	09:00	0	2			
07:44	4	0	09:04	2	0			
07:50	0	2	09:05	0	2			
07:52	2	0	09:07	4	0			
07:54	3	0	09:08	5	0			
07:56	1	0	09:12	3	0			
07:57	2	0	09:22	2	0			
08:00	0	2	09:30	0	3			
08:01	3	0	09:38	2	0			
08:02	2	2	09:58	2	0			
08:03	2	0	10:03	0	2			
08:07	2	0	11:17	0	3			
08:10	0	2	11:39	0	3			
08:13	2	0	12:05	0	4			
08:15	1	0	12:54	5	0			
08:17	4	0	13:04	0	2			
08:20	0	2	13:23	2	0			
08:21	4	3	13:25	2	0			
08:25	0	3	13:51	0	2			
08:28	8	5	14:06	0	3			
08:29	0	7	14:08	4	0			
08:30	7	0	14:16	0	3			
08:31	0	2	14:19	0	3			
08:32	0	1	14:32	0	2			
08:33	2	0	15:03	0	3			

Queue Lengt] Su rvey Count □□□ max □mum queue l□□□□□ eve ry mi]u□e when t]ey occu r.

□□□□: Barnet T□□ es: 07.00 - 19.00 hrs Job No . GC1825-01

Da □e: Tuesday 28/01/13 Su rveyo r: ts/ss/wf

□□□□: Wellhouse Lane, Barnet Leg: 3

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07:06	2	08:06	5	09:01	3	10:31	3
07:07	1	08:07	9	09:03	2	10:32	4
07:11	1	08:08	11	09:07	6	10:34	2
07:17	1	08:09	10	09:08	2	10:35	5
07:19	2	08:10	9	09:11	3	10:36	4
07:20	4	08:11	1	09:18	2	10:37	2
07:21	2	08:12	2	09:21	2	10:38	2
07:22	1	08:13	2	09:25	7	10:40	3
07:23	2	08:15	1	09:27	3	10:43	4
07:24	2	08:17	2	09:29	2	10:44	2
07:26	5	08:18	1	09:30	3	10:45	4
07:27	4	08:20	2	09:34	3	10:47	3
07:29	1	08:21	1	09:36	4	10:49	2
07:33	3	08:24	3	09:38	3	10:50	4
07:34	2	08:27	1	09:43	5	10:54	2
07:37	2	08:28	2	09:44	3	10:55	2
07:38	2	08:29	5	09:50	2	10:57	3
07:39	1	08:30	2	09:51	4	10:58	4
07:41	1	08:31	2	09:52	6	10:59	2
07:42	1	08:33	2	10:00	3	11:01	4
07:45	2	08:34	1	10:02	2	11:04	5
07:46	1	08:36	3	10:05	4	11:09	4
07:47	1	08:37	2	10:08	4	11:10	2
07:48	1	08:40	2	10:10	3	11:12	2
07:49	3	08:41	3	10:11	3	11:13	3
07:51	1	08:42	4	10:13	2	11:14	5
07:52	1	08:43	5	10:14	3	11:16	4
07:55	2	08:44	6	10:16	2	11:18	3
07:56	2	08:45	2	10:17	2	11:19	3
07:58	2	08:46	2	10:20	4	11:20	2
07:59	5	08:47	2	10:21	3	11:22	3
08:00	3	08:52	2	10:25	7	11:23	4
08:01	2	08:54	2	10:26	2	11:26	2
08:02	6	08:56	3	10:27	3	11:27	3
08:03	3	08:57	2	10:28	4	11:28	5
08:05	4	08:59	3	10:30	3	11:32	2

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11:38	4	12:52	4	14:15	7	15:20	7
11:39	5	12:53	4	14:16	4	15:21	8
11:40	3	13:01	3	14:18	2	15:22	13
11:41	4	13:02	4	14:19	4	15:23	14
11:42	2	13:03	3	14:20	3	15:24	15
11:45	4	13:05	2	14:23	3	15:25	13
11:46	8	13:06	2	14:24	4	15:26	12
11:47	5	13:12	2	14:25	3	15:27	12
11:48	4	13:14	2	14:26	4	15:28	8
11:50	5	13:15	6	14:28	6	15:29	8
11:51	6	13:16	4	14:29	4	15:30	5
11:52	8	13:17	2	14:31	2	15:31	3
11:53	5	13:25	2	14:32	4	15:33	3
11:54	2	13:27	2	14:34	2	15:36	2
11:55	5	13:29	2	14:37	2	15:37	2
11:56	5	13:43	2	14:40	3	15:38	2
11:57	2	13:44	4	14:42	4	15:41	8
11:58	1	13:45	2	14:45	8	15:42	9
12:02	3	13:47	3	14:46	6	15:43	8
12:03	4	13:48	6	14:50	5	15:44	11
12:04	4	13:49	2	14:51	8	15:45	12
12:05	3	13:50	2	14:53	5	14:46	9
12:10	2	13:52	2	14:54	4	15:48	3
12:17	3	13:54	2	14:55	3	15:51	3
12:19	2	13:58	4	14:56	4	15:52	6
12:23	3	13:59	4	14:57	5	15:53	3
12:24	3	14:03	3	14:58	8	15:54	6
12:30	4	14:04	6	14:59	5	15:55	3
12:31	7	14:05	6	15:00	4	15:56	6
12:32	7	14:07	2	15:01	2	15:57	10
12:45	2	14:09	6	15:02	5	15:58	13
12:46	5	14:10	15	15:03	6	15:59	13
12:47	2	14:11	10	15:06	4	16:00	7
12:48	4	14:12	14	15:09	5	16:01	8
12:49	2	14:13	15	15:15	2	16:02	5
12:50	2	14:14	10	15:18	6	16:03	4

Queue Lengt] Su rvey Count □□□ max □mum queue l□□□□□ eve ry mi]u□e when t]ey occu r.

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Da □e: Tuesday 28/01/13 Su rveyo r: ts/ss/wf

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16:05	9	16:48	15	17:27	15	18:16	3
16:06	12	16:49	11	17:28	13	18:17	2
16:07	13	16:50	9	17:29	15	18:24	7
16:08	12	16:51	5	17:30	16	18:25	4
16:09	9	16:54	3	17:31	13	18:27	5
16:10	5	16:55	3	17:32	17	18:30	5
16:11	2	16:56	2	17;33	15	18:31	5
16:15	4	16:58	7	17:34	12	18:32	2
16:16	6	16:59	5	17:35	11	18:36	2
16:17	7	17:00	6	17;36	13	18:37	2
16:19	4	17:01	9	17;37	13	18:38	5
16:21	2	17:02	11	17;38	14	18:39	3
16:23	4	17:03	9	17:39	13	18:52	4
16:24	8	17:04	10	17:40	15		
16:25	6	17:05	13	17:41	10		
16:26	10	17:06	15	17:42	13		
16:27	8	17:07	13	17:43	12		
16:28	4	17:08	11	17:44	7		
16:29	4	17:09	13	17:45	8		
16:30	2	17:10	13	17:46	6		
16:32	3	17:11	14	17:47	4		
16:33	2	17:12	15	17:48	5		
16:34	6	17:13	16	17:49	2		
16:35	10	17:14	14	17:52	6		
16:36	11	17:15	16	17:53	2		
16:37	8	17:16	13	17;57	2		
16:38	8	17:17	13	17:59	9		
16:39	12	17:18	13	18:00	8		
16:40	13	17:19	15	18:05	5		
16:41	11	17:20	13	18;06	3		
16:42	9	17:21	17	18:08	5		
16:43	13	17:22	17	18:09	5		
16:44	7	17:23	15	18:10	4		
16:45	13	17:24	17	18:12	2		
16:46	16	17:25	17	18:13	3		
16:47	13	17:26	15	18:15	9		

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07:02	0	1	08:29	20	24	10:45	0	6
07:03	1	0	08:31	0	12	10:55	5	4
07:06	1	0	08:32	1	0	11:10	4	0
07:10	0	1	08:34	0	2	11:11	0	2
07:15	1	0	08:35	0	7	11:18	0	5
07:19	1	0	08:36	0	9	11:19	0	3
07:29	1	0	08:37	1	12	11:20	0	2
07:34	0	2	08:38	0	5	11:24	0	2
07:47	1	0	08:40	3	0	11:29	5	0
07:51	0	6	08:42	2	0	11:30	3	0
07:52	0	4	08:47	0	3	11:31	0	3
07:53	0	4	08:49	2	0	11:45	6	0
07:57	0	2	08:52	3	0	12:01	3	0
07:59	3	0	08:53	2	0	12:02	0	3
08:00	0	4	08:59	0	4	12:07	0	3
08:01	0	4	09:05	0	4	12:12	2	0
08:02	0	12	09:07	6	0	12:13	5	0
08:03	1	0	09:10	2	0	12:30	0	2
08:04	0	2	09:11	2	0	12:36	0	2
08:05	2	0	09:18	3	0	12:47	0	3
08:06	0	10	09:19	0	2	12:52	2	0
08:07	4	0	09:20	3	0	12:57	0	2
08:08	2	0	09:25	0	2	13;01	0	2
08:09	0	14	09:26	6	0	13:02	4	0
08:10	0	15	09:40	0	2	13:05	3	0
08:11	0	1	09:41	2	0	13:12	2	0
08:12	4	17	09:47	0	2	13:13	3	0
08:13	0	27	09:55	0	2	13:20	5	0
08:15	0	10	10:05	4	0	13:45	5	0
08:18	0	7	10:15	0	4	13:50	0	6
08:19	0	3	10:17	2	0	13:53	0	4
08:20	0	15	10:19	0	6	13:57	4	5
08:22	0	4	10:20	5	0	14:06	2	0
08:25	0	3	10:22	4	0	14;07	0	4
08:27	0	2	10:30	0	2	14:17	0	2
08:28	0	14	10:35	0	3	14:30	0	5

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□□□□	A411 Wood Street (WEST), Barnet			□□□□	4

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14:36	2	0	17:46	2	0			
14:40	2	0	17:48	6	0			
14:42	3	0	18:09	0	3			
14:45	0	4	18:23	0	3			
14:46	0	3	18:27	5	0			
14:47	8	0	18:36	5	0			
14:55	2	0	18:45	6	0			
15:03	2	0						
15:04	4	0						
15:10	0	2						
15:11	0	3						
15:17	0	3						
15:18	6	0						
15:24	5	0						
15:25	8	0						
15:29	3	0						
15:35	2	0						
15:39	3	0						
15;41	0	14						
15:42	0	10						
15:43	0	6						
15:44	0	18						
15:45	0	19						
15:46	0	10						
15:47	0	24						
15:48	0	14						
15;50	0	16						
16:05	7	0						
16:20	4	0						
16:27	0	2						
16:29	2	3						
16:35	3	0						
17:06	0	10						
17:10	0	9						
17:12	2	0						
17:30	5	0						

Appendix 4

Pedestrian Counts


Pedestrian Survey Plan
Queens Road
Stand here to see both sites, both count in peak times
Zebra crossing
A411 Wood Street to A1000
a
b
A411 Wood Street to A1
End of footpath
lamppost
Wellhouse Lane
Image © 2014 Bluesky
Barnet Hospital
Arrows ↔ indicate pedestrian direction to count
12 pedestrian count at A411, Wood Street/ Wellhouse Lane. Tuesday 28/01/2004

A411 Wood Street/Wellhouse Lane, Barnet. Tuesday 28/01/2014								
Pedestrian crossing on zebra crossing on A411 Wood Street, Barnet								
	Adult	**Child**	**OAP**	**Disabled**	**Pram**	**Cyclist**	**Total**	**Peds per min.**
7:00- 7:15	7	0	0	0	0	0	7	0.47
7:15- 7:30	1	0	0	0	0	0	1	0.07
7:30- 7:45	2	0	0	0	0	1	3	0.20
7:45- 8:00	0	1	1	0	0	0	2	0.13
8:00- 8:15	1	7	0	0	0	0	8	0.53
8:15- 8:30	8	37	0	0	0	0	45	3.00
8:30- 8:45	17	21	0	0	1	0	39	
8:45- 9:00	7	0	0	0	1	0	8	
8:00- 9:00 hour	**33**	**65**	**0**	**0**	**2**	**0**	**100**	
9:00- 9:15	11	0	0	1	0	0	12	
9:15- 9:30	6	0	0	0	0	0	6	
9:30- 9:45	12	3	1	0	2	0	18	
9:45-10:00	6	0	0	0	0	0	6	
9:00-10:00 hour	**35**	**3**	**1**	**1**	**2**	**0**	**42**	
10:00-10:15	1	1	0	0	0	0	2	
10:15-10:30	8	0	1	1	0	0	10	
10:30-10:45	4	0	1	0	0	0	5	
10:45-11:00	8	1	2	0	1	0	12	
10:00-11:00 hour	**21**	**2**	**4**	**1**	**1**	**0**	**29**	
11:00-11:15	7	0	1	0	0	0	8	
11:15-11:30	16	1	2	0	1	0	20	
11:30-11:45	7	1	3	0	1	0	12	
11:45-12:00	8	0	4	0	0	0	12	
11:00-12:00 hour	**38**	**2**	**10**	**0**	**2**	**0**	**52**	
12:00-12:15	8	1	0	0	1	0	10	
12:15-12:30	2	0	0	0	0	0	2	
12:30-12:45	5	0	0	0	0	0	5	
12:45-13:00	6	0	0	0	1	0	7	
12:00-13:00 hour	**21**	**1**	**0**	**0**	**2**	**0**	**24**	
13:00-13:15	3	0	0	0	0	0	3	
13:15-13:30	1	0	1	0	0	0	2	
13:30-13:45	2	0	0	0	0	0	2	
13:45-14:00	1	0	0	0	0	0	1	
13:00-14:00 hour	**7**	**0**	**1**	**0**	**0**	**0**	**8**	
14:00-14:15	0	0	0	0	0	0	0	
14:15-14:30	2	0	0	0	1	0	3	
14:30-14:45	0	0	0	0	0	0	0	
14:45-15:00	1	0	0	0	0	0	1	
14:00-15:00 hour	**3**	**0**	**0**	**0**	**1**	**0**	**4**	
15:00-15:15	7	0	0	0	0	0	7	
15:15-15:30	9	0	0	1	0	0	10	
15:30-15:45	3	24	0	1	0	0	28	
15:45-16:00	15	50	0	0	2	1	68	
15:00-16:00 hour	**34**	**74**	**0**	**2**	**2**	**1**	**113**	
16:00-16:15	4	3	1	0	0	0	8	
16:15-16:30	4	6	0	0	0	0	10	
16:30-16:45	2	5	0	0	0	0	7	**Peds per min.**
16:45-17:00	4	3	1	0	0	0	8	0.53
17:00-17:15	2	38	3	0	0	0	43	2.87
17:15-17:30	5	7	0	0	0	0	12	0.80
17:30-17:45	4	1	0	0	0	0	5	0.33
17:45-18:00	0	0	0	0	0	0	0	0.00
18:00-18:15	7	1	0	0	0	0	8	0.53
18:15-18:30	2	0	0	0	0	0	2	
18:30-18:45	2	0	0	0	0	0	2	
18:45-19:00	0	0	0	0	0	0	0	
18:00-19:00 hour	**11**	**1**	**0**	**0**	**0**	**0**	**12**	
total	**238**	**212**	**22**	**4**	**12**	**2**	**490**	

