

13 July 2016

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Dear Fraser

Whangarei Airport Long List Evaluation – Peer Review

1 Introduction

We are writing to provide our peer review of the Beca's evaluation of the alternative airport sites long list.

Following an initial review of the documents below, a workshop was held between Beca and Opus to discuss the results of the investigations, during which a number of issues were resolved. A summary of the observations and recommendations can be found below and in the attached review by Dave Park.

There was agreement over the majority of the ratings applied by Beca and the project control group. Some inconsistencies found in the way individual sites were rated are discussed, but are not thought to affect the outcome. The main discussion during the review process centred around three sites which are all close to town and were failed on their OLS ratings. These ratings were discussed and subsequently adjusted, leading to one of the sites ranking amongst the top five rated sites.

2 Documentation

The following documents were reviewed:

- Draft Analysis – Whangarei District Airport Review – Phase 2 (19/02/2016)
- Long list sites – Obstacle limitation Surfaces sheet 0-26
- NZ1-12104096-Long List Evaluation - Workshop 1 update Rev 2.xlsm



3 Peer Review Comments/ Observations

Most of the issues discussed during the workshop were related to the OLS and have been addressed by Dave Park in his review attached to this document.

3.1 Failed sites

Three previously eliminated sites have been discussed during the workshop.

3.1.1 Site 9 Gumtown

It was agreed that the runway would be rotated slightly to the NE, thus avoiding some of the major penetration and that the OLS for this site would be further investigated by Beca. As suggested by Opus/Astral, the site was further assessed under the ILS criteria and the OLS found to be viable.

The rating was adjusted accordingly and the site is now within the top five sites.

3.1.2 Site 13 Port Nikau/Oaks Rd.

Whilst this site has major penetrations of the OLS, it was agreed that by moving the runway to the SW by about two kilometres, the new site would warrant further investigation of the operational requirements by Beca.

It was discussed that this site would face major obstacles from a consenting point of view, but the proximity to Whangarei and the wider economic benefits of this site would warrant further investigation.

During the further assessment process, Opus was informed that the site was again failed, this time not on the OLS criteria but on the planning. Any reclamation activity in the area of the Oaks Rd site is currently a prohibited activity under the regional plan, which would require a plan change to become viable.

Opus has pointed out that, barring the reclamation issue, this site would be one of the top two sites in the evaluation, as it rates very high on all other criteria. Also, since the introduction of the RMA, no consent has actually been applied for considering a green field airport site. Opus has recommended to investigate this site further because of its great merits, and to seriously challenge the normal thinking around the feasibility of consenting, recognising that a new district airport is an extremely rare and important project.

However, we do recognise that the WDC current position is not to apply for a plan change.

3.1.3 Site 26 Puwera

It was agreed that the geography of this site was unlikely to produce a viable future airport.

3.2 Ratings during the evaluation

During the workshop Beca explained that the individual ratings for the site were discussed and applied by the Project Advisory Group. The application of ratings on some of the

criteria appears inconsistent; there are many examples where different ratings have been applied under what appear to be the same circumstances.

However, Beca confirmed that these ratings were applied individually by the Project Control Group and that, notwithstanding any such inconsistencies, this is unlikely to have any effect on the final rating of the sites.

4 Recommendations

It is recommended that:

- Site 9 Gumtown is taken through to further evaluation
- Site 26 Puwera remains a fail
- Should the further evaluation of the sites lead to no viable sites, the option of a plan change for Oaks Road is reconsidered

The views and findings of this review are based on local knowledge and general consistency checks and is further supplemented by the review undertaken by Dave Park of Astral Aviation.

Regards



Felix Richter
Manager Civil & Structural

Attachments:

1. Dave Park (Astral Ltd.) - PEER REVIEW OF BECA ALTERNATIVE SITES STUDY FOR WHAGAREI AIRPORT – 05-07-2016
2. Dave Park (Astral Ltd.) - PEER REVIEW OF BECA ALTERNATIVE SITES STUDY FOR WHAGAREI AIRPORT – Update on comments 27-05-2016



MEMO:

TO: FELIX RICHTER- OPUS

FROM: DAVE PARK – ASTRAL

DATE: 05 May 2016

SUBJECT: PEER REVIEW OF BECA ALTERNATIVE SITES STUDY FOR WHAGAREI AIRPORT

I have reviewed the Beca report Whangarei District Airport Strategic Review – Phase 2 Revision B (draft) dated 19 Feb 2016 and the associated Beca spreadsheet Draft NZ1-11883018- Long List Evaluation.xlms. Beca document “Long list sites – Obstacle Limitation Surfaces Sheet 0-26” exists this also provided for review as was the Opus Peer review letter to Whangarei District Council dated 27 Apr 16

The Beca Phase 2 draft report, which identifies 27 alternative sites, does not contain enough information for me to conduct a detailed peer review. In particular there is no:

- Specification of proposed runway elevations.
- Indication of the impact of the OLS penetrations identified on runway effective operational lengths.
- Specification for the OLS used, or associated runway strip width and length, or RESA dimensions.
- Specification for the RNP surfaces used in the assessment.
- Discussion on the balance sought between runway orientation and the consequent OLS penetrations and runway usability.
- Clear statement as to what cross wind limits were used in assessing runway usability, i.e. Annex 14 recommended limits or aircraft/airline specific limits that are higher.

