# Crash Report including Vehicle and Casualty Information

| | | | | | |
|---|---|---|---|---|---|
| **Crash Date:** | Monday, February 04, 2013 | **Time of Crash:** | 8:37:00 PM | **Crash Reference:** | **201320M002513** |
| **Highest Injury Severity:** | Slight | **Number of Vehicles:** | 2 | **Number of Casualties:** | 1 |
| **Highway Authority:** | Coventry | | | **OS Grid Reference:** | 428050 276580 |
| **Local Authority:** | Coventry City | | | | |
| **Road Number:** | U0 | **Road Type:** | Single carriageway | | |
| **Weather Description:** | Fine without high winds | | | | |
| **Road Surface Description:** | Wet or Damp | | | | |
| **Speed Limit:** | 30 | **Junction Control:** | Give way or uncontrolled | | |
| **Light Conditions:** | Darkness: street lights present and lit | | | | |
| **Carriageway Hazards:** | None | | | | |
| **Junction Detail:** | T or staggered junction | | | | |
| **Junction Pedestrian Crossing:** | No physical crossing facility within 50 metres | | | | |

## Vehicles involved

| Vehicle Ref | Vehicle Type | Vehicle Age | Driver Gender | Driver Age Band | Vehicle Maneouvre |
|---|---|---|---|---|---|
| 1 | Car (excluding private hire cars 2005 onwards) | 11 | Female | 16 - 20 | Vehicle is in the act of turning right |
| 2 | Car (excluding private hire cars 2005 onwards) | 1 | Male | 66 - 75 | Vehicle proceeding normally along the carriageway, not on a bend |

For more information about the data please visit: *http://www.crashmap.com/home/aboutthedata* and *http://www.crashmap.com/home/definitions*

# Crash Report including Vehicle and Casualty Information

## Casualties

| Vehicle Ref | Casualty Ref | Injury Severity | Casualty Class | Gender | Age Band | Pedestrian Location | Pedestrian Movement |
|---|---|---|---|---|---|---|---|
| 1 | 1 | Slight | Driver or rider | Female | 16 - 20 | Unknown or other | Unknown or other |

For more information about the data please visit: *http://www.crashmap.com/home/aboutthedata* and *http://www.crashmap.com/home/definitions*

# Crash Report including Vehicle and Casualty Information

| | | | | | |
|---|---|---|---|---|---|
| **Crash Date:** | Sunday, May 24, 2015 | **Time of Crash:** | 10:30:00 AM | **Crash Reference:** | **201520M007425** |
| **Highest Injury Severity:** | Serious | **Number of Vehicles:** | 2 | **Number of Casualties:** | 1 |
| **Highway Authority:** | Coventry | | | **OS Grid Reference:** | 428000 276600 |
| **Local Authority:** | Coventry City | | | | |
| **Road Number:** | U0 | **Road Type:** | Single carriageway | | |
| **Weather Description:** | Raining without high winds | | | | |
| **Road Surface Description:** | Wet or Damp | | | | |
| **Speed Limit:** | 30 | **Junction Control:** | Give way or uncontrolled | | |
| **Light Conditions:** | Daylight: regardless of presence of streetlights | | | | |
| **Carriageway Hazards:** | Pedestrian in carriageway - not injured | | | | |
| **Junction Detail:** | T or staggered junction | | | | |
| **Junction Pedestrian Crossing:** | No physical crossing facility within 50 metres | | | | |

## Vehicles involved

| Vehicle Ref | Vehicle Type | Vehicle Age | Driver Gender | Driver Age Band | Vehicle Maneouvre |
|---|---|---|---|---|---|
| 2 | Pedal cycle | -1 | Male | 36 - 45 | Vehicle proceeding normally along the carriageway, not on a bend |
| 1 | Car (excluding private hire cars 2005 onwards) | 4 | Male | 21 - 25 | Vehicle is in the act of turning left |

For more information about the data please visit: *http://www.crashmap.com/home/aboutthedata* and *http://www.crashmap.com/home/definitions*

# Crash Report including Vehicle and Casualty Information

## Casualties

| Vehicle Ref | Casualty Ref | Injury Severity | Casualty Class | Gender | Age Band | Pedestrian Location | Pedestrian Movement |
|---|---|---|---|---|---|---|---|
| 2 | 1 | Serious | Driver or rider | Male | 36 - 45 | Unknown or other | Unknown or other |

For more information about the data please visit: *http://www.crashmap.com/home/aboutthedata* and *http://www.crashmap.com/home/definitions*

# Crash Report including Vehicle and Casualty Information

| | | | | | |
|---|---|---|---|---|---|
| **Crash Date:** | Friday, July 12, 2013 | **Time of Crash:** | 5:40:00 PM | **Crash Reference:** | **201320M009453** |
| **Highest Injury Severity:** | Slight | **Number of Vehicles:** | 2 | **Number of Casualties:** | 3 |
| **Highway Authority:** | Coventry | | | **OS Grid Reference:** | 427390 276860 |
| **Local Authority:** | Coventry City | | | | |
| **Road Number:** | U0 | **Road Type:** | Single carriageway | | |
| **Weather Description:** | Fine without high winds | | | | |
| **Road Surface Description:** | Dry | | | | |
| **Speed Limit:** | 30 | **Junction Control:** | Give way or uncontrolled | | |
| **Light Conditions:** | Daylight: regardless of presence of streetlights | | | | |
| **Carriageway Hazards:** | None | | | | |
| **Junction Detail:** | T or staggered junction | | | | |
| **Junction Pedestrian Crossing:** | No physical crossing facility within 50 metres | | | | |

## Vehicles involved

| Vehicle Ref | Vehicle Type | Vehicle Age | Driver Gender | Driver Age Band | Vehicle Maneouvre |
|---|---|---|---|---|---|
| 1 | Car (excluding private hire cars 2005 onwards) | 12 | Female | 66 - 75 | Vehicle proceeding normally along the carriageway, not on a bend |
| 2 | Car (excluding private hire cars 2005 onwards) | 8 | Female | 56 - 65 | Vehicle proceeding normally along the carriageway, not on a bend |

For more information about the data please visit: *http://www.crashmap.com/home/aboutthedata* and *http://www.crashmap.com/home/definitions*

# Crash Report including Vehicle and Casualty Information

## Casualties

| Vehicle Ref | Casualty Ref | Injury Severity | Casualty Class | Gender | Age Band | Pedestrian Location | Pedestrian Movement |
|---|---|---|---|---|---|---|---|
| 1 | 1 | Slight | Driver or rider | Female | 66 - 75 | Unknown or other | Unknown or other |
| 1 | 3 | Slight | Vehicle or pillion passenger | Male | Over 75 | Unknown or other | Unknown or other |
| 2 | 2 | Slight | Driver or rider | Female | 56 - 65 | Unknown or other | Unknown or other |

For more information about the data please visit: *http://www.crashmap.com/home/aboutthedata* and *http://www.crashmap.com/home/definitions*

# Crash Report including Vehicle and Casualty Information

| | | | | | |
|---|---|---|---|---|---|
| **Crash Date:** | Tuesday, May 10, 2011 | **Time of Crash:** | 2:30:00 PM | **Crash Reference:** | **201120M006601** |
| **Highest Injury Severity:** | Slight | **Number of Vehicles:** | 2 | **Number of Casualties:** | 1 |
| **Highway Authority:** | Coventry | | | **OS Grid Reference:** | 427400 276910 |
| **Local Authority:** | Coventry City | | | | |
| **Road Number:** | U0 | **Road Type:** | Single carriageway | | |
| **Weather Description:** | Fine without high winds | | | | |
| **Road Surface Description:** | Dry | | | | |
| **Speed Limit:** | 30 | **Junction Control:** | Give way or uncontrolled | | |
| **Light Conditions:** | Daylight: regardless of presence of streetlights | | | | |
| **Carriageway Hazards:** | None | | | | |
| **Junction Detail:** | T or staggered junction | | | | |
| **Junction Pedestrian Crossing:** | No physical crossing facility within 50 metres | | | | |

## Vehicles involved

| Vehicle Ref | Vehicle Type | Vehicle Age | Driver Gender | Driver Age Band | Vehicle Maneouvre |
|---|---|---|---|---|---|
| 1 | Car (excluding private hire cars 2005 onwards) | 11 | Male | 21 - 25 | Vehicle is in the act of turning right |
| 2 | Car (excluding private hire cars 2005 onwards) | 9 | Female | 56 - 65 | Vehicle proceeding normally along the carriageway, not on a bend |

For more information about the data please visit: *http://www.crashmap.com/home/aboutthedata* and *http://www.crashmap.com/home/definitions*

# Crash Report including Vehicle and Casualty Information

## Casualties

| Vehicle Ref | Casualty Ref | Injury Severity | Casualty Class | Gender | Age Band | Pedestrian Location | Pedestrian Movement |
|---|---|---|---|---|---|---|---|
| 2 | 1 | Slight | Driver or rider | Female | 56 - 65 | Unknown or other | Unknown or other |

For more information about the data please visit: *http://www.crashmap.com/home/aboutthedata* and *http://www.crashmap.com/home/definitions*

# APPENDIX C

**Westwood Heath Road**
Crest Nicholson

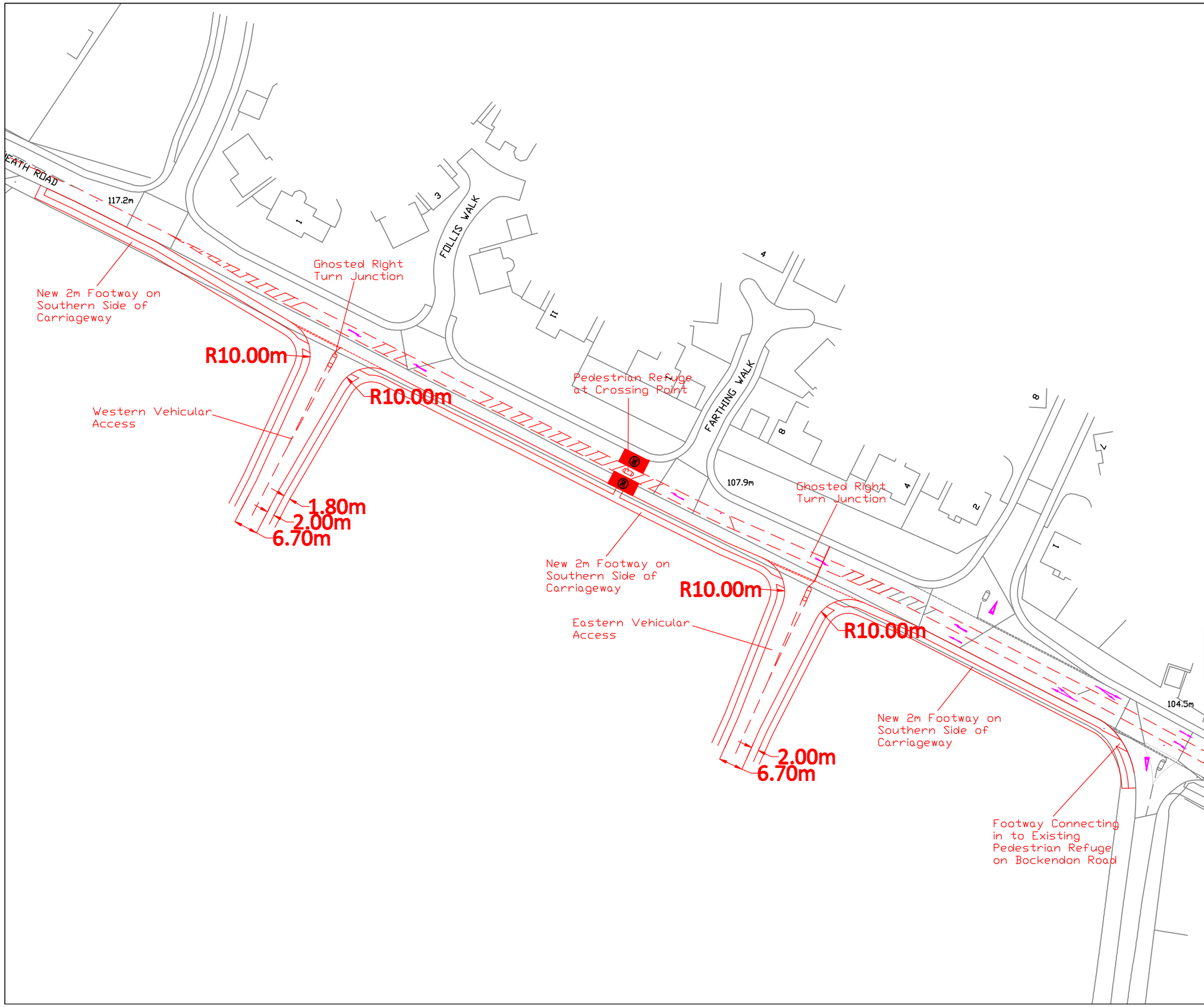
Based upon the 2016 Ordnance Survey Mastermap vector data with the permission of the Ordnance Survey on behalf of Her Majesty's Stationery Office. © Crown copyright. Terence O'Rourke Ltd. License No. 100019980.

**Illustrative master plan with aerial**

15602SB/MP02 /
NTS@A3
August 2016

TERENCE O'ROURKE

# APPENDIX D




THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

NOTES

| Revision Details | By / Check | Date | Suffix |
|---|---|---|---|

Drawing Number
SK21222-01

Westwood Heath Road

Drawing Title
Access Strategy to Proposed Development

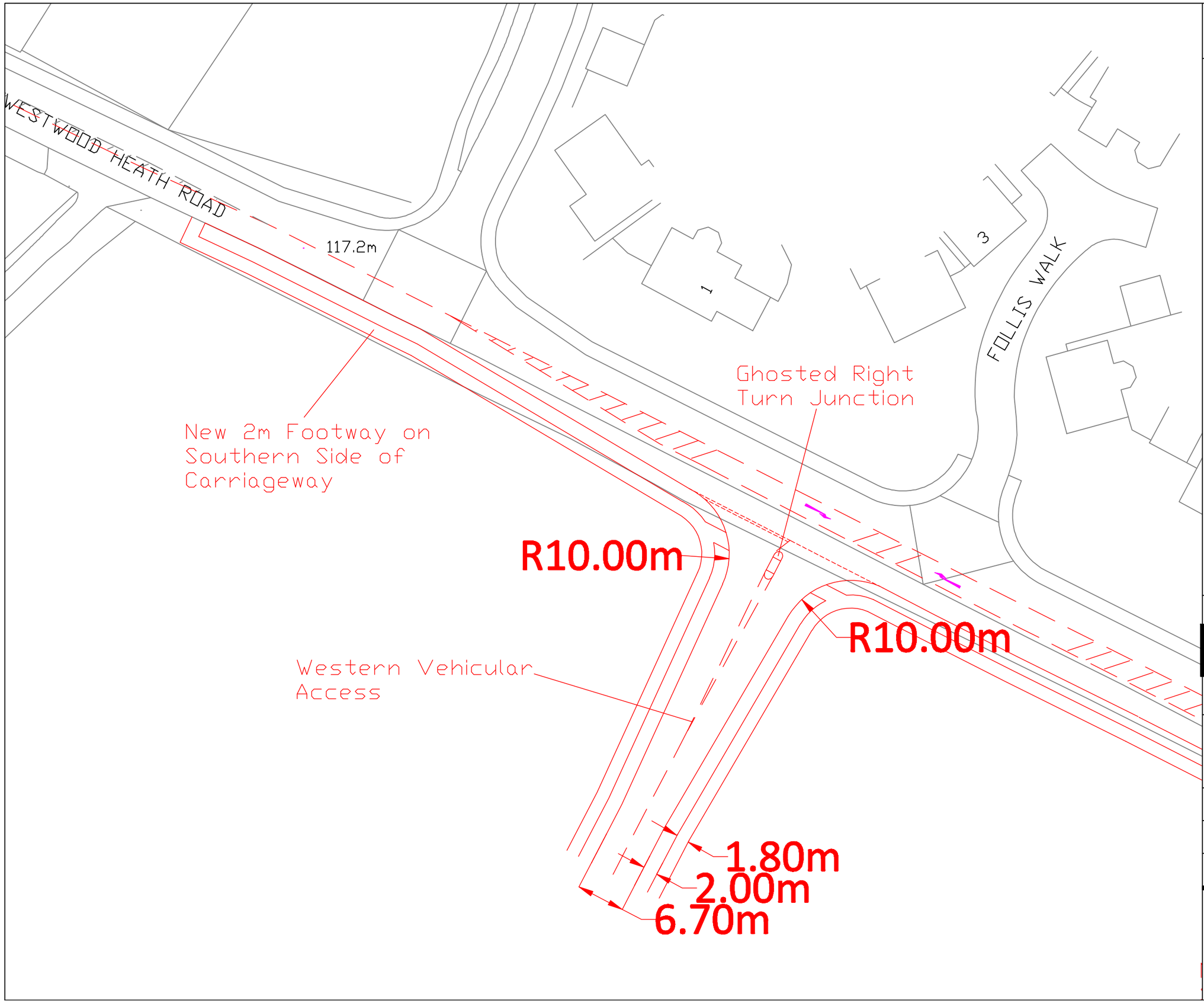
Scale at A3
1:1000

| Drawn | Approved |
|---|---|
| KAT | MAK |
| **Check** | **Date** |
| KAT | 08/08/16 |