A411 Wood Street/Wellhouse Lane, Barnet. Tuesday 28/01/2014								
Pedestrian crossing on Wellhouse Lane, Barnet								
	Adult	**Child**	**OAP**	**Disabled**	**Pram**	**Cyclist**	**Total**	**Peds per min.**
7:00- 7:15	3	1	0	0	0	0	4	0.27
7:15- 7:30	10	0	0	0	0	0	10	0.67
7:30- 7:45	13	0	0	0	0	0	13	0.87
7:45- 8:00	12	4	2	1	0	0	19	1.27
8:00- 8:15	15	15	2	0	0	0	32	2.13
8:15- 8:30	14	21	1	0	0	0	36	2.40
8:30- 8:45	22	14	0	0	0	0	36	
8:45- 9:00	9	1	0	0	0	0	10	
8:00- 9:00 hour	**60**	**51**	**3**	**0**	**0**	**0**	**114**	
9:00- 9:15	24	0	1	1	0	0	26	
9:15- 9:30	12	0	0	1	0	0	13	
9:30- 9:45	18	4	2	0	2	0	26	
9:45-10:00	25	1	1	1	1	1	30	
9:00-10:00 hour	**79**	**5**	**4**	**3**	**3**	**1**	**95**	
10:00-10:15	7	2	0	1	0	0	10	
10:15-10:30	21	1	0	0	0	0	22	
10:30-10:45	21	0	2	0	1	0	24	
10:45-11:00	17	1	7	0	0	0	25	
10:00-11:00 hour	**66**	**4**	**9**	**1**	**1**	**0**	**81**	
11:00-11:15	17	0	7	0	0	0	24	
11:15-11:30	36	0	6	0	0	0	42	
11:30-11:45	13	1	4	0	0	0	18	
11:45-12:00	12	0	11	0	0	0	23	
11:00-12:00 hour	**78**	**1**	**28**	**0**	**0**	**0**	**107**	
12:00-12:15	12	1	1	0	0	0	14	
12:15-12:30	7	0	3	1	0	0	11	
12:30-12:45	19	1	5	1	1	0	27	
12:45-13:00	17	0	6	0	0	0	23	
12:00-13:00 hour	**55**	**2**	**15**	**2**	**1**	**0**	**75**	
13:00-13:15	16	1	1	0	0	0	18	
13:15-13:30	7	0	6	0	0	0	13	
13:30-13:45	13	0	0	0	1	0	14	
13:45-14:00	26	2	1	0	0	0	29	
13:00-14:00 hour	**62**	**3**	**8**	**0**	**1**	**0**	**74**	
14:00-14:15	27	0	2	0	1	0	30	
14:15-14:30	21	3	2	1	0	0	27	
14:30-14:45	19	1	0	0	0	0	20	
14:45-15:00	9	0	0	0	0	0	9	
14:00-15:00 hour	**76**	**4**	**4**	**1**	**1**	**0**	**86**	
15:00-15:15	25	4	1	0	0	0	30	
15:15-15:30	27	0	0	1	0	0	28	
15:30-15:45	13	32	1	0	0	1	47	
15:45-16:00	34	36	0	0	1	0	71	
15:00-16:00 hour	**99**	**72**	**2**	**1**	**1**	**1**	**176**	
16:00-16:15	29	6	4	0	2	0	41	
16:15-16:30	18	11	2	0	0	0	31	
16:30-16:45	15	11	5	0	0	0	31	**Peds per min.**
16:45-17:00	19	4	2	0	0	0	25	1.67
17:00-17:15	8	26	1	0	0	1	36	2.40
17:15-17:30	11	7	1	0	0	1	20	1.33
17:30-17:45	6	3	1	0	0	1	11	0.73
17:45-18:00	8	0	2	0	0	0	10	0.67
18:00-18:15	13	2	0	0	0	0	15	1.00
18:15-18:30	11	4	2	0	0	0	17	
18:30-18:45	13	2	0	0	1	0	16	
18:45-19:00	5	0	0	0	0	0	5	
18:00-19:00 hour	**42**	**8**	**2**	**0**	**1**	**0**	**53**	
total	**769**	**223**	**95**	**9**	**11**	**5**	**1112**	

Appendix 5

Waterman Boreham Technical Note

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CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 5.1 ANALYSIS PROGRAM
RELEASE 4.0 (SEPT 2008)

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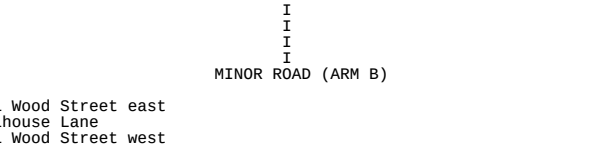
Run with file:-
"P:\GC001800 - 001899\GC001825 - Barnett Local Improvement Plan 2013-14\5 - Team Applications\Transportation\
PICADY\AM Base S T JCT DOSOME V2.vpi"
(drive-on-the-left) at 15:37:28 on Tuesday, 4 February 2014

RUN INFORMATION

RUN TITLE	: Wellhouse Lane/A411 Wood Street
LOCATION	: Barnet London
DATE	: 31/01/14
CLIENT	: Barnet London Borough
ENUMERATOR	: mearsd [COM143HZ]
JOB NUMBER	: GC1825
STATUS	:
DESCRIPTION	: AM Base 2014 with proposed improvements to Wellhouse Lane, existing crossing on Wood Street and proposed crossing on Wellhouse Lane

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS Arm A A411 Wood Street east
ARM B IS Arm B Wellhouse Lane
ARM C IS Arm C A411 Wood Street west

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 8.05 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.20 M.
- VISIBILITY	(VC-B) 87.00 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 32.0 M.
- VISIBILITY TO RIGHT	(VB-A) 32.0 M.
- LANE 1 WIDTH	(WB-C) -
- LANE 2 WIDTH	(WB-A) -
WIDTH AT 0 M FROM JUNCTION	10.00 M.
WIDTH AT 5 M FROM JUNCTION	7.70 M.
WIDTH AT 10 M FROM JUNCTION	4.80 M.
WIDTH AT 15 M FROM JUNCTION	4.50 M.
WIDTH AT 20 M FROM JUNCTION	4.40 M.
- LENGTH OF FLARED SECTION	DERIVED: 3 PCU

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

Intercept For STREAM B-C	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
0.00	0.00	0.00

* Due to the presence of a flare, data is not available

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B
0.00	0.00	0.00	0.00	0.00

* Due to the presence of a flare, data is not available

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
624.35	0.22	0.22

(NB These values do not allow for any site specific corrections)

TRAFFIC DEMAND DATA

ARM	FLOW SCALE(%)
A	100
B	100
C	100

Demand set: Wellhouse Lane/A411 Wood Street

TIME PERIOD BEGINS 07.00 AND ENDS 08.30

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
ARM A	15.00	45.00	75.00	9.19	13.78	9.19
ARM B	15.00	45.00	75.00	1.67	2.51	1.67
ARM C	15.00	45.00	75.00	8.11	12.17	8.11

Demand set: Wellhouse Lane/A411 Wood Street

TIME	FROM/TO	TURNING COUNTS	TURNING PROPORTIONS (PERCENTAGE OF H.V.S)	ARM A	ARM B	ARM C
07.00 - 07.15	ARM A	0.0	0.000	0.424	0.576	
			(0.0)	312.0	423.0	
			(0.0)	(5.1)	(4.0)	
	ARM B	109.0	0.813	0.000	0.187	
			(21.1)	(0.0)	(8.0)	
	ARM C	578.0	0.891	0.109	0.000	
			(2.4)	(0.0)	(0.0)	

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

PEDESTRIAN CROSSING DATA

B PEDESTRIAN CROSSING FLOW:
C PEDESTRIAN CROSSING FLOW:

ARM	LENGTH OF CROSSING (M) (ENTRY)	(EXIT)	QUEUEING SPACE BETWEEN CROSSING AND JUNCTION ENTRY (VEHS) (LEFT)	(RIGHT)	QUEUEING SPACE WITHOUT BLOCKING BACK INTO JUNCTION (VEHS)
B	4.50		4.0		50.0
C	8.30		3.0		3.0

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.00-07.15									
B-C	0.31	0.00	***	0.3	0.00	4.71	35.3	-999.00	
B-A	1.37	0.00	*** XX	0.3	0.00	20.52	153.9	-999.00	
C-A	7.25	26.06	0.278	0.5	0.00	0.69	10.1	0.05	
C-B	0.89	2.84	0.313	0.5	0.00	0.10	1.4	0.50	
A-B	3.91								
A-C	5.31								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.15-07.30									
B-C	0.37	0.00	***	0.7	4.71	10.32	112.7	-999.00	
B-A	1.63	0.00	*** XX	0.7	20.52	45.01	491.5	-999.00	
C-A	8.66	26.19	0.331	0.1	0.69	0.89	13.0	0.06	
C-B	1.06	2.89	0.368	0.1	0.10	0.13	1.9	0.53	
A-B	4.67								
A-C	6.34								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.30-07.45									
B-C	0.46	0.00	***	0.9	10.32	17.21	206.5	-999.00	
B-A	2.00	0.00	*** XX	0.9	45.01	75.02	900.2	-999.00	
C-A	10.61	25.57	0.415	0.2	0.88	1.26	18.3	0.07	
C-B	1.30	2.89	0.451	0.2	0.13	0.19	2.7	0.60	
A-B	5.73								
A-C	7.76								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00									
B-C	0.46	0.00	***	1.3	17.21	24.09	309.7		-999.00
B-A	2.00	0.00	*** XX	1.3	75.02	105.02	1350.2		-999.00
C-A	10.61	25.64	0.414	0.1	1.26	1.27	19.0		0.07
C-B	1.30	2.90	0.450	0.1	0.19	0.19	2.8		0.60
A-B	5.73								
A-C	7.76								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15									
B-C	0.37	0.00	***	2.1	24.09	29.71	403.4		-999.00
B-A	1.63	0.00	*** XX	2.1	105.02	129.52	1759.0		-999.00
C-A	8.66	25.68	0.337	0.5	1.27	0.93	14.4		0.06
C-B	1.06	2.85	0.373	0.5	0.18	0.13	2.1		0.54
A-B	4.67								
A-C	6.34								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30									
B-C	0.31	0.00	***	2.4	29.71	34.41	480.9		-999.00
B-A	1.37	0.00	*** XX	2.4	129.52	150.03	2096.6		-999.00
C-A	7.25	23.49	0.309	3.0	0.93	0.81	12.5		0.06
C-B	0.89	2.63	0.339	3.0	0.13	0.11	1.7		0.56
A-B	3.91								
A-C	5.31								

WARNING ENTRY CAPACITIES IN CERTAIN TIME SEGMENTS (FLAGGED XX IN THE TABULATION) ARE DOMINATED BY THE PEDESTRIAN CROSSING. (AG23 REF. 8.4.2(ii)).

WARNING THE ENTRY CAPACITY OF AT LEAST ONE STREAM HAS BECOME ZERO DURING THE PERIOD MODELLED. (AG23 REF. 8.4.2(i)).

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.15	4.7	*****
07.30	10.3	**********
07.45	17.2	*****************
08.00	24.1	************************
08.15	29.7	*****************************
08.30	34.4	**********************************

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.15	20.5	********************
07.30	45.0	***
07.45	75.0	**
08.00	105.0	**
08.15	129.5	**
08.30	150.0	**

QUEUE FOR STREAM C-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.15	0.3	
07.30	0.4	
07.45	0.6	*
08.00	0.6	*
08.15	0.5	
08.30	0.4	

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.15	0.5	
07.30	0.6	*
07.45	0.8	*
08.00	0.8	*
08.15	0.6	*
08.30	0.5	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-C	34.4	22.9	1548.5	45.00	********	********
B-A	150.0	100.0	6751.4	45.00	********	********
C-A	795.6	530.4	87.2	0.11	87.2	0.11
C-B	97.7	65.2	12.6	0.13	12.6	0.13
A-B	429.4	286.3				
A-C	582.2	388.2				
ALL	2089.4	1392.9	8399.6	4.02	**********	********

WARNING THE CAPACITY OF AT LEAST ONE STREAM HAS BECOME ZERO DURING THE PERIOD MODELLED.
* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*******END OF RUN*******

========== end of file ==========

Printed at 15:40:01 on 04/02/2014]

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CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

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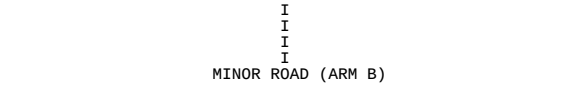
Run with file:-
"P:\GC001800 - 001899\GC001825 - Barnett Local Improvement Plan 2013-14\5 - Team Applications\Transportation\
PICADY\PM Base S T JCT DOSOME V2.vpi"
(drive-on-the-left) at 15:42:05 on Tuesday, 4 February 2014

RUN INFORMATION

RUN TITLE	: Wellhouse Lane/A411 Wood Street
LOCATION	: Barnet London
DATE	: 31/01/14
CLIENT	: Barnet London Borough
ENUMERATOR	: mearsd [COM143HZ]
JOB NUMBER	: GC1825
STATUS	:
DESCRIPTION	: PM Base 2014 with proposed improvements to Wellhouse Lane, existing crossing on Wood Street and proposed crossing on Wellhouse Lane

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS Arm A A411 Wood Street east
ARM B IS Arm B Wellhouse Lane
ARM C IS Arm C A411 Wood Street west

