

Whenuapai Airbase Preliminary Traffic Analysis – Stage 3

Final Report

1. Introduction

This note sets out the modelling and analysis that has been undertaken as the third stage in the assessment of the regional traffic effects of a possible airport at Whenuapai located at the site of the present airbase. This analysis follows the first and second stage analyses by David Young Consulting that are documented in the reports:

- ❑ *Whenuapai Airbase Traffic Analysis, June 2003.*
- ❑ *Whenuapai Airbase Traffic Analysis – Stage 2, September 2003*

Waitakere City Council (the Council) has commissioned David Young Consulting to undertake this third stage of strategic analysis involving use of the Auckland Regional Transport (ART) model as for the previous stages.

The scope of this work was discussed and agreed between Steve Wilcox of Council and David Young. It has involved using the same modelling procedures developed previously, and has modified the following inputs:

- ❑ the assumed growth in flights and therefore flight-related traffic, and
- ❑ the proportion of flights diverted from the existing Auckland Airport to the proposed Whenuapai Airport.

The analysis undertaken to date (as reported here and previously) suggest that significant traffic benefits arise from the establishment of an airport at the site of the existing airbase at Whenuapai. These results are dependent on the inputs assumed and on the methodology of the airport sub-model within ART and these need to be clearly understood when interpreting and using them.

2. Methodology and Assumptions

This modelling has involved using the ART model with the same procedures as developed previously but with modifications. Reference should be made to the two reports noted above for details of the processes.

The methodology and assumptions include the following:

- ❑ The modelling has been carried out in the year 2011 and 2021 for the three modelled 2-hour time periods: AM peak, average Midday, and PM peak.
- ❑ The land use inputs to the ART model were based on the recent ASP model runs using the latest population projections, which are higher than previous projections, but with modifications around the Whenuapai area. One set of inputs was developed for 2011 and 2 sets for 2021. The first of these has all 2021 capacity taken up and the other has

year 2050 capacities and uptake around Whenuapai included. The land use inputs are documented elsewhere and the transport analysis has taken these inputs as given.

- ❑ The 2011 and 2021 transport networks remain the same as for the first two stages and are based on the current RLTS.
- ❑ Recent changes to the way in which the ART model is run have been incorporated in this modelling.
- ❑ Two base transport cases with two corresponding options each have been modelled and assessed.
- ❑ The base cases have no Whenuapai Airport and three separate growth rates in flights and flight-related traffic are assumed:
 - 3%, 4% and 5% p.a.
 compared with 3% p.a. assumed in the original model.
- ❑ The options assume the same growth rates but also have the airport at Whenuapai with the mid-range distribution of flight-related trips assumed (this was referred to as Option 3 in the Stage 1 modelling and report), and
 - 15% of the flight-related trips allocated to Whenuapai, and
 - 20% of the flight-related trips allocated to Whenuapai.
- ❑ The base cases and the options have been labelled:
 - Base3, Option3_15, Option3_20,
 - Base4, Option4_15, Option4_20,
 - Base5, Option5_15, Option5_20.
- ❑ The two 2021 land use inputs have been labelled:
 - 2021_21, and
 - 2021_50 (modelled for 3% and 4% growth only).
- ❑ The model outputs produced from each model run for the purposes of evaluating the road user benefits of the options were vehicle travel time and distance statistics, that is vehicle-kilometres and vehicle-minutes. The costs of other modes have not been included.
- ❑ The evaluation procedures are the same as those used in Stage 2, which evolved from that specified for Stage 1.
- ❑ The inputs to the evaluation are as follows:
 - Annualisation of the outputs from the three modelled time periods has used the factors set out in Table 1.

Table 1: Annualisation Factors

Attribute	Factor
Weekdays/year	245
Weekend days+ Public Holidays /year	120
Weekday IP periods	3.5
Weekday OP periods	1.8
Weekend Periods	5.5
IP Annualisation factor	1958.5
AM and PM Annualisation factors	245

- The values of time used are:
 - AM \$14.40 / hour
 - IP \$17.85 / hour
 - PM \$13.75 / hour
- Vehicle operating costs are \$0.20/km
- The 2011 and 2021 road user costs and benefits were annualised, linearly interpolated and extrapolated over 25 years (2011 to 2035), and discounted at 10% to 2011.
- The benefits for each option were calculated as the difference in costs with the corresponding base case.

3. Results

Network Statistics

The network statistics for the 2011 base cases with 4% growth for are given in Table 2 along with the corresponding statistics from Stage 2. This data is provided to show the change in vehicle trips and travel time and distance between the lower population projections and the more recent higher projections.

These show increases in the network statistics in Stage 3 in all but the AM peak network travel time.

Table 2: Network Statistics for 2011 Base Cases, Stage 2 and Stage 3

	2011	Stage 3 Base4	Stage 2 Base4	Difference	% Difference
AM	Veh km	4,440,162	4,357,497	82,665	2%
	Veh min	6,677,226	6,719,513	-42,288	-1%
	Vehicle trips	419,405	408,278	11,127	3%
MD	Veh km	3,896,337	3,621,255	275,082	8%
	Veh min	4,920,063	4,481,071	438,992	10%
	Vehicle trips	423,178	388,227	34,951	9%
PM	Veh km	5,173,710	4,950,262	223,448	5%
	Veh min	8,070,102	7,563,139	506,963	7%
	Vehicle trips	522,402	493,833	28,569	6%

Benefits

Table 3 gives the results of the evaluations, that is, the NPV road user costs and benefits.

