December 15, 2014

Memorandum to: Councilwoman Kathee Burke-Gonzalez

From: Airport Planning Committee, Noise Sub-committee

Re: Eleventh Preliminary Findings and Recommendations – Complaint Analysis

Attached hereto as Exhibit A is an analysis of noise complaints performed by our colleague on the Noise Sub-committee, Jim Matthews, of the Northwest Coalition. As a former professor at NYU, he is eminently qualified to undertake this analysis. His results are necessarily very similar to, but in important respects more detailed and revealing, than the similar analyses undertaken by Peter Wadsworth, at no cost to the Town, and by HMMH, at considerable cost to the Town.

In its Eighth Findings, our committee stated its priorities as to the airport noise problems that the Town ought to address. Jim's analysis, together with the prior complaint analyses, of noise complaints affords abundant justification for the committee's identification of the most acute problems:

-- Helicopters

-- Time of Day of Operations

-- Frequency of Operations

-- Other Noisy Aircraft Types

For your convenience, our statement of those priorities is attached here again as Exhibit B.

Of particular note is that complaints per operation for helicopters are at two and a half times the rate of complaints for jet aircraft and nearly five times the rate for propeller planes of all types. However, in that the Phase 1 noise analysis discloses that the rate of "exceedances" per operation for helicopters, noise above the limit in the Town's noise ordinance, is approximately 2/3 that of jets, helicopter noise is in fact nearly four times as objectionable to the community as jet aircraft noise.

However, Jim's analysis, particularly his adjustment of noise complaints for population, shows us that noise is not less of a problem off-season, although fewer people are affected. To suggest that airport noise is only a problem when local population swells in the summer would be, in effect, to suggest that the year-round population is not worthy of protection from noise, that only summer residents deserve this protection.

Of course, the volume of air traffic is much higher in the summer, which means that reductions in numbers of operations must primarily be directed at summer traffic. However, Jim's analysis makes clear to us that noisy aircraft types, those noisier than the light aircraft that are the traditional and intended users of the airport, are a problem at all times. Accordingly:

The ultimate airport noise policy objective of the Town should be to eliminate this traffic entirely, by inducing airport users to employ existing quieter types, so that that all aircraft types using the airport are similar in their noise impact to the aircraft flown by local pilot-owners for their own pleasure and transportation.

This is achievable. In all cases of noisier aircraft types, helicopter, jet, and turbo-prop, there are models of aircraft that are not noisier than light piston aircraft. Aircraft owners have much quieter alternatives that they must ultimately be required to employ in

order to enjoy continued access to East Hampton Airport. Given the existence of technological alternatives, it would be unconscionable if aircraft owners were permitted indefinitely to impose oppressive noise on the community by employing less than the quietest types available.

As a start, in addition to rules addressed specifically to helicopters, night operations, and summer weekend/holiday operations, *operations by the noisiest types of aircraft, those noisier than the general class of piston aircraft for which the airport is intended, should be reduced significantly year-round and at all times*, a matter to be addressed more thoroughly in the committee's final proposal on noise control measures.

Respectfully submitted,

Airport Planning Committee,
Noise Sub-committee

Exhibit A

An Analysis of the PlaneNoise Complaint Data and Flight Records for 2014:

Implications for Proposed Aircraft Noise Abatement Restrictions.

The goal of this analysis is to assess the implications of the records of complaints gathered by the PlaneNoise site flight records gathered from the Vector, Airscene, and control tower notes. The data are from January through September of 2014. Separate from the physics of aircraft noise, these data are the only information we have that directly measures the experiential effects of aircraft on the people below. Even though few who were exposed to aircraft noise took the trouble to file a complaint (~1 in 1000), aircraft noise is the only issue that has been so unpopular with residents that the Town has had to hire an outside firm to computerize the recording of complaints. No other issue in Town has generated complaints on this scale. We must accept that the complaint record provides an unequivocal and compelling mandate for change and we must ask what the complaint patterns tell us about how to address the problem.

Recent discussions on-line have suggested that there are three bases for developing legislative proposals. The first is the committee chair's position that we should advance "a technically, politically, legally, and financially optimal solution and try to get the Board to come as close to it as possible. In other words, we need to place ourselves in the Board's shoes and do what we think best if faced with their constellation of constraints." The second source of guidance for shaping our proposal to the Board is our views based on our own personal experience and our sense of the best interest of the people. Several such proposals have been offered. Finally, we might frame our proposals to largest extent possible on the empirical work that has been done to measure the attitudes of the people toward aircraft noise and their relation to aircraft types and patterns of aircraft flights. The following report is offered in response to this last approach to framing a proposal to the Town Board.