SK Transport Planning Ltd
Albion Wharf, 19 Albion Street
Manchester M1 5LN
Telephone (0161) 234 6509
Fax (0161) 236 7959

SKTP

# APPENDIX **E**




THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

NOTES

| Revision Details | By / Check | Date | Suffix |
|---|---|---|---|

Drawing Number
SK21222-02

Westwood Heath Road

Drawing Title
Access Strategy to Proposed Development (Western Access)

Scale at A3
1:500

| Drawn | Approved |
|---|---|
| KAT | MAK |
| **Check** | **Date** |
| KAT | 08/08/16 |

SK Transport Planning Ltd
Albion Wharf, 19 Albion Street
Manchester M1 5LN
Telephone (0161) 234 6509
Fax (0161) 236 7959

SKTP

Plot Date :29 August 2016 02:58:13
AutoCAD File Name :\\Mac\Home\Dropbox\Project Work\Westwood Heath Road\SK21222-01 180816.dwg

THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

NOTES

Pedestrian Refuge at Crossing Point

FARTHING WALK

107.9m

Ghosted Right Turn Junction

New 2m Footway on Southern Side of Carriageway

R10.00m

Eastern Vehicular Access

R10.00m

New 2m Footway on Southern Side of Carriageway

2.00m

6.70m

| Revision Details | By / Check | Date | Suffix |
|---|---|---|---|
| | | | |

Drawing Number
SK21222-03

Westwood Heath Road

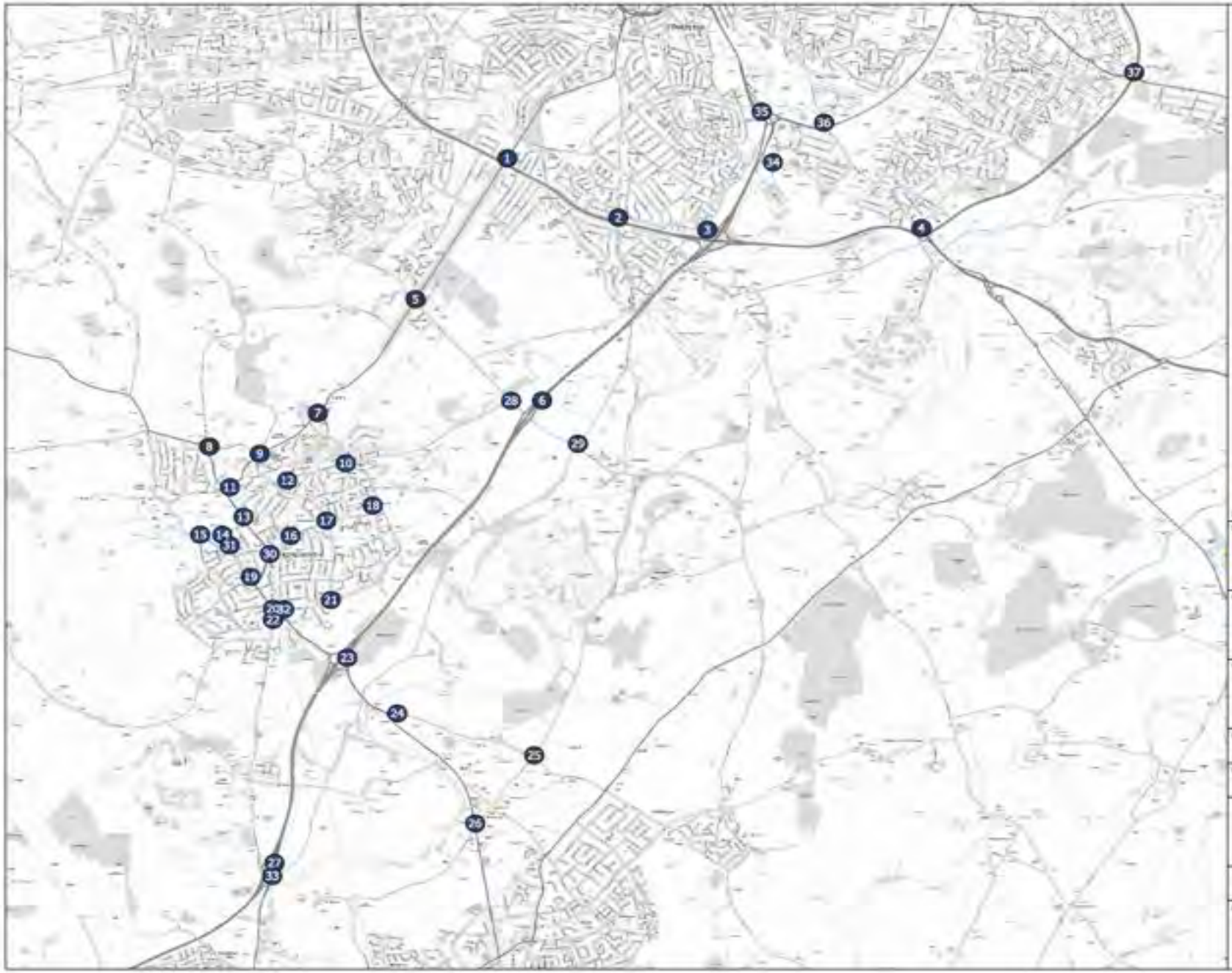
Drawing Title
Access Strategy to Proposed Development (Eastern Access)

Scale at A3
1:500

| Drawn | Approved |
|---|---|
| KAT | MAK |
| **Check** | **Date** |
| KAT | 08/08/16 |

SK Transport Planning Ltd
Albion Wharf, 19 Albion Street
Manchester M1 5LN
Telephone (0161) 234 6509
Fax (0161) 236 7959

# APPENDIX **F**




Legend

Queues junction Locations

SK transport planning.

VM160108 Westwood Heath Road SK Transport

Queue Junction Location

NTS

| | | | |
|---|---|---|---|
| DL | SA | 23/08/2016 | 1 |

vectos

JL - 001

| Change in Traffic Flows at Key Junctions (425, 529 and 610 Units at Westwood Heath Road) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Total Throughput** | **2028 Reference** | **+425 Dwellings** | **%age Change** | **+529 Dwellings** | **Traffic Flow Change** | **%age Change** | **+610 Dwellings** | **Traffic Flow Change** | **%age Change** |
| **Junction 1 - A45/A429** | | | | | | | | | |
| AM Peak (0800 - 0900) | 4631 | 117 | 2.5% | 141 | 24 | 3.0% | 164 | 47 | 3.5% |
| PM Peak (1700 - 1800) | 5091 | 116 | 2.3% | 147 | 31 | 2.9% | 169 | 53 | 3.3% |
| **Junction 2 - A45/B4113** | | | | | | | | | |
| AM Peak (0800 - 0900) | 5239 | 67 | 1.3% | 80 | 13 | 1.5% | 93 | 26 | 1.8% |
| PM Peak (1700 - 1800) | 5450 | 47 | 0.9% | 58 | 11 | 1.1% | 66 | 19 | 1.2% |
| **Junction 3 - Stivichall Interchange** | | | | | | | | | |
| AM Peak (0800 - 0900) | 5291 | 22 | 0.4% | 26 | 4 | 0.5% | 30 | 8 | 0.6% |
| PM Peak (1700 - 1800) | 5215 | 49 | 0.9% | 58 | 9 | 1.1% | 64 | 15 | 1.2% |
| **Junction 4 - Tollbar End** | | | | | | | | | |
| AM Peak (0800 - 0900) | 5747 | 46 | 0.8% | 56 | 10 | 1.0% | 64 | 18 | 1.1% |
| PM Peak (1700 - 1800) | 6117 | 53 | 0.9% | 66 | 13 | 1.1% | 75 | 22 | 1.2% |
| **Junction 5 - A429/Stoneleigh Rd/Gibbet Hill** | | | | | | | | | |
| AM Peak (0800 - 0900) | 2770 | 113 | 4.1% | 139 | 26 | 5.0% | 160 | 47 | 5.8% |
| PM Peak (1700 - 1800) | 2585 | 122 | 4.7% | 136 | 14 | 5.3% | 175 | 53 | 6.8% |
| **Junction 6 - A46/Stoneleigh Road** | | | | | | | | | |
| AM Peak (0800 - 0900) | 2620 | 51 | 1.9% | 60 | 9 | 2.3% | 69 | 18 | 2.6% |
| PM Peak (1700 - 1800) | 2739 | 90 | 3.3% | 106 | 16 | 3.9% | 118 | 28 | 4.3% |
| **Junction 7 - A429 Coventry Road/Common Lane** | | | | | | | | | |
| AM Peak (0800 - 0900) | 1155 | 7 | 0.6% | 13 | 6 | 1.1% | 15 | 8 | 1.3% |
| PM Peak (1700 - 1800) | 916 | 5 | 0.5% | 9 | 4 | 1.0% | 10 | 5 | 1.1% |
| **Junction 8 - A452 Beehive Hill/Upper Spring Lane/Fieldgate** | | | | | | | | | |
| AM Peak (0800 - 0900) | 604 | 38 | 6.3% | 47 | 9 | 7.8% | 53 | 15 | 8.8% |
| PM Peak (1700 - 1800) | 542 | 40 | 7.4% | 50 | 10 | 9.2% | 56 | 16 | 10.3% |
| **Junction 9 - Coventry Rd/Tainters Hill/Upper** | | | | | | | | | |
| AM Peak (0800 - 0900) | 1230 | 31 | 2.5% | 39 | 8 | 3.2% | 44 | 13 | 3.6% |
| PM Peak (1700 - 1800) | 1192 | 12 | 1.0% | 66 | 14 | 5.5% | 17 | 5 | 1.4% |
| **Junction 10 - Dalehouse Lane/Knowle Hill** | | | | | | | | | |
| AM Peak (0800 - 0900) | 998 | 4 | 0.4% | 7 | 3 | 0.7% | 7 | 3 | 0.7% |
| PM Peak (1700 - 1800) | 2585 | 122 | 4.7% | 136 | 14 | 5.3% | 175 | 53 | 6.8% |
| **Junction 11 - A429 New St/A452 Bridge St/High** | | | | | | | | | |
| AM Peak (0800 - 0900) | 952 | 36 | 3.8% | 45 | 9 | 4.7% | 51 | 15 | 5.4% |
| PM Peak (1700 - 1800) | 891 | 39 | 4.4% | 48 | 9 | 5.4% | 55 | 16 | 6.2% |
| **Junction 12 -Stoneleigh Road/Park hill/Albion** | | | | | | | | | |
| AM Peak (0800 - 0900) | 880 | 3 | 0.3% | 4 | 1 | 0.5% | 5 | 2 | 0.6% |
| PM Peak (1700 - 1800) | 867 | 3 | 0.3% | 106 | 3 | 12.2% | 3 | 0 | 0.3% |
| **Junction 13 - A452 Bridge St/Upper Rosemary** | | | | | | | | | |
| AM Peak (0800 - 0900) | 1205 | 34 | 2.8% | 43 | 9 | 3.6% | 48 | 14 | 4.0% |
| PM Peak (1700 - 1800) | 1238 | 36 | 2.9% | 46 | 10 | 3.7% | 54 | 18 | 4.4% |
| **Junction 14 - A4103 Abbey End/Forrest Rd/Abbey Hill** | | | | | | | | | |
| AM Peak (0800 - 0900) | 687 | 11 | 1.6% | 16 | 5 | 2.3% | 16 | 5 | 2.3% |
| PM Peak (1700 - 1800) | 689 | 13 | 1.9% | 17 | 4 | 2.5% | 19 | 6 | 2.8% |
| **Junction 15 - Borrowwell Lane/Forest Rd/Brookside Ave** | | | | | | | | | |
| AM Peak (0800 - 0900) | 1146 | 1 | 0.1% | 1 | 0 | 0.1% | 2 | 1 | 0.2% |
| PM Peak (1700 - 1800) | 1202 | 1 | 0.1% | 1 | 14 | 0.1% | 1 | 0 | 0.1% |
| **Junction 16 - Whitemoor Road/Farmer Ward** | | | | | | | | | |
| AM Peak (0800 - 0900) | 543 | 3 | 0.6% | 4 | 1 | 0.7% | 4 | 1 | 0.7% |
| PM Peak (1700 - 1800) | 602 | 4 | 0.7% | 4 | 0 | 0.7% | 5 | 1 | 0.8% |
| **Junction 17 - Park Hill/Leyes lane/Windy Arbour** | | | | | | | | | |
| AM Peak (0800 - 0900) | 636 | 2 | 0.3% | 1 | -1 | 0.2% | 2 | 0 | 0.3% |
| PM Peak (1700 - 1800) | 655 | 1 | 0.2% | 1 | 0 | 0.2% | 1 | 0 | 0.2% |
| **Junction 18 - Rawnsley Dr/Dencer Dr** | | | | | | | | | |
| AM Peak (0800 - 0900) | 381 | 1 | 0.3% | 1 | 0 | 0.3% | 1 | 0 | 0.3% |
| PM Peak (1700 - 1800) | 309 | 1 | 0.3% | 1 | 0 | 0.3% | 2 | 1 | 0.6% |
| **Junction 19 -Waverley Rd/Warwick Rd** | | | | | | | | | |
| AM Peak (0800 - 0900) | 1561 | 11 | 0.7% | 13 | 2 | 0.8% | 16 | 5 | 1.0% |
| PM Peak (1700 - 1800) | 1808 | 10 | 0.6% | 14 | 3 | 0.8% | 15 | 5 | 0.8% |
| **Junction 20 - A452 Warwick Road/Birches** | | | | | | | | | |
| AM Peak (0800 - 0900) | 2766 | 12 | 0.4% | 15 | 3 | 0.5% | 17 | 5 | 0.6% |
| PM Peak (1700 - 1800) | 3026 | 10 | 0.3% | 14 | 4 | 0.5% | 15 | 5 | 0.5% |

| Change in Traffic Flows at Key Junctions (425, 529 and 610 Units at Westwood Heath Road) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Total Throughput** | **2028 Reference** | **+425 Dwellings** | **%age Change** | **+529 Dwellings** | **Traffic Flow Change** | **%age Change** | **+610 Dwellings** | **Traffic Flow Change** | **%age Change** |
| **Junction 21 - Birches Lane/Windy Harbour/Glasshouse Lane** | | | | | | | | | |
| AM Peak (0800 - 0900) | 798 | 1 | 0.1% | 1 | 0 | 0.1% | 2 | 1 | 0.3% |
| PM Peak (1700 - 1800) | 711 | 0 | 0.0% | 0 | 0 | 0.0% | 0 | 0 | 0.0% |
| **Junction 22 - Warwick Road/Rouncil Lane** | | | | | | | | | |
| AM Peak (0800 - 0900) | 1098 | 5 | 0.5% | 6 | 1 | 0.5% | 7 | 2 | 0.6% |
| PM Peak (1700 - 1800) | 1029 | 4 | 0.4% | 6 | 14 | 0.6% | 4 | 0 | 0.4% |
| **Junction 23 - A46 Thickthorn Roundabout** | | | | | | | | | |
| AM Peak (0800 - 0900) | 4057 | 26 | 0.6% | 33 | 7 | 0.8% | 36 | 10 | 0.9% |
| PM Peak (1700 - 1800) | 4082 | 32 | 0.8% | 37 | 5 | 0.9% | 43 | 11 | 1.1% |
| **Junction 24 - A452/Bericote Rd/Kenilworth Rd** | | | | | | | | | |
| AM Peak (0800 - 0900) | 2887 | 20 | 0.7% | 26 | 6 | 0.9% | 28 | 8 | 1.0% |
| PM Peak (1700 - 1800) | 2894 | 22 | 0.8% | 25 | 3 | 0.9% | 30 | 8 | 1.0% |
| **Junction 25 - B4113 Stoneleigh Rd/Westhill** | | | | | | | | | |
| AM Peak (0800 - 0900) | 1849 | 18 | 1.0% | 21 | 3 | 1.1% | 25 | 7 | 1.4% |
| PM Peak (1700 - 1800) | 1854 | 16 | 0.9% | 24 | 8 | 1.3% | 27 | 11 | 1.5% |
| **Junction 26 -A452 Kenilworth Road/Stoneleigh** | | | | | | | | | |
| AM Peak (0800 - 0900) | 2751 | 12 | 0.4% | 15 | 3 | 0.5% | 17 | 5 | 0.6% |
| PM Peak (1700 - 1800) | 2503 | 14 | 0.6% | 15 | 3 | 0.6% | 18 | 4 | 0.7% |
| **Junction 27 - A46/B4115 Coventry** | | | | | | | | | |
| AM Peak (0800 - 0900) | 2721 | 5 | 0.2% | 5 | 0 | 0.2% | 6 | 1 | 0.2% |
| PM Peak (1700 - 1800) | 2527 | 5 | 0.2% | 6 | 1 | 0.2% | 8 | 3 | 0.3% |
| **Junction 28 - Stoneleigh Road/Dalehouse Lane** | | | | | | | | | |
| AM Peak (0800 - 0900) | 2287 | 53 | 2.3% | 61 | 8 | 2.7% | 70 | 17 | 3.1% |
| PM Peak (1700 - 1800) | 2263 | 92 | 4.1% | 110 | 18 | 4.9% | 122 | 30 | 5.4% |
| **Junction 29 - B4115/Birmingham Road/Stoneleigh Rd** | | | | | | | | | |
| AM Peak (0800 - 0900) | 1011 | 4 | 0.4% | 5 | 1 | 0.5% | 6 | 2 | 0.6% |
| PM Peak (1700 - 1800) | 1210 | 9 | 0.7% | 12 | 14 | 1.0% | 13 | 4 | 1.1% |
| **Junction 30 - A452 Priory Road/Station Road** | | | | | | | | | |
| AM Peak (0800 - 0900) | 477 | 13 | 2.7% | 14 | 1 | 2.9% | 17 | 4 | 3.6% |
| PM Peak (1700 - 1800) | 600 | 16 | 2.7% | 20 | 4 | 3.3% | 24 | 8 | 4.0% |
| **Junction 31 - B4103 Borrowell Lane/Abbey** | | | | | | | | | |
| AM Peak (0800 - 0900) | 1307 | 8 | 0.6% | 12 | 4 | 0.9% | 13 | 5 | 1.0% |
| PM Peak (1700 - 1800) | 1455 | 10 | 0.7% | 13 | 3 | 0.9% | 14 | 4 | 1.0% |
| **Junction 32 - Birches Lane/Farmer Ward Road** | | | | | | | | | |
| AM Peak (0800 - 0900) | 1192 | 2 | 0.2% | 3 | 1 | 0.3% | 3 | 1 | 0.3% |
| PM Peak (1700 - 1800) | 1218 | 2 | 0.2% | 3 | 1 | 0.2% | 2 | 0 | 0.2% |
| **Junction 33 - Coventry Road/A46 SB Slip** | | | | | | | | | |
| AM Peak (0800 - 0900) | 1425 | 3 | 0.2% | 4 | 1 | 0.3% | 4 | 1 | 0.3% |
| PM Peak (1700 - 1800) | 1087 | 1 | 0.1% | 1 | 3 | 0.1% | 1 | 0 | 0.1% |
| **Junction 34 - A444/Sci,itar Way/Leaf Lane** | | | | | | | | | |
| AM Peak (0800 - 0900) | 1304 | 5 | 0.4% | 7 | 2 | 0.5% | 8 | 3 | 0.6% |
| PM Peak (1700 - 1800) | 1339 | 7 | 0.5% | 9 | 2 | 0.7% | 10 | 3 | 0.7% |
| **Junction 35 -A4114 London Road/A4082/A444** | | | | | | | | | |
| AM Peak (0800 - 0900) | 3349 | 0 | 0.0% | 0 | 0 | 0.0% | 1 | 1 | 0.0% |
| PM Peak (1700 - 1800) | 3324 | 3 | 0.1% | 2 | -1 | 0.1% | 3 | 0 | 0.1% |
| **Junction 36 - A4082 London Road/B4110 London Road/Allard** | | | | | | | | | |
| AM Peak (0800 - 0900) | 3986 | 2 | 0.1% | 2 | 0 | 0.1% | 3 | 1 | 0.1% |
| PM Peak (1700 - 1800) | 3967 | 2 | 0.1% | 2 | 14 | 0.1% | 3 | 1 | 0.1% |
| **Junction 37 - A46 Coventry Eastern Bypass/A428** | | | | | | | | | |
| AM Peak (0800 - 0900) | 6254 | 1 | 0.0% | 1 | 0 | 0.0% | 2 | 1 | 0.0% |
| PM Peak (1700 - 1800) | 6582 | 1 | 0.0% | 2 | 1 | 0.0% | 2 | 1 | 0.0% |