While some of the above data may be in the Phase 1 report, there does not appear to be any cross references to that report that would confirm this.

Consequently, the comments below are of a general nature only, and are confined to the operational suitability assessment only, the other assessment criteria (such as planning issues) being outside my expertise.

Peer review comments

1. Reliance on Air New Zealand and RNP

The Phase 2 report refers to consultation with Air New Zealand over aircraft equipage for RNP procedures which may enable OLS penetrations to be mitigated or avoided. Whilst Air New Zealand is currently the main airline operating services to regional airports such as Whangarei, it is not the only airline. For example, Jetstar now operates services to four of the larger regional centres and Air Chathams operates services to between Whakatane and Auckland. Barrier Airlines and Sunair also operate regional services in the upper North island.

These airlines predominantly operate older, non-RNP capable aircraft. It is recommended the Phase 2 report consider the impact on these airlines of reliance on RNP procedures at a new Whangarei airport as this could be a disincentive for them to start operations there.

Recommendation: The future application of RNP across the wider range of New Zealand airlines be considered.

2. “Fail” assessment of potential sites

It is noted that 10 sites “failed” due to a zero rating on one or more of the assessment criteria. Of these 10 sites, 8 failed due to OLS restrictions. Several of these sites otherwise rated quite high and consequently the decision to give a zero rating (fail) has changed the rankings significantly.

Little detail is given in the Phase 2 report of the basis of the decision to fail some sites. For example, site 13 Port Nikau “failed” on OLS suitability but is within 10 mins of drive time of 54% of the population and accordingly scored very well on proximity. The OLS “fail” is stated as being due to the approach OLS to the east being penetrated but no specific details of the extent of the penetration are provided. Nor is there any discussion on alternative runway alignments on the site, or even the location of the runway within the potential site area, that may reduce the OLS penetrations.

It is noted several other NZ airports have approach OLS penetrations, some quite close to the threshold, for example Queenstown runway 23, Rotorua runway 36 and Whangarei runways 06 and 24.

Recommendation: The OLS “fail” assessment be reviewed for sites that otherwise rate highly.

Note: At the request of Opus three otherwise high ranking sites that were eliminated due to OLS “fail” assessment have been reviewed in section 8 below.

3. Runway usability

Runway usability is highly dependent on the limit crosswind selected. The report contains little information on this, other than quoting the ICAO recommended limits for the various aircraft codes and the Air New Zealand limits for the ATR and Q300 aircraft. Usability should include the mix of aircraft for which the aerodrome is intended which presumably includes users other than Air New Zealand.

The ability to add a second runway direction, as currently exists at Whangarei should also be considered as this considerably improves usability by small aircraft.

4. Benchmarking against the existing Whangarei (Onerahi) airport

It would be useful to apply the OLS assessment and usability criteria to the existing Onerahi airport as a benchmark. It is understood the main driver for seeking a new airport site is the lack of ability to extend the runway at Onerahi for the larger turbo-prop aircraft, and the lack ability to provide RESA.¹ While the OLS is penetrated at Onerahi it does not appear that this a major driver to relocate.

It would be inappropriate if a site under consideration was failed on a criterion that was not the primary reason for relocating the airport where the existing site also fails on that criterion.

Recommendation: “Sanity check” the criteria by which OLS “fail” ratings are applied against the existing Onerahi OLS.

5. Weighting of sub-criteria

¹ Whangarei District Airport Strategic Review Phase 1 – Whangarei Airport (Onerahi) Assessment

There are 4 main assessment criteria each with a nominal weighting (Ops Suitability (40% weighting), Planning (10% weighting), Engineering (10% weighting) and Accessibility (40% weighting)). These weightings are varied in the sensitivity analysis.

Each of these main criteria has 3-5 sub-criteria with their own fixed weightings. The Long List Evaluation Criteria spreadsheet indicates OLS is the dominant criteria with a total 24% weighting in the overall assessment score. The next most dominant criteria are proximity to Whangarei (20%) then site accessibility (16%). No other criteria exceed 8% and most are around 2-3%. The weighting of runway usability is much less (8%) than that of OLS yet the two are closely related in aerodrome design and it is rarely possible to optimise both in terrain- challenged locations. A small change in runway orientation can greatly improve the OLS with only a small impact on usability due to cross winds.

Usability due to operating minima is also strongly influenced by optimisation of the OLS i.e. less severe OLS penetrations will improve (lower) operating minima thereby raising usability.

Given the high nominal weighting of Ops Suitability (40%), the interrelatedness of the sub-criteria within it, and the ability to influence this on a given site at preliminary runway layout stage (unlike Accessibility) a more detailed study of OLS optimisation seems warranted.

Recommendation: Review OLS failed and low rated (0 and 1) sites to determine the ability to optimise the OLS by runway orientation, and the consequent impact on usability due to minima and cross winds.