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 8.05 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.20 M.
- VISIBILITY	(VC-B) 87.00 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 32.0 M.
- VISIBILITY TO RIGHT	(VB-A) 32.0 M.
- LANE 1 WIDTH	(WB-C) -
- LANE 2 WIDTH	(WB-A) -
WIDTH AT 0 M FROM JUNCTION	10.00 M.
WIDTH AT 5 M FROM JUNCTION	7.70 M.
WIDTH AT 10 M FROM JUNCTION	4.80 M.
WIDTH AT 15 M FROM JUNCTION	4.50 M.
WIDTH AT 20 M FROM JUNCTION	4.40 M.
- LENGTH OF FLARED SECTION	DERIVED: 3 PCU

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

Intercept For STREAM B-C	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
0.00	0.00	0.00

* Due to the presence of a flare, data is not available

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B
0.00	0.00	0.00	0.00	0.00

* Due to the presence of a flare, data is not available

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
624.35	0.22	0.22

(NB These values do not allow for any site specific corrections)

TRAFFIC DEMAND DATA

ARM	FLOW SCALE(%)
A	100
B	100
C	100

Demand set: Wellhouse Lane/A411 Wood Street

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
ARM A	15.00	45.00	75.00	7.24	10.86	7.24
ARM B	15.00	45.00	75.00	3.56	5.34	3.56
ARM C	15.00	45.00	75.00	9.13	13.69	9.13

Demand set: Wellhouse Lane/A411 Wood Street

TURNING COUNTS
TURNING PROPORTIONS (PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C
16.45 - 17.00	ARM A	0.000	0.204	0.796
		0.0	118.0	461.0
		(0.0)	(19.5)	(1.5)
	ARM B	0.811	0.000	0.189
		231.0	0.0	54.0
		(7.8)	(0.0)	(0.0)
	ARM C	0.970	0.030	0.000
		708.0	22.0	0.0
		(2.6)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

PEDESTRIAN CROSSING DATA

B PEDESTRIAN CROSSING FLOW:
C PEDESTRIAN CROSSING FLOW:

ARM	LENGTH OF CROSSING (M) (ENTRY)	LENGTH OF CROSSING (M) (EXIT)	QUEUEING SPACE BETWEEN CROSSING AND JUNCTION ENTRY (VEHS) (LEFT)	QUEUEING SPACE BETWEEN CROSSING AND JUNCTION ENTRY (VEHS) (RIGHT)	QUEUEING SPACE WITHOUT BLOCKING BACK INTO JUNCTION (VEHS)
B	4.50		4.0		50.0
C	8.30		3.0		3.0

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00									
B-C	0.68	0.00	***	1.7	0.00	10.16	76.2		-999.00
B-A	2.90	0.00	*** XX	1.7	0.00	43.48	326.1		-999.00
C-A	8.88	29.69	0.299	0.5	0.00	0.82	11.9		0.05
C-B	0.28	0.90	0.306	0.5	0.00	0.03	0.4		1.49
A-B	1.48								
A-C	5.78								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15									
B-C	0.81	0.00	***	2.4	10.16	22.30	243.5		-999.00
B-A	3.46	0.00	*** XX	2.4	43.48	95.39	1041.5		-999.00
C-A	10.61	26.67	0.398	2.9	0.82	1.26	18.4		0.06
C-B	0.33	0.82	0.403	2.9	0.03	0.04	0.6		1.82
A-B	1.77								
A-C	6.91								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30									
B-C	0.99	0.00	***	1.3	22.30	37.16	446.0		-999.00
B-A	4.24	0.00	*** XX	1.3	95.39	158.98	1907.8		-999.00
C-A	12.99	29.15	0.446	0.8	1.26	1.54	22.5		0.06
C-B	0.40	0.90	0.450	0.8	0.04	0.05	0.7		1.76
A-B	2.17								
A-C	8.46								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
B-C	0.99	0.00	***	0.7	37.16	52.03	668.9		-999.00
B-A	4.24	0.00	*** XX	0.7	158.98	222.56	2861.5		-999.00
C-A	12.99	29.79	0.436	0.3	1.54	1.51	22.8		0.06
C-B	0.40	0.92	0.441	0.3	0.05	0.05	0.7		1.71
A-B	2.17								
A-C	8.46								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
B-C	0.81	0.00	***	0.7	52.03	64.16	871.4		-999.00
B-A	3.46	0.00	*** XX	0.7	222.56	274.48	3727.8		-999.00
C-A	10.61			0.0					0.00
C-B	0.02	0.52	0.039	0.0	0.05	0.00	0.0		2.01
A-B	1.77								
A-C	6.91								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
B-C	0.68	0.00	***	1.0	64.16	74.33	1038.7		-999.00
B-A	2.90	0.00	*** XX	1.0	274.48	317.95	4443.2		-999.00
C-A	8.88	29.67	0.299	0.5	0.04	0.82	11.9		0.05
C-B	0.28	0.91	0.304	0.5	0.00	0.03	0.4		1.47
A-B	1.48								
A-C	5.78								

WARNING ENTRY CAPACITIES IN CERTAIN TIME SEGMENTS (FLAGGED XX IN THE TABULATION) ARE DOMINATED BY THE PEDESTRIAN CROSSING. (AG23 REF. 8.4.2(ii)).

WARNING THE ENTRY CAPACITY OF AT LEAST ONE STREAM HAS BECOME ZERO DURING THE PERIOD MODELLED. (AG23 REF. 8.4.2(i)).

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	10.2	**********
17.15	22.3	**********
17.30	37.2	**********
17.45	52.0	**********
18.00	64.2	**********
18.15	74.3	**********

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	43.5	**********
17.15	95.4	**********
17.30	159.0	**********
17.45	222.6	**********
18.00	274.5	**********
18.15	318.0	**********

QUEUE FOR STREAM C-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.4	
17.15	0.6	*
17.30	0.8	*
17.45	0.8	*
18.00	0.0	
18.15	0.4	

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.4	
17.15	0.7	*
17.30	0.8	*
17.45	0.8	*
18.00	0.0	
18.15	0.4	

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-C	74.3	49.6	3344.7	45.00	********	********
B-A	318.0	212.0	14307.9	45.00	********	********
C-A	979.2	652.8	88.2	0.09	88.2	0.09
C-B	25.6	17.1	2.9	0.11	2.9	0.11
A-B	162.4	108.3				
A-C	634.5	423.0				
ALL	2194.0	1462.7	17743.8	8.09	**********	********

WARNING THE CAPACITY OF AT LEAST ONE STREAM HAS BECOME ZERO DURING THE PERIOD MODELLED.
* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*******END OF RUN*******

========== end of file ==========

Printed at 15:43:04 on 04/02/2014]

Appendix 6

PICADY Output

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CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 5.1 ANALYSIS PROGRAM
RELEASE 4.0 (SEPT 2008)

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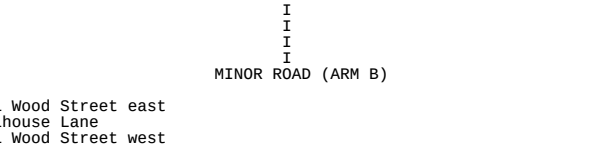
Run with file:-
"P:\GC001800 - 001899\GC001825 - Barnett Local Improvement Plan 2013-14\5 - Team Applications\Transportation\
PICADY\AM Base S T JCT DOSOME V2.vpi"
(drive-on-the-left) at 15:37:28 on Tuesday, 4 February 2014

RUN INFORMATION

RUN TITLE	: Wellhouse Lane/A411 Wood Street
LOCATION	: Barnet London
DATE	: 31/01/14
CLIENT	: Barnet London Borough
ENUMERATOR	: mearsd [COM143HZ]
JOB NUMBER	: GC1825
STATUS	:
DESCRIPTION	: AM Base 2014 with proposed improvements to Wellhouse Lane, existing crossing on Wood Street and proposed crossing on Wellhouse Lane

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS Arm A A411 Wood Street east
ARM B IS Arm B Wellhouse Lane
ARM C IS Arm C A411 Wood Street west

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 8.05 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.20 M.
- VISIBILITY	(VC-B) 87.00 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 32.0 M.
- VISIBILITY TO RIGHT	(VB-A) 32.0 M.
- LANE 1 WIDTH	(WB-C) -
- LANE 2 WIDTH	(WB-A) -
WIDTH AT 0 M FROM JUNCTION	10.00 M.
WIDTH AT 5 M FROM JUNCTION	7.70 M.
WIDTH AT 10 M FROM JUNCTION	4.80 M.
WIDTH AT 15 M FROM JUNCTION	4.50 M.
WIDTH AT 20 M FROM JUNCTION	4.40 M.
- LENGTH OF FLARED SECTION	DERIVED: 3 PCU

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

Intercept For STREAM B-C	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
0.00	0.00	0.00

* Due to the presence of a flare, data is not available

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B
0.00	0.00	0.00	0.00	0.00

* Due to the presence of a flare, data is not available

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
624.35	0.22	0.22

(NB These values do not allow for any site specific corrections)

TRAFFIC DEMAND DATA

ARM	FLOW SCALE(%)
A	100
B	100
C	100

Demand set: Wellhouse Lane/A411 Wood Street

TIME PERIOD BEGINS 07.00 AND ENDS 08.30

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
ARM A	15.00	45.00	75.00	9.19	13.78	9.19
ARM B	15.00	45.00	75.00	1.67	2.51	1.67
ARM C	15.00	45.00	75.00	8.11	12.17	8.11

Demand set: Wellhouse Lane/A411 Wood Street

TIME	FROM/TO	TURNING COUNTS	TURNING PROPORTIONS (PERCENTAGE OF H.V.S)	ARM A	ARM B	ARM C
07.00 - 07.15	ARM A	0.0	0.000	0.424	0.576	
			(0.0)	312.0	423.0	
			(0.0)	(5.1)	(4.0)	
	ARM B	109.0	0.813	0.000	0.187	
			(21.1)	(0.0)	(8.0)	
	ARM C	578.0	0.891	0.109	0.000	
			(2.4)	(0.0)	(0.0)	

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

PEDESTRIAN CROSSING DATA

B PEDESTRIAN CROSSING FLOW:
C PEDESTRIAN CROSSING FLOW:

ARM	LENGTH OF CROSSING (M) (ENTRY)	(EXIT)	QUEUEING SPACE BETWEEN CROSSING AND JUNCTION ENTRY (VEHS) (LEFT)	(RIGHT)	QUEUEING SPACE WITHOUT BLOCKING BACK INTO JUNCTION (VEHS)
B	4.50		4.0		50.0
C	8.30		3.0		3.0

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.00-07.15									
B-C	0.31	0.00	***	0.3	0.00	4.71	35.3	-999.00	
B-A	1.37	0.00	*** XX	0.3	0.00	20.52	153.9	-999.00	
C-A	7.25	26.06	0.278	0.5	0.00	0.69	10.1	0.05	
C-B	0.89	2.84	0.313	0.5	0.00	0.10	1.4	0.50	
A-B	3.91								
A-C	5.31								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.15-07.30									
B-C	0.37	0.00	***	0.7	4.71	10.32	112.7	-999.00	
B-A	1.63	0.00	*** XX	0.7	20.52	45.01	491.5	-999.00	
C-A	8.66	26.19	0.331	0.1	0.69	0.89	13.0	0.06	
C-B	1.06	2.89	0.368	0.1	0.10	0.13	1.9	0.53	
A-B	4.67								
A-C	6.34								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.30-07.45									
B-C	0.46	0.00	***	0.9	10.32	17.21	206.5	-999.00	
B-A	2.00	0.00	*** XX	0.9	45.01	75.02	900.2	-999.00	
C-A	10.61	25.57	0.415	0.2	0.88	1.26	18.3	0.07	
C-B	1.30	2.89	0.451	0.2	0.13	0.19	2.7	0.60	
A-B	5.73								
A-C	7.76								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00									
B-C	0.46	0.00	***	1.3	17.21	24.09	309.7		-999.00
B-A	2.00	0.00	*** XX	1.3	75.02	105.02	1350.2		-999.00
C-A	10.61	25.64	0.414	0.1	1.26	1.27	19.0		0.07
C-B	1.30	2.90	0.450	0.1	0.19	0.19	2.8		0.60
A-B	5.73								
A-C	7.76								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15									
B-C	0.37	0.00	***	2.1	24.09	29.71	403.4		-999.00
B-A	1.63	0.00	*** XX	2.1	105.02	129.52	1759.0		-999.00
C-A	8.66	25.68	0.337	0.5	1.27	0.93	14.4		0.06
C-B	1.06	2.85	0.373	0.5	0.18	0.13	2.1		0.54
A-B	4.67								
A-C	6.34								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30									
B-C	0.31	0.00	***	2.4	29.71	34.41	480.9		-999.00
B-A	1.37	0.00	*** XX	2.4	129.52	150.03	2096.6		-999.00
C-A	7.25	23.49	0.309	3.0	0.93	0.81	12.5		0.06
C-B	0.89	2.63	0.339	3.0	0.13	0.11	1.7		0.56
A-B	3.91								
A-C	5.31								

WARNING ENTRY CAPACITIES IN CERTAIN TIME SEGMENTS (FLAGGED XX IN THE TABULATION) ARE DOMINATED BY THE PEDESTRIAN CROSSING. (AG23 REF. 8.4.2(ii)).

WARNING THE ENTRY CAPACITY OF AT LEAST ONE STREAM HAS BECOME ZERO DURING THE PERIOD MODELLED. (AG23 REF. 8.4.2(i)).

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.15	4.7	*****
07.30	10.3	**********
07.45	17.2	*****************
08.00	24.1	************************
08.15	29.7	*****************************
08.30	34.4	**********************************

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.15	20.5	********************
07.30	45.0	***
07.45	75.0	**
08.00	105.0	**
08.15	129.5	**
08.30	150.0	**

QUEUE FOR STREAM C-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.15	0.3	
07.30	0.4	
07.45	0.6	*
08.00	0.6	*
08.15	0.5	
08.30	0.4	

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.15	0.5	
07.30	0.6	*
07.45	0.8	*
08.00	0.8	*
08.15	0.6	*
08.30	0.5	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-C	34.4	22.9	1548.5	45.00	********	********
B-A	150.0	100.0	6751.4	45.00	********	********
C-A	795.6	530.4	87.2	0.11	87.2	0.11
C-B	97.7	65.2	12.6	0.13	12.6	0.13
A-B	429.4	286.3				
A-C	582.2	388.2				
ALL	2089.4	1392.9	8399.6	4.02	**********	********

WARNING THE CAPACITY OF AT LEAST ONE STREAM HAS BECOME ZERO DURING THE PERIOD MODELLED.
* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*******END OF RUN*******

========== end of file ==========

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CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

PICADY 5.1 ANALYSIS PROGRAM
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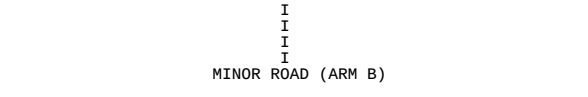
Run with file:-
"P:\GC001800 - 001899\GC001825 - Barnett Local Improvement Plan 2013-14\5 - Team Applications\Transportation\
PICADY\PM Base S T JCT DOSOME V2.vpi"
(drive-on-the-left) at 15:42:05 on Tuesday, 4 February 2014

RUN INFORMATION

RUN TITLE	: Wellhouse Lane/A411 Wood Street
LOCATION	: Barnet London
DATE	: 31/01/14
CLIENT	: Barnet London Borough
ENUMERATOR	: mearsd [COM143HZ]
JOB NUMBER	: GC1825
STATUS	:
DESCRIPTION	: PM Base 2014 with proposed improvements to Wellhouse Lane, existing crossing on Wood Street and proposed crossing on Wellhouse Lane

MAJOR/MINOR JUNCTION CAPACITY AND DELAY

INPUT DATA



ARM A IS Arm A A411 Wood Street east
ARM B IS Arm B Wellhouse Lane
ARM C IS Arm C A411 Wood Street west

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B
STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C
ETC.

GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 8.05 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.20 M.
- VISIBILITY	(VC-B) 87.00 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 32.0 M.
- VISIBILITY TO RIGHT	(VB-A) 32.0 M.
- LANE 1 WIDTH	(WB-C) -
- LANE 2 WIDTH	(WB-A) -
WIDTH AT 0 M FROM JUNCTION	10.00 M.
WIDTH AT 5 M FROM JUNCTION	7.70 M.
WIDTH AT 10 M FROM JUNCTION	4.80 M.
WIDTH AT 15 M FROM JUNCTION	4.50 M.
WIDTH AT 20 M FROM JUNCTION	4.40 M.
- LENGTH OF FLARED SECTION	DERIVED: 3 PCU

.SLOPES AND INTERCEPT

(NB:Streams may be combined, in which case capacity will be adjusted)

Intercept For STREAM B-C	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
0.00	0.00	0.00

* Due to the presence of a flare, data is not available

Intercept For STREAM B-A	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B	Slope For Opposing STREAM C-A	Slope For Opposing STREAM C-B
0.00	0.00	0.00	0.00	0.00

* Due to the presence of a flare, data is not available

Intercept For STREAM C-B	Slope For Opposing STREAM A-C	Slope For Opposing STREAM A-B
624.35	0.22	0.22

(NB These values do not allow for any site specific corrections)

TRAFFIC DEMAND DATA

ARM	FLOW SCALE(%)
A	100
B	100
C	100

Demand set: Wellhouse Lane/A411 Wood Street

TIME PERIOD BEGINS 16.45 AND ENDS 18.15

LENGTH OF TIME PERIOD - 90 MIN.
LENGTH OF TIME SEGMENT - 15 MIN.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	NUMBER OF MINUTES FROM START WHEN TOP OF PEAK IS REACHED	NUMBER OF MINUTES FROM START WHEN FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	RATE OF FLOW (VEH/MIN) AT TOP OF PEAK	RATE OF FLOW (VEH/MIN) AFTER PEAK
ARM A	15.00	45.00	75.00	7.24	10.86	7.24
ARM B	15.00	45.00	75.00	3.56	5.34	3.56
ARM C	15.00	45.00	75.00	9.13	13.69	9.13

Demand set: Wellhouse Lane/A411 Wood Street

TURNING COUNTS
TURNING PROPORTIONS (PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C
16.45 - 17.00	ARM A	0.000	0.204	0.796
		0.0	118.0	461.0
		(0.0)	(19.5)	(1.5)
	ARM B	0.811	0.000	0.189
		231.0	0.0	54.0
		(7.8)	(0.0)	(0.0)
	ARM C	0.970	0.030	0.000
		708.0	22.0	0.0
		(2.6)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
THE PERCENTAGE OF HEAVY VEHICLES VARIES OVER TURNING MOVEMENTS

PEDESTRIAN CROSSING DATA

B PEDESTRIAN CROSSING FLOW:
C PEDESTRIAN CROSSING FLOW:

ARM	LENGTH OF CROSSING (M) (ENTRY)	LENGTH OF CROSSING (M) (EXIT)	QUEUEING SPACE BETWEEN CROSSING AND JUNCTION ENTRY (VEHS) (LEFT)	QUEUEING SPACE BETWEEN CROSSING AND JUNCTION ENTRY (VEHS) (RIGHT)	QUEUEING SPACE WITHOUT BLOCKING BACK INTO JUNCTION (VEHS)
B	4.50		4.0		50.0
C	8.30		3.0		3.0

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

FOR COMBINED DEMAND SETS
AND FOR TIME PERIOD 1

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00									
B-C	0.68	0.00	***	1.7	0.00	10.16	76.2		-999.00
B-A	2.90	0.00	*** XX	1.7	0.00	43.48	326.1		-999.00
C-A	8.88	29.69	0.299	0.5	0.00	0.82	11.9		0.05
C-B	0.28	0.90	0.306	0.5	0.00	0.03	0.4		1.49
A-B	1.48								
A-C	5.78								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15									
B-C	0.81	0.00	***	2.4	10.16	22.30	243.5		-999.00
B-A	3.46	0.00	*** XX	2.4	43.48	95.39	1041.5		-999.00
C-A	10.61	26.67	0.398	2.9	0.82	1.26	18.4		0.06
C-B	0.33	0.82	0.403	2.9	0.03	0.04	0.6		1.82
A-B	1.77								
A-C	6.91								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30									
B-C	0.99	0.00	***	1.3	22.30	37.16	446.0		-999.00
B-A	4.24	0.00	*** XX	1.3	95.39	158.98	1907.8		-999.00
C-A	12.99	29.15	0.446	0.8	1.26	1.54	22.5		0.06
C-B	0.40	0.90	0.450	0.8	0.04	0.05	0.7		1.76
A-B	2.17								
A-C	8.46								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
B-C	0.99	0.00	***	0.7	37.16	52.03	668.9		-999.00
B-A	4.24	0.00	*** XX	0.7	158.98	222.56	2861.5		-999.00
C-A	12.99	29.79	0.436	0.3	1.54	1.51	22.8		0.06
C-B	0.40	0.92	0.441	0.3	0.05	0.05	0.7		1.71
A-B	2.17								
A-C	8.46								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
B-C	0.81	0.00	***	0.7	52.03	64.16	871.4		-999.00
B-A	3.46	0.00	*** XX	0.7	222.56	274.48	3727.8		-999.00
C-A	10.61			0.0					0.00
C-B	0.02	0.52	0.039	0.0	0.05	0.00	0.0		2.01
A-B	1.77								
A-C	6.91								

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)	AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
B-C	0.68	0.00	***	1.0	64.16	74.33	1038.7		-999.00
B-A	2.90	0.00	*** XX	1.0	274.48	317.95	4443.2		-999.00
C-A	8.88	29.67	0.299	0.5	0.04	0.82	11.9		0.05
C-B	0.28	0.91	0.304	0.5	0.00	0.03	0.4		1.47
A-B	1.48								
A-C	5.78								

WARNING ENTRY CAPACITIES IN CERTAIN TIME SEGMENTS (FLAGGED XX IN THE TABULATION) ARE DOMINATED BY THE PEDESTRIAN CROSSING. (AG23 REF. 8.4.2(ii)).

WARNING THE ENTRY CAPACITY OF AT LEAST ONE STREAM HAS BECOME ZERO DURING THE PERIOD MODELLED. (AG23 REF. 8.4.2(i)).

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	10.2	**********
17.15	22.3	**********
17.30	37.2	**********
17.45	52.0	**********
18.00	64.2	**********
18.15	74.3	**********

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	43.5	**********
17.15	95.4	**********
17.30	159.0	**********
17.45	222.6	**********
18.00	274.5	**********
18.15	318.0	**********

QUEUE FOR STREAM C-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.4	
17.15	0.6	*
17.30	0.8	*
17.45	0.8	*
18.00	0.0	
18.15	0.4	

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.4	
17.15	0.7	*
17.30	0.8	*
17.45	0.8	*
18.00	0.0	
18.15	0.4	

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-C	74.3	49.6	3344.7	45.00	********	********
B-A	318.0	212.0	14307.9	45.00	********	********
C-A	979.2	652.8	88.2	0.09	88.2	0.09
C-B	25.6	17.1	2.9	0.11	2.9	0.11
A-B	162.4	108.3				
A-C	634.5	423.0				
ALL	2194.0	1462.7	17743.8	8.09	**********	********

WARNING THE CAPACITY OF AT LEAST ONE STREAM HAS BECOME ZERO DURING THE PERIOD MODELLED.
* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES
WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS
A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

*******END OF RUN*******

========== end of file ==========

Printed at 15:43:04 on 04/02/2014]

Appendix 7

A411 Wood Street/Wellhouse Lane Mini-roundabout Design

Notes:
ICD = 17.0m
Central island = 4.0m

DRAFT
03/03/2014

E = 5.88
I = 4.99
VA = 3.75
V = 4.14
A = 15.6
K = 14.4

Existing driveway

5,88

8,28

5,47

3,23

E = 5.47
I = 3.86
VA = 3.52
V = 3.23
A = 15.0
K = 13.4

5,88

5,92

E = 5.88
I = 4.4
VA = 2.38
V = 2.76
A = 11.8
K = 5.8

Key:
VA min approach road half width (within 100m of give way line)
V half width at flare
E entry width
I flare (based on lower dimension of VA or V)
A distance to next arm
K entry corner kerbline distance

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Rev	Amendment Details	Date	Made	Chk'd

COMMERCIAL IN CONFIDENCE

Client :
LONDON BOROUGH OF BARNET

Project :
WELLHOUSE LANE

Purpose :
PRELIMINARY

Title :
OPTION 10
Mini Rbt Arcady Dimensions

Scale	Drawn	Checked	Approved
1 : 250 Original drawing A3	S Beaumont	Brian Baker	Wayne Palmer

Job No. GC/001825
Date 5th Mar '14

Drg No. G/0/16
Rev.

Consultant :
CAPITA
Property and infrastructure
St Davids House, Pascal Close, St Mellons, Cardiff, CF3 0LW
T 02920 803500 www.capita.co.uk/infrastructure

Appendix 8

A411 Wood Street/Wellhouse Lane Mini-roundabout ARCADY Output

ARCADY 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)

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THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS
IN NO WAY RELIEVED OF THEIR RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

Run with file:- "C:\Wellhouse Lane Mini Rbt V2\Wellhouse Mini AM + 2 Peds V2.vai" (drive-on-the-left) at 10:38:51 on

FILE PROPERTIES

RUN TITLE: Wellhouse Lane Mini Roundabout AM Peak Hour
LOCATION: Barnet London
DATE: 05/03/14
CLIENT: Barnet London Borough
ENUMERATOR: mearsd [CSL85140W]
JOB NUMBER: GC1825
STATUS:
DESCRIPTION:

INPUT DATA

ARM A - Arm A A411 Wood Street (east)
ARM B - Arm B Wellhouse Lane
ARM C - Arm C A411 Wood Street (west)

MINI-ROUNDABOUT GEOMETRIC DATA

JUNCTION IN LONDON
LIGHTING CONDITIONS : NORMAL
ROAD SURFACE CONDITION: NORMAL
ARM * HAS A ZEBRA CROSSING
ARM * HAS A ZEBRA CROSSING

ARM	V (M)	E (M)	Lm(M)	Vm(M)	A (M)	K (M)	G (%)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.23	5.47	3.86	3.52	15.00	13.40	0.00	0.478	16.378
ARM B	2.76	5.88	4.40	2.38	11.80	5.80	0.00	0.412	12.109
ARM C	4.14	5.88	4.99	3.75	15.60	14.40	0.00	0.511	15.664

V = approach half-width Lm = effective flare length A = distance between arms
E = entry width Vm = minimum approach half-width K= entry corner kerb line G=gradient over 50 m

TRAFFIC DEMAND DATA

Only sets included in the current run are shown

SCALING FACTORS

IARM	FLOW SCALE(%)
A	100
B	100
C	100

TIME PERIOD BEGINS(07.00)AND ENDS(08.30)

LENGTH OF TIME PERIOD -(90) MINUTES

LENGTH OF TIME SEGMENT - (15) MINUTES

DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

DEMAND SET TITLE: Wellhouse Lane Mini Roundabout AM Peak Hour

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS	TO RISE	TOP OF PEAK REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00		45.00	75.00	10.07	15.11	10.07
ARM B	15.00		45.00	75.00	1.67	2.51	1.67
ARM C	15.00		45.00	75.00	8.11	12.17	8.11

DEMAND SET TITLE: Wellhouse Lane Mini Roundabout AM Peak Hour

T33

TIME	FROM/T	TURNING PROPORTIONS / TURNING COUNTS / (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
07.00 - 08.30	ARM A	0.000	0.387	0.613
		0.0	312.0	494.0
		(0.0)	(5.1)	(4.0)
	ARM B	0.813	0.000	0.187
		109.0	0.0	25.0
		(21.1)	(0.0)	(8.0)
	ARM C	0.891	0.109	0.000
		578.0	71.0	0.0
		(4.3)	(0.0)	(0.0)

PEDESTRIAN CROSSING DATA
PEDESTRIAN CROSSING USE:
ARM B: Frequency of use is input directly for each time segment
ARM C: Frequency of use is input directly for each time segment
ZEBRA CROSSINGS

T40

ARM	LENGTH OF CROSSING (M) (ENTRY)	(EXIT)	QUEUEING SPACE BETWEEN CROSSING AND JUNCTION ENTRY (VEHS)	QUEUEING SPACE WITHOUT BLOCKING BACK INTO JUNCTION (VEHS)
B	5.70		3.5	3.6
C	8.30		3.5	3.7

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)		AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.00-07.15									
ARM A	10.11	15.28	0.662	- - -	0.0	1.9	26.0	-	0.185
ARM B	1.68	7.99	0.210	- - 0.3	0.0	0.3	3.8	-	0.158
ARM C	8.14	14.28	0.570	- - 0.5	0.0	1.3	18.2	-	0.159

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)		AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.15-07.30									
ARM A	12.08	15.20	0.795	- - -	1.9	3.5	47.7	-	0.300
ARM B	2.01	7.55	0.266	- - 0.7	0.3	0.4	5.2	-	0.180
ARM C	9.72	14.12	0.689	- - 0.1	1.3	2.1	29.6	-	0.222