# APPENDIX G

| PICADY |
|---|
| GUI Version: 5.1 AD<br>Analysis Program Release: 4.0 (SEPT 2008)<br><br> |
| For sales and distribution information, program advice and maintenance, contact: |
| TRL Limited<br>Crowthorne House<br>Nine Mile Ride<br>Wokingham, Berks.<br>RG40 3GA, UK<br><br>Tel: +44 (0)1344 770758<br>Fax:+44 (0)1344 770864<br>E-mail: software@trl.co.uk<br>Web: www.trlsoftware.co.uk |
| **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 Analysis

| Parameter | Values |
|---|---|
| File Run | C:\..\Westwood Heath Road – Traffic\Site Access Flows 270816.vpi |
| Date Run | 28 August 2016 |
| Time Run | 02:37:49 |
| Driving Side | Drive On The Left |

### Arm Names and Flow Scaling Factors

| Arm | Arm Name | Flow Scaling Factor (%) |
|---|---|---|
| Arm A | Westwood Heath Road (East) | 100 |
| Arm B | Site Access | 100 |
| Arm C | Westwood Heath Road (West) | 100 |

### Stream Labelling Convention

Stream A-B contains traffic going from A to B etc.

## Run Information

| Parameter | Values |
|---|---|
| Run Title | Westwood Heath Road - Access |
| Location | Westwood Heath Road |
| Date | 27 August 2016 |
| Enumerator | Michael [MAKPROBOOK] |
| Job Number | SK21222 |
| Status | Preliminary |
| Client | CSP |
| Description | - |

## Errors and Warnings

| Parameter | Values |
|---|---|
| Warning | No Errors Or Warnings |

## Geometric Data

### Geometric Parameters

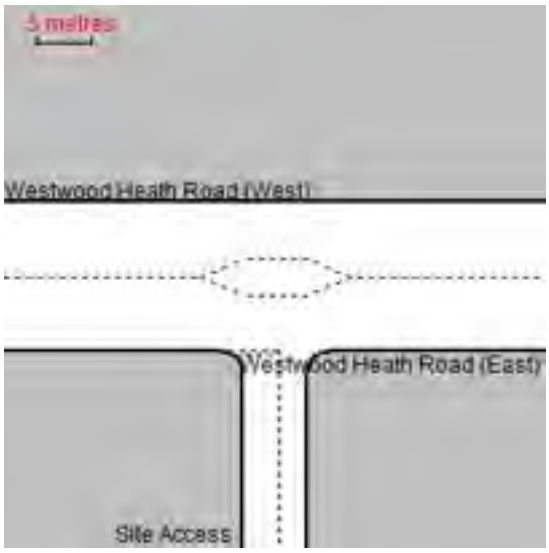
| Parameter | Minor Arm B |
|---|---|
| Major Road Carriageway Width (m) | 10.00 |
| Major Road Kerbed Central Reserve Width (m) | 0.00 |
| Major Road Right Turning Lane Width (m) | 3.50 |
| Minor Road First Lane Width (m) | 3.35 |
| Minor Road Visibility To Right (m) | 120 |
| Minor Road Visibility To Left (m) | 120 |
| Major Road Right Turn Visibility (m) | 120 |
| Major Road Right Turn Blocks Traffic | Yes |

### Slope and Intercept Values

| Stream | Intercept for Stream B-A | Slope for A-B | Slope for A-C | Slope for C-A | Slope for C-B |
|---|---|---|---|---|---|
| B-A | 598.351 | 0.090 | 0.228 | 0.143 | 0.325 |
| B-C | 723.991 | 0.092 | 0.232 | - | - |
| C-B | 734.495 | 0.235 | 0.235 | - | - |

Note: Streams may be combined in which case capacity will be adjusted
These values do not allow for any site-specific corrections

## Junction Diagram




## Demand Data

### Modelling Periods

| Parameter | Period | Duration (min) | Segment Length (min) |
|---|---|---|---|
| First Modelling Period | 07:45-09:15 | 90 | 15 |
| Second Modelling Period | 16:45-18:15 | 90 | 15 |

### ODTAB Turning Counts

**Demand Set:** 425 AM WEstwood Heath Road - Access
**Modelling Period:** 07:45-09:15

| From/To | Arm A | Arm B | Arm C |
|---|---|---|---|
| Arm A | 0.0 | 43.0 | 880.0 |
| Arm B | 34.0 | 0.0 | 170.0 |
| Arm C | 176.0 | 9.0 | 0.0 |

**Demand Set:** 425 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

| From/To | Arm A | Arm B | Arm C |
|---|---|---|---|
| Arm A | 0.0 | 36.0 | 152.0 |
| Arm B | 42.0 | 0.0 | 9.0 |
| Arm C | 709.0 | 168.0 | 0.0 |

### ODTAB Synthesised Flows

**Demand Set:** 425 AM WEstwood Heath Road - Access
**Modelling Period:** 07:45-09:15

| Arm | Rising Time | Rising Flow (veh/min) | Peak Time | Peak Flow (veh/min) | Falling Time | Falling Flow (veh/min) |
|---|---|---|---|---|---|---|
| Arm A | 08:00 | 11.538 | 08:30 | 17.306 | 09:00 | 11.538 |
| Arm B | 08:00 | 2.550 | 08:30 | 3.825 | 09:00 | 2.550 |
| Arm C | 08:00 | 2.313 | 08:30 | 3.469 | 09:00 | 2.313 |

### Heavy Vehicles Percentages

**Demand Set:** 425 AM WEstwood Heath Road - Access
**Modelling Period:** 07:45-09:15

| From/To | Arm A | Arm B | Arm C |
|---|---|---|---|
| Arm A | - | 10.0 | 10.0 |
| Arm B | 10.0 | - | 10.0 |
| Arm C | 10.0 | 10.0 | - |

**Demand Set:** 425 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

| From/To | Arm A | Arm B | Arm C |
|---|---|---|---|
| Arm A | - | 10.0 | 10.0 |
| Arm B | 10.0 | - | 10.0 |
| Arm C | 10.0 | 10.0 | - |

Default proportions of heavy vehicles are used

## Queue Diagrams

**Demand Set:** 425 AM WEstwood Heath Road - Access
**Modelling Period:** 07:45-09:15
**View Extent:** 40m

Queue Interval 1: 07:45-08:00


Queue Interval 2: 08:00-08:15


Queue Interval 3: 08:15-08:30


Queue Interval 4: 08:30-08:45

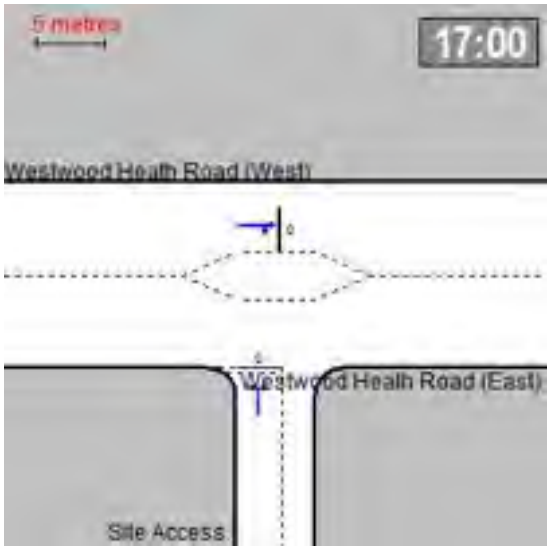

Queue Interval 5: 08:45-09:00

Queue Interval 6: 09:00-09:15

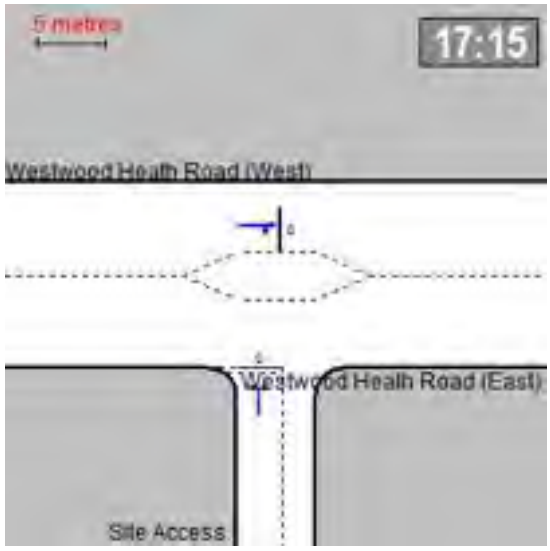

5 metres
09:00
Westwood Heath Road (West)
Westwood Heath Road (East)
Site Access
5 metres
09:15
Westwood Heath Road (West)
Westwood Heath Road (East)
Site Access

**Demand Set:** 425 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15
**View Extent:** 40m

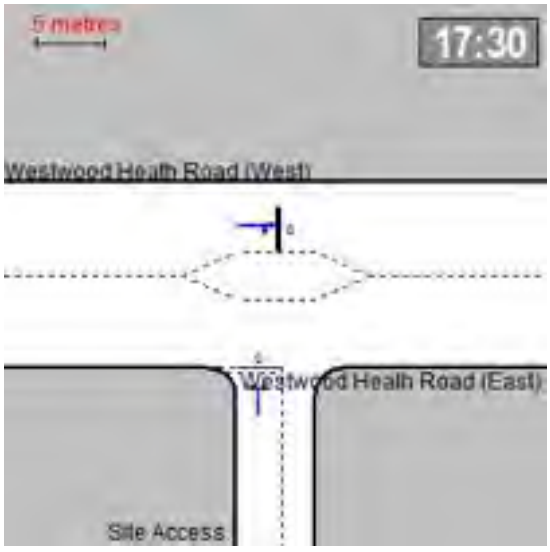
Queue Interval 1: 16:45-17:00



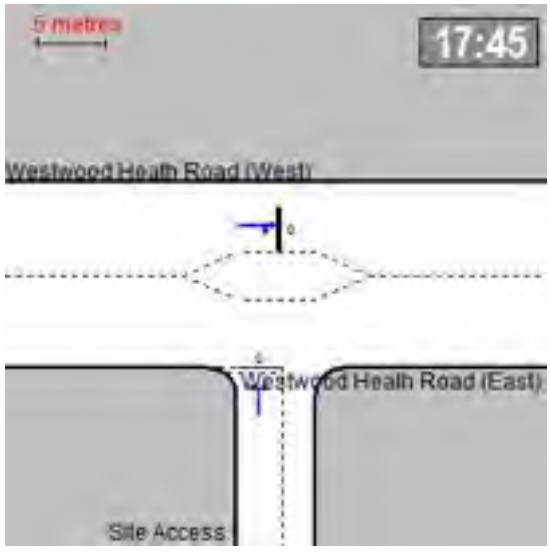

Queue Interval 2: 17:00-17:15




Queue Interval 3: 17:15-17:30




Queue Interval 4: 17:30-17:45



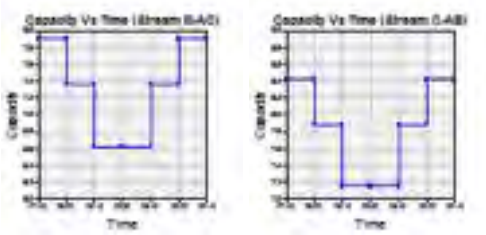

Queue Interval 5: 17:45-18:00

Queue Interval 6: 18:00-18:15

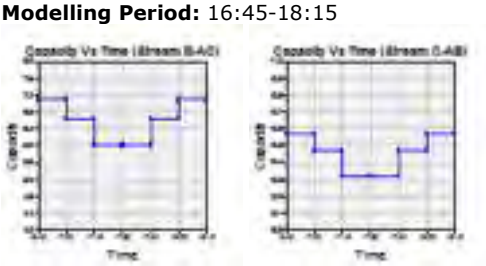

5 metres
18:00
Westwood Heath Road (West)
Westwood Heath Road (East)
Site Access
5 metres
18:15
Westwood Heath Road (West)
Westwood Heath Road (East)
Site Access