6. Wind data

It is appreciated detailed wind data is not available for each site and (it is understood) only exists for Onerahi and Marsen Point. However local wind effects due to topography can be estimated by experienced surface wind modellers and climatologists. NIWA is very helpful in this regard and their advice is relatively inexpensive. Certainly for the top rated sites NIWA advice should be sought on local wind and other relevant climatology (e.g. prevalence of fog). Local anecdotal advice should also be sought, particularly from the farming community.

Recommendation: Obtain more climate and local wind data on the top rated sites.

7. Specific site OLS assessment

At the request of Opus the OLS was assessed based on the Beca obstacle limitation sheets at three sites which failed on OLS in the Beca assessment. These sites are Gumtown, Port Nikau and Puwera. I have briefly assessed these sites and have the following comments:

a) Gumtown

- Runway orientation could be rotate more NE/SW and the runway moved to the west so RESA extents remain within the boundaries set by the roads at each end. This would appear to remove or eliminate much of the low penetration.
- With some refinement this site looks workable for OLS and certainly does not warrant a fail.
- Initially I would rate the OLS at 1 for scoring purposes, pending further investigation of the OLS.

b) Port Nikau

- This site does look difficult due OLS penetrations to the east.

- If the runway could be rotated more SW/NE it may be possible to remove the highest penetrations to the east although this would bring on lower penetrations closer in at both ends. Without knowing what "low" penetration means this can't be assessed.
- The site should not be failed, it's worth a closer look at runway orientation given its other merits (proximity to city etc.). I would score the OLS at 1 initially.

c) Puwera

- This site also looks difficult but moving runway to the north may help by removing the 60m contour on south side of the west OLS.
- Consideration could be given to earthworks to remove the low penetrations close in.
- I would score the OLS at 0 initially for ranking purposes, but not fail this site until it had been looked at more closely.



Dave Park

Director

Astral Limited

MEMO:

TO: FELIX RICHTER- OPUS

FROM: DAVE PARK – ASTRAL

DATE: 27 May 2016

SUBJECT: PEER REVIEW OF BECA ALTERNATIVE SITES STUDY FOR WHAGAREI AIRPORT

This memo is to update my peer review comments, as listed in my memo to you of 5 May, following the workshop with Beca on 26 May.

The workshop, which was attended by Alex Fullerton, Graham Roberts, Ric Pemberton and Dennis Hoskin of Beca, and you and I, was to discuss the issues I raised in the 5 May memo and specifically to review the three potential sites:

- Gumtown
- Purewa
- Port Nikau

These three sites had been dropped from the Beca site ranging as they were determined by Beca to fail the OLS criteria.

General comments

GIS viewer – Beca demonstrated their GIS viewer and how it was used in initial site selection. The GIS has a model (template) of the optimum runway strip, OLS, apron and terminal plan. This template can be “dropped” onto a potential site with the strip set level at an elevation representative of the local ground elevation. The GIS terrain model, obtained from LINZ and accurate to 10m in elevation, then shows areas where the terrain penetrates the template OLS. Beca advises that the sites were relatively insensitive to strip and RESA dimensions. **Agreed**

Crosswind analysis – Beca explained the wind data (for Onerahi) showed 95% of the time the wind is less than 13kts, making runway orientation less critical. That said Beca preferred a runway orientation of NE-SW which aligns with prevailing winds. BECA advised NIWA would be consulted on likely local wind and weather effects at short listed sites only. **Agreed**

Impact of OLS penetrations – Beca explained that standard Annex 14 and PANS OPS non-precision approach splay areas were used to check for terrain penetrations. Astral suggested using ILS (precision) approach splay areas on the basis that within the timeframe of the airport’s development GPS based precision approaches (e.g. local or wide area augmentation) would become widely available to all aircraft. Worst case should this not happen then ILS could be installed at a relatively low cost relative to the whole project. Beca concurred. **Agreed**

Specification for RNP surfaces – Beca explained RNP 0.3nm was used for assessing some sites. Astral stated it view that RNP procedures would only be available to the large airlines, GA will still be using non-RNP procedures for many years as their aircraft will not have RNP capability to the required level. **Agreed**

Balance between runway orientation, OLS penetrations and runway usability – see comments on crosswind analysis above and GIS template above. The template can be rotated and moved around on a potential site to minimise OLS penetrations.

Cross wind limits – given 95% of winds at Onerahi are less than 13kts, the cross wind limits issue does not appear relevant. Agreed

“Fail” assessment of potential sites due OLS penetrations – of concern were Gumtown, Purewa and Port Nikau as otherwise these sites were fairly highly highly ranked. The OLS penetrations for these three sites were reviewed using the GIS viewer with the following consensus:

Gumtown – appears viable for OLS using ILS splay criteria. Beca agreed to review.

Port Nikau – original site still has OLS compromised with ILS splay, agreed not viable. However nearby Oaks Rd may have potential although very difficult to consent due environmental sensitivity. Beca to review.

Purewa – agreed OLS not viable even with ILS splay criteria.

Summary

The workshop resolved Astral’s peer review comments with Gumtown and Oaks Rd to be further investigated by Beca



Dave Park
Director
Astral Limited