So far, two types of legislate proposal elements have been put forward by which the Town might, within its post-FAA assurances authority, address the aircraft noise issue. The first is restrictions based on aircraft type, the second is based on limitations of traffic during various times including month of the year, day of the week, and hour of the day. *Restrictions could be imposed by outright exclusions or by a fee structure.*

Method of Analysis. The following analyses will present two representations of the data, flight and complaint frequency and corrected complaint frequency. Both of the above analyses can inform decisions about flight regulation.

Flight and complaint frequency graphs show the raw number of each in various time frames. These data portray the number of people who have taken the time to file a complaint and the number of flights that have occurred in the same time period. This can be taken as an indication of the number of people

affected by noise, although multiple complaints from the same person can confound this meaning somewhat.

Corrected complaints take into account the fact that complaints will not occur unless there are flights and the more flights there are, the more opportunities arise to file a complaint. Thus Complaints per flight are reflective of the sensitivity of people on the ground to aircraft noise, not to volume of people affected. Another correction is needed when the number of people on the ground varies. The winter population is about one quarter of the peak summer population and the number of complaints is therefore necessarily reduced in the winter. A complaints per person correction for this problem is used where population variation is documented.

Type of Aircraft

It is well accepted that different types of aircraft have different sound profiles. Helicopter fly lower, slower, and can be louder than fixed wing aircraft. Helicopter noise is also uniquely percussive and has a much higher low frequency component, which means that the sound is both more disturbing and heard a longer distance from the source. Piston engines make a very different kind of noise than jets. These facts are reflected in the levels of complaints associated with the aircraft types. For simplicity we will consider only helicopters, jets, and propeller planes. As can be seen in Figure 1a, The number of complaints for helicopters is much larger than for either jets or propeller planes while the number of helicopter flights is actually less than propeller planes and not greatly more than jets. To clarify the extent to which the different types of aircraft provoke complaints, Figure 1b shows the number of complaints per flight for each aircraft type. Here it is clear that helicopters generate more than 5 times as many complaints per flight than propeller planes and more than twice as many as jets. Moreover, of all the various factors that might cause complaints, including time of day and flight frequency, the type of aircraft seems to be the most significant. In particular, helicopters are more disturbing by far than any other source of aircraft noise.