## Capacity Graph

**Demand Set:** 425 AM WEstwood Heath Road - Access
**Modelling Period:** 07:45-09:15

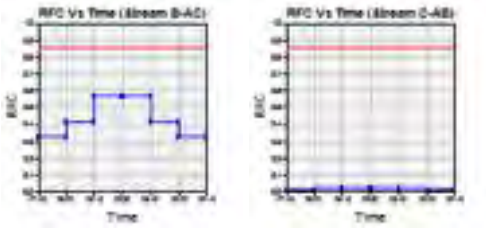


**Demand Set:** 425 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

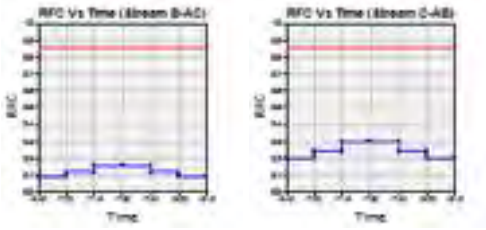


## RFC Graph

**Demand Set:** 425 AM WEstwood Heath Road - Access
**Modelling Period:** 07:45-09:15

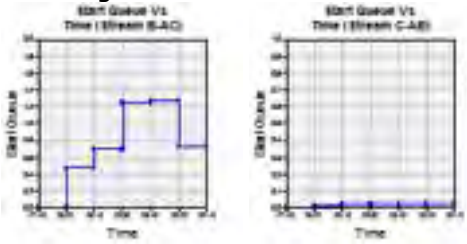


**Demand Set:** 425 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

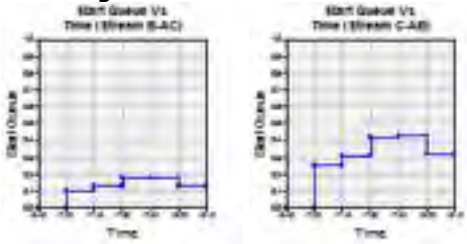


## Start Queue Graph

**Demand Set:** 425 AM WEstwood Heath Road - Access
**Modelling Period:** 07:45-09:15

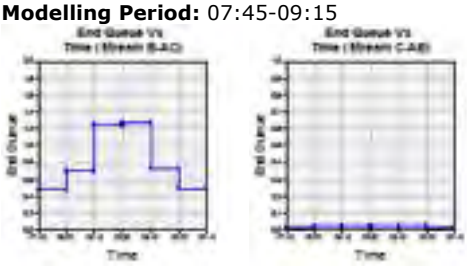


**Demand Set:** 425 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

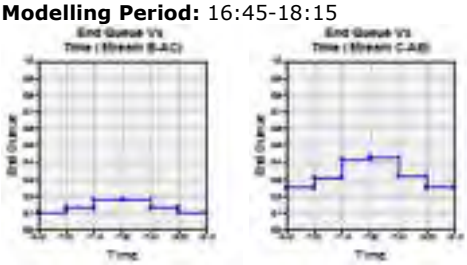


## End Queue Graph

**Demand Set:** 425 AM WEstwood Heath Road - Access
**Modelling Period:** 07:45-09:15

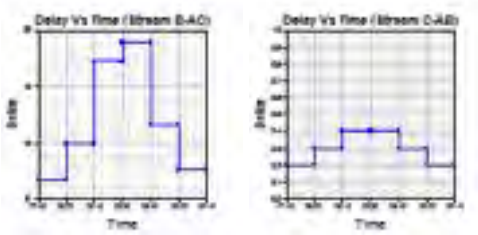


**Demand Set:** 425 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

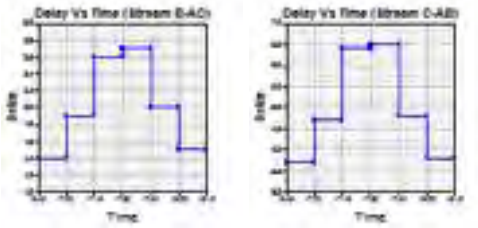


## Delay Graph

**Demand Set:** 425 AM WEstwood Heath Road - Access
**Modelling Period:** 07:45-09:15



**Demand Set:** 425 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15



## Queues & Delays

**Demand Set:** 425 AM WEstwood Heath Road - Access
**Modelling Period:** 07:45-09:15

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 07:45-08:00 | B-AC | 2.56 | 7.89 | 0.324 | - | 0.00 | 0.47 | - | 6.7 | 0.19 |
| | C-AB | 0.11 | 8.41 | 0.013 | - | 0.00 | 0.01 | - | 0.2 | 0.12 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.54 | - | - | - | - | - | - | - | - |
| | A-C | 11.04 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 08:00-08:15 | B-AC | 3.06 | 7.36 | 0.415 | - | 0.47 | 0.69 | - | 9.9 | 0.23 |
| | C-AB | 0.13 | 7.88 | 0.017 | - | 0.01 | 0.02 | - | 0.3 | 0.13 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.64 | - | - | - | - | - | - | - | - |
| | A-C | 13.19 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 08:15-08:30 | B-AC | 3.74 | 6.62 | 0.566 | - | 0.69 | 1.24 | - | 17.2 | 0.34 |
| | C-AB | 0.17 | 7.15 | 0.023 | - | 0.02 | 0.02 | - | 0.4 | 0.14 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.79 | - | - | - | - | - | - | - | - |
| | A-C | 16.15 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 08:30-08:45 | B-AC | 3.74 | 6.62 | 0.566 | - | 1.24 | 1.27 | - | 18.9 | 0.35 |
| | C-AB | 0.17 | 7.15 | 0.023 | - | 0.02 | 0.02 | - | 0.4 | 0.14 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.79 | - | - | - | - | - | - | - | - |
| | A-C | 16.15 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 08:45-09:00 | B-AC | 3.06 | 7.36 | 0.415 | - | 1.27 | 0.73 | - | 11.6 | 0.24 |
| | C-AB | 0.13 | 7.88 | 0.017 | - | 0.02 | 0.02 | - | 0.3 | 0.13 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.64 | - | - | - | - | - | - | - | - |
| | A-C | 13.19 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 09:00-09:15 | B-AC | 2.56 | 7.89 | 0.324 | - | 0.73 | 0.49 | - | 7.6 | 0.19 |
| | C-AB | 0.11 | 8.41 | 0.013 | - | 0.02 | 0.01 | - | 0.2 | 0.12 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.54 | - | - | - | - | - | - | - | - |
| | A-C | 11.04 | - | - | - | - | - | - | - | - |

**Demand Set:** 425 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 16:45-17:00 | B-AC | 0.64 | 7.09 | 0.090 | - | 0.00 | 0.10 | - | 1.4 | 0.15 |
| | C-AB | 2.11 | 10.57 | 0.199 | - | 0.00 | 0.25 | - | 3.7 | 0.12 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.45 | - | - | - | - | - | - | - | - |
| | A-C | 1.91 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 17:00-17:15 | B-AC | 0.76 | 6.63 | 0.115 | - | 0.10 | 0.13 | - | 1.9 | 0.17 |
| | C-AB | 2.52 | 10.47 | 0.240 | - | 0.25 | 0.31 | - | 4.7 | 0.13 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.54 | - | - | - | - | - | - | - | - |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | A-C | 2.28 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 17:15-17:30 | B-AC | 0.94 | 5.99 | 0.156 | - | 0.13 | 0.18 | - | 2.6 | 0.20 |
| | C-AB | 3.08 | 10.32 | 0.299 | - | 0.31 | 0.42 | - | 6.4 | 0.14 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.66 | - | - | - | - | - | - | - | - |
| | A-C | 2.79 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 17:30-17:45 | B-AC | 0.94 | 5.99 | 0.156 | - | 0.18 | 0.18 | - | 2.7 | 0.20 |
| | C-AB | 3.08 | 10.32 | 0.299 | - | 0.42 | 0.43 | - | 6.5 | 0.14 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.66 | - | - | - | - | - | - | - | - |
| | A-C | 2.79 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 17:45-18:00 | B-AC | 0.76 | 6.63 | 0.115 | - | 0.18 | 0.13 | - | 2.0 | 0.17 |
| | C-AB | 2.52 | 10.47 | 0.240 | - | 0.43 | 0.32 | - | 4.8 | 0.13 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.54 | - | - | - | - | - | - | - | - |
| | A-C | 2.28 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 18:00-18:15 | B-AC | 0.64 | 7.09 | 0.090 | - | 0.13 | 0.10 | - | 1.5 | 0.16 |
| | C-AB | 2.11 | 10.57 | 0.199 | - | 0.32 | 0.25 | - | 3.8 | 0.12 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.45 | - | - | - | - | - | - | - | - |
| | A-C | 1.91 | - | - | - | - | - | - | - | - |

Entry capacities marked with an '(X)' are dominated by a pedestrian crossing in that time segment.
In time segments marked with a '(B)', traffic leaving the junction may block back from a crossing so impairing normal operation of the junction.
Delays marked with '##' could not be calculated.

## Overall Queues & Delays

### Queueing Delay Information Over Whole Period

**Demand Set:** 425 AM WEstwood Heath Road - Access
**Modelling Period:** 07:45-09:15

| Stream | Total Demand (veh) | Total Demand (veh/h) | Queueing Delay (min) | Queueing Delay (min/veh) | Inclusive Delay (min) | Inclusive Delay (min/veh) |
|---|---|---|---|---|---|---|
| B-AC | 280.8 | 187.2 | 72.0 | 0.3 | 72.0 | 0.3 |
| C-AB | 12.4 | 8.3 | 1.6 | 0.1 | 1.6 | 0.1 |
| C-A | - | - | - | - | - | - |
| A-B | 59.2 | 39.5 | - | - | - | - |
| A-C | 1211.3 | 807.5 | - | - | - | - |
| **All** | **1805.9** | **1203.9** | **73.6** | **0.0** | **73.6** | **0.0** |

**Demand Set:** 425 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

| Stream | Total Demand (veh) | Total Demand (veh/h) | Queueing Delay (min) | Queueing Delay (min/veh) | Inclusive Delay (min) | Inclusive Delay (min/veh) |
|---|---|---|---|---|---|---|
| B-AC | 70.2 | 46.8 | 12.3 | 0.2 | 12.3 | 0.2 |
| C-AB | 231.2 | 154.2 | 29.8 | 0.1 | 29.8 | 0.1 |
| C-A | - | - | - | - | - | - |
| A-B | 49.6 | 33.0 | - | - | - | - |
| A-C | 209.2 | 139.5 | - | - | - | - |
| **All** | **1536.1** | **1024.1** | **42.1** | **0.0** | **42.1** | **0.0** |

Delay is that occurring only within the time period.
Inclusive delay includes delay suffered by vehicles which are still queuing 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.

### PICADY 5 Run Successful

| PICADY |
|---|
| GUI Version: 5.1 AD<br>Analysis Program Release: 4.0 (SEPT 2008)<br><br> |
| For sales and distribution information, program advice and maintenance, contact: |
| TRL Limited<br>Crowthorne House<br>Nine Mile Ride<br>Wokingham, Berks.<br>RG40 3GA, UK<br><br>Tel: +44 (0)1344 770758<br>Fax:+44 (0)1344 770864<br>E-mail: software@trl.co.uk<br>Web: www.trlsoftware.co.uk |
| **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 Analysis

| Parameter | Values |
|---|---|
| File Run | C:\..\Westwood Heath Road – Traffic\Site Access Flows 270816.vpi |
| Date Run | 28 August 2016 |
| Time Run | 13:01:02 |
| Driving Side | Drive On The Left |

### Arm Names and Flow Scaling Factors

| Arm | Arm Name | Flow Scaling Factor (%) |
|---|---|---|
| Arm A | Westwood Heath Road (East) | 100 |
| Arm B | Site Access | 100 |
| Arm C | Westwood Heath Road (West) | 100 |

### Stream Labelling Convention

Stream A-B contains traffic going from A to B etc.

## Run Information

| Parameter | Values |
|---|---|
| Run Title | Westwood Heath Road - Access |
| Location | Westwood Heath Road |
| Date | 27 August 2016 |
| Enumerator | Michael [MAKPROBOOK] |
| Job Number | SK21222 |
| Status | Preliminary |
| Client | CSP |
| Description | - |

## Errors and Warnings

| Parameter | Values |
|---|---|
| Warning | No Errors Or Warnings |

## Geometric Data

### Geometric Parameters

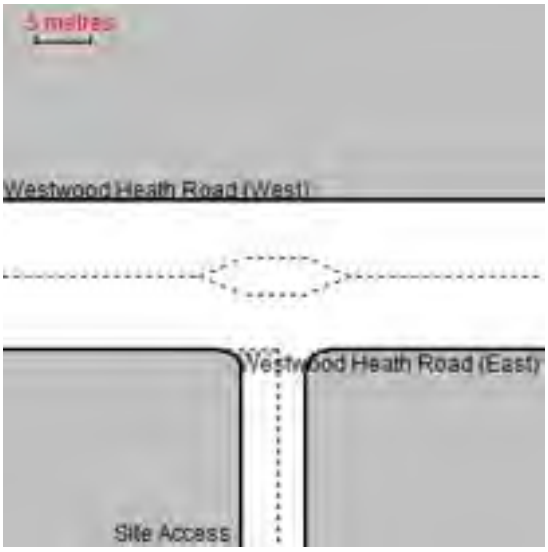
| Parameter | Minor Arm B |
|---|---|
| Major Road Carriageway Width (m) | 10.00 |
| Major Road Kerbed Central Reserve Width (m) | 0.00 |
| Major Road Right Turning Lane Width (m) | 3.50 |
| Minor Road First Lane Width (m) | 3.35 |
| Minor Road Visibility To Right (m) | 120 |
| Minor Road Visibility To Left (m) | 120 |
| Major Road Right Turn Visibility (m) | 120 |
| Major Road Right Turn Blocks Traffic | Yes |

### Slope and Intercept Values

| Stream | Intercept for Stream B-A | Slope for A-B | Slope for A-C | Slope for C-A | Slope for C-B |
|---|---|---|---|---|---|
| B-A | 598.351 | 0.090 | 0.228 | 0.143 | 0.325 |
| B-C | 723.991 | 0.092 | 0.232 | - | - |
| C-B | 734.495 | 0.235 | 0.235 | - | - |

Note: Streams may be combined in which case capacity will be adjusted
These values do not allow for any site-specific corrections

## Junction Diagram




## Demand Data

### Modelling Periods

| Parameter | Period | Duration (min) | Segment Length (min) |
|---|---|---|---|
| First Modelling Period | 07:45-09:15 | 90 | 15 |
| Second Modelling Period | 16:45-18:15 | 90 | 15 |

### ODTAB Turning Counts

**Demand Set:** 529 AM Westwood Heath Road - Access
**Modelling Period:** 07:45-09:15

| From/To | Arm A | Arm B | Arm C |
|---|---|---|---|
| Arm A | 0.0 | 53.0 | 880.0 |
| Arm B | 42.0 | 0.0 | 212.0 |
| Arm C | 176.0 | 11.0 | 0.0 |

**Demand Set:** 529 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

| From/To | Arm A | Arm B | Arm C |
|---|---|---|---|
| Arm A | 0.0 | 45.0 | 152.0 |
| Arm B | 52.0 | 0.0 | 11.0 |
| Arm C | 709.0 | 209.0 | 0.0 |

### ODTAB Synthesised Flows

**Demand Set:** 529 AM Westwood Heath Road - Access
**Modelling Period:** 07:45-09:15

| Arm | Rising Time | Rising Flow (veh/min) | Peak Time | Peak Flow (veh/min) | Falling Time | Falling Flow (veh/min) |
|---|---|---|---|---|---|---|
| Arm A | 08:00 | 11.663 | 08:30 | 17.494 | 09:00 | 11.663 |
| Arm B | 08:00 | 3.175 | 08:30 | 4.762 | 09:00 | 3.175 |
| Arm C | 08:00 | 2.338 | 08:30 | 3.506 | 09:00 | 2.338 |

### Heavy Vehicles Percentages

**Demand Set:** 529 AM Westwood Heath Road - Access
**Modelling Period:** 07:45-09:15

| From/To | Arm A | Arm B | Arm C |
|---|---|---|---|
| Arm A | - | 10.0 | 10.0 |
| Arm B | 10.0 | - | 10.0 |
| Arm C | 10.0 | 10.0 | - |

**Demand Set:** 529 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

| From/To | Arm A | Arm B | Arm C |
|---|---|---|---|
| Arm A | - | 10.0 | 10.0 |
| Arm B | 10.0 | - | 10.0 |
| Arm C | 10.0 | 10.0 | - |

Default proportions of heavy vehicles are used

## Queue Diagrams

**Demand Set:** 529 AM Westwood Heath Road - Access
**Modelling Period:** 07:45-09:15
**View Extent:** 40m

Queue Interval 1: 07:45-08:00


Queue Interval 2: 08:00-08:15


Queue Interval 3: 08:15-08:30


Queue Interval 4: 08:30-08:45

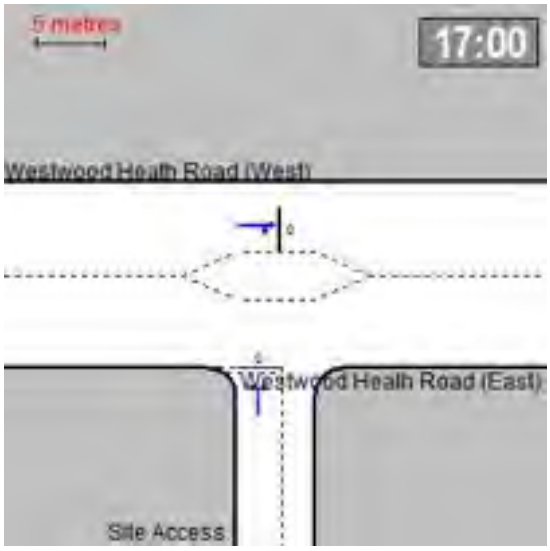

Queue Interval 5: 08:45-09:00

Queue Interval 6: 09:00-09:15

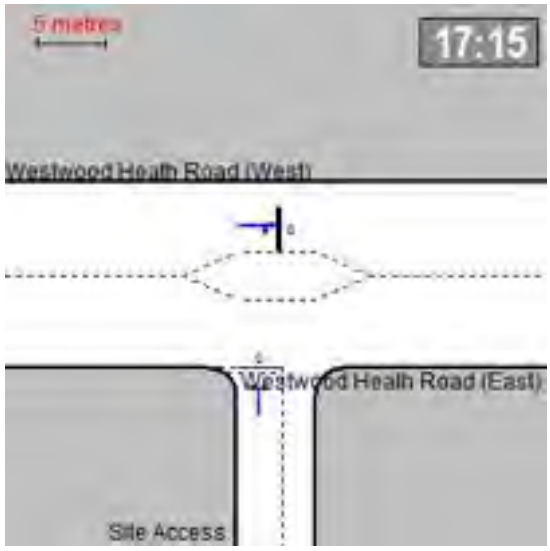

5 metres
09:00
Westwood Heath Road (West)
Site Access
5 metres
09:15
Westwood Heath Road (West)
Site Access

