

North Oxfordshire
Consortium

**Heyford Park Transport
Assessment**

Construction Traffic
Report

ARUP

North Oxfordshire
Consortium

**Heyford Park Transport
Assessment**

Construction Traffic
Report

January 2008

Ove Arup & Partners Ltd

The Arup Campus, Blythe Gate, Blythe Valley Park,
Solihull, West Midlands. B90 8AE
Tel +44 (0)121 213 3000 Fax +44 (0)121 213 3001
www.arup.com

This report takes into account the
particular instructions and requirements
of our client.

It is not intended for and should not be
relied upon by any third party and no
responsibility is undertaken to any third
party

Job number 120643

Job title	Heyford Park Transport Assessment	Job number
		120643
Document title	Construction Traffic Report	File reference

Document ref

Revision	Date	Filename	0007Construction traffic v1.doc		
Draft 1	18/12/07	Description	First draft		
			Prepared by	Checked by	Approved by
		Name	Ian Clarke	Iain Dick	Johnny Ojeil
		Signature			
Draft 2	21/12/07	Filename	0008Construction traffic v2.doc		
		Description	Re-ordered sections, minor edits, clarified methodology.		
			Prepared by	Checked by	Approved by
		Name	Ian Clarke	Jagjit Riat	Johnny Ojeil
		Signature			
Issue	04/01/08	Filename	0009Construction Traffic Report_Issued_04.01.08.doc		
		Description	Final checks and edits		
			Prepared by	Checked by	Approved by
		Name	Ian Clarke	Jagjit Riat	Johnny Ojeil
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			

Issue Document Verification with Document



Contents

	Page
1 Introduction	1
1.1 Background	1
1.2 Layout of the Report	1
2 Traffic Related to Construction	2
2.1 Residential Development	2
2.1.1 HGVs	2
2.1.2 Delivery Timing	2
2.1.3 Workforce	3
2.2 Commercial Development	3
2.2.1 Workforce	3
2.2.2 HGVs	3
2.3 Change of Use	3
3 Traffic Related to Demolition/Bulk Fill	4
3.1 Material Volumes	4
3.2 HGV Trips	4
4 Impact of Construction Traffic	5
4.1 Impact on Road Network	5
4.2 Traffic Volume	5
4.3 Construction Traffic Routes	6
4.4 Mitigation Measures	6
4.5 Residual Impacts	6

Appendices

Appendix A

Trip Generation Assumptions

Appendix B

Summary of Demolition Material Exercise

1 Introduction

1.1 Background

Arup was commissioned by North Oxfordshire Consortium to undertake a Transport Assessment (TA) in support of an outline planning application for the proposed development of Heyford Park, which forms part of the former RAF Upper Heyford in Oxfordshire.

Upper Heyford was an operational airfield for many years and at its peak the airbase housed some 12,000 servicemen and their families. Extensive building and other works were carried out at various periods resulting in a large site area with a great variety of infrastructure.

After a period of reduced activity in the early nineties, the airbase closed in 1994 although most of the infrastructure has been retained. As of summer 2006 approximately 980 people were employed on the site.

The Transport Assessment, which included a brief consideration of construction issues, was submitted as part of the planning application in September 2007.

Arup was subsequently commissioned to produce this report which looks at construction issues in more detail and in particular, assesses the likely volume of HGV traffic generated by construction activities at the site.

A full description of the development proposals is provided in the Supporting Planning Statement that accompanies the planning application.

At this stage of the development limited information is available on which to base an assessment of construction traffic and therefore a number of assumptions have had to be made. These are stated in the report and are listed in Appendix A.

A five year construction period has been assumed based on the Development Phasing Plan (Drawing N.0111_35) which was submitted with the planning application.

1.2 Layout of the Report

Chapter 2, following this introduction, sets out the estimation of traffic related to construction.

Chapter 3 estimates traffic arising from demolition and fill.

Chapter 4 considers construction traffic impact.

Appendices are enclosed at the end of the document.

2 Traffic Related to Construction

2.1 Residential Development

The major construction associated with the Heyford Park development will be that of new dwellings. The planning application is for up to 1075 dwellings. A total of 1005 will be new build and 70 existing dwellings will be retained and refurbished.

2.1.1 HGVs

One of Arup's core services is civil engineering consultancy and as such the firm has been involved in numerous construction projects. Based upon Arup's experience of similar developments across the UK an estimate of the number of HGV trips associated with the construction of houses has been developed and is shown in Table 2.1. The HGV trips per dwelling includes an allowance for road material, utilities and other infrastructure.