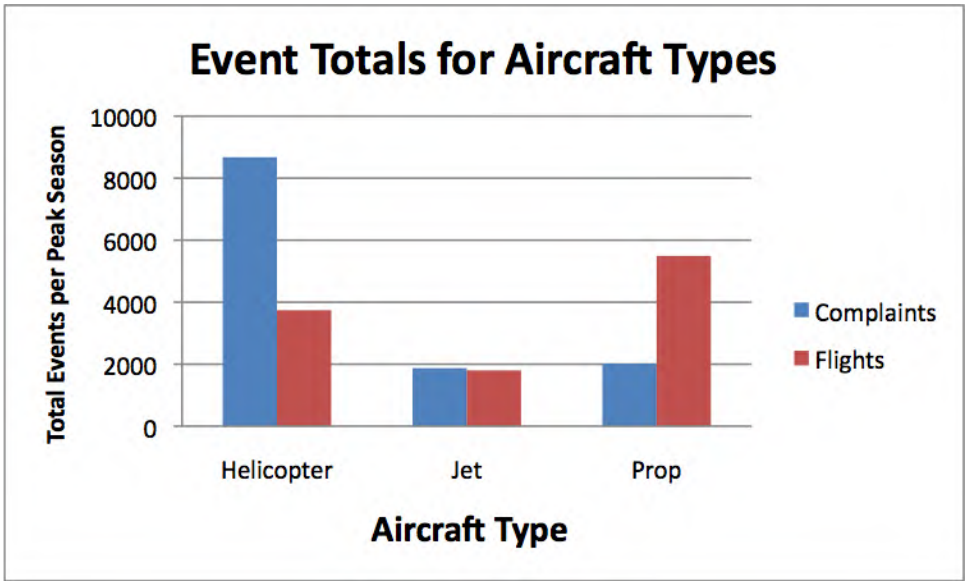

Figure 1A

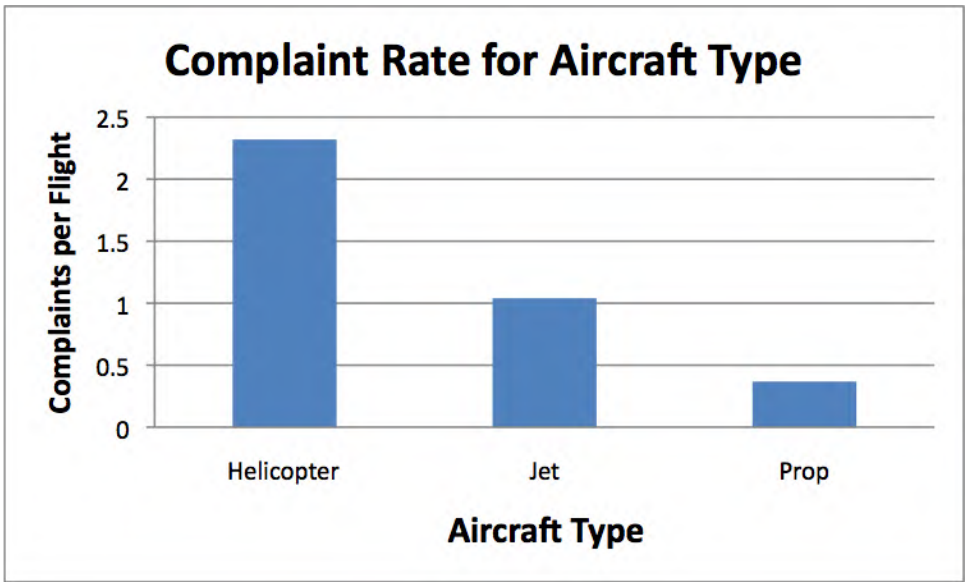

Figure 1B

These data offer strong support for restricting access to the airport on the basis of type of aircraft. Any standard for helicopters should certainly exclude most helicopters currently using HTO, but should be set to a level that would reachable with improved manufacture or the adoption by users of the quietest models. Although propeller planes are much more frequent than either helicopters or jets, the sensitivity of people on the ground to propeller planes is less than either. On this basis, noise standards should distinguish between jets and propeller planes and should also be more lenient than for helicopters.

Curfew.

It is a common perception that aircraft noise is more disturbing at night than in the daytime, which is one reason that there is a curfew at the E34th St, Manhattan heliport. Evidence from complaint records at KHTO confirm this perception. Figure 2a below shows both the number of complaints filed and the number of flights each hour of the day for the first nine months of 2014. It can be seen that there are more complaints and flights during the day than at night. This, of course, is because each flight represents an opportunity to complain, and as there are many more flights during the day, there are many more opportunities to complain. The equally important question, however is how many complaints does each flight produce. This question is answered by computing the number of complaints per flight, and as shown in Figure 2b. Here it can be clearly seen that flights at night and in the early morning generate much higher rates of complaint. There are many fewer flights at night but those flights are apparently much more disturbing to the people below than flights during the daytime. As flight frequencies at night are actually rather low, there would be little gained by simply reducing the

frequency of nighttime flights. Rather the obvious solution is to impose a curfew banning all nighttime flights.