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)		PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)		AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.30-07.45										
ARM A	14.79	15.09	0.980	- -	-	3.5	12.8	138.5	-	0.783
ARM B	2.46	7.06	0.348	- -	0.9	0.4	0.5	7.5	-	0.216
ARM C	11.91	13.90	0.857	- -	0.2	2.1	5.0	64.0	-	0.424

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)		PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)		AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
07.45-08.00										
ARM A	14.79	15.09	0.980	- -	-	12.8	16.9	225.2	-	1.184
ARM B	2.46	6.98	0.352	- -	1.3	0.5	0.5	8.0	-	0.221
ARM C	11.91	13.90	0.857	- -	0.1	5.0	5.4	78.9	-	0.481

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)		PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)		AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.00-08.15										
ARM A	12.08	15.19	0.795	- -	-	16.9	4.3	103.3	-	0.546
ARM B	2.01	7.34	0.274	- -	2.1	0.5	0.4	6.0	-	0.188
ARM C	9.72	14.11	0.689	- -	0.5	5.4	2.3	38.9	-	0.250

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)		PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)		AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
08.15-08.30										
ARM A	10.11	15.27	0.662	- -	-	4.3	2.0	33.1	-	0.205
ARM B	1.68	7.93	0.212	- -	2.4	0.4	0.3	4.2	-	0.160
ARM C	8.14	14.27	0.571	- -	3.0	2.3	1.4	21.6	-	0.167

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.15	1.9	**
07.30	3.5	****
07.45	12.8	**********
08.00	16.9	**********
08.15	4.3	****
08.30	2.0	**

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.15	0.3	
07.30	0.4	
07.45	0.5	*
08.00	0.5	*
08.15	0.4	
08.30	0.3	

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.15	1.3	*
07.30	2.1	**
07.45	5.0	*****
08.00	5.4	*****
08.15	2.3	**
08.30	1.4	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
A	1109.4	739.6	573.9	0.52	574.1	0.52
B	184.4	123.0	34.6	0.19	34.7	0.19
C	893.3	595.5	251.2	0.28	251.2	0.28
ALL	2187.1	1458.1	859.8	0.39	860.0	0.39

T75

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

========== end of file ==========

Printed at 10:40:44 on 07/03/2014]

ARCADY 6

ASSESSMENT OF ROUNDABOUT CAPACITY AND DELAY

Analysis Program: Release 7.0 (FEBRUARY 2010)

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Run with file:- "C:\Wellhouse Lane Mini Rbt V2\Wellhouse Mini PM + 2 Peds V2.vai" (drive-on-the-left) at 10:48:03 on

FILE PROPERTIES

RUN TITLE: Wellhouse Lane Mini Roundabout PM Peak Hour
LOCATION: Barnet London
DATE: 05/03/14
CLIENT: Barnet London Borough
ENUMERATOR: mearsd [CSL85140W]
JOB NUMBER: GC1825
STATUS:
DESCRIPTION:

INPUT DATA

ARM A - Arm A A411 Wood Street (east)
ARM B - Arm B Wellhouse Lane
ARM C - Arm C A411 Wood Street (west)

MINI-ROUNDABOUT GEOMETRIC DATA

JUNCTION IN LONDON
LIGHTING CONDITIONS : NORMAL
ROAD SURFACE CONDITION: NORMAL
ARM * HAS A ZEBRA CROSSING
ARM * HAS A ZEBRA CROSSING

ARM	V (M)	E (M)	Lm(M)	Vm(M)	A (M)	K (M)	G (%)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	3.23	5.47	3.90	3.52	15.00	13.40	0.00	0.478	16.394
ARM B	2.76	5.88	4.40	2.38	11.80	5.80	0.00	0.412	12.109
ARM C	4.14	5.88	5.00	3.75	15.60	14.40	0.00	0.511	15.668

V = approach half-width Lm = effective flare length A = distance between arms
E = entry width Vm = minimum approach half-width K= entry corner kerb line G=gradient over 50 m

TRAFFIC DEMAND DATA

Only sets included in the current run are shown

SCALING FACTORS

T13

IARM	FLOW SCALE(%)
A	100
B	100
C	100

TIME PERIOD BEGINS(16.45)AND ENDS(18.15)

LENGTH OF TIME PERIOD -(90) MINUTES

LENGTH OF TIME SEGMENT - (15) MINUTES

DEMAND FLOW PROFILES ARE SYNTHESISED FROM THE TURNING COUNT DATA

DEMAND SET TITLE: Wellhouse Lane Mini Roundabout AM Peak Hour

T15

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	7.76	11.64	7.76
ARM B	15.00	45.00	75.00	3.56	5.34	3.56
ARM C	15.00	45.00	75.00	9.13	13.69	9.13

DEMAND SET TITLE: Wellhouse Lane Mini Roundabout AM Peak Hour

T33

TIME	FROM/T	TURNING PROPORTIONS / TURNING COUNTS / (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
16.45 - 18.15	ARM A	0.000	0.190	0.810
		0.0	118.0	503.0
		(0.0)	(19.5)	(1.5)
	ARM B	0.811	0.000	0.189
		231.0	0.0	54.0
		(7.8)	(0.0)	(0.0)
	ARM C	0.970	0.030	0.000
		708.0	22.0	0.0
		(2.6)	(0.0)	(0.0)

PEDESTRIAN CROSSING DATA
PEDESTRIAN CROSSING USE:
ARM B: Frequency of use is input directly for each time segment
ARM C: Frequency of use is input directly for each time segment
ZEBRA CROSSINGS

T40

ARM	LENGTH OF CROSSING (M) (ENTRY)	(EXIT)	QUEUEING SPACE BETWEEN CROSSING AND JUNCTION ENTRY (VEHS)	QUEUEING SPACE WITHOUT BLOCKING BACK INTO JUNCTION (VEHS)
B	5.70		3.5	3.6
C	8.30		3.5	3.7

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

T70

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)		AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
16.45-17.00									
ARM A	7.79	15.50	0.503	- - -	0.0	1.0	14.2	-	0.128
ARM B	3.58	8.92	0.401	- - 1.7	0.0	0.7	9.3	-	0.184
ARM C	9.16	13.75	0.666	- - 0.5	0.0	1.9	26.2	-	0.207

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)		AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.00-17.15									
ARM A	9.30	15.48	0.601	- - -	1.0	1.5	21.0	-	0.160
ARM B	4.27	8.42	0.507	- - 2.4	0.7	1.0	14.2	-	0.239
ARM C	10.94	13.43	0.814	- - 2.9	1.9	3.9	51.5	-	0.362

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)		AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.15-17.30									
ARM A	11.40	15.45	0.737	- - -	1.5	2.7	36.6	-	0.237
ARM B	5.23	7.76	0.674	- - 1.3	1.0	1.9	26.2	-	0.377
ARM C	13.40	13.03	1.028	- - 0.8	3.9	17.4	174.3	-	1.106

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)		AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.30-17.45									
ARM A	11.40	15.45	0.738	- - -	2.7	2.7	40.5	-	0.246
ARM B	5.23	7.74	0.676	- - 0.7	1.9	2.0	29.6	-	0.395
ARM C	13.40	13.01	1.030	- - 0.3	17.4	26.6	332.1	-	1.932

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)		AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
17.45-18.00									
ARM A	9.30	15.46	0.602	- - -	2.7	1.6	24.7	-	0.167
ARM B	4.27	8.40	0.508	- - 0.7	2.0	1.1	17.1	-	0.249
ARM C	10.94	13.40	0.816	- - 0.0	26.6	5.5	196.4	-	1.162

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)		AVERAGE DELAY PER ARRIVING VEHICLE (MIN)
18.00-18.15									
ARM A	7.79	15.50	0.503	- - -	1.6	1.0	16.1	-	0.131
ARM B	3.58	8.89	0.402	- - 1.0	1.1	0.7	10.8	-	0.190
ARM C	9.16	13.72	0.668	- - 0.5	5.5	2.1	35.5	-	0.242

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.0	*
17.15	1.5	*
17.30	2.7	***
17.45	2.7	***
18.00	1.6	**
18.15	1.0	*

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	0.7	*
17.15	1.0	*
17.30	1.9	**
17.45	2.0	**
18.00	1.1	*
18.15	0.7	*

QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.00	1.9	**
17.15	3.9	****
17.30	17.4	*****************
17.45	26.6	**************************
18.00	5.5	*****
18.15	2.1	**

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

T75

ARM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
A	854.8	569.8	153.0	0.18	153.1	0.18
B	392.3	261.5	107.1	0.27	107.1	0.27
C	1004.8	669.9	816.0	0.81	816.2	0.81
ALL	2251.8	1501.2	1076.2	0.48	1076.4	0.48

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

========== end of file ==========

Printed at 10:48:17 on 07/03/2014]

Appendix B Linsig Analysis, Traffic Signal Control Option.

JUNCTION CAPACITY ANALYSIS – Wellhouse Lane

Junction Capacity Analysis

Capita were commissioned to undertake a LinSig analysis to establish the effects of signalising the junction of A411/Wellhouse Lane. The junction is in the London Borough of Barnet. Nearby is the junction of A411/Queens Road, as can be seen in **Fig. 1**.

Figure 1 *Site Location Plan*

A junction capacity analysis was undertaken for the roundabout using JCT's industry approved LinSig software package (version 3.2.13.0).

Traffic flows were obtained from the manual survey count carried out on 28th January 2014. Intergreen and saturation flow information was calculated from the preliminary design drawing G/0/08. A cycle time of 90 seconds was selected in order to avoid delays to pedestrians greater than 85 seconds.

Pedestrian phases have been calculated during the modelling process.

Two scenarios were set up for the model, based on the peak traffic flow times:

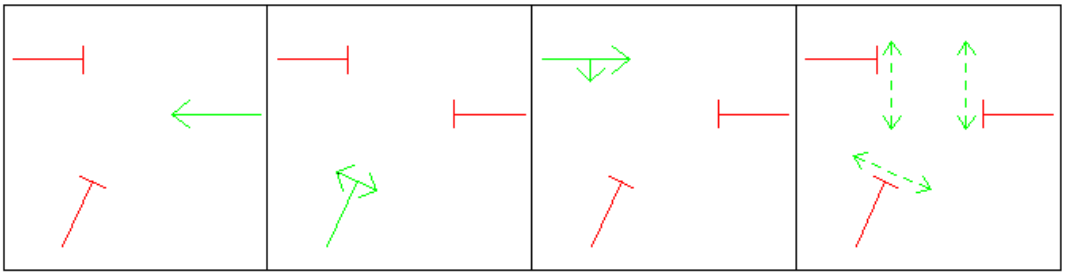
- Weekday A.M. Peak (07:15 – 08:15)
- Weekday P.M. Peak (17:00 – 18:00)

The capacity assessment results of the junctions are expressed in terms of the Practical Reserve Capacity (PRC) and the links are expressed in terms of degree of Saturation and maximum queue in PCUs. The theoretical capacity of the junction is taken at a PRC of zero and the link capacity is taken as a value of 0.90 (i.e. a maximum degree of saturation of 90% or below normally indicates an acceptable level of junction operation). Values in excess of this normally represent operational problems in the form of vehicle delays and the formation of traffic queues along the junction approaches.

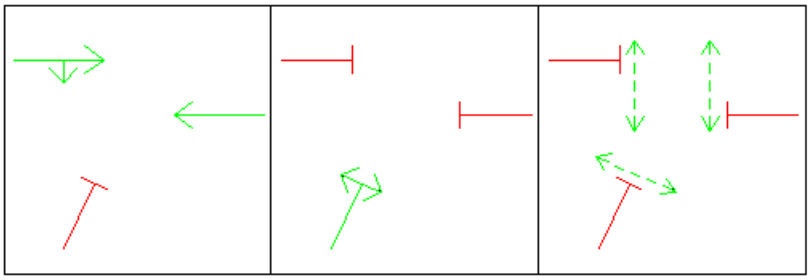
The results from the assessments of the proposed signal controlled junctions are contained in Appendix X.1 and summarised in *Tables 1 to 3* below.

Three options have been considered as part of the modelling process:

- Option 1: 4 Stage Junction (Unopposed Right Turn)



- Option 2: 3 Stage Junction (Right Turners Give Way without storage lane)



- Option 3: 3 Stage Junction (Right Turners Give Way with short storage lane)

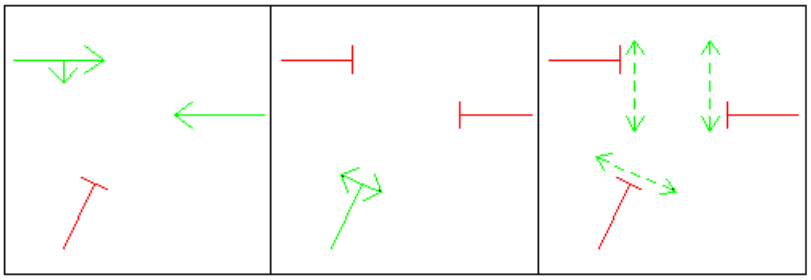


Table 1 Option 1 Capacity Analysis Summary Table (4 Stage) – Cycle Time (s): 90

Link	Road	A.M. Peak Period		P.M. Peak Period	
		Deg. Sat (%)	Queue (pcu)	Deg. Sat (%)	Queue (pcu)
1/1	A411 Wood Street Left Ahead	137.4	145.8	133.8	107.9
2/1	Wellhouse Lane Right Left	107.9	14.7	131.7	49.2
3/1	A411 Wood Street Ahead Right	132.1	108.8	131.8	117.8
Practical Reserve Capacity (PRC)		**-52.7%**		**-48.7%**	

Option 1 was modelled as a baseline. Given the heavy traffic flows, a 4 stage junction would result in too much delay, and consequently an oversaturated arrangement.

Table 2 Option 2 Capacity Analysis Summary Table (3 Stage) – Cycle Time (s): 90

Link	Road	A.M. Peak Period		P.M. Peak Period	
		Deg. Sat (%)	Queue (pcu)	Deg. Sat (%)	Queue (pcu)
1/1	A411 Wood Street Left Ahead	69.9	15.2	60.4	11.8
2/1	Wellhouse Lane Right Left	107.9	14.7	112.9	29.7
3/1	A411 Wood Street Ahead Right	123.4	89.6	112.0	66.3
Practical Reserve Capacity (PRC)		**-37.1%**		**-25.5%**	

Option 2 was modelled as reducing the stages by providing a right turn give way, also reduces the saturation at the junction. However, in this option, waiting right turners block the Eastbound ahead movement, so some capacity is lost as a result.