Table 2.1 HGV trips per Dwelling Construction

Dwelling size	HGVs
One bedroom	6
Two bedrooms	7
Three bedrooms	8
Four bedrooms	9
Five bedrooms	10

At this stage of the Heyford Park development, the mix of house types and sizes has not been established and therefore a mean/median of 8 HGVs per dwelling has been assumed.

It is understood that the construction of new dwellings will be implemented evenly across the construction period which equates to 201 dwellings per year for each year of the five year construction programme. It has been assumed that deliveries will only be made on Monday to Friday working days and that there are 252 working days per year.

Thus: the total HGV deliveries per year will be $201 \times 8 = 1608$, divided by the number of working days $1608 \div 252 = 6.38$ deliveries per working day.

It has been assumed that the refurbishment of the 70 existing dwellings will be carried out over the same five year construction period at the rate of 14 per year. It is further assumed that refurbishment will require significantly fewer HGV trips than new build and therefore 2 HGVs per refurbished dwelling has been assumed.

Thus: the total HGV deliveries per year related to refurbishment of existing dwellings will be $14 \times 2 = 28$, divided by the number of working days $28 \div 252 = 0.11$ deliveries per working day.

When added to the HGVs resulting from new build, the total per day is 6.49 deliveries.

Therefore, based on the assumptions stated above, there will be an average of just fewer than **7 HGV deliveries per working day associated with the residential construction** which equates to 14 trips on the road network (7 in and 7 out).

2.1.2 Delivery Timing

It has been assumed that HGV incoming deliveries will arrive one per hour from 8am until 3pm. It has been assumed that each vehicle will take 2 hours to unload and therefore the corresponding departing trip will be 2 hours after the arrival trip. Based on these assumptions, a delivery profile is shown in Table 2.2.

Table 2.2 HGV Daily Delivery Profile

Time Commencing	8.00	9.00	10.00	11.00	12.00	1.00	2.00	3.00	4.00	5.00
Arrivals	1	1	1	1	1	1	1			
Departures			1	1	1	1	1	1	1	

2.1.3 Workforce

Based on Arup's experience of the construction industry and previous similar studies, it has been assumed that each dwelling will have a construction period of 3 months. Therefore, at any one time 50 dwellings will be under construction. No allowance has been made for changes in construction period due to the seasons or weather conditions as it is assumed that the effect of these factors will even out across the year.

The numbers of workers per dwelling has been assumed to be 4 at any one time which equates to a total of 200 on site at any one time.

It is common practice for contractors to use minibuses to transport staff to site rather than each worker making their own arrangements. Not all trips are likely to be during the peak hours. It has been assumed therefore, that overall, the number of daily vehicle trips is fifty percent of the workforce total.

In total, therefore, **the number of trips associated with the workforce constructing the residential development is estimated to be 100 per working day.**

It has been assumed that the construction workforce will undertake the dwelling refurbishment and demolition/fill works.

2.2 Commercial Development

Included in the planning application are a number of new commercial buildings:

- A two form-entry primary school;
- 6 Class B1 buildings totalling 7,800sqm; and
- Refurbishment of the old Officers Mess to provide offices and/or a Conference Centre of 4,150sqm.

2.2.1 Workforce

The primary school has been assumed to require a workforce of 20 and a construction period of 24 months probably commencing in 2009.

The Class B1 buildings have been assumed to require a workforce of 20 and a construction period of 24 months probably commencing in 2011.

The Conference Centre has been assumed to require a workforce of 10 and a refurbishment period of 12 months probably commencing in 2012.

2.2.2 HGVs

Based upon Arup's experience of similar developments across the UK it is estimated that there will be a maximum of **1 HGV per working day each for the school, B1 development and Conference Centre.**

2.3 Change of Use

It is understood that no refurbishment or other construction work is required for the remaining buildings subject to change of use as this element of the planning application is to obtain permanent consent for existing uses.

3 Traffic Related to Demolition/Bulk Fill

3.1 Material Volumes

The possible volumes of material related to demolition, have been quantified in the Davis Langdon 'Demolition Material Exercise' dated 29th November 2007. This gives details of demolition material and approximate quantity of fill required on-site. The note is provided in Appendix B and summarised in Table 3.1 below.

Table 3.1 Demolition and Fill Material

	Gross Volumes (m3)
Demolition Material	81,582
Fill Required	194,977
Nett Import	113,395

Notes: The volume of material that would have to be carted off site if none was to be re-used on site is given as 163,164m³ in the report. However, in order to calculate the number of lorry movements, the exercise has taken the gross volume of re-usable material and multiplied that by a bulking factor of 2 to arrive at a figure of 163,164m³ for the total lorry-carrying requirements (ie: material to be removed off-site 163,164 ÷ 2 = 81,582). The exercise has also applied a crushing factor of 0.66 to bring this 'cart away' figure back to the volume of material that could be re-used on site, i.e. once it has been crushed to a useable size and then compacted in place. For the purpose of the construction traffic assessment, both of these factors have been discounted and gross volumes used.