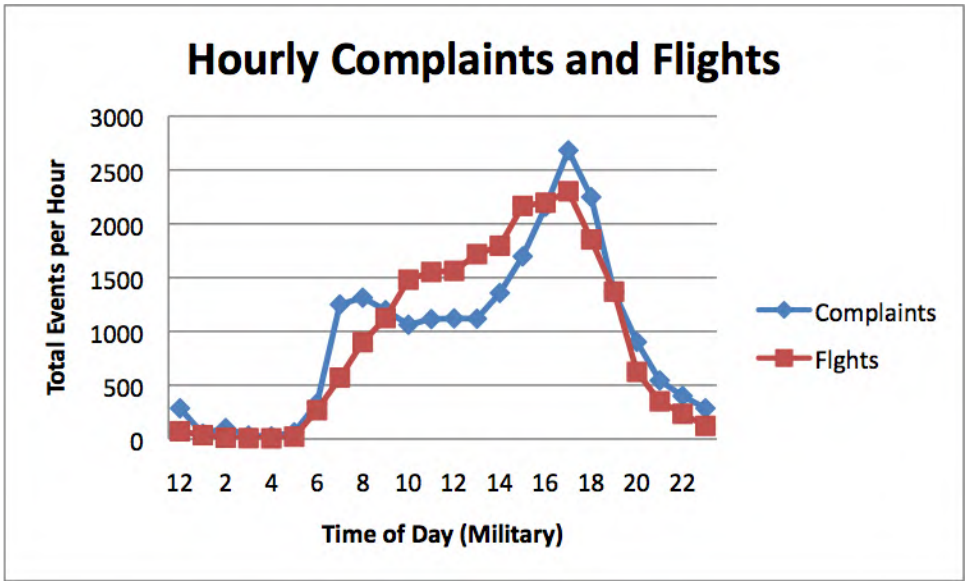

Figure 2A

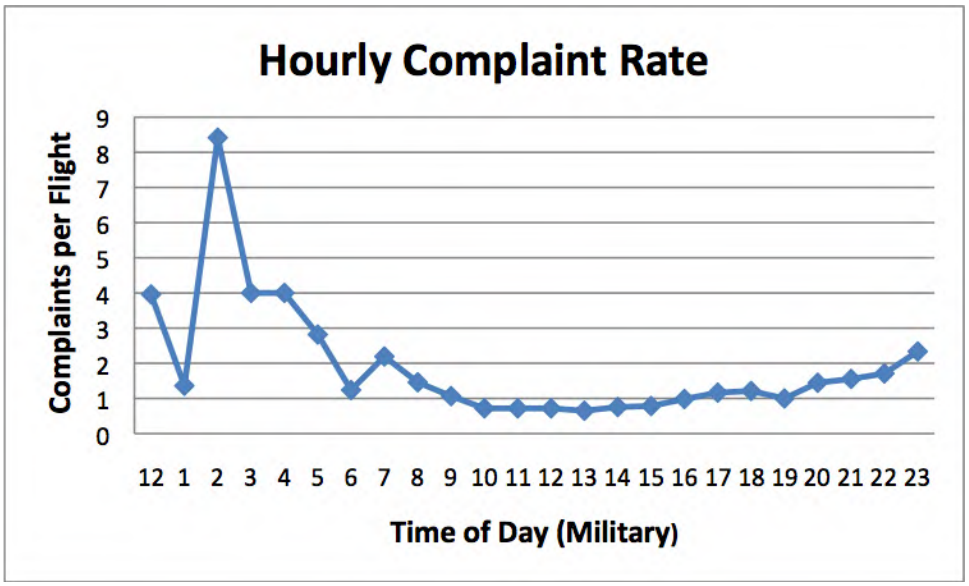

Figure 2B

As can be seen from in Figure 1b, there is here a natural basis for setting the limits of a curfew. It appears that complaints fall off at around 9:00 am and return to comparable levels at around 5:00 pm. Thus, **these data can be used to defend a curfew between 05:00pm and 9:00am.**

Monthly Flight Restrictions

Figure 3A shows the numbers of complaints and flights are shown across the covered months of 2014, January through September. It is obvious that both increase dramatically in the summer months May through September, peaking in August.

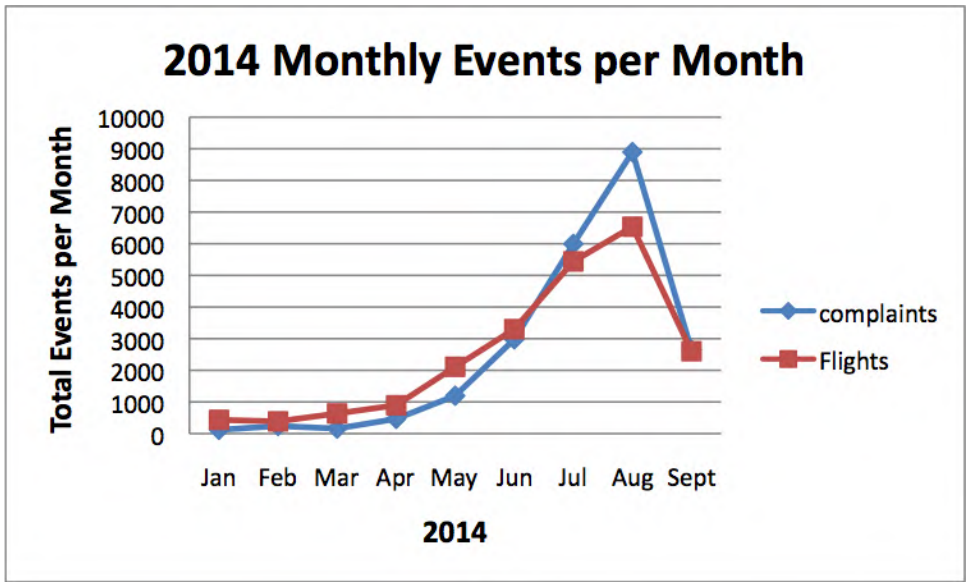

Figure 3A

But the interpretation of the number of complaints is now complicated by two factors. First, the increase in the number of flights increases the number of occasions for the filing of complaints and could therefore increases the number of complaints without necessarily indicating greater sensitivity to noise. Worse, because the town is a resort, its population varies dramatically between seasons and therefore the number of complaints must be corrected by the changing number of people on the ground across the year. In 1995, the County Planning Office did a careful count of the decrease in population in the winter, which turned out to be 23%. If we now correct the number of complaints per flight in winter and summer seasons for the changing population level, we see in Figure 3B that the corrected level of complaints per flight in the winter is markedly higher than in the summer. This result is precisely the opposite of the observation in Figure 3A that the number of complaints in the winter months is far lower than in the summer. It appears that the population of people who live here year round may be more sensitive to aircraft noise. **Accordingly, there is no reason to except the off-season months from any restrictions on aircraft flight frequency.** Indeed, not to regulate noise in the off-season months is in effect to say that, if there were no seasonal population increase, year-round residents would not deserve protection from airport noise. Plainly, this makes no sense. The year-round population is at least as sensitive to noise a the seaosonal population, but 80% of aircraft operations occur in the warm months.