The benefits for the 2021_21 land use range between \$228 million, for 3% growth rate in flights and airport traffic and 15% allocated to Whenuapai, and \$583 million for 5% growth rate and 20% allocation to Whenuapai.

The benefits for the 2021_50 land use are higher than for the 2021_21 land use with the corresponding assumptions.

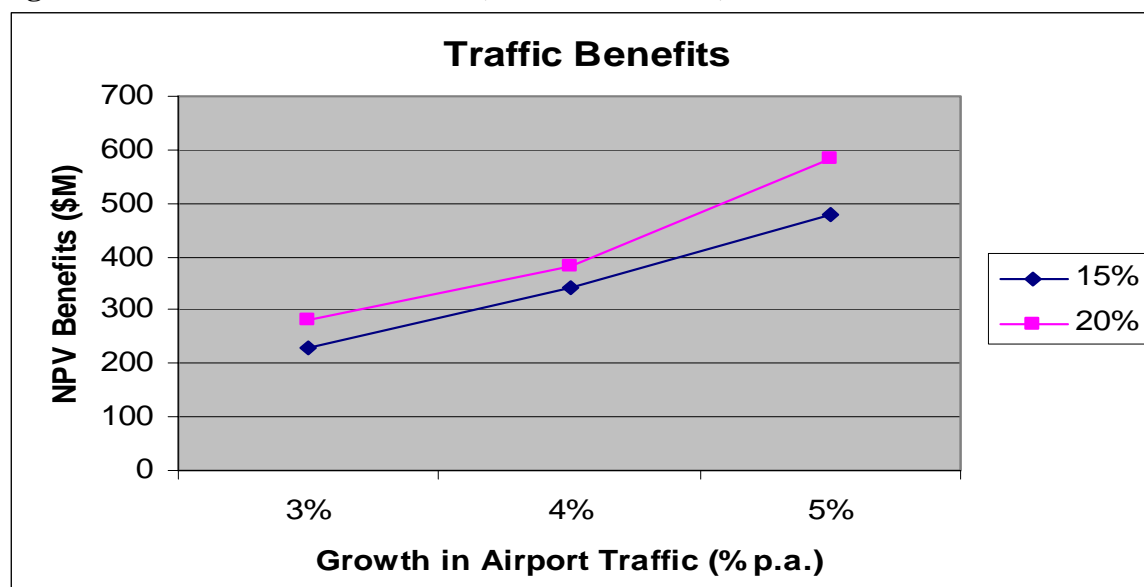
Hence the benefits increase with increasing proportion of flights allocated to Whenuapai and with the assumed annual growth in flights and between use of the 2021_21 and 2021_50 land use inputs. They also increase more between the assumed growth rates (3%, 4%, 5%) than between the 15% and 20% allocation to Whenuapai.

Table 3: NPV Road User Costs and Benefits

	Option3_15	Option3_20	Option4_15	Option4_20	Option5_15	Option5_20
2021_21 land use						
Base Costs (\$M)	70,686	70,686	71,377	71,377	72,291	72,291
Option Costs (\$M)	70,458	70,404	71,036	70,995	71,814	71,708
Benefits \$(M)	228	282	341	382	477	583
2021_50 land use						
Base Costs (\$M)	70,733	70,733	71,450	71,450		
Option Costs (\$M)	70,453	70,402	71,066	70,974		
Benefits \$(M)	280	330	384	476		

Figure 1 plots the NPV road user benefits for the 2021_21 land use by growth rate in airport traffic and by the proportion of flights allocated to Whenuapai.

Figure 1: NPV Road User Benefits (2021_21 land use)



Comparison of Benefits with Previous Results

Table 4 summarises the NPV benefits calculated in the strategic assessment in each of the 3 stages to date. The yellow section indicates Stage 1, blue Stage 2 and green Stage3.

These are given for each of the aspects varied: the distribution of flight-related trips, the growth rate of flights (and therefore associated traffic), and the percentage of flights allocated to Whenuapai and the input future land use estimates.

The evaluation method in Stage 1 used 2011 results only to estimate 25-year NPV benefits, while Stages 2 and 3 used 2011 and 2021 results to interpolate and extrapolate to other years to estimate NPV benefits.

The results of the strategic assessment of the traffic impacts suggest that the benefits the road user benefits range between around \$230 million and \$600 million depending on the input assumptions and the evaluation methodology. This ignores the Stage 1 results given that the estimates are based on 2011 results only.

Table 4: NPV Benefits from Stages 1, 2 and 3

Distribution	1	2	3								
Flight growth rate	3			4				5			
% Allocated to Whenuapai	15			15	20	15	20	15,20	15,20	15	20
Lower population projections	34	233	96					315	609		
New projections				228	282	341	382			477	583
New Projections with 2050 land use in NW				280	330	384	476				

4. Concluding Statement

The modelling undertaken to date using the ART model indicates that there are some significant benefits to private road traffic associated with an airport being established at Whenuapai. This is a preliminary modelling and analysis exercise and as such it is important to recognise the following.

These results are from a strategic assessment and are based on modifications to the existing airport model within the ART model. The results are heavily dependent on the airport model and its input assumptions.

The only assessment of where the traffic benefits occur within the network has been some consideration of plots showing differences in traffic volumes and travel time benefits.

Finally, the modelling and analysis is based on fixed transport systems in the years modelled (2011 and 2021). The roading and PT networks used have future improvements based on the current RLTS. No consideration has been given to modifications to these networks in the vicinity of either the existing Auckland Airport or Whenuapai in order to optimise road user benefits or reduce expenditure on infrastructure.

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