**Demand Set:** 529 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15
**View Extent:** 40m

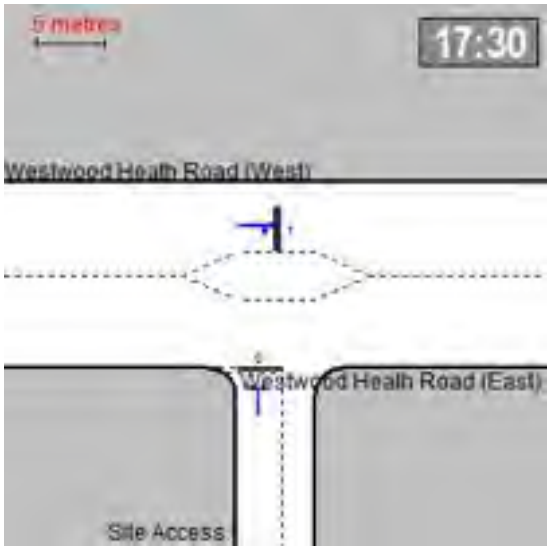
Queue Interval 1: 16:45-17:00



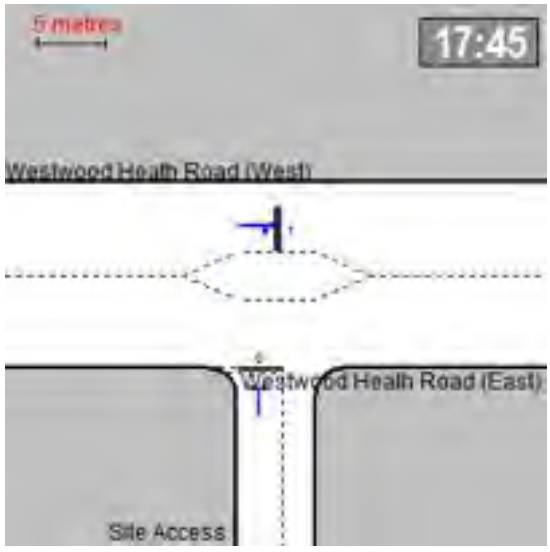

Queue Interval 2: 17:00-17:15




Queue Interval 3: 17:15-17:30




Queue Interval 4: 17:30-17:45



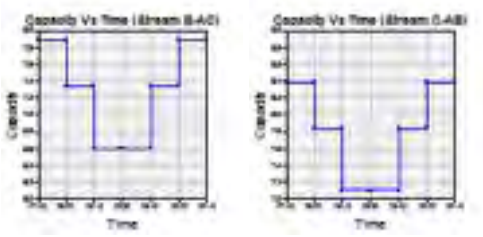

Queue Interval 5: 17:45-18:00

Queue Interval 6: 18:00-18:15

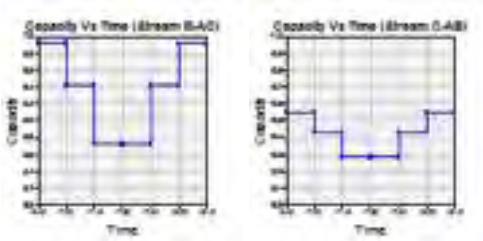

5 metres
18:00
Westwood Heath Road (West)
Westwood Heath Road (East)
Site Access
5 metres
18:15
Westwood Heath Road (West)
Westwood Heath Road (East)
Site Access

## Capacity Graph

**Demand Set:** 529 AM Westwood Heath Road - Access
**Modelling Period:** 07:45-09:15

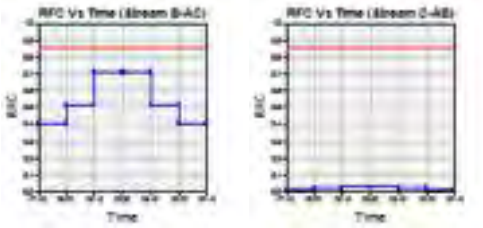


**Demand Set:** 529 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

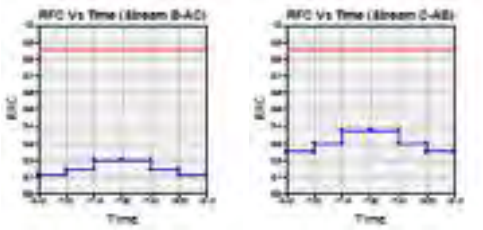


## RFC Graph

**Demand Set:** 529 AM Westwood Heath Road - Access
**Modelling Period:** 07:45-09:15

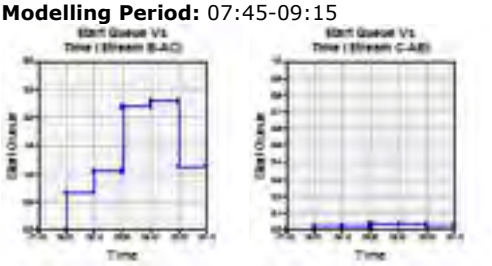


**Demand Set:** 529 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

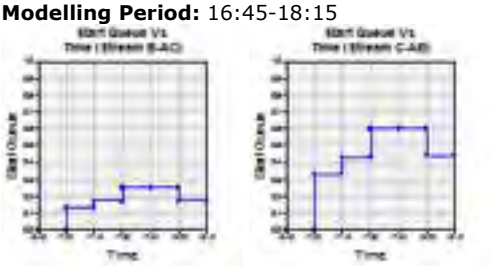


## Start Queue Graph

**Demand Set:** 529 AM Westwood Heath Road - Access
**Modelling Period:** 07:45-09:15

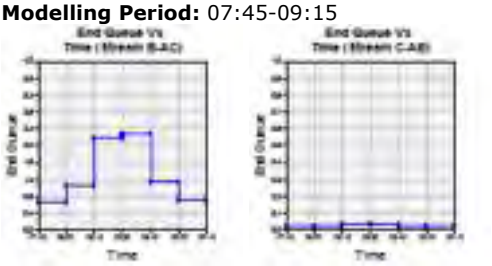


**Demand Set:** 529 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

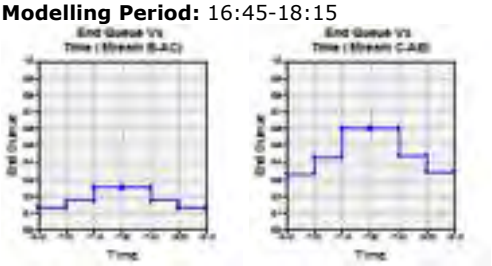


## End Queue Graph

**Demand Set:** 529 AM Westwood Heath Road - Access
**Modelling Period:** 07:45-09:15

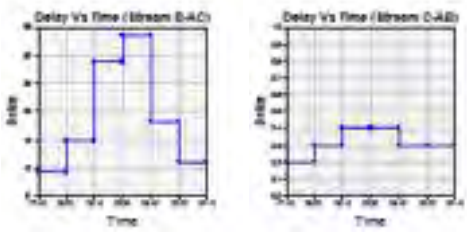


**Demand Set:** 529 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

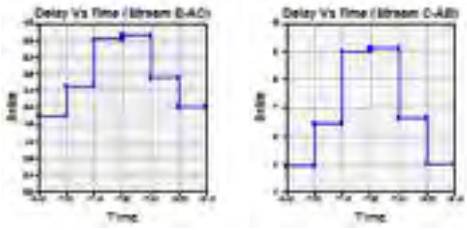


## Delay Graph

**Demand Set:** 529 AM Westwood Heath Road - Access
**Modelling Period:** 07:45-09:15



**Demand Set:** 529 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15



## Queues & Delays

**Demand Set:** 529 AM Westwood Heath Road - Access
**Modelling Period:** 07:45-09:15

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 07:45-08:00 | B-AC | 3.19 | 7.88 | 0.404 | - | 0.00 | 0.66 | - | 9.3 | 0.21 |
| | C-AB | 0.14 | 8.38 | 0.016 | - | 0.00 | 0.02 | - | 0.2 | 0.12 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.67 | - | - | - | - | - | - | - | - |
| | A-C | 11.04 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 08:00-08:15 | B-AC | 3.81 | 7.34 | 0.518 | - | 0.66 | 1.04 | - | 14.7 | 0.28 |
| | C-AB | 0.16 | 7.84 | 0.021 | - | 0.02 | 0.02 | - | 0.3 | 0.13 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.79 | - | - | - | - | - | - | - | - |
| | A-C | 13.19 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 08:15-08:30 | B-AC | 4.66 | 6.60 | 0.706 | - | 1.04 | 2.18 | - | 28.9 | 0.48 |
| | C-AB | 0.20 | 7.10 | 0.028 | - | 0.02 | 0.03 | - | 0.4 | 0.14 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.97 | - | - | - | - | - | - | - | - |
| | A-C | 16.15 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 08:30-08:45 | B-AC | 4.66 | 6.60 | 0.706 | - | 2.18 | 2.28 | - | 33.6 | 0.51 |
| | C-AB | 0.20 | 7.10 | 0.028 | - | 0.03 | 0.03 | - | 0.4 | 0.14 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.97 | - | - | - | - | - | - | - | - |
| | A-C | 16.15 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 08:45-09:00 | B-AC | 3.81 | 7.34 | 0.518 | - | 2.28 | 1.12 | - | 18.2 | 0.30 |
| | C-AB | 0.16 | 7.84 | 0.021 | - | 0.03 | 0.02 | - | 0.3 | 0.13 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.79 | - | - | - | - | - | - | - | - |
| | A-C | 13.19 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 09:00-09:15 | B-AC | 3.19 | 7.88 | 0.405 | - | 1.12 | 0.69 | - | 11.0 | 0.22 |
| | C-AB | 0.14 | 8.38 | 0.016 | - | 0.02 | 0.02 | - | 0.3 | 0.12 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.67 | - | - | - | - | - | - | - | - |
| | A-C | 11.04 | - | - | - | - | - | - | - | - |

**Demand Set:** 529 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 16:45-17:00 | B-AC | 0.79 | 6.92 | 0.114 | - | 0.00 | 0.13 | - | 1.8 | 0.16 |
| | C-AB | 2.62 | 10.55 | 0.249 | - | 0.00 | 0.33 | - | 4.9 | 0.13 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.56 | - | - | - | - | - | - | - | - |
| | A-C | 1.91 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 17:00-17:15 | B-AC | 0.94 | 6.42 | 0.147 | - | 0.13 | 0.17 | - | 2.5 | 0.18 |
| | C-AB | 3.13 | 10.43 | 0.300 | - | 0.33 | 0.43 | - | 6.4 | 0.14 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.67 | - | - | - | - | - | - | - | - |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | A-C | 2.28 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 17:15-17:30 | B-AC | 1.16 | 5.73 | 0.202 | - | 0.17 | 0.25 | - | 3.6 | 0.22 |
| | C-AB | 3.84 | 10.28 | 0.373 | - | 0.43 | 0.60 | - | 9.0 | 0.15 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.83 | - | - | - | - | - | - | - | - |
| | A-C | 2.79 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 17:30-17:45 | B-AC | 1.16 | 5.72 | 0.202 | - | 0.25 | 0.25 | - | 3.7 | 0.22 |
| | C-AB | 3.84 | 10.28 | 0.373 | - | 0.60 | 0.60 | - | 9.1 | 0.16 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.83 | - | - | - | - | - | - | - | - |
| | A-C | 2.79 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 17:45-18:00 | B-AC | 0.94 | 6.42 | 0.147 | - | 0.25 | 0.17 | - | 2.7 | 0.18 |
| | C-AB | 3.13 | 10.43 | 0.300 | - | 0.60 | 0.44 | - | 6.6 | 0.14 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.67 | - | - | - | - | - | - | - | - |
| | A-C | 2.28 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 18:00-18:15 | B-AC | 0.79 | 6.91 | 0.114 | - | 0.17 | 0.13 | - | 2.0 | 0.16 |
| | C-AB | 2.62 | 10.55 | 0.249 | - | 0.44 | 0.34 | - | 5.0 | 0.13 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.56 | - | - | - | - | - | - | - | - |
| | A-C | 1.91 | - | - | - | - | - | - | - | - |

Entry capacities marked with an '(X)' are dominated by a pedestrian crossing in that time segment.
In time segments marked with a '(B)', traffic leaving the junction may block back from a crossing so impairing normal operation of the junction.
Delays marked with '##' could not be calculated.

## Overall Queues & Delays

### Queueing Delay Information Over Whole Period

**Demand Set:** 529 AM Westwood Heath Road - Access
**Modelling Period:** 07:45-09:15

| Stream | Total Demand (veh) | Total Demand (veh/h) | Queueing Delay (min) | Queueing Delay (min/veh) | Inclusive Delay (min) | Inclusive Delay (min/veh) |
|---|---|---|---|---|---|---|
| B-AC | 349.6 | 233.1 | 115.6 | 0.3 | 115.7 | 0.3 |
| C-AB | 15.1 | 10.1 | 2.0 | 0.1 | 2.0 | 0.1 |
| C-A | - | - | - | - | - | - |
| A-B | 73.0 | 48.6 | - | - | - | - |
| A-C | 1211.3 | 807.5 | - | - | - | - |
| **All** | **1891.2** | **1260.8** | **117.7** | **0.1** | **117.7** | **0.1** |

**Demand Set:** 529 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

| Stream | Total Demand (veh) | Total Demand (veh/h) | Queueing Delay (min) | Queueing Delay (min/veh) | Inclusive Delay (min) | Inclusive Delay (min/veh) |
|---|---|---|---|---|---|---|
| B-AC | 86.7 | 57.8 | 16.4 | 0.2 | 16.4 | 0.2 |
| C-AB | 287.7 | 191.8 | 41.0 | 0.1 | 41.0 | 0.1 |
| C-A | - | - | - | - | - | - |
| A-B | 61.9 | 41.3 | - | - | - | - |
| A-C | 209.2 | 139.5 | - | - | - | - |
| **All** | **1621.4** | **1081.0** | **57.4** | **0.0** | **57.4** | **0.0** |

Delay is that occurring only within the time period.
Inclusive delay includes delay suffered by vehicles which are still queuing 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.

### PICADY 5 Run Successful

# PICADY

GUI Version: 5.1 AD
Analysis Program Release: 4.0 (SEPT 2008)



For sales and distribution information, program advice and maintenance, contact:

TRL Limited
Crowthorne House
Nine Mile Ride
Wokingham, Berks.
RG40 3GA, UK

Tel: +44 (0)1344 770758
Fax:+44 (0)1344 770864
E-mail: software@trl.co.uk
Web: www.trlsoftware.co.uk



## Run Analysis

| Parameter | Values |
|---|---|
| File Run | C:\..\Westwood Heath Road – Traffic\Site Access Flows 270816.vpi |
| Date Run | 28 August 2016 |
| Time Run | 02:28:25 |
| Driving Side | Drive On The Left |

### Arm Names and Flow Scaling Factors

| Arm | Arm Name | Flow Scaling Factor (%) |
|---|---|---|
| Arm A | Westwood Heath Road (East) | 100 |
| Arm B | Site Access | 100 |
| Arm C | Westwood Heath Road (West) | 100 |

### Stream Labelling Convention

Stream A-B contains traffic going from A to B etc.