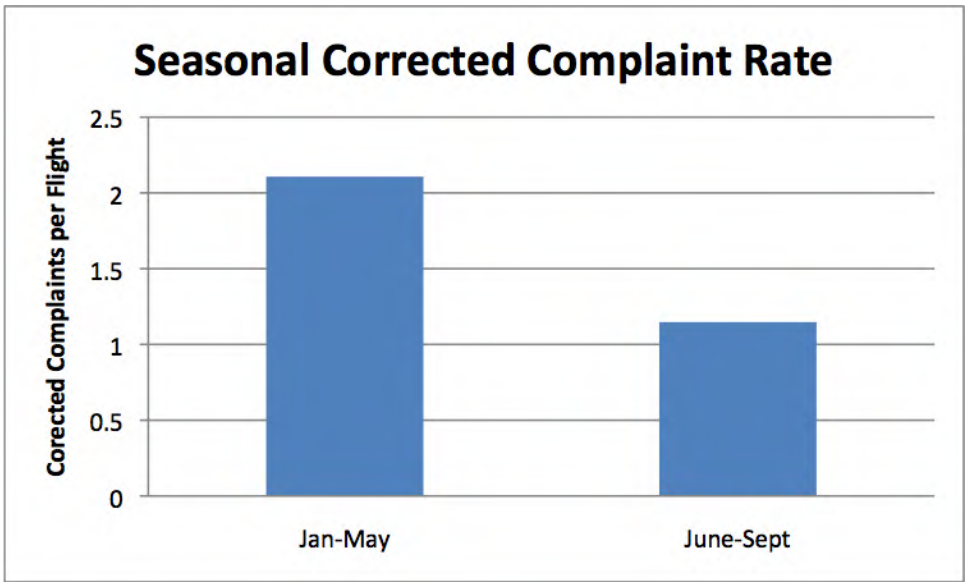

Figure 3B

The above result even more convincing when looked at with respect to aircraft type. Figure 3C shows the complaints per flight in winter and summer months for each aircraft type. It can be seen that tendency for aircraft to be more disruptive in the winter arises exclusively from helicopters, for which the complaint rate is, again twice that of summer. Complaint rates for jets and propeller planes are comparable in summer and winter. This result clearly supports year-round access restrictions for helicopters.

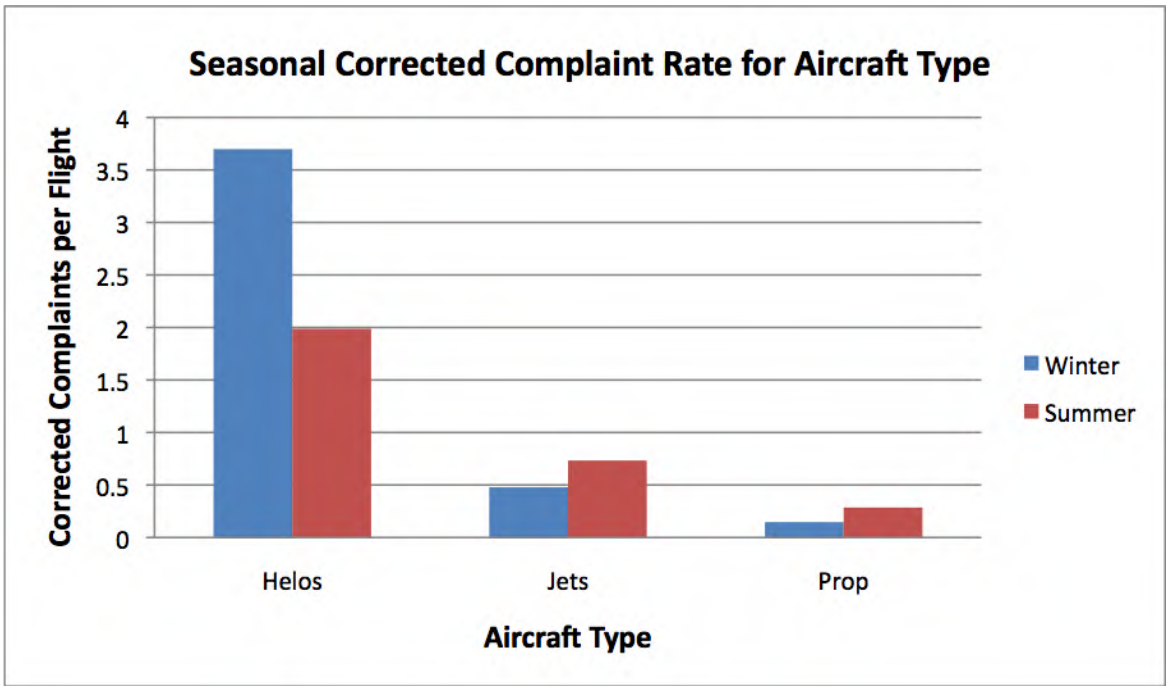

Figure 3

Weekly Flight Restrictions

Figure 4A shows the rates of both complaints and flights in the days before, during, and after the weekend. Very clearly, both rise in frequency at the beginning and end of the weekend and are relatively lower on Saturday and in midweek.