Table 3 Option 3 Capacity Analysis Summary Table (3 Stage with Right Turn Storage Lane) – Cycle Time (s): 90

Link	Road	A.M. Peak Period		P.M. Peak Period	
		Deg. Sat (%)	Queue (pcu)	Deg. Sat (%)	Queue (pcu)
1/1	A411 Wood Street Left Ahead	75.2	17.2	68.4	13.8
2/1	Wellhouse Lane Right Left	71.9	5.2	79.0	8.9
3/1	A411 Wood Street Ahead Right	66.3	12.4	82.3	18.4
Practical Reserve Capacity (PRC)		**19.7%**		**9.4%**	

Option 3 was modelled with an almost identical arrangement to Option 2, but whereas right turners blocked the Eastbound ahead movement in Option 2, Option 3 has been modelled around a storage lane for right turners. This lane can store two vehicles in advance of the stopline without blocking ahead traffic.

It can be seen that implementing Option 1 would result in a junction that operates significantly above capacity. Option 2 offers only slightly improved results - the junction would still operate above capacity.

While it can be seen that implementing Option 3 results in spare capacity and acceptable queuing, there is the potential for exit blocking in the westbound direction, due to the immediate proximity of the priority junction of A411/Queens Road, where waiting right turners may create queues across the junction of A411/Wellhouse Lane.

To provide some indication of the queues resulting from right turning vehicles onto Queens Road, a Picady model was created.

The Picady was run without the zebra crossing, as this would be removed if the junction of A411/Wellhouse Lane was signalised (with pedestrian crossings). The Picady was also run without taking into account any potential exit blocking that may occur due to the junction of A411/Wellhouse Lane. The results of the model are contained in Appendix X.2 and summarised in Table 4.

Table 4 Summary of Picady Model (A411/Queens Road Junction)

Road	A.M. Peak Period			P.M. Peak Period		
	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)	RFC
Queens Road	0.28	10.82	0.22	0.57	14.28	0.37
A411 Westbound	0.68	5.82	0.24	0.41	4.96	0.15

Table 4 indicates that queuing back from the junction of A411/Queens Road is unlikely to cause exit blocking at the junction of A411/Wellhouse Lane. This would suggest that signalising the junction of A411/Wellhouse Lane is a viable option although it is recommended that detailed site observations are undertaken to verify the queuing caused by vehicles waiting to turn right onto Queens Road.

The approximate cost of signalising the junction is £85,000.00. This would be in addition to the levy from TfL for adding traffic signals to London's network.

Summary

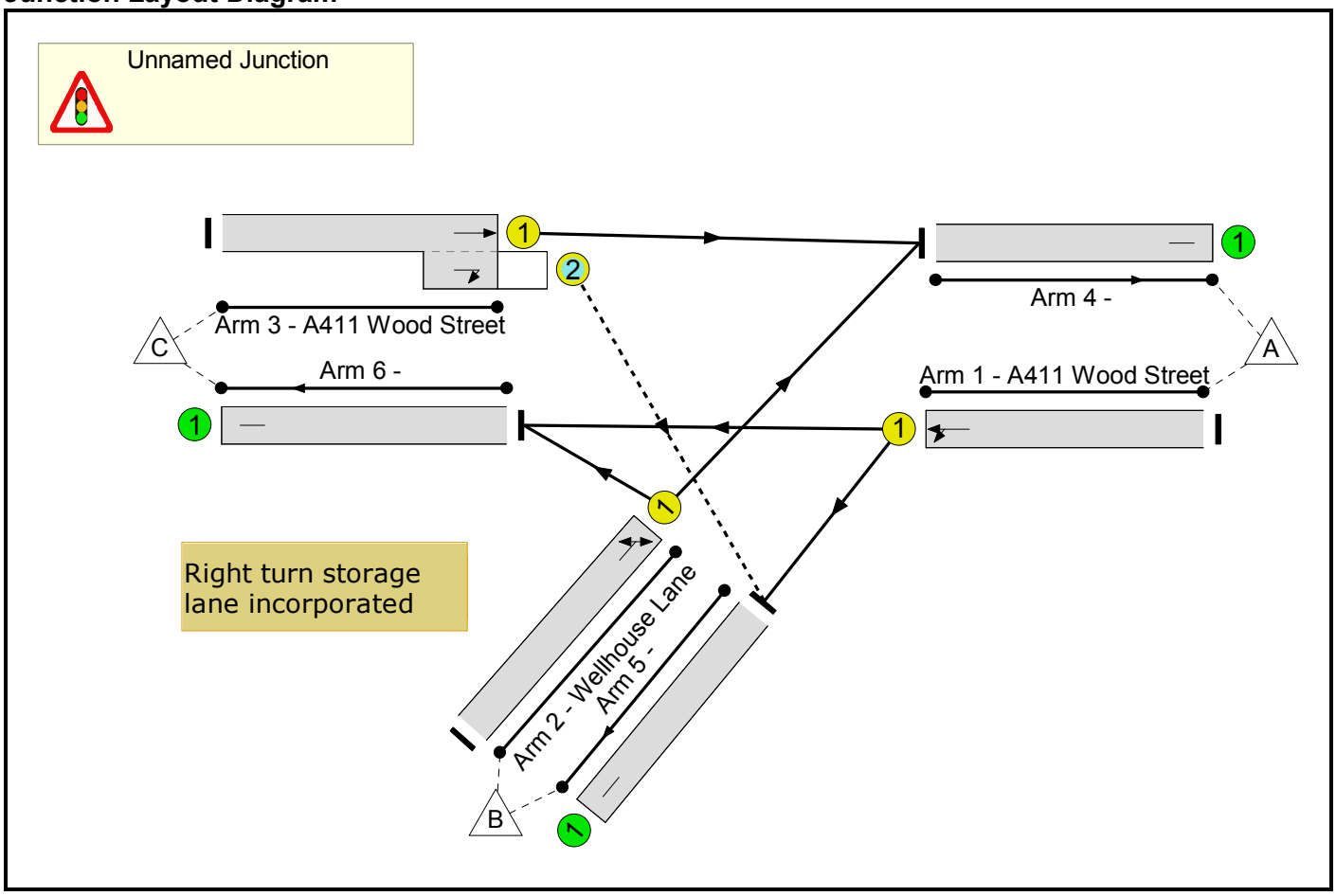
Based on the LinSig analysis, signalising the junction will be effective if room is provided for a ghost island for right turning vehicles into Wellhouse Lane and detailed site observations prove that queues arising from vehicles waiting to turn right onto Queens Road does not affect the junction of A411/Wellhouse Lane.

Basic Results Summary

User and Project Details

Project:	**Barnet Local Improvement Plan 2013-14**
Title:	**LinSig Analysis Option 3**
Location:	A411/Wellhouse Lane
Company:	Capita
Address:	

Junction Layout Diagram



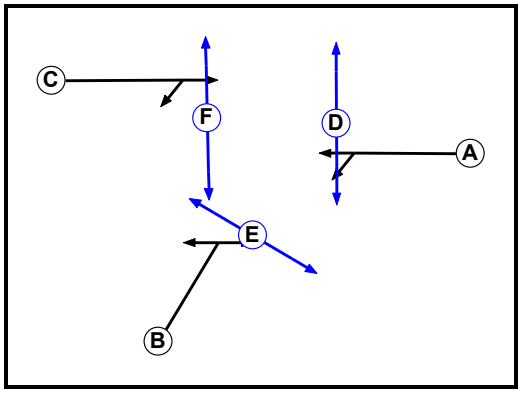
Basic Results Summary

Lane Input Data

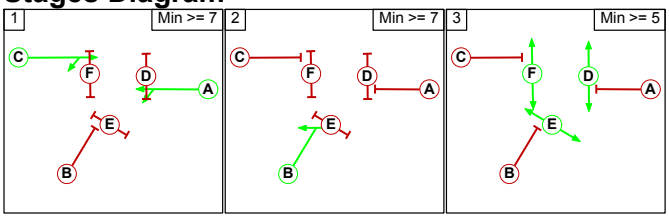
Junction: Unnamed Junction

Lane	Lane Type	Phases	Start Disp.	End Disp.	Physical Length (PCU)	Sat Flow Type	Def User Saturation Flow (PCU/Hr)	Lane Width (m)	Gradient	Nearside Lane	Turns	Turning Radius (m)
1/1 (A411 Wood Street)	U	A	2	3	200.0	Geom	-	3.90	0.00	Y	Arm 5 Left	16.00
											Arm 6 Ahead	Inf
2/1 (Wellhouse Lane)	U	B	2	3	200.0	Geom	-	3.00	0.00	Y	Arm 4 Right	20.00
											Arm 6 Left	7.00
3/1 (A411 Wood Street)	U	C	2	3	200.0	Geom	-	3.00	0.00	Y	Arm 4 Ahead	Inf
3/2 (A411 Wood Street)	O	C	2	3	3.0	Geom	-	2.60	0.00	Y	Arm 5 Right	11.00

Phase Diagram



Stages Diagram



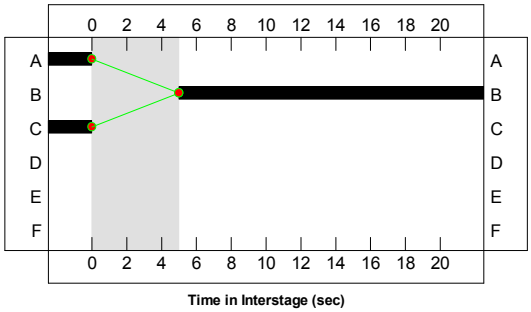
Phase Delays

Term. Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined					

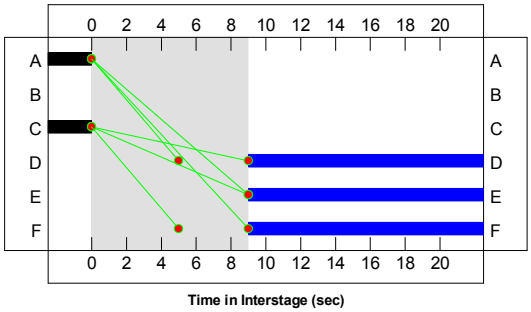
Basic Results Summary

Interstage Diagram

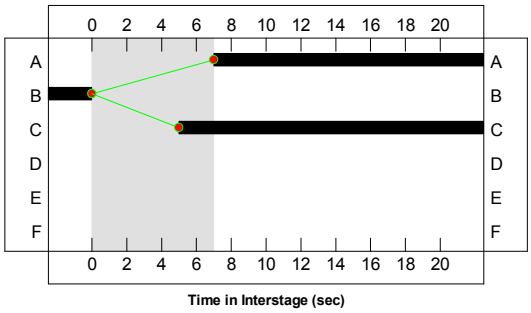
Stage Change 1 -> 2



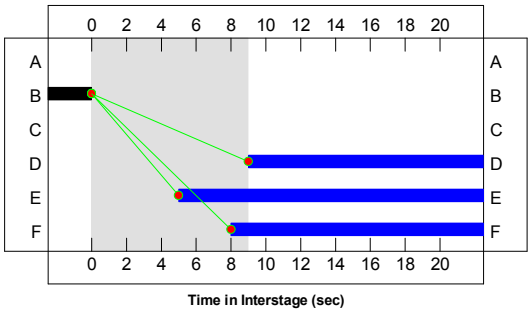
Stage Change 1 -> 3



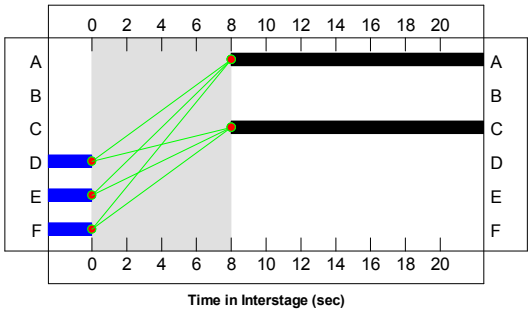
Stage Change 2 -> 1



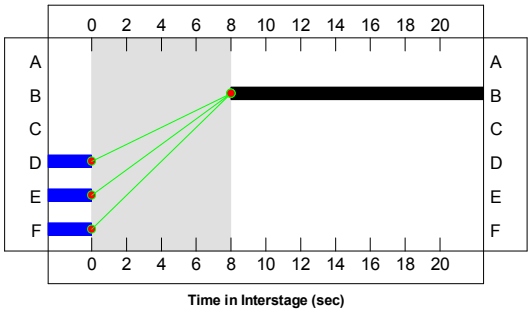
Stage Change 2 -> 3



Stage Change 3 -> 1



Stage Change 3 -> 2



Basic Results Summary

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: 'A.M. Peak Hour'	07:15	08:15	01:00	

Scenario 1: 'A.M. Peak' (FG1: 'A.M. Peak Hour', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	333	524	857
	B	138	0	29	167
	C	628	72	0	700
	Tot.	766	405	553	1724

Traffic Flows, Actual

Actual Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	333	524	857
	B	138	0	29	167
	C	628	72	0	700
	Tot.	766	405	553	1724

Lane Green Times

Junction: Unnamed Junction					
Lane	**Description**	**Type**	**Phases**	**Start Green**	**End Green**
1/1	A411 Wood Street Left Ahead	U	A	8	60
2/1	Wellhouse Lane Right Left	U	B	65	76
3/1	A411 Wood Street Ahead	U	C	8	60
3/2	A411 Wood Street Right	O	C	8	60

Basic Results Summary

Link Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: LinSig Analysis Option 3	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**75.2%**	**72**	**0**	**0**	**11.2**	**-**	**-**
Unnamed Junction	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**75.2%**	**72**	**0**	**0**	**11.2**	**-**	**-**
1/1	A411 Wood Street Left Ahead	U	A		1	52	-	857	1935	1140	75.2%	-	-	-	4.8	20.0	17.2
2/1	Wellhouse Lane Right Left	U	B		1	11	-	167	1742	232	71.9%	-	-	-	3.0	64.0	5.2
3/1+3/2	A411 Wood Street Ahead Right	U+O	C		1	52	-	700	1915:1650	1118	62.6%	72	0	0	3.5	17.9	11.8

C1 - A411/Wellhouse Lane

PRC for Signalled Lanes (%): 19.7
PRC Over All Lanes (%): 19.7

Total Delay for Signalled Lanes (pcuHr): 11.20
Total Delay Over All Lanes(pcuHr): 11.20

Cycle Time (s): 90

Basic Results Summary

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
2: 'P.M. Peak Hour'	17:00	18:00	01:00	

