

ALASKA SCIENCE & TECHNOLOGY

P.O. Box 102915
Anchorage, Alaska 99510-2915 U.S.A.

907.562.2482
800.770.2482
fax 907.561.2482
akscitec@alaska.net

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Scott M. Haan, P.E.
Plan Review Engineer
Building Safety Division
Municipality of Anchorage
P.O. Box 196650
Anchorage, Alaska 99519-6650

Subject: Anchorage Wind Study Peer Review

Dear Mr. Haan:

The definition of maximum winds occurring in the Anchorage Bowl is recognized to be very important in considerations of building safety and cost-effective construction. This firm has had many projects and interactions over the years, which are pertinent to review of the wind study that has been performed. This review is critical as required, but intended to be constructive. The following are specific comments pertaining to Phase I and Phase II of the Anchorage Wind Study performed by BBFM Engineers of Anchorage and RWDI Consulting Engineers of Guelph, Ontario, Canada.

1. Methodology used in the RWDI report is technically correct, but limited in application. Shortcomings are at least partially due to the lack of representative wind data.
2. A considerable amount of unnecessary effort was expended in familiarization with the locality and defining the obvious. This inefficiency was inevitable in the use a non-Alaskan consultant, let alone one having no local experience and based in a foreign country. Further, structuring a project requiring meteorological expertise, in engineering, was unlikely to be productive.
3. It has been well-established empirically and through research that northerly winds do not reach magnitudes important in the structural considerations under question. Only easterly winds are important in this study. The study of northerly winds was not productive.
4. Unfortunately, the reporting locations utilized in the wind study are airport locations, which were sited specifically to avoid high magnitude winds. The Anchorage International Airport, Merrill Field, and Elmendorf AFB data points have little application in the study of high magnitude easterly winds.

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They are representative of northerly winds, which do not rise to the significant magnitudes under investigation in this study. There is a major disconnect between data derived at these locations and that experienced on the east side of the Anchorage Bowl. The data points used are not capable of defining the maximum wind speeds in question. The level of effort applied to nonrepresentative data is not justified.

5. Use of uncalibrated and unreliable amateur wind data does not meet the public standard required by this effort.

6. The study excluded the important Ft. Richardson data point, for unknown reasons, without justification. The Fort Richardson report is the only long-term reporting point situated relatively in line with the mouth of a Chugach Front canyon, Ship Creek in this instance. This is a very significant omission.

7. The exclusion of apparently erroneous data at one data point simply by comparison to another data point is not sufficiently rigorous. Official wind data routinely receives several quality control screenings before archival. Proper justification includes a review of that day's record, and if necessary, a review of the mesoscale weather circulation.

8. The documentation survey of wind equipment sitings was not thorough, at least in the case of Merrill Field. This is not important, as that data point is not influential. As noted, Fort Richardson was not addressed.

9. The study does not demonstrate a technical understanding of the significant meteorology that produces high magnitude easterly winds in the Anchorage Bowl. This is important and bears directly upon insight about representative data points and expected wind velocities.

10. There is no discussion of spacial wind fields relative to the jets and turbulent eddies associated with the stream drainages and canyons of the Chugach Mts. This does not demonstrate a technical understanding of the importance of terrain to the problem.

11. Any study of maximum winds in Anchorage must include a reference and understanding of the important paper by Waldo J. Younker, Jr., AAAS 1982: Forecasting Foehn Winds At Anchorage, Alaska. This preeminent work provides the ongoing basis for predicting strong easterly winds in the Anchorage Bowl.

12. The CALMET model is widely used, but can only be as good as the data provided for analysis. Available data is not representative of high magnitude easterly winds. All models have conditional capabilities relative to the influences of complex terrain, and especially if the effects of terrain on wind circulations are not well documented.

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Use of the CALMET model in this project was not important and significant results were not produced.

13. The selection of the wind events modeled by CALMET is very limited and no meteorological justification for selection was provided. Further, the sampling used is too small to demonstrate statistical significance, even if better data had been used. The only product is a demonstration of typical model output under nonrepresentative circumstances.

14. It is not possible to justify the wind zones recommended by this study, as the result of quantitative analysis. Additionally, there is likely to be significant error in the northerly area of the map, where contours are discontinued. The contours drawn elsewhere are questionable at this point in time.

15. The study area should be extended north to include Eagle River and Peters Creek.

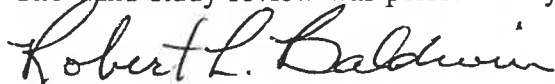
The foregoing concludes comments about the BBFM/RWDI Phase I/Phase II wind study.

A unique requirement of this review is to supply specific locations where additional wind data is required to validate or improve the accuracy of the wind speed map developed by RWDI.

To define maximum easterly winds, wind data should be obtained within one mile of the 1000 foot contour, in a direct line with the mouth of each significant stream canyon on the Chugach Mountain Front. At a minimum this should include Peters Creek, Eagle River, the North Fork of Ship Creek, the North Fork of Campbell Creek, the South Fork of Campbell Creek, and Rabbit Creek drainages. A second rank of observational locations about 2 miles from the canyon mouths is desirable. Turnagain Arm wind should be measured at Beluga Point and Potter. At least one mountain top measuring site should be utilized, and the retired Nike Site is a desirable location.

Data should be taken for a minimum period of two years. Ten years would be more statistically significant. Interesting challenges will be encountered in providing this wind data.

The wind study review was performed by:



Robert L. Baldwin
Senior Meteorologist.