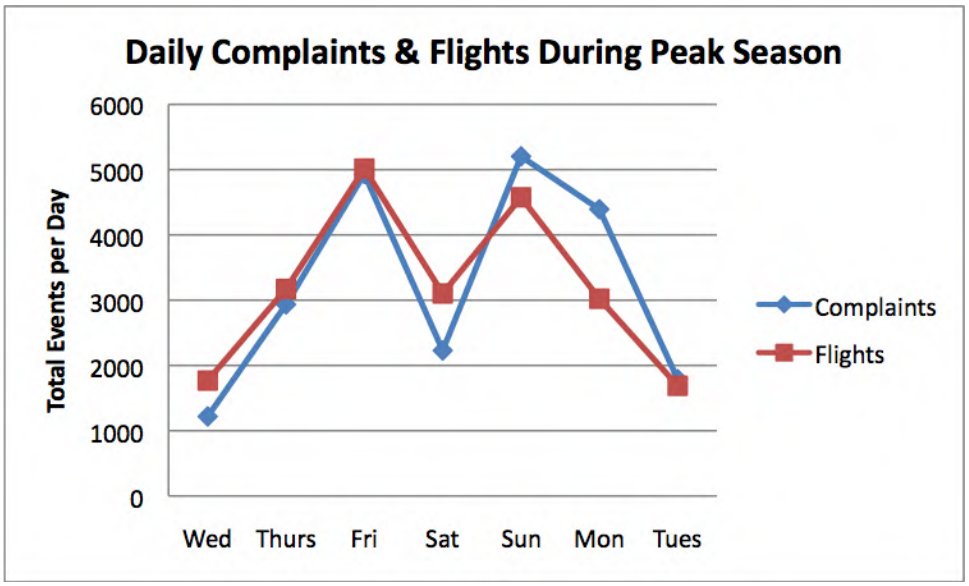

Figure 4A

Just as in the analysis of daytime versus nighttime flights in Figure 1B, Figure 4B shows the more complaints per fight as this reflects the sensitivity of observers to individual flights. Figure 4B shows that sensitivity does not vary greatly with flight frequency. Higher complaint rates on Fridays, Sundays, and Mondays during the season are principally due to higher rates of operations.

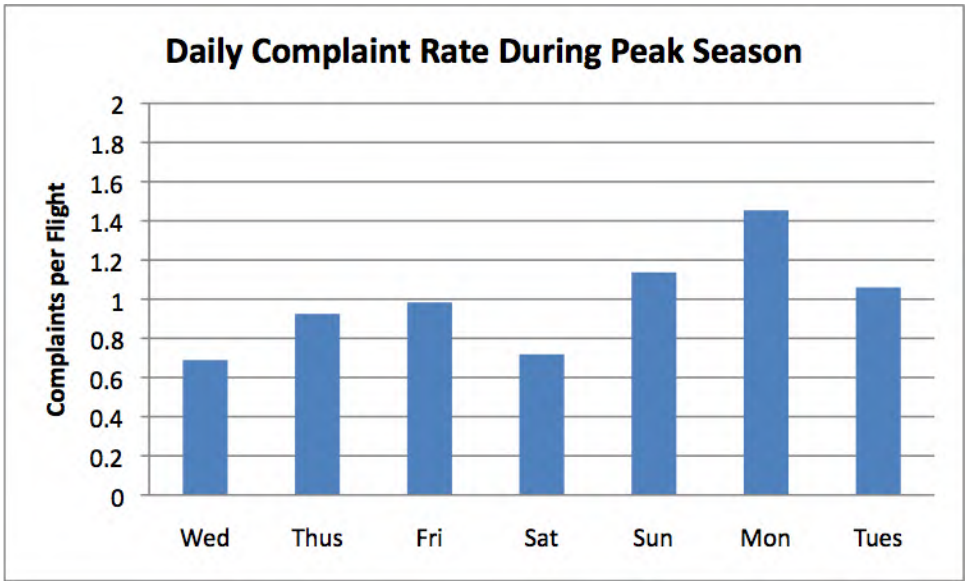

Figure 4B

The end of the weekend, Sunday and Monday, produce the highest complaints per flight, and Wednesday and Saturday the least. The end of the weekend seems to produce more disturbance than the beginning of the weekend. Overall, these differences in sensitivity are not very large. While the beginning and end of the weekend is the most disturbing time, other days are only slightly less disturbing.