Scenario 2: 'P.M. Peak' (FG2: 'P.M. Peak Hour', Plan 1: 'Network Control Plan 1')

Traffic Flows, Desired

Desired Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	146	526	672
	B	252	0	54	306
	C	741	23	0	764
	Tot.	993	169	580	1742

Traffic Flows, Actual

Actual Flow :

		Destination			
		A	B	C	Tot.
Origin	A	0	146	526	672
	B	252	0	54	306
	C	741	23	0	764
	Tot.	993	169	580	1742

Lane Green Times

Junction: Unnamed Junction					
Lane	**Description**	**Type**	**Phases**	**Start Green**	**End Green**
1/1	A411 Wood Street Left Ahead	U	A	8	52
2/1	Wellhouse Lane Right Left	U	B	57	76
3/1	A411 Wood Street Ahead	U	C	8	52
3/2	A411 Wood Street Right	O	C	8	52

Basic Results Summary

Link Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: LinSig Analysis Option 3	-	-	-		-	-	-	-	-	-	**80.5%**	**23**	**0**	**0**	**15.0**	-	-
Unnamed Junction	-	-	-		-	-	-	-	-	-	**80.5%**	**23**	**0**	**0**	**15.0**	-	-
1/1	A411 Wood Street Left Ahead	U	A		1	44	-	672	1965	982	68.4%	-	-	-	4.3	22.9	13.8
2/1	Wellhouse Lane Right Left	U	B		1	19	-	306	1742	387	79.0%	-	-	-	4.6	54.3	8.9
3/1+3/2	A411 Wood Street Ahead Right	U+O	C		1	44	-	764	1915:1650	950	80.5%	23	0	0	6.1	28.6	17.8

C1 - A411/Wellhouse Lane

PRC for Signalled Lanes (%): 11.9
PRC Over All Lanes (%): 11.9

Total Delay for Signalled Lanes (pcuHr): 14.95
Total Delay Over All Lanes(pcuHr): 14.95

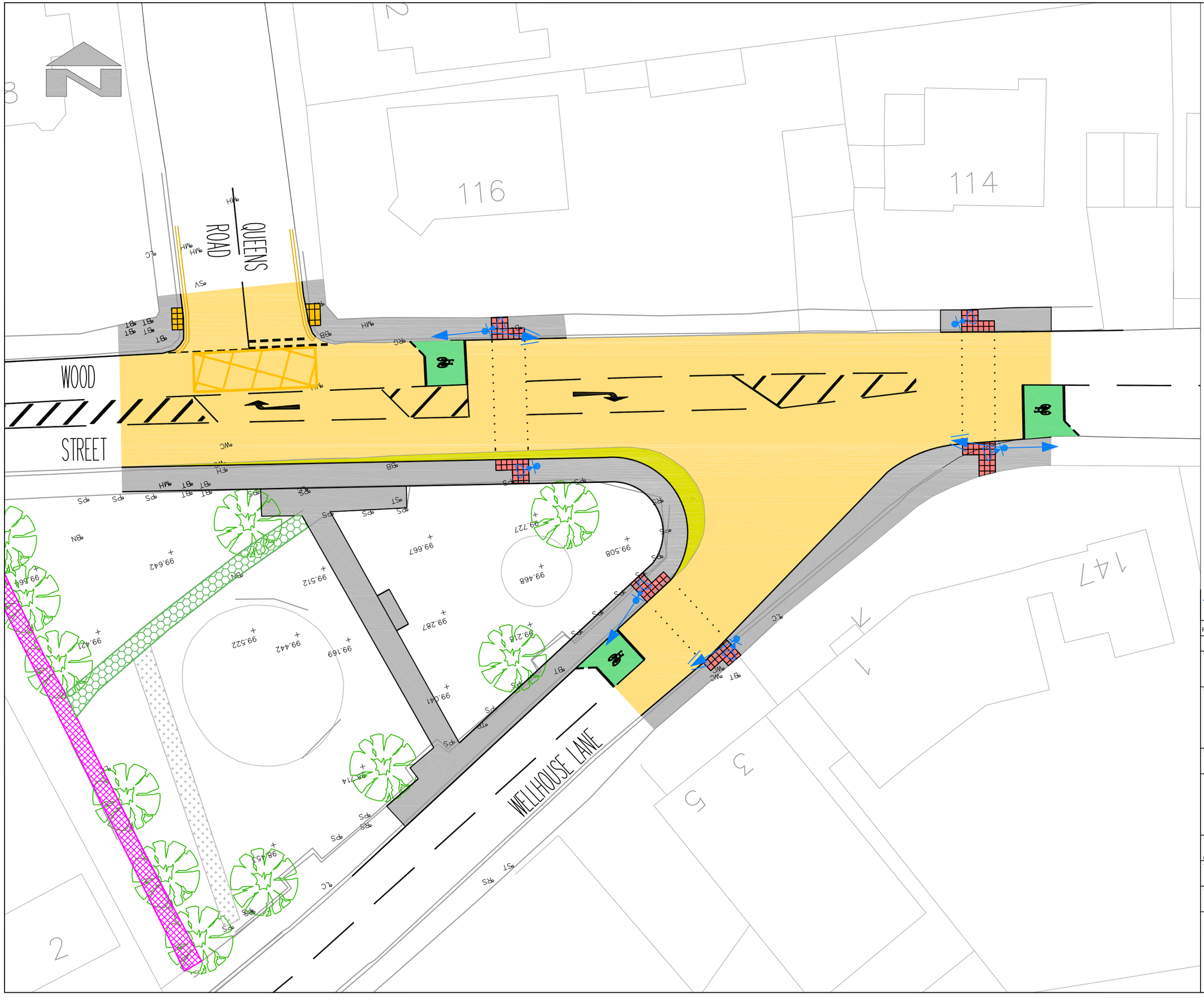
Cycle Time (s): 90

Appendix C Drawings

The following drawings are those options developed further following the clients initial observations, and included within this appendix.

G/0/08	Option 4 - Traffic Signals
G/0/10	Option 6 - Junction Plateau
G/0/12	Option 8 - One Way System
G/0/14	Option 10 - Mini Roundabout
G/0/15	Option 11 – Pedestrian Improvements
G/0/17	Option 12 – Bus Stop Enhancements
G/0/18	Landscaping
Fig 1	Landscape Materials Palette

The clients original outline plan (Drg. No 60689 Feasi) is also attached to this document for ease of reference



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Rev	Amendment Details	Date	Made	Chk'd
A	Modified to achieve optimum signals benefits	25/03/14	DNH	

COMMERCIAL IN CONFIDENCE

Client :
LONDON BOROUGH OF BARNET

Project :
WELLHOUSE LANE

Purpose :
PRELIMINARY

Title :
OPTION 4
TRAFFIC SIGNALS

Scale	Drawn	Checked	Approved
1 : 250 Original drawing A3	S Beaumont	Brian Baker	Wayne Palmer

Job No. GC/001825 — Date 12th Feb '14

Drg No. G/0/08 — Rev. A

Consultant :

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Property and infrastructure
St Davids House, Pascal Close, St Mellons, Cardiff, CF3 0LW
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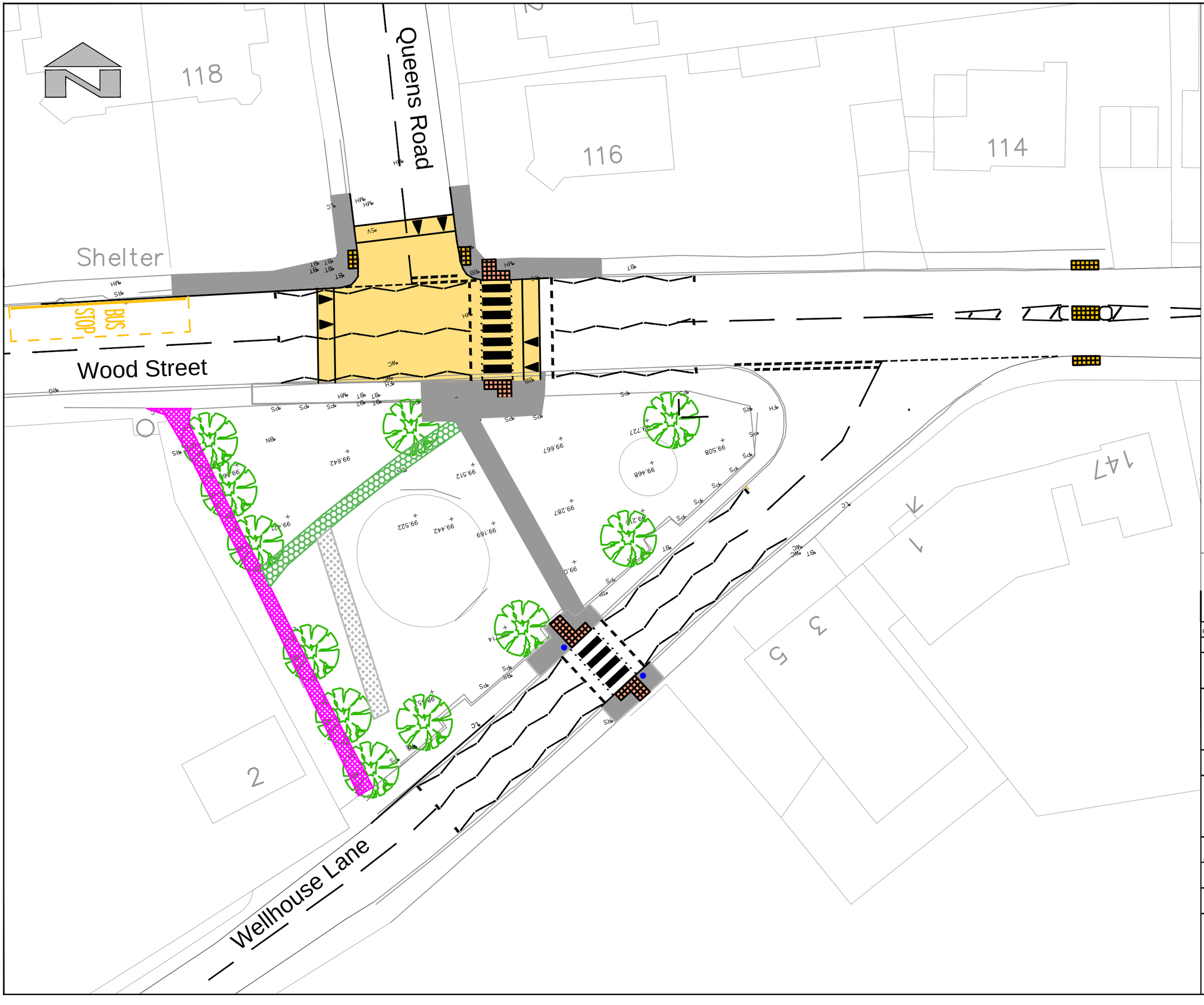

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Rev	Amendment Details	Date	Made	Chk'd
A	Zebra crossing on Wellhouse Lane relocated			

COMMERCIAL IN CONFIDENCE

Client :
LONDON BOROUGH OF BARNET

Project :
WELLHOUSE LANE

Purpose :
PRELIMINARY

Title :
OPTION 6
JUNCTION PLATEAU

Scale	Drawn	Checked	Approved
1 : 250 Original drawing A3	S Beaumont	Brian Baker	Wayne Palmer

Job No. GC/001825 | Date MAR'14

Drg No. G/0/10 | Rev. A

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DRAFT 24/03/14

Notes:
It is proposed that a one way system along Argyl Road, Granville Road and Queens Road be introduced. This would effectively remove right turns into Queens Road, clearing traffic from the Wellhouse Lane junction, and improve turning movements into and out of the residential streets, plus along the residential streets themselves.

A right turn facility could be introduced from Wood Street into Argyl Road, although this will remove up to 90 metres of roadside parking.

Pedestrian crossing of the Queens Road at its junction with Wood Street would be improved with the one way traffic and also a "build out" to reduce the crossing distance and also improve left turning traffic movements.

The option can be introduced as a stand alone improvement or with most of the Wellhouse Lane junction improvements.

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Rev	Amendment Details	Date	Made	Chk'd

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Client :
LONDON BOROUGH OF BARNET

Project :
WELLHOUSE LANE

Purpose :
PRELIMINARY

Title :
OPTION 8
ONE WAY SYSTEM

Scale	Drawn	Checked	Approved
1 : 1,000 Original drawing A3	Liam Davies	Brian Baker	Wayne Palmer

Job No. GC/001825 — Date 17th mar '14

Drg No. G/0/12 — Rev. A

Consultant :
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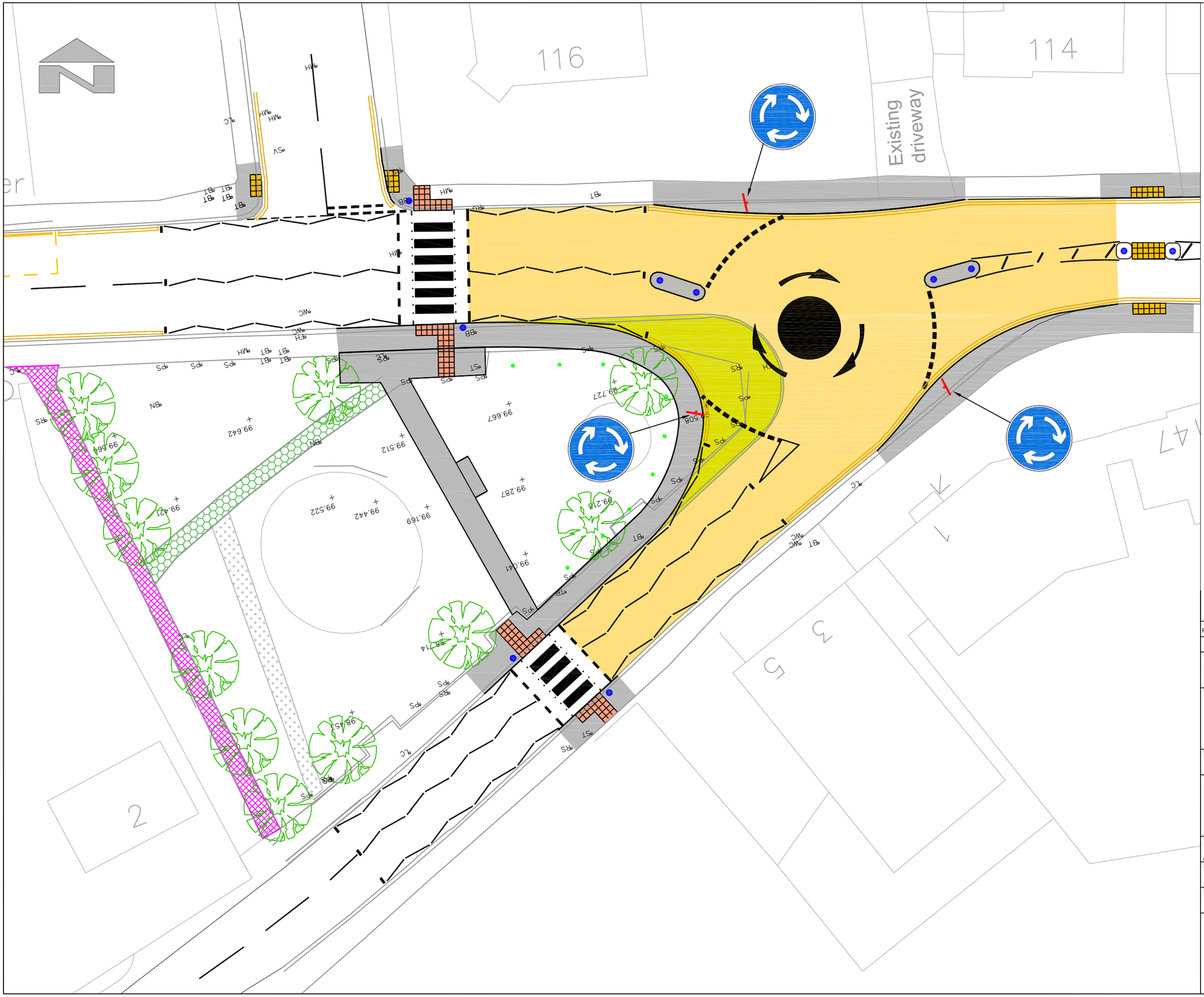