Therefore, the volume of material to be imported is 194,977 - 81,582 = **113,395m³**.

3.2 HGV Trips

The following assumptions have been made related to bulk material:

- trips will utilise articulated HGVs with a capacity of 28m³;
- carrying of bulk material will take place evenly over the five year construction period; and
- bulk material deliveries will only be made on working days and that there are 252 working days per year.

Thus: the HGV deliveries related to import of bulk fill material per year will be 113,395m³ ÷ 5 = 22,679m³, divided by the number of working days: 22,679m³ ÷ 252 = 90m³ per day.

The number of HGVs is thus 90m³ ÷ 28m³ = 3.21.

Therefore, based on the assumptions stated above, there will be an average of **4 HGVs per working day associated with the demolition/fill** which equates to 8 trips on the road network (4 in and 4 out). It has been assumed that HGV incoming bulk material deliveries will arrive, unload and depart outside of the peak hours.

4 Impact of Construction Traffic

4.1 Impact on Road Network

The issues likely to cause impacts are:

- The volume of construction traffic and its effect on the highway network in terms of capacity;
- The volume of construction traffic and its route to and from the site.

4.2 Traffic Volume

Table 4.1 shows the estimated daily vehicle trips that could be generated during the construction programme.

Table 4.1: Estimated Daily Volumes of Construction Traffic

Year	Residential		Commercial		Demolition / Fill		Total	
	Workforce Cars/Vans	HGVs	Workforce Cars/Vans	HGVs	Workforce Cars/Vans	HGVs	Workforce Cars/Vans	HGVs
2008	100	7	0	0	0	4	100	11
2009	100	7	10	1	0	4	110	12
2010	100	7	10	1	0	4	110	12
2011	100	7	10	1	0	4	110	12
2012	100	7	15	2	0	4	115	13

It can be seen that during normal construction periods, 90% of daily construction trips will be cars / light vans and 10% will be HGV.

Import of bulk fill material has been included although, given the nature of the site, it is possible that alternative fill material will be found on-site, for example by utilising arisings from the foundation excavations, thereby negating the requirement to import.

Construction operations are assumed to take place on Monday to Friday working days only.

Daily construction is likely to take place between 7.30am and 6.00pm. The peak traffic flows identified in the Transport Assessment are 8.00am to 9.00am and 5.00pm to 6.00pm and therefore the majority of workforce trips will be outside of the peak hours with minimal impact on the AM or PM peaks. HGV trips are assumed to be spread throughout the day with very few in the peak hours.

Table 4.2 shows the total daily trips to and from the existing Heyford Park development along with the estimated construction traffic and percentage.

Table 4.2: Percentage of Construction Traffic

7.00am to 7.00pm	Arrivals	Departures
Existing	2584	2529
Construction (2012)	126	126
Percent	4.8%	4.9%

2012 will experience a slightly higher level of construction traffic than earlier in the five year construction period. However, even in 2012 construction traffic only represents an increase of less than 5% on the existing daily traffic levels associated with the site and it will therefore have a minor adverse impact.

Furthermore, even if all construction traffic trips were to take place in the peaks hours, the volume would still be significantly lower than that forecast in the Transport Assessment for the AM and PM peaks in the opening year of the full development.

4.3 Construction Traffic Routes

Options for construction traffic to access the site are limited. HGV construction traffic approaching and leaving the site will use the existing approved route which is followed by HGVs servicing the major existing commercial tenants at Heyford Park.

The existing approved route from the site is eastbound via Camp Road to the Chilgrove Drive junction, then to the B430 and then north to the M40 Motorway at Junction 10. There is a condition that routes must be on the M40 where possible.

There will be a minor adverse impact on the existing houses fronting Camp Road and the village of Ardley due to a minor increase in traffic and HGVs during the construction phase.

Localised traffic management will be required during highway works planned to take place at Camp Road. These include the construction of a junction with a new lorry access road, improvements to existing junctions which form accesses to the site and the introduction of upgraded traffic calming measures. During this phase there will be some local inconvenience to road users, the impact of which is considered to be minor adverse.

4.4 Mitigation Measures

At the appropriate time, a Code of Construction Practice will be produced for the site to manage and control the construction process. This will include details of the approved route for construction traffic approaching/leaving the site, and will cover on-site issues such as speed limits and other restrictions for vehicle movement, segregation of pedestrians from vehicles, access times for construction traffic, site operational hours and so on.