It should be considered that this analysis does not take into account the fact that even in the peak summer months, the number of people on the ground fluctuates through the week with many more people present on the weekends. If we knew just how many people come and go on weekends, we could perform the same correction of complaints per flight as was used for Figure 2B. Unfortunately, those numbers are not available, but one can infer that **corrected daily figures would tend to elevate the complaints per flight on the midweek days, further reducing the significance of the weekends as having greater sensitivity. The higher weekend complaint rate is chiefly due to greater volume of aircraft operations.**

Hourly Flight Restrictions

It was established above that, despite reduced flight frequency during the nighttime hours, those continuing flights are clearly experienced as more disturbing than those that occur during the daytime. This raises a question as to how people react to flights across the hours of daytime. Figure 5a shows the number of complaints and flights across the non-curfew hours (8:00 am to 10:00pm) of the July-August period this year (2014). It can be seen plainly that the most complaints occur when the most flights occur. But a more telling analysis is shown in Figure 5b. Here the curve of complaints per flight is the reverse, indicating that it is flights that occur in the hours with the least amount of traffic that are experienced as the most disturbing. This result suggests that the more surprising the sound of an approaching aircraft, the more disturbing it becomes.

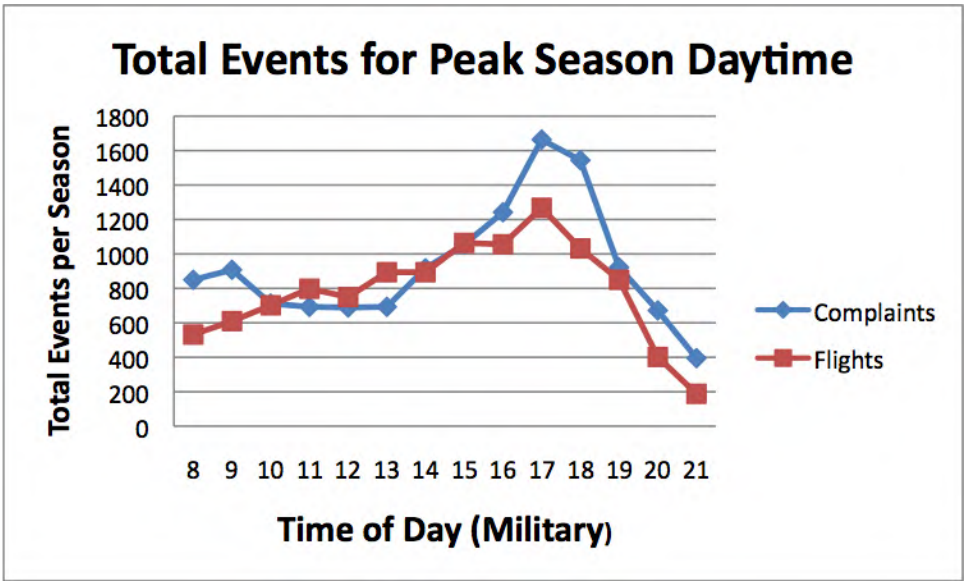

Figure 5A

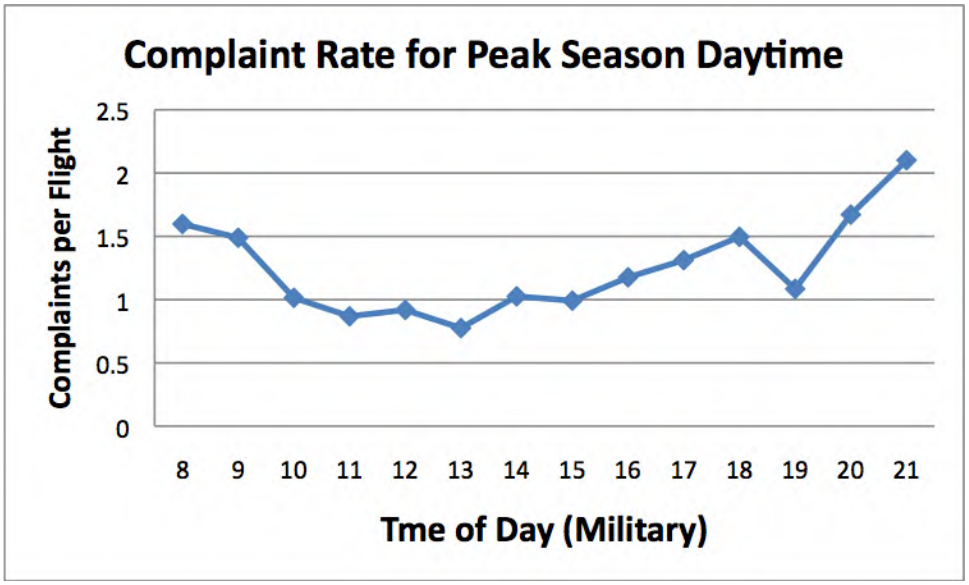

Figure 5B

[NOTE: There is a typo in the chart above, the spelling of Time.]