## Run Information

| Parameter | Values |
|---|---|
| Run Title | Westwood Heath Road - Access |
| Location | Westwood Heath Road |
| Date | 27 August 2016 |
| Enumerator | Michael [MAKPROBOOK] |
| Job Number | SK21222 |
| Status | Preliminary |
| Client | CSP |
| Description | - |

## Errors and Warnings

| Parameter | Values |
|---|---|
| Warning | No Errors Or Warnings |

## Geometric Data

### Geometric Parameters

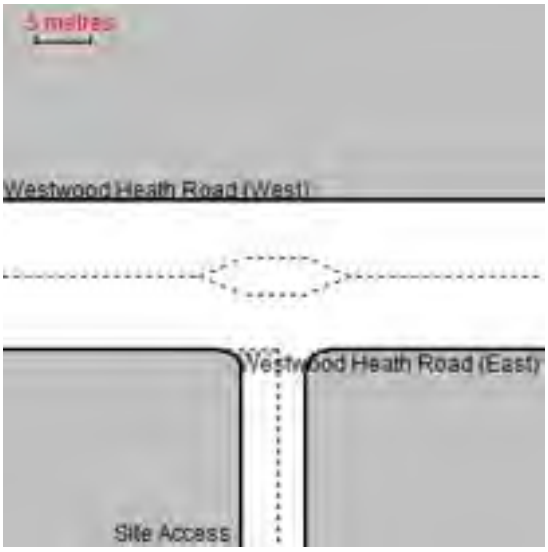
| Parameter | Minor Arm B |
|---|---|
| Major Road Carriageway Width (m) | 10.00 |
| Major Road Kerbed Central Reserve Width (m) | 0.00 |
| Major Road Right Turning Lane Width (m) | 3.50 |
| Minor Road First Lane Width (m) | 3.35 |
| Minor Road Visibility To Right (m) | 120 |
| Minor Road Visibility To Left (m) | 120 |
| Major Road Right Turn Visibility (m) | 120 |
| Major Road Right Turn Blocks Traffic | Yes |

### Slope and Intercept Values

| Stream | Intercept for Stream B-A | Slope for A-B | Slope for A-C | Slope for C-A | Slope for C-B |
|---|---|---|---|---|---|
| B-A | 598.351 | 0.090 | 0.228 | 0.143 | 0.325 |
| B-C | 723.991 | 0.092 | 0.232 | - | - |
| C-B | 734.495 | 0.235 | 0.235 | - | - |

Note: Streams may be combined in which case capacity will be adjusted
These values do not allow for any site-specific corrections

## Junction Diagram




## Demand Data

### Modelling Periods

| Parameter | Period | Duration (min) | Segment Length (min) |
|---|---|---|---|
| First Modelling Period | 07:45-09:15 | 90 | 15 |
| Second Modelling Period | 16:45-18:15 | 90 | 15 |

### ODTAB Turning Counts

**Demand Set:** 610 AM Westwood Heath Road - Access
**Modelling Period:** 07:45-09:15

| From/To | Arm A | Arm B | Arm C |
|---|---|---|---|
| Arm A | 0.0 | 61.0 | 880.0 |
| Arm B | 49.0 | 0.0 | 244.0 |
| Arm C | 176.0 | 12.0 | 0.0 |

**Demand Set:** 610 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

| From/To | Arm A | Arm B | Arm C |
|---|---|---|---|
| Arm A | 0.0 | 52.0 | 152.0 |
| Arm B | 60.0 | 0.0 | 13.0 |
| Arm C | 709.0 | 241.0 | 0.0 |

### ODTAB Synthesised Flows

**Demand Set:** 610 AM Westwood Heath Road - Access
**Modelling Period:** 07:45-09:15

| Arm | Rising Time | Rising Flow (veh/min) | Peak Time | Peak Flow (veh/min) | Falling Time | Falling Flow (veh/min) |
|---|---|---|---|---|---|---|
| Arm A | 08:00 | 11.762 | 08:30 | 17.644 | 09:00 | 11.762 |
| Arm B | 08:00 | 3.662 | 08:30 | 5.494 | 09:00 | 3.662 |
| Arm C | 08:00 | 2.350 | 08:30 | 3.525 | 09:00 | 2.350 |

### Heavy Vehicles Percentages

**Demand Set:** 610 AM Westwood Heath Road - Access
**Modelling Period:** 07:45-09:15

| From/To | Arm A | Arm B | Arm C |
|---|---|---|---|
| Arm A | - | 10.0 | 10.0 |
| Arm B | 10.0 | - | 10.0 |
| Arm C | 10.0 | 10.0 | - |

**Demand Set:** 610 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

| From/To | Arm A | Arm B | Arm C |
|---|---|---|---|
| Arm A | - | 10.0 | 10.0 |
| Arm B | 10.0 | - | 10.0 |
| Arm C | 10.0 | 10.0 | - |

Default proportions of heavy vehicles are used

## Queue Diagrams

**Demand Set:** 610 AM Westwood Heath Road - Access
**Modelling Period:** 07:45-09:15
**View Extent:** 40m

Queue Interval 1: 07:45-08:00


Queue Interval 2: 08:00-08:15


Queue Interval 3: 08:15-08:30


Queue Interval 4: 08:30-08:45

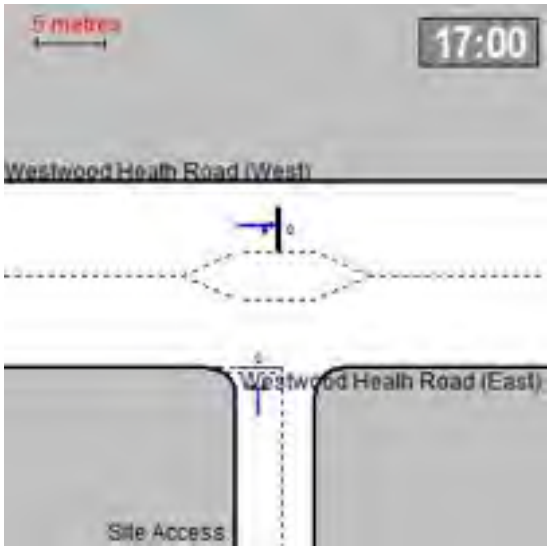

Queue Interval 5: 08:45-09:00

Queue Interval 6: 09:00-09:15

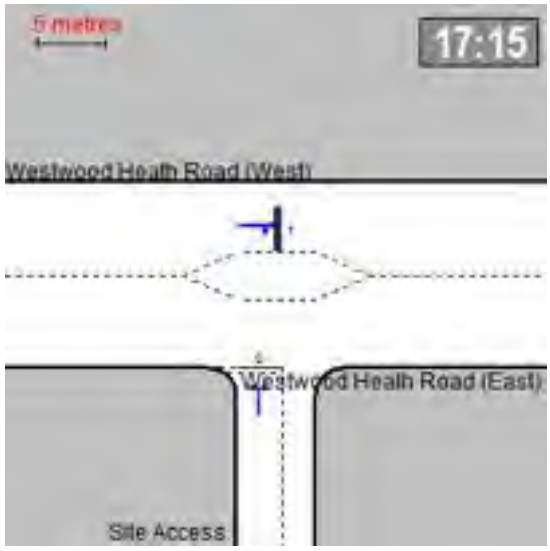

5 metres
09:00
Westwood Heath Road (West)
Site Access
5 metres
09:15
Westwood Heath Road (West)
Site Access

**Demand Set:** 610 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15
**View Extent:** 40m

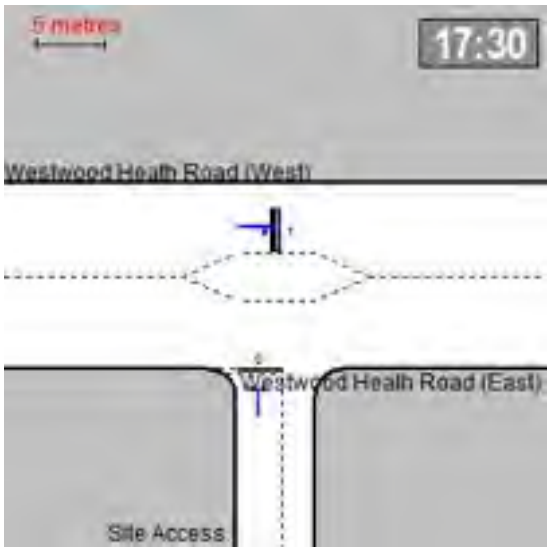
Queue Interval 1: 16:45-17:00



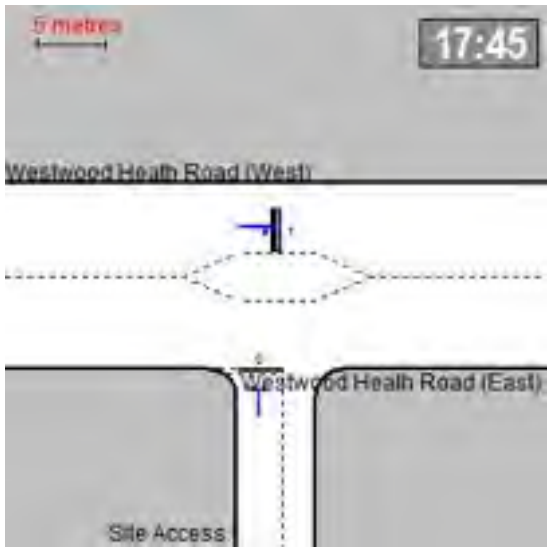

Queue Interval 2: 17:00-17:15




Queue Interval 3: 17:15-17:30

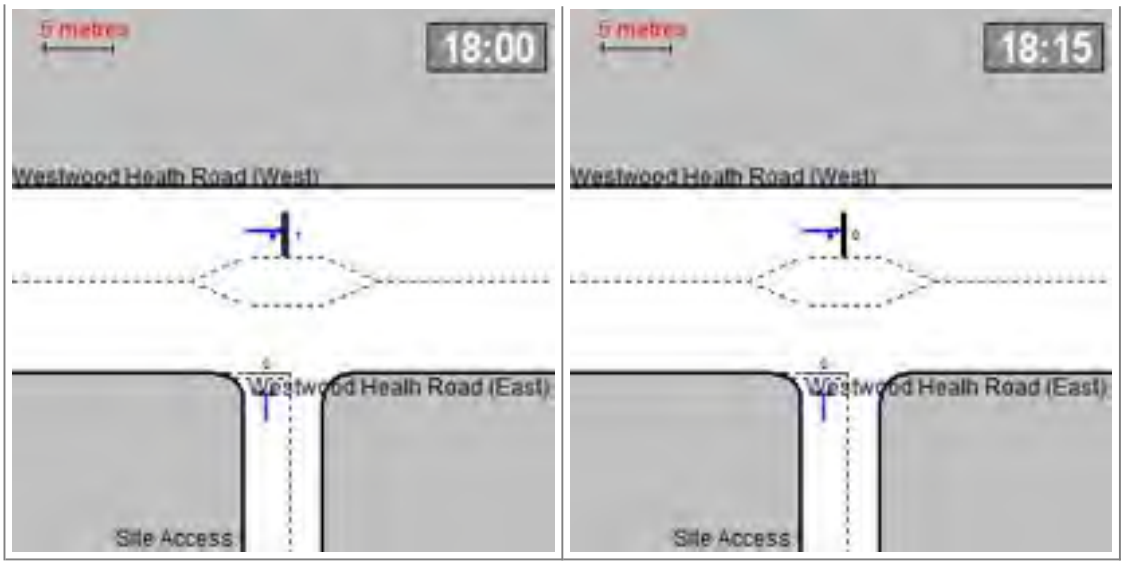



Queue Interval 4: 17:30-17:45



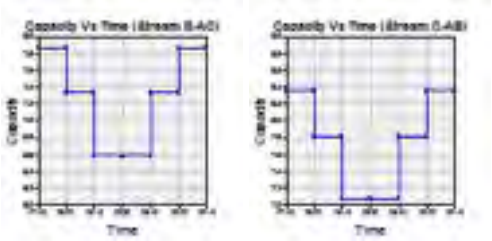

Queue Interval 5: 17:45-18:00

Queue Interval 6: 18:00-18:15

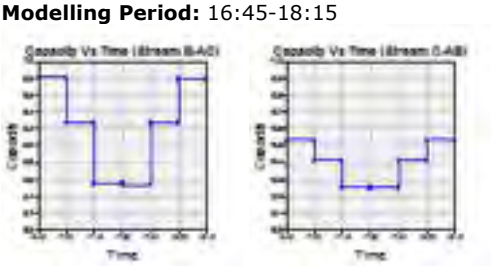

5 metres
18:00
Westwood Heath Road (West)
Westwood Heath Road (East)
Site Access
5 metres
18:15
Westwood Heath Road (West)
Westwood Heath Road (East)
Site Access

## Capacity Graph

**Demand Set:** 610 AM Westwood Heath Road - Access
**Modelling Period:** 07:45-09:15

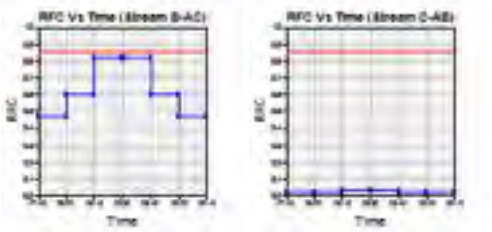


**Demand Set:** 610 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

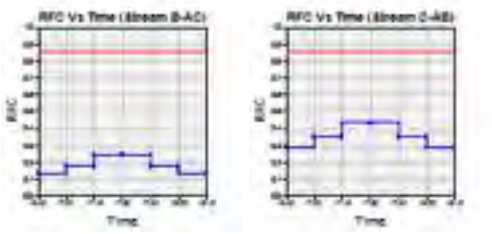


## RFC Graph

**Demand Set:** 610 AM Westwood Heath Road - Access
**Modelling Period:** 07:45-09:15

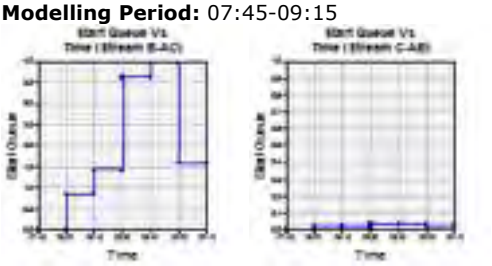


**Demand Set:** 610 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

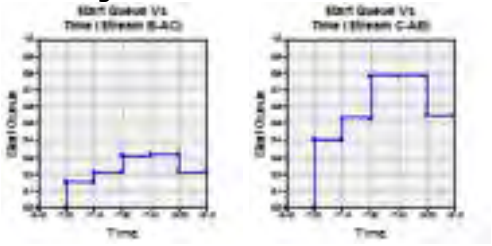


## Start Queue Graph

**Demand Set:** 610 AM Westwood Heath Road - Access
**Modelling Period:** 07:45-09:15

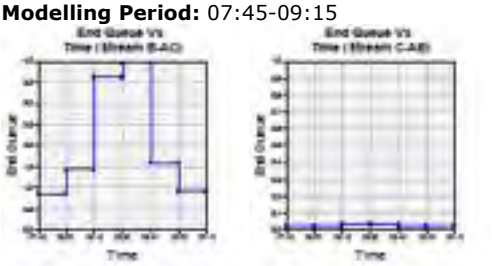


**Demand Set:** 610 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

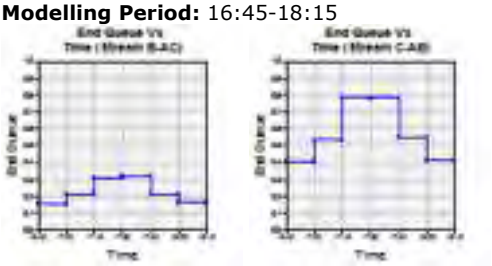


## End Queue Graph

**Demand Set:** 610 AM Westwood Heath Road - Access
**Modelling Period:** 07:45-09:15

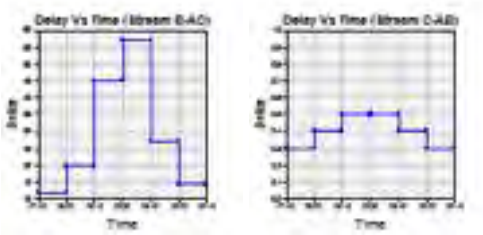


**Demand Set:** 610 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

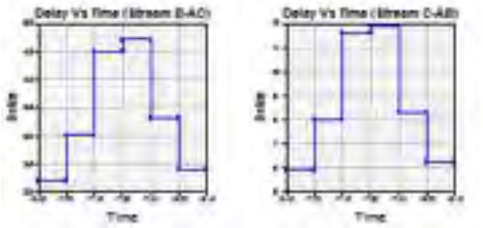


## Delay Graph

**Demand Set:** 610 AM Westwood Heath Road - Access
**Modelling Period:** 07:45-09:15



**Demand Set:** 610 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15



## Queues & Delays

**Demand Set:** 610 AM Westwood Heath Road - Access
**Modelling Period:** 07:45-09:15

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 07:45-08:00 | B-AC | 3.68 | 7.86 | 0.468 | - | 0.00 | 0.85 | - | 11.9 | 0.23 |
| | C-AB | 0.15 | 8.35 | 0.018 | - | 0.00 | 0.02 | - | 0.3 | 0.12 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.77 | - | - | - | - | - | - | - | - |
| | A-C | 11.04 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 08:00-08:15 | B-AC | 4.39 | 7.33 | 0.599 | - | 0.85 | 1.42 | - | 19.7 | 0.33 |
| | C-AB | 0.18 | 7.81 | 0.023 | - | 0.02 | 0.02 | - | 0.4 | 0.13 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.91 | - | - | - | - | - | - | - | - |
| | A-C | 13.19 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 08:15-08:30 | B-AC | 5.38 | 6.58 | 0.817 | - | 1.42 | 3.61 | - | 45.0 | 0.68 |
| | C-AB | 0.22 | 7.07 | 0.031 | - | 0.02 | 0.03 | - | 0.5 | 0.15 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 1.12 | - | - | - | - | - | - | - | - |
| | A-C | 16.15 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 08:30-08:45 | B-AC | 5.38 | 6.58 | 0.817 | - | 3.61 | 3.95 | - | 57.1 | 0.78 |
| | C-AB | 0.22 | 7.07 | 0.031 | - | 0.03 | 0.03 | - | 0.5 | 0.15 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 1.12 | - | - | - | - | - | - | - | - |
| | A-C | 16.15 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 08:45-09:00 | B-AC | 4.39 | 7.33 | 0.599 | - | 3.95 | 1.58 | - | 27.1 | 0.38 |
| | C-AB | 0.18 | 7.81 | 0.023 | - | 0.03 | 0.02 | - | 0.4 | 0.13 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.91 | - | - | - | - | - | - | - | - |
| | A-C | 13.19 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 09:00-09:15 | B-AC | 3.68 | 7.86 | 0.468 | - | 1.58 | 0.90 | - | 14.4 | 0.24 |
| | C-AB | 0.15 | 8.35 | 0.018 | - | 0.02 | 0.02 | - | 0.3 | 0.12 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.77 | - | - | - | - | - | - | - | - |
| | A-C | 11.04 | - | - | - | - | - | - | - | - |

**Demand Set:** 610 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 16:45-17:00 | B-AC | 0.92 | 6.80 | 0.135 | - | 0.00 | 0.15 | - | 2.2 | 0.17 |
| | C-AB | 3.02 | 10.53 | 0.287 | - | 0.00 | 0.40 | - | 5.9 | 0.13 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.65 | - | - | - | - | - | - | - | - |
| | A-C | 1.91 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 17:00-17:15 | B-AC | 1.09 | 6.27 | 0.174 | - | 0.15 | 0.21 | - | 3.0 | 0.19 |
| | C-AB | 3.61 | 10.41 | 0.347 | - | 0.40 | 0.53 | - | 8.0 | 0.15 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.78 | - | - | - | - | - | - | - | - |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | A-C | 2.28 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 17:15-17:30 | B-AC | 1.34 | 5.54 | 0.242 | - | 0.21 | 0.31 | - | 4.5 | 0.24 |
| | C-AB | 4.42 | 10.25 | 0.432 | - | 0.53 | 0.78 | - | 11.6 | 0.17 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.95 | - | - | - | - | - | - | - | - |
| | A-C | 2.79 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 17:30-17:45 | B-AC | 1.34 | 5.53 | 0.242 | - | 0.31 | 0.32 | - | 4.7 | 0.24 |
| | C-AB | 4.42 | 10.25 | 0.432 | - | 0.78 | 0.78 | - | 11.9 | 0.17 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.95 | - | - | - | - | - | - | - | - |
| | A-C | 2.79 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 17:45-18:00 | B-AC | 1.09 | 6.26 | 0.175 | - | 0.32 | 0.21 | - | 3.3 | 0.19 |
| | C-AB | 3.61 | 10.41 | 0.347 | - | 0.78 | 0.55 | - | 8.3 | 0.15 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.78 | - | - | - | - | - | - | - | - |
| | A-C | 2.28 | - | - | - | - | - | - | - | - |

| Segment | Stream | Demand (veh/min) | Capacity (veh/min) | RFC | Ped. Flow (ped/min) | Start Queue (veh) | End Queue (veh) | Geometric Delay (veh.min/ segment) | Delay (veh.min/ segment) | Mean Arriving Vehicle Delay (min) |
|---|---|---|---|---|---|---|---|---|---|---|
| 18:00-18:15 | B-AC | 0.92 | 6.79 | 0.135 | - | 0.21 | 0.16 | - | 2.4 | 0.17 |
| | C-AB | 3.02 | 10.53 | 0.287 | - | 0.55 | 0.41 | - | 6.2 | 0.13 |
| | C-A | - | - | - | - | - | - | - | - | - |
| | A-B | 0.65 | - | - | - | - | - | - | - | - |
| | A-C | 1.91 | - | - | - | - | - | - | - | - |

Entry capacities marked with an '(X)' are dominated by a pedestrian crossing in that time segment.
In time segments marked with a '(B)', traffic leaving the junction may block back from a crossing so impairing normal operation of the junction.
Delays marked with '##' could not be calculated.