Key:

- New Footway / Footpath Surfacing
- Existing footpath to be removed, grassed over
- Existing footpath to be retained/upgraded
- Ramped Footpath
- Full Carriageway construction
- Resurface carriageway
- Re-instate worn grass area

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Rev	Amendment Details	Date	Made	Chk'd

COMMERCIAL IN CONFIDENCE

Client :
LONDON BOROUGH OF BARNET

Project :
WELLHOUSE LANE

Purpose :
PRELIMINARY

Title :
OPTION 10
MINI ROUNDABOUT

Scale	Drawn	Checked	Approved
1 : 250 Original drawing A3	S Beaumont	Brian Baker	Wayne Palmer

Job No. GC/001825 — Date 12th Feb '14

Drg No. G/0/14 — Rev.

Consultant :

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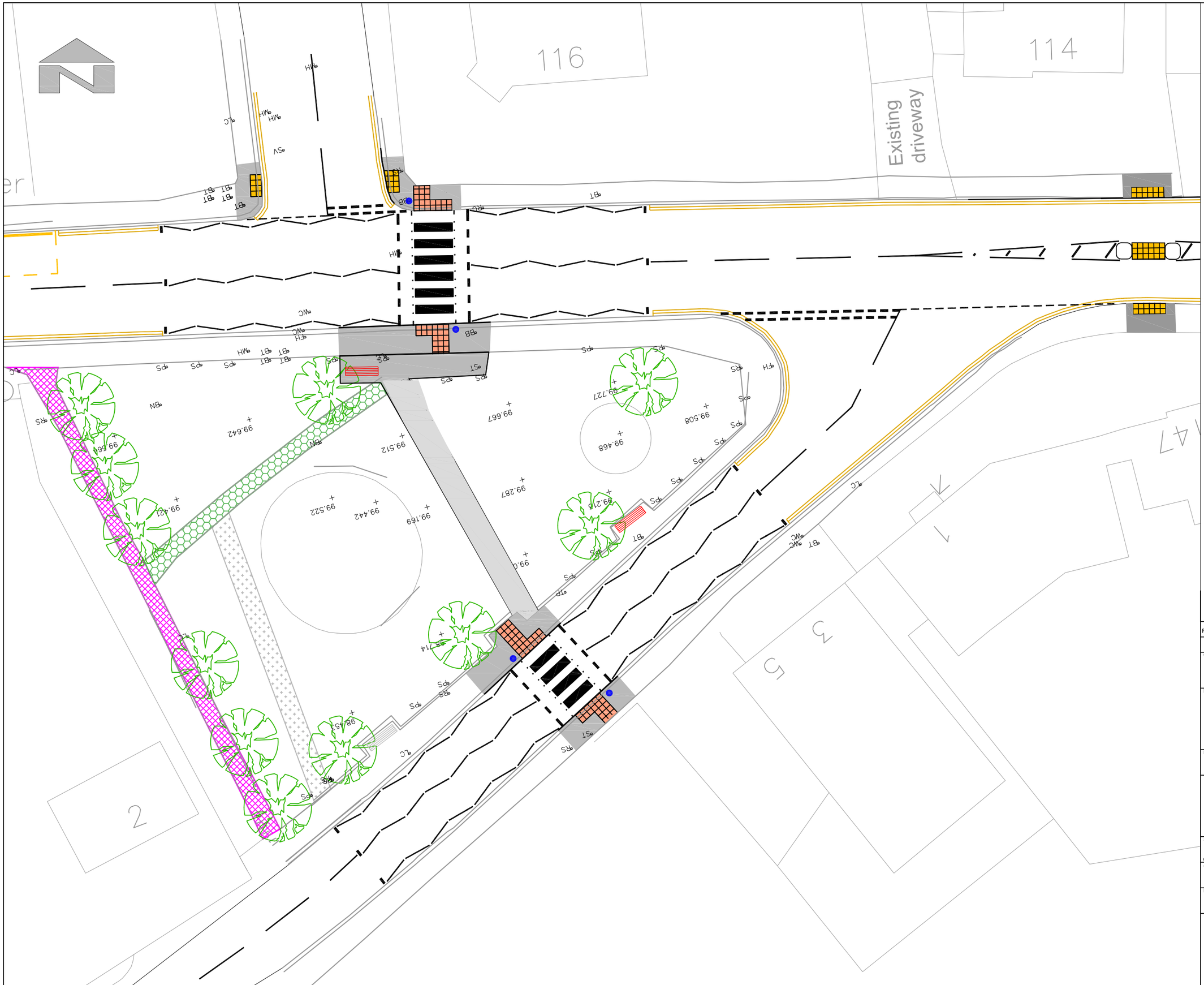
DRAFT 03/03/2014



Key:

- New Footway / Footpath Surfacing
- Existing footpath to be removed, grassed over
- Existing footpath to be retained/upgraded
- Re-instate worn grass area

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COMMERCIAL IN CONFIDENCE

Client:
LONDON BOROUGH OF BARNET

Project:
WELLHOUSE LANE

Purpose:
PRELIMINARY

Title:
OPTION 11
PEDESTRIAN FACILITIES

Scale	Drawn	Checked	Approved
1 : 250 Original drawing A3	S Beaumont	Brian Baker	Wayne Palmer

Job No.	Date
GC/001825	12th Feb '14

Drg No.	Rev.
G/0/15	

Consultant:

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Key:

- Bus boarding zone
- Shelter — Repositioned bus shelter
- New 140mm high kerbing
- New bus stop flag
- Repaved footway

Scope of works:

Eastbound:- Take up existing shelter, reposition to front of number 122. Provide new 140mm high kerbs to create boarding / alighting zones and resurface footways. New bus flag post to replace existing. Remove existing cage, provide new bus cage markings at new location, plus remedial works to yellow lines. new footway surfacing at both existing and new bus stops.

Westbound:- provide new 140mm high kerbs to improve boarding / alighting, resurface footway as required. Refresh existing bus cage markings.

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Rev	Amendment Details	Date	Made	Chk'd

COMMERCIAL IN CONFIDENCE

Client :
LONDON BOROUGH OF BARNET

Project :
WELLHOUSE LANE

Purpose :
PRELIMINARY

Title :
OPTION 12
BUS STOP ENHANCEMENT

Scale	Drawn	Checked	Approved
1 : 250 Original drawing A3	J Walker	Brian Baker	Wayne Palmer

Job No.	Date
GC/001825	17th Mar '14

Drg No.	Rev.
G/0/17	

Consultant :

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Key:

- New Footway / Footpath Surfacing
- Existing footpath to be removed, grassed over
- Existing footpath to be retained/upgraded
- Timber bench seat
- Re-instate worn grass area
- Existing planting bed seeded with grass
- Proposed semi mature tree planting
- Proposed shrub and ground cover planting
- Proposed black painted steel estate fencing
- Existing railing repainted black
- Proposed porous resin bound aggregate paving

Note that the proposed landscaping is designed to be introduced independent of any other highway improvements, it is shown with the mini-rbt option for ease of understanding

Exact position of proposed trees and street furniture subject to location of underground services.

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Rev	Amendment Details	Date	Made	Chk'd

COMMERCIAL IN CONFIDENCE

Client: LONDON BOROUGH OF BARNET

Project: WELLHOUSE LANE

Purpose: PRELIMINARY

Title: Landscape Proposal

Scale	Drawn	Checked	Approved
1 : 250 Original drawing A3	R Bryan	Brian Baker	Wayne Palmer

Job No. GC/001825 Date 25th Mar 2014

Drg No. G/0/18 Rev.

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STEEL ESTATE FENCING PAINTED BLACK

STEEL CLIMBING ROSE GAZIBO PAINTED BLACK

LOW SUNDERLAND
BOLLARD BLACK

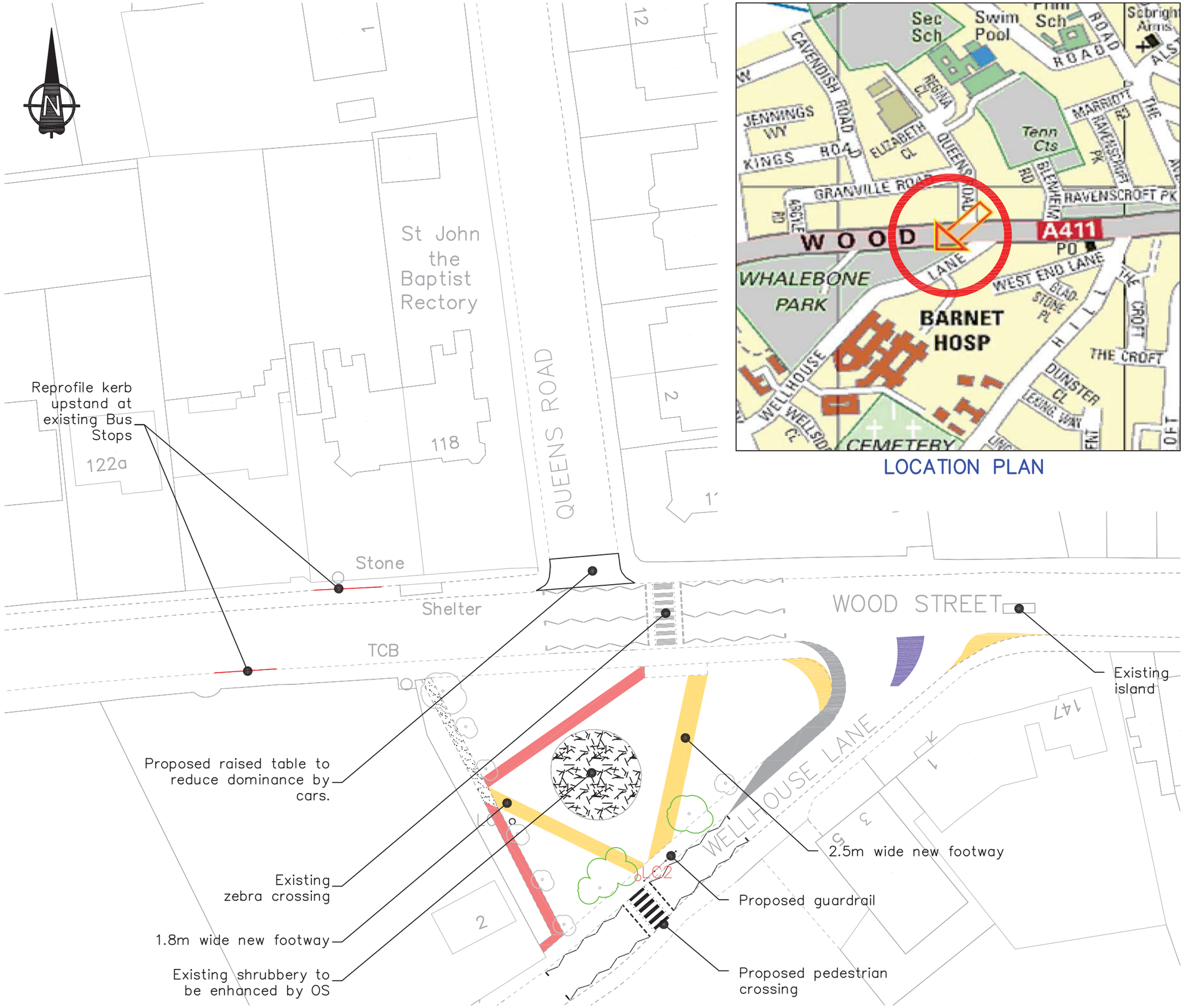
SINEU GRAFF ROYAL BLACK CAST IRON AND TIMBER SEAT

DRAFT

POROUS RESIN BOUND PAVING WITH STEEL EDGE TO ACHIVE CURVES

CAPITA Re

WELLHOUSE LANE
LONDON BOROUGH OF BARNET
PROPOSED STREET FURNATURE AND
PAVING PALETTE
FIGURE 1 MARCH 2014



Scale: 1:500

LOCATION PLAN

NOTES:

1. Not to scale. This drawing should not be scaled.

KEY

- Trim lower tree branches
- LC2 ○ Lighting column to relocate
- Convert to grassed verge
- Footway to be retained
- Proposed new carriageway
- Proposed new footway
- Proposed new island

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X	Xxx XX	Add notes	XX
Revision and Date		Description	Initial

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Director of Place

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Tel. (020) 8359 2000

BARNET
LONDON BOROUGH
Design Team

SCHEME:

Wellhouse Lane / A411 Wood Street

TITLE:

Junction & Pedestrian Safety Improvements Feasibility

Scales:	Date:
AS SHOWN	xx/04/13

Initiated:	Drawn:	Checked
LW	TN	-

DRAWING NO: 60689 Feasi

Acad Ref. -

We | Listen Create Deliver

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