All vehicles will enter the site via security-manned posts/gates and drivers will be briefed by the traffic supervisor and issued with a copy of the site rules and route maps indicating storage areas, routes, speed restrictions etc. Vehicle arrival and departure times will be recorded. Regular co-ordination meetings will be organised in order to ensure good housekeeping.

Personnel access to the site will be via security-manned posts/gates and where appropriate, segregated from on-site construction traffic by means of vehicular barriers/fencing/hoardings etc.

Washing facilities (including wheel wash) will be provided to ensure vehicles are clean when leaving the site and will not deposit matter onto the highway.

4.5 Residual Impacts

Construction traffic impacts are temporary and will cease upon completion of the construction works. There are consequently no residual transport impacts associated with construction.

Appendix A

Trip Generation Assumptions

CONSTRUCTION TRAFFIC REPORT: TRIP GENERATION ASSUMPTIONS

1. A five year construction period from 2008 to 2013.
2. A total of 1005 dwellings will be new build and 70 existing dwellings will be retained and refurbished.
3. Arup's estimate of HGV trips per dwelling construction are shown in the table. The mix of house types and sizes has not been established and therefore a mean/median of 8 HGVs per dwelling has been assumed.

Dwelling	HGVs
One bedroom	6
Two bedrooms	7
Three bedrooms	8
Four bedrooms	9
Five bedrooms	10

4. Construction of new dwellings will be implemented evenly across the construction period which equates to 201 dwellings per year for each year of the five year construction programme.
5. Deliveries will only be made on working days and that there are 252 working days per year.
6. The refurbishment of the 70 existing dwellings will be carried out over the same five year construction period at the rate of 14 per year.
7. Refurbishment will require significantly fewer HGV trips than new build and therefore 2 HGVs per refurbished dwelling has been assumed.
8. HGV deliveries will arrive from 8.00am until 3pm. Each vehicle will take 2 hours to unload.
9. The assessment will include construction of a two form-entry primary school and 6 Class B1 buildings totalling 7,800sqm.
10. No refurbishment or other construction work is required for the buildings subject to change of use other than the Officers Mess – see Item 20 below.
11. Each dwelling will be constructed over a period of 3 months.
12. No allowance has been made for changes in construction period due to the seasons or weather conditions.
13. The numbers of workers per new dwelling has been assumed to be 4 at any one time. No additional workers are required for the refurbishment of existing dwellings.
14. The primary school has been assumed to require a workforce of 20 at any one time and a construction period of 24 months commencing in 2009.
15. The Class B1 buildings, in total, have been assumed to require a workforce of 20 at any one time and a construction period of 24 months commencing in 2012.
16. It is common practice for contractors to use minibuses to transport staff to site rather than each worker making their own arrangements. Not all trips are likely to be during the peak hours. It has been assumed therefore, that overall, the number of daily vehicle trips is 50% of the workforce total and working hours are 07.30 to 18.00 meaning workforce travel in the peak hours will be minimal.
17. HGVs will follow the existing HGV route to and from the site.
18. Workforce trips will follow the same distribution agreed for the Transport Assessment.
19. Trips carrying bulk materials will be based on 28 cubic metres per HGV.
20. HGV and workforce trips will be added for the refurbishment of the Officers Mess to form a Conference Centre.

Appendix B

Summary of Demolition Material Exercise

RAF Heyford**Demolition Material Exercise****Summary**Demolition material (not including Crushing)

Approximate building material to be Cart Away	64,108.71 m ³
Approximate hardstanding and existing roads material to be Cart Away	68,438.00 m ³
Approximate HAS material to be Cart Away	17,097.30 m ³
Approximate runway material to be Cart Away	13,520.00 m ³

Total Approximate Demolished Material	163,164.01 m³
--	---------------------------------

Approximate number of HGV trips estimated to Cart Away all material from site (not crushed)

Based on 740 Ejector Articulated HGV carrying 28m ³ per journey	5,827 nr
--	-----------------

Demolition material potentially suitable for reuse

Building material suitable for reuse	33,158.62 m ³
Hardstanding and existing road material suitable for reuse	45,169.08 m ³
HAS material suitable for reuse	11,284.22 m ³
Runway material suitable for reuse	8,923.20 m ³

Total Approximate Demolished Material Suitable for Reuse	98,535.12 m³
---	--------------------------------

Approximate quantity of fill required on site

Demolished building areas	45,126.50 m ³
New infrastructure	17,923.29 m ³
POL tanks	131,927.39 m ³

Total Approximate Fill Required On Site	194,977.17 m³
--	---------------------------------

BJ/H:\Projects\04923501 Heyford Park\Legacy\Cost Model Rev C\Demolition Waste Exercise
Davis Langdon LLP updated after visit.xls