## Overall Queues & Delays

### Queueing Delay Information Over Whole Period

**Demand Set:** 610 AM Westwood Heath Road - Access
**Modelling Period:** 07:45-09:15

| Stream | Total Demand (veh) | Total Demand (veh/h) | Queueing Delay (min) | Queueing Delay (min/veh) | Inclusive Delay (min) | Inclusive Delay (min/veh) |
|---|---|---|---|---|---|---|
| B-AC | 403.3 | 268.9 | 175.3 | 0.4 | 175.3 | 0.4 |
| C-AB | 16.5 | 11.0 | 2.2 | 0.1 | 2.2 | 0.1 |
| C-A | - | - | - | - | - | - |
| A-B | 84.0 | 56.0 | - | - | - | - |
| A-C | 1211.3 | 807.5 | - | - | - | - |
| **All** | **1957.3** | **1304.9** | **177.5** | **0.1** | **177.5** | **0.1** |

**Demand Set:** 610 PM Westwood Heath Road - Access
**Modelling Period:** 16:45-18:15

| Stream | Total Demand (veh) | Total Demand (veh/h) | Queueing Delay (min) | Queueing Delay (min/veh) | Inclusive Delay (min) | Inclusive Delay (min/veh) |
|---|---|---|---|---|---|---|
| B-AC | 100.5 | 67.0 | 20.3 | 0.2 | 20.3 | 0.2 |
| C-AB | 331.7 | 221.1 | 51.8 | 0.2 | 51.8 | 0.2 |
| C-A | - | - | - | - | - | - |
| A-B | 71.6 | 47.7 | - | - | - | - |
| A-C | 209.2 | 139.5 | - | - | - | - |
| **All** | **1688.9** | **1125.9** | **72.0** | **0.0** | **72.0** | **0.0** |

Delay is that occurring only within the time period.
Inclusive delay includes delay suffered by vehicles which are still queuing 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.

### PICADY 5 Run Successful

REUBY & STAGG LTD.
CONSULTING CIVIL & STRUCTURAL ENGINEERS

# Engineering Text for Planning Support

**Crest Nicholson** **Dec 2015**



Reuby & Stagg Ltd, Dewey House, 55 High Street, Ringwood, Dorset BH24 1 AE
Tel: 01425 484400 Fax: 01425 484409 Email: admin:reuby-stagg.co.uk

## 1.0 Existing Services

Record drawings have been obtained from each of the utilities providers in the area however capacity assessments have yet to be undertaken, it has therefore only been possible to review the availability of supplies against the location of each service assuming that capacity is available, capacity checks will be required in due course.

### Gas

Network records have been obtained from National and GTC, the National Grid records show a low pressure gas main running along Westwood Heath Road, adjacent to the site boundary, there is also a second low pressure gas main shown on the northern side of Westwood Heath Road. The GTC records also show a low pressure gas main on the northern side of Westwood Heath Road.

It therefore follows, subject to available capacity, the site is served by gas mains which are in the immediate vicinity.

### Electric

Western Power Distribution provide the electricity supply in the area, their records show a high voltage 33kV main running along the southern side of Westwood Heath Road adjacent to the site and running along the eastern side of Bockenden Road, there is a substation shown opposite the junction of Westwood Heath Road and Bockenden Road.

It therefore also follows that the site is potentially well served by electricity, again subject to available capacity.

### Telecoms

The BT records show a below ground service running along the northern side of Westwood Heath Road and an overhead service running along the western side of Bockenden Road.

There is also cable provided in the northern side of Westwood Heath Road which is operated by Vodafone.

It can therefore be said that the site is well served by telecoms



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## Water

Severn Trent Water provide the potable water supply in the area and their records show a 250mm diameter water main running down the northern side of Westwood Heath Road, there is also a 100mm diameter water main running along the western side of Bockenden Road.

It can therefore be seen that there are substantial water mains immediately adjacent to the site and, subject to a network assessment, may have sufficient capacity to serve the new development.

### Pipelines

There is a multi-product pipeline that cuts across the north eastern corner of the site, the pipeline is owned and operated by The British Pipeline Agency Ltd who have confirmed that a 3.0m wide easement exists each side of the pipeline.

BPA have advised that the pipeline is 250mm diameter and approximately 900mm deep across the farmland, they have not advised of any restrictions placed on residential development adjacent to the pipeline providing that it is outwith of the easement zone and that the pipeline assessed and protected according prior to development commencing.

## 2.0 Geo-Environmental

### 2.1 Geotechnical Considerations

Although a site specific intrusive ground investigation has not been undertaken to date, relatively detailed desk top information has been obtained which provides useful insight into the geo-environmental setting of the land.

British Geological Survey mapping shows the site as being predominantly underlain by Tile Hill Mudstone (a Sandstone bedrock), with a small area of Glacial Till located at the far west near the Water Tower, the Mudstone is described as being a very weak marl with a low potential for ground movement, whereas the Till has a moderate potential for ground movement, it is therefore likely that the soils are susceptible to volume change and this will need to considered in the engineering design of any new development on the site.

The hydrological properties of the Mudstone are described as being slowly permeable with slight seasonal waterlogging and moderate storage capacity over slowly permeable substrates, this is important for the design of drainage systems as it is very unlikely that the site will support the use of infiltration methods for surface water disposal, as discussed in the drainage section of this document.

It is also important to note that The Coal Authority have confirmed that the area is not within a zone of likely physical influence on the surface from underground coal workings, nor is it in a Brine Compensation District.



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2.2 Contamination Risk

Historical mapping has been obtained for the area which dates back to 1886, Lodge Farm is shown on the 1886 map, with Westwood Heath Farm (now known as 'The Moat') shown to the south east, the land is indicated as being farmland with no discernible features except for field boundaries and a footpath route running north \ south, a drainage ditch is shown in the south east corner which flows into Westwood Heath Farm, a second footpath running eastwards from Lodge Farm is shown on the 1926 mapping. There are no further relevant changes shown on the historical mapping up to the last publication. Development along Cromwell Lane to east becomes more dense post 1925 and the water tower appears on the 1937 mapping, the historical mapping therefore does not show any features on the land that could be described as a potential source of contamination risk.

Site sensitivity mapping has been reviewed for potential sources of contamination in the immediate vicinity of the site, several trade directory entries are indicated on the immediate northern side of Westwood Heath Road however they have been described as being inactive, there is a discharge consent for the disposal of effluent from a sewage treatment works on Lodge Farm Barns into a stream however the exact details are unknown, no landfill sites or other potential high risk activities have been identified from the mapping within a 1.0km radius from the site boundary.

2.3 Ground water

Desk top mapping has identified that the site overlies a principle aquifer that has an intermediate vulnerability rating however the site is outside of any Groundwater Source Protection Zones.

The land has been identified as being within a Nitrate Vulnerable Zone, this means that certain requirements are placed on the use of fertilizers, the same rules will therefore need to be applied to any new areas of public open space proposed as part of the development of the land.

## 3.0 Flood Risk

Current Environment Agency mapping indicates that the site is not at risk of flooding from rivers up to a 1 in 1000yr event (ie has an annual probability of flooding < 0.1%), the site is therefore classified as being within Flood Zone 1 according to the National Planning Policy Framework and is therefore suitable for all types of development in this regard.

The nearest source of river flooding as shown on the EA mapping is approximately 1.2km to the south east of the site, and approximately 15m lower in elevation, however two tertiary rivers exist immediately to the east, these run from a drainage ditch along Bockenden Road and from the property to the south east of the site, known as the 'Moat', both of these



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watercourses merge at an area named 'Fish Ponds' on the OS mapping, approximately 250m to the east.

Although the site has not been identified as being at risk of flooding from rivers there is localised surface water flooding indicated on the mapping, this flooding appears to reflect the topography of the land, ie the flooding follows the natural valley lines and old land drainage features, it is therefore likely to be overland flow paths created by the impermeable nature of the underlying soils rather than standing water, the worst affected area is in the north east corner of the site.

These areas of localised surface water flooding and overland flow should be maintained and reflected in any master planning proposals for the site such that they are incorporated into the proposed drainage, this is discussed in more detail in the following section.

## 4.0 Surface Water Drainage

Development of the site will introduce impermeable surfaces such as roofs and hardstandings which, if left unmanaged, could increase surface water runoff with the potential to increase downstream flood risk, it is therefore essential that the rate of surface water runoff from the existing farm land is quantified such that measures can be proposed to ensure that it is not exceeded.

From the desk top study undertaken to date it has been established that the site is potentially underlain by impermeable soils with limited soakage potential therefore, in the absence of any detailed and targeted soils information, it has been assumed that run off from the farmland drains to the two tertiary watercourses described previously.

Sustainable Urban Drainage Systems (SuDS) are to employed on the site to ensure that best practice and current standards are met, the SuDS Manual, as published by CIRIA, together with the recently published Non-Statutory Technical Standards for Sustainable Drainage (Local Authority SuDS Officer Organisation) are to be used as guiding documents during the assessment and design process.

Not only will the rate and volume of surface water runoff be governing factors, water quality will also require careful consideration to ensure that pollutants from the built environment are contained and managed accordingly, this is particularly important due to the site overlying and aquifer and being within a nitrate sensitive area.

Ideally, runoff should be managed at source, such methods as permeable paving and rainwater harvesting can be used to attenuate and filter rainwater before being discharged into a drainage network for further management, a system of swales and filter drains can be provided that will further attenuate and filter runoff.

It is viewed that storage basins are likely to be the optimum method for surface containment and treatment, they should be positioned in the lowest areas of the site to facilitate drainage by gravity and provide safe routes for any overland flows, the basins could incorporate treatment



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forebays planted with reeds etc and be sized to contain a 1 in 100yr rainfall event with outflows limited to the existing green field rates.

From examination of the existing site topography and overland flow routes an initial recommendation would that the basins are best located in the north eastern corner where surface water flooding currently occurs, and in the south eastern corner where ground levels are lowest, based on an initial assessment for an assumed hard paved area ratio for a given residential development density it is recommended that 400m2 of basin area is provided per 1.0 ha of residential development.

## 5.0 Foul Water Drainage

Severn Trent Water are the Sewerage Undertaker for the region and their records show two 150mm located in Westwood Heath Road, there is also 225mm foul sewer running along the rear of the properties to the north on Cromwell Lane.

The sewer records are incomplete and it has not been possible to determine a point of outfall from the information provided by Severn Trent Water, therefore further enquiries will need to be made with them, however for the purposes of this exercise it can be said that the site is in an area benefitting from mains foul sewerage.

Subject to a suitable point of connection being agreed with Severn Trent Water it may be necessary to pump flows off site, or undertake offsite sewer improvements, the scope of which will be determined by a network assessment undertaken at design stage.

## 6.0 Engineering Summary

A preliminary assessment of the availability of utility services based on mapping records has identified that Gas, Electricity and Telecom services are located within the public highway immediately adjacent to the site it therefore follows that, subject to available capacity, the site is well served existing utilities.

A desk top study has determined that the site is predominantly underlain by weak mudstone which should, subject to further intrusive ground investigation, be suitable to support shallow foundations for low rise residential development, it has been ascertained that the area is not at risk from coal mine workings.

A review of historical mapping and desk top environmental data has not identified any previous activities that could be a potential source of contamination on the site, it is evident that the site has remained farmland since the earliest available mapping (1886), however further intrusive investigation will be required in order to verify this and check for unknown sources, such as made ground etc.

The desk top study has also not identified any significant sources of contamination risk in the immediate locale, and no recorded landfill sites within a 1.0km radius.



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The site falls within Flood Zone 1 according the latest Environment Agency data, and is therefore suitable for residential development, however there may be localised areas on the land that are subject to periodic surface water flooding due to the impermeable nature of the underlying soils.

A surface water drainage strategy has been proposed that promotes the widespread use of SuDS to ensure that runoff from any new development does not exceed the existing green field rates, open swales and basins are proposed that will contain and control runoff whilst providing the appropriate level of treatment to ensure downstream water quality is not compromised.

Sewer records have been obtained from Severn Trent Water which indicate that the site is in an area benefiting from mains foul sewerage, therefore subject to a network assessment being undertaken by Severn Trent it may be possible to discharge foul sewerage from the new development into the existing system, offsite improvements may be necessary and an on-site pumping station could be required depending on the agreed point of connection.

From this preliminary engineering assessment it can be concluded that the land at Westwood Heath Road does not present any significant engineering constraints that would render it unsuitable for residential development, from examination of existing services records appears to be in an area well served by all public utilities and foul sewerage, the site has no previous usage that would give rise to significant contamination and is not in an area of flood risk.



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# Technical Briefing Note

Project: Land at Westwood Heath Road, Warwick

## Technical Briefing Note 1: Overview of Ecological Survey Results, Constraints and Opportunities (2016)

Date: 22 August 2016

**Executive Summary of Ecological Constraints and Opportunities**

i) **Introduction.** Aspect Ecology has been appointed to advise in respect of ecological matters relating to proposed development of Land at Westwood Heath Road, Warwick.

ii) **Designations.** The non-statutory designation Black Waste Wood Ecosite and Local Wildlife Site (LWS), which is also listed as ancient woodland, is located adjacent to the south western boundary of the site.

A 15m undeveloped buffer around this designation is recommended, and has been incorporated within the site masterplan. Provision of dense tree and shrub planting within the buffer zone will increase the overall area of the woodland and achieve a net gain in biodiversity.

iii) **Habitats.** The majority of the site comprises habitats of low ecological value, being dominated by arable land, whilst habitats of value within the site include hedgerows and trees. The scheme presents the opportunity to enhance the site for ecology and achieve a net gain in biodiversity through a number of measures including:

- Gapping up with native species and management of retained hedgerows;
- Provision of new native tree and shrub planting within open green space;
- Creation of wildflower grassland using native seed mixes within areas of open green space;
- Provision of new native linear woodland / double hedgerow to provide connectivity within the site east – west and to connect the offsite woodland to the south west and east; and
- Creation of new waterbodies.

iv) **Fauna.** The survey work undertaken to date indicates that the site is relatively unconstrained in terms of faunal species, such that the opportunity to achieve a net gain in biodiversity exists whilst incorporating enhancements for the minor constraints identified, summarised in Table 1 below:

**Table 1.** Summary of ecological mitigation/safeguards and enhancements.

| Species | Mitigation / Safeguards | Enhancement |
|---|---|---|
| Bats | Retain trees with potential to support roosting bats | New planting within the buffer zone around Black Waste Wood LWS, hedgerow gapping up, management and new tree and shrub planting. Sensitive lighting scheme at detailed stage. |
| Badger | Retain Badger setts with a 20m buffer zone. | New planting within the buffer zone around Black Waste Wood LWS, hedgerow gapping up and new tree and shrub planting will provide foraging/shelter resources. |
| Dormouse | Retain hedgerows within the site. A Natural England licence will likely be required for works to hedgerows, including supervised vegetation clearance (seasonal constraints). Creation of canopy hop-overs will ensure connectivity is retained for the species. | New woodland planting and hedgerow gapping up will provide a net gain in habitat for Dormouse. |
| Breeding birds | Clearance of nesting habitat undertaken outside of bird nesting season, or preceded by a nesting bird survey. | New landscape planting will be provide additional nesting and foraging opportunities. The provision of Barn Owl boxes will benefit this species should it colonise and woodland planting will benefit Tawny Owl. |
| Great Crested Newt | Retain suitable terrestrial habitat and provide a 50m buffer zone around breeding ponds. A Natural England licence may be required, including translocation exercise (seasonal constraints). | Creation of new ponds and associated terrestrial habitat in the south of the site, creation of wildflower grassland, retention and infilling of hedgerows. Point features also created in the form of hibernacula and refugia. These measures will provide a substantial net gain in habitat for the species. |
| Reptiles | None required as few opportunities for this species group at present. | The creation of wild flower grassland and scrub will provide substantial new opportunities for this species group should they colonise. |
| Invertebrates | None required | The creation of wildflower grassland, scrub, woodland and aquatic habitats which are not within an agricultural regime will provide a substantial net benefit for invertebrates. Specialist point features will also be introduced such as butterfly banks, insect hotels and dead wood piles to increase the diversity of opportunities on offer. |

## 1. Introduction and Background

1.1. Aspect Ecology has been appointed to advise in respect of ecological matters relating to proposed development of Land at Westwood Heath Road, Warwick.