Recommendations:

-Setting specific noise standards for distinct aircraft types will be the most effective way to reduce disturbance caused by aircraft noise. Helicopters are, by far, the worst offenders. Although propeller aircraft flights are far more frequent than Jet aircraft flights, public sensitivity to propeller aircraft seems to be but half of that to jets. Combining the two measures, restrictions should therefore be placed primarily on two types of aircraft, helicopters and jets.

-Curfew for all aircraft from 7:00pm to 9:00am will be very effective in reducing noise disturbance.

- With respect to helicopters particularly, but also with respect to other types, restrictions that affect only summer months and are not applied during winter months seem particularly ill advised as the sensitivity of the winter population seems to be markedly higher than the summer population.

- Similarly, though less decisively, the population appears as sensitive to noise during the lower flight-frequency periods during midweek or early and late in the day. While the number of complaints decreases during these periods, due to lower volume of operations, the apparent sensitivity of people on the ground does not. Restrictions should be designed to reduce the complaint rate during peak periods to that of the off-peak periods.

Jim Matthews

Northwest Alliance

Exhibit B.

What we propose here is not merely a list of possible measures, but a framework for thinking about the problem and the trade-offs to be made. The first matter is our consensus on the priority of the noise problems experienced by the public.

Priority of Problems.

1. *Helicopters* -- Our highest priority is helicopter noise, either to be eliminated entirely or reduced drastically. Helicopters generate far and away the most complaints and the most complaints per operation, and for good reason. They are first of all in absolute terms among the noisiest types of aircraft operating at East Hampton Airport. They also have specific characteristics, beyond sheer decibel level, that exacerbate the disturbance they cause: (a) they have a unique percussive sound that is especially disturbing; (b) the duration of helicopter noise is longer than with other comparably noisy types because of lower speed and relatively lower and more constant altitude on approach and departure; (c) their aural signature includes a higher proportion of low frequencies that are heard at a much longer distance than with other types, aggravating the disturbance by causing significant periods during which those on the ground anticipate the noise to come and are reminded of the noise they have just endured; (d) as noted by Henry Young, helicopter noise, when it occurs, dominates the aural environment drawing the listener's attention even when not extremely loud:

"Helicopters are so distinctive and intrusive that their presence and frequency of occurrence are objectionable [to those of the community affected] regardless of peak noise level or local ambient." [1]

2. *Time of Day of Operations.* The next highest priority are flights that are especially disturbing because of the time when they occur. Before helicopters were even noteworthy as a local problem, night flights were already considered a serious problem and were the source of many complaints. The 1989 Airport Master Plan called for a jet curfew. It was never implemented due to objections from the FAA regarding compliance with grant assurances. Those are no longer an issue after December 31, 2014. We note the predominance of complaints in the evening and early morning when people are at home and have an expectation of repose.

Also significant are operations during weekends, particularly in the summer, when people are out of doors and especially eager to enjoy the peace and beauty of the environment that are the special attraction of life on the East End. Aircraft noise has robbed many of the quiet enjoyment of their homes and vacation time.

3. *Frequency of Operations*. If aircraft operations were equally spread out in time, they would not be nearly as disturbing as they are. Inevitably, they cluster on summer week-ends because aircraft users are interested in coming to the East End and enjoying vacation and recreation at the very same time that the rest of the East End community is looking to enjoy its vacation and rest time. Thus, aircraft operations peak

[1] Advice, September 14, 2014.

just at the time when the demand for quiet enjoyment is at its highest. Ironically, aircraft commuters want the same peace and quite for themselves and are using aircraft to minimize their travel time to the South Fork and maximize their own quiet enjoyment of our environmental bounty while denying the same to others. We note the high levels of complaints Friday evenings, Sunday evenings, and Monday mornings when commuter operations are at their peak.

A subset of high-frequency operations are touch and gos -- repetitive, low-altitude operations. The 1989 Airport Master Plan required that such operations be prohibited on summer weekends, May into September, from noon Friday to noon Monday. This too was never implemented due to FAA objections under grant assurances, no longer an issue after the end of this year.

4. *Noisy Aircraft Types*. Although helicopters have sound characteristics that make them especially disturbing, comparably noisy types of jet and piston aircraft also generate high levels of complaints. Loud aircraft are not merely intrusive; they are an urban noise that is inconsistent with what is otherwise the quiet, rural sound level in East Hampton and neighboring communities. It is for this reason that the 1989 Airport Master Plan had already concluded, at a time when helicopters were not yet an issue and there were fewer jet operations, that an airport designed for business jets would be "inconsistent with the character of the community."