

# BOROUGH OF HAINES HELICOPTER NOISE MEASUREMENT SURVEY

Mead & Hunt/BridgeNet International

September 2015

# Project Tasks

- Monitor noise from March 9<sup>th</sup> through March 15<sup>th</sup>
- Analyze measurements using:
  - single event
  - cumulative metrics
- Prepare Noise Report to document measurement results
- Presentation to Borough

# Study Location



Slide 3

# Noise Monitoring Locations

- March 9 – 15, 2015
- Four sites chosen by the Borough
- Noise monitored 24-hours per day
  - Monitored noise levels from operations from SEABA Mile 26 base to heliski sites
  - Monitored ambient noise levels
- Duration of events
- Helicopter information (type, flight track, airport/SEABA base)
- Non-aircraft event information (type, activity)



# Noise Analysis – Single Event

## Single Event Noise Metrics

- Most closely models how the ear hears an individual event

## Primary Single Event Noise Metrics Analyzed

- Maximum Noise Level (Lmax)
  - Maximum noise level of a single aircraft event
- Time Above Audible (TAA)
  - The amount of time helicopter event is audible

# Noise Analysis – Cumulative Average