1.2. Phase 1 habitat survey work was undertaken at the site in November 2012, the findings of which are set out within an 'Ecological Baseline Assessment' (dated November 2012). Specific Phase 2 surveys were subsequently undertaken between March and November 2014 in respect of bats, Badger, Dormouse, breeding birds and Great Crested Newt.

1.3. Natural England's Standing Advice sets out data for planning applications may be up to four years old, although should be from the most recent survey season if possible, particularly where a mitigation licence from Natural England may be required. On this basis, update survey work was undertaken in 2016, including a Phase 1 habitat survey, and Phase 2 surveys in respect of bats, Badger, Dormouse, breeding birds and Great Crested Newt.

1.4. This note provides a summary of the 2016 survey findings with regard to the proposals for development of the site, focusing on any potential constraints to development that may require consideration. A number of recommendations are then provided in order to address ecological constraints identified and highlight potential opportunities to enhance the site for ecology and achieve net gains in biodiversity.

## 2. Site Description

2.1. The site (see Plan 3134/CON1 for boundary) largely comprises agricultural land under intensive arable cultivation. Other habitats in the form of hedgerows, trees, rough grassland, ditches and scattered scrub were also recorded, in addition to offsite woodland and ponds.

## 3. Summary of Survey Results and Ecological Considerations

Designations

3.1. The site itself is not subject to any statutory or non-statutory nature conservation designations. However, the non-statutory designation Black Waste Wood, designated as an Ecosite and Local Wildlife Site (LWS), is located adjacent to the south west of the site (see Plan 3134/CON1).

3.2. Black Waste Wood Ecosite and LWS is classified as ancient semi-natural woodland (in part) and a UK Priority Habitat. It is therefore considered to be of high ecological value at the local level.

3.3. No other significant issues in regard to ecological designations have been identified.

Habitats

3.4. The update Phase 1 habitat survey undertaken in 2016 recorded the majority of the existing habitats within the site to be largely unconstrained in terms of ecology, being dominated by arable land, which is not considered to be of particular elevated ecological value. Nonetheless, a number of other habitats within the site (indicated at Plan 3134/CON1), namely hedgerows and trees, in addition to the offsite woodland and ponds, provide some elevated ecological value in relative terms.

Bats

3.5. Update transect surveys are in the process of being completed, with a single survey undertaken to date in May 2016, in order to investigate bat activity levels within the site and assess the use of the site by foraging and commuting bats.

3.6. The results of the 2016 survey work to date have recorded relatively low levels of Common Pipistrelle *Pipistrellus pipistrelle* activity, which indicates that the site is unlikely to be of high significance to foraging bats overall. However, habitats in the form of hedgerows, trees and the offsite woodland are considered to be of elevated value for bats in the context of the site. In particular, relatively higher levels of activity were recorded at the south western boundary, where Black Waste Wood adjoins the site boundary, and along a number of hedgerows within the site (see Plan 3134/CON1).

3.7. A number of trees with potential to support roosting bats have also been identified within the site, as shown at Plan 3134/CON1.

Badger

3.8. The update Badger survey undertaken in 2016 recorded a single inactive Badger sett within the site, whilst a second Badger sett (recorded as active in the 2014 update survey), which is located within a hedgerow, was heavily overgrown such that an assessment of its status was not possible at the time of survey. An old Badger latrine was also recorded.

Dormouse

3.9. Dormouse nests were recorded at various locations within on-site hedgerows during the 2014 survey work. Update survey work in respect of Dormouse is currently being carried out at the site, with the check undertaken in May 2016 recording evidence of Wood Mouse *Apodemus sylvaticus*, in the form of nests and feeding remains, in various locations within the site. No evidence of Dormouse has been recorded to date in 2016.

Breeding Birds

3.10. Breeding bird surveys undertaken in spring 2016 recorded an increase in the number of bird species utilising the site, however, of these, only a modest assemblage of breeding birds was recorded (as in the 2014 surveys). Almost all breeding activity is associated with the network of hedgerows within and around the site, the only exception being small numbers of Skylark *Alauda arvensis* breeding in the arable fields.

3.11. Declining farmland birds breeding at the site include one or two each of Skylark, Linnet *Linaria cannabina* and Yellowhammer *Emberiza citrinella*, all of which are included on the RSPB Red List having undergone major declines in their UK populations over 25 years. Other Red or Amber List species (which have undergone a moderate decline) breeding at the site include Dunnock *Prunella modularis* and Whitethroat *Sylvia atricapilla*, whilst Song Thrush *Turdus philomelos* and House Sparrow *Passer domesticus* are associated with adjacent housing. Despite declines, all of these species remain common and widespread both locally and nationally, as are all the other species recorded breeding or possibly breeding at the site.

Great Crested Newt

3.12. No ponds were identified within the site itself, although a number of ponds are located offsite within 250m of the site boundary. Update survey work of these ponds was undertaken during April to June 2016.

3.13. The survey work has highlighted that four of the offsite ponds, located beyond the site boundary to the south and west of the site, support a small population of Great Crested Newt, two of which were recorded to support breeding populations (see Plan 3134/CON1). This species could enter the site in its terrestrial phase, although the habitats present within the site are largely of poor suitability for the species.

Other Fauna

3.14. Generally the site is considered to provide few opportunities for other protected or notable faunal species with no evidence for the presence of such species recorded during the survey work undertaken to date.

## 4. Recommended Mitigation / Safeguard and Enhancement Measures

4.1. On the basis of the survey results and understanding of the ecological considerations summarised above, the site appears to be relatively unconstrained in terms of ecology, save for a number of minor issues. Nonetheless, in order to ensure ecological matters of relevance discussed above are given due consideration at the design stage, a number of recommendations for mitigation and enhancement that can be readily incorporated within the masterplan to achieve a net gain in biodiversity are set out below.

Designations

4.2. It is recommended that where Black Waste Wood LWS and ancient woodland adjoins the site boundary, a minimum 15m undeveloped buffer zone (ideally extended to 30m) be provided in order to safeguard this designation (see Plan 3134/CON1). This recommended buffer zone has been incorporated within the current masterplan for the site. This is particularly advisable as ancient woodland is afforded strict policy protection under the NPPF. This buffer zone should be left permanently to allow it to grow into semi-natural habitat and could be planted with dense shrubs to discourage public disturbance to the woodland and increase the overall area of the woodland to achieve a net gain in biodiversity. The ability of the scheme to increase the area of Black Waste Wood will bring particular benefits to biodiversity as is set out below.

Habitats

4.3. It is recommended that habitats of elevated ecological value (i.e. trees, hedgerows and off-site woodland) are retained where possible under the proposals, and buffered from built development and enhanced wherever possible. In particular, in order to maintain the ecological viability of these features it is recommended that the layout incorporates a high degree of connectivity between all retained and proposed habitats of ecological value.

4.4. The following habitat creation measures would serve to provide an enhancement to ecology.

4.5. **Open green space.** Areas of open green space have been incorporated into the proposals. These can be utilised for new landscape planting of native shrubs and trees, and creating areas of wildflower grassland using native seed mixes. Provision of an appropriate level of open greenspace under the scheme provides potential scope for creation of further habitats, as

suggested below, which will contribute toward ensuring an overall net gain for biodiversity and meeting the broad objectives of the NPPF.

4.6. **Hedgerow gapping up.** The ecological value and biodiversity of hedgerows within the site could be enhanced through infilling gaps in the hedgerows with native shrubs, such as Blackthorn *Prunus spinosa* and Hawthorn *Crataegus monogyna*, which were recorded to be the dominant species in the majority of the hedgerows while planting of Hazel *Corylus avellana* would further benefit Dormouse. Any dominant areas of Bramble *Rubus fructicosus* agg. could be reinforced through shrub planting. This will serve to improve the structure of the hedgerows, providing shelter and commuting/foraging opportunities for a range of fauna including Badger, bats, breeding birds and Dormouse.

4.7. **Linear Planting.** The provision of a new native linear woodland / double hedgerow within the south of the site could be included to improve east – west connectivity, in addition to connecting the offsite woodlands to the south west and east (see plan 3134/CON1). This will be of benefit to a range of fauna, including bats, Dormouse and Badger.

4.8. **New woodland planting.** Planting new areas of woodland and scrub within the site is recommended, and these new habitats are incorporated within the masterplan for the site. In particular, woodland planting is recommended adjacent to the off-site Black Waste Wood (see Plan 3134/CON1), which would serve as a buffer between the built development and the off-site ancient woodland. New woodland planting would provide opportunities for a range of fauna, particularly breeding birds and Dormouse. Species planted should be native and could include Ash *Fraxinus excelsior*, Oak *Quercus* sp., Birch *Betula* sp., Hazel, Hawthorn and Blackthorn.

4.9. **New pond creation.** Although ponds recorded to support Great Crested Newt lie offsite, the species may enter the site in its terrestrial phase which presents an opportunity to provide additional habitat for this species. A series of attenuation ponds are included within the masterplan in the south of the site where the land is relatively flat. These ponds could also be managed for the benefit of wildlife, including Great Crested Newt, including the creation of associated suitable terrestrial habitat, which would significantly enhance the site for this species. Ponds should ideally be located within 250m of the existing ponds supporting Great Crested Newts (see Plan 3134/CON1) as this is the typical distance this species will travel on land. The introduction of these ponds provides a considerable benefit of this species and provides a link between currently isolated populations offsite to the south and east.

Fauna

4.10. **Bats.** It is recommended that trees with potential to support roosting bats (as shown at Plan 3134/CON1) are retained where possible, which is reflected in the current masterplan for the site. In the event that these trees are likely to be affected under the proposals, appropriate mitigation measures, in the form of further survey and ecological supervision of works may be required. Furthermore, it is recommended that features which provide opportunities for foraging / commuting bats, particularly hedgerows and trees, are incorporated into the design layout and subject to appropriate safeguards and enhancement measures wherever possible. A sensitive lighting scheme at the detailed stage would also serve to minimise impacts on bats. The provision of new woodland planting, create of water bodies and wildflower grassland under the proposals will provide a net benefit for bats.

4.11. **Badger.** It is recommended that habitat connectivity via hedgerows is maintained. The two Badger setts, although inactive / not visible at the time of survey in 2016, should be considered

for retention under the proposals, with a 20m buffer if possible. Should the loss of either sett be required, or works required within 20m, the setts may need to be closed following an exclusion exercise under licence from Natural England. Obtaining licences is a somewhat bureaucratic process and may have seasonal constraints (NE usually only issue licences to close setts during July to the end of November, outside of the sensitive Badger breeding season). It is also recommended that an update survey for Badger is undertaken prior to the submission of a planning application, as the status of Badger setts can change rapidly. The creation of new habitats in the form of woodland, scrub wildflower grassland as well as formal landscaping will benefit this species.

4.12. **Dormouse.** It is recommended that hedgerows are retained under the proposals wherever possible, and this has been incorporated within the site masterplan. Should sections of hedgerow require removal, and due to the presence of Dormouse recorded during the 2014 survey work, it is probable that a Natural England licence would be required, which will likely impose seasonal constraints for vegetation clearance (above ground vegetation clearance should be undertaken between November and March, with stump removal undertaken from May onwards) and require creation of replacement woody habitat. Canopy hop-overs could be provided to maintain habitat connectivity for Dormouse within the site. The proposals to provide new areas of woodland planting, hedgerows and scrub will provide a net benefit for this species.

4.13. **Breeding birds.** Although no significant breeding bird assemblage was recorded, as occupied nests of birds are legally protected, any clearance of suitable nesting habitat should be undertaken outside of the bird breeding season (which runs from March to August inclusive), or preceded by a nesting bird survey with any nests cordoned off and protected until the nest is no longer occupied. New formal landscaping and rear gardens will provide benefits for the bird assemblage as a whole over the existing areas of arable while the incorporation of bird nesting boxes will provide opportunities for new species to colonise the site that are not present at the current time. Moreover, habitat creation under the proposals in the form of new woodland, waterbodies and wildflower grassland will benefit birds as will the provision of Owl boxes as part of the scheme.

4.14. **Great Crested Newt.** It is recommended that consideration be given to the retention of habitat within 250m of ponds used by Great Crested Newts, particularly hedgerows which are likely to be occupied by this species in their terrestrial phase. A 50m undeveloped buffer zone around breeding ponds is also recommended (see Plan 3134/CON1). Depending on the proposals and the extent of habitat loss, it is probable that a Natural England licence would be required, which may involve a translocation exercise of newts within the site prior to works commencing, and provision of suitable replacement habitat. It is therefore recommended that terrestrial habitat in the form of semi-natural green space is created in the southern part of the site, as shown on the current masterplan to benefit Great Crested Newt. The creation of new waterbodies would provide a net benefit for the species and would serve to link offsite population to the east and south while further benefits are afforded through the creation of refugia and hibernacula for the species. Should significant time pass prior to applying for a Natural England licence, update survey work may be required to inform licensing.

4.15. **Reptiles**. Little habitat is present for this species group on site at the present time and accordingly they do not act as a constraint on the proposals. However, the new habitat creation which will take place under the proposals will provide opportunities for this group which will also benefit from the refugia and hibernacula to be provide to benefit Great crested Newts.

4.16. **Invertebrates**. The intensively managed arable habitats which dominate the site at present provide few opportunities for invertebrates with only the hedgerows and narrow field margins

supporting common species. The removal of the land from an intensive agricultural regime will bring immediate benefits for invertebrates while under the proposals new habitat creation will provide a range of habitats and niches for the group. In addition, the creation of new features such as buttery banks, insect hotels and log piles will further increase the opportunities for invertebrates.

## 5. Ecological Deliverability of the Site

5.1. In summary, no overriding constraints to development are present in ecological terms, albeit a number of recommendations are outlined above, which can be readily incorporated within the masterplan for the site, in order to ensure relevant ecological matters are given due consideration at the design stage. In particular, consideration should be given to the retention of habitats identified as being of relatively elevated ecological value (particularly trees and hedgerows), in addition to safeguarding of off-site ancient woodland through appropriate buffers. Significant opportunities to enhance the biodiversity of the site are available, particularly in regard to reinforcement of hedgerows, new landscape/woodland planting and new pond creation. These measures will also serve to contribute towards biodiversity offsetting requirements under Warwickshire guidance. On this basis, subject to consideration of recommendations set out in this briefing note, it can be concluded that the site is deliverable in ecological terms and the opportunity exists to bring forward considerable biodiversity benefits in line with the aims of the NPPF.


KEY:

- Site Boundary
- Tree with Moderate Bat Roosting Potential
- Tree with Low Bat Roosting Potential
- Offsite Woodland
- Offsite Ancient Woodland and Local Wildlife Site
- 15m Buffer Around Offsite Woodland (Ideally Extend to 30m)
- Pond with Breeding Great Crested Newt (GCN) Present
- Pond with Non-breeding GCN Present
- Pond not Surveyed - GCN Unknown
- 50m Buffer Around Breeding Pond (or Possible Breeding Pond)
- 250m GCN Dispersal Zone

N.B. Update surveys are yet to be completed, with the exception of GCN. The information on this plan is therefore based on interim survey results.

*Plan based on Terrence O'Rourke's 'Illustrative Masterplan with Aerial' (ref: 156025B/MP02), dated August 2016*

Land at Westwood Heath Road, Warwick — PROJECT

Ecological Mitigation and Opportunities — TITLE

3134/CON1 — DRAWING NO.

C — REV.

August 2016 — DATE

Aspect Ecology Limited - West Court - Hardwick Business Park
Noral Way - Banbury - Oxfordshire - OX16 2AF
01295 276066 - info@aspect-ecology.com - www.aspect-ecology.com

aspect ecology

# Land at Westwood Heath Road, Burton Green

# Delivery Trajectory

| | |
|---|---|
| Draft Allocation | 29th January 2016 |
| Outline/hybrid application submitted | Early 2017 |
| Outline/hybrid application granted | End 2017 |
| 25 Dwellings | End 2018 |
| 100 Dwellings | End 2019 |
| 150 Dwellings | End 2020 |
| 150 Dwellings | End 2021 |
| 150 Dwellings | End 2022 |
| 35 Dwellings | End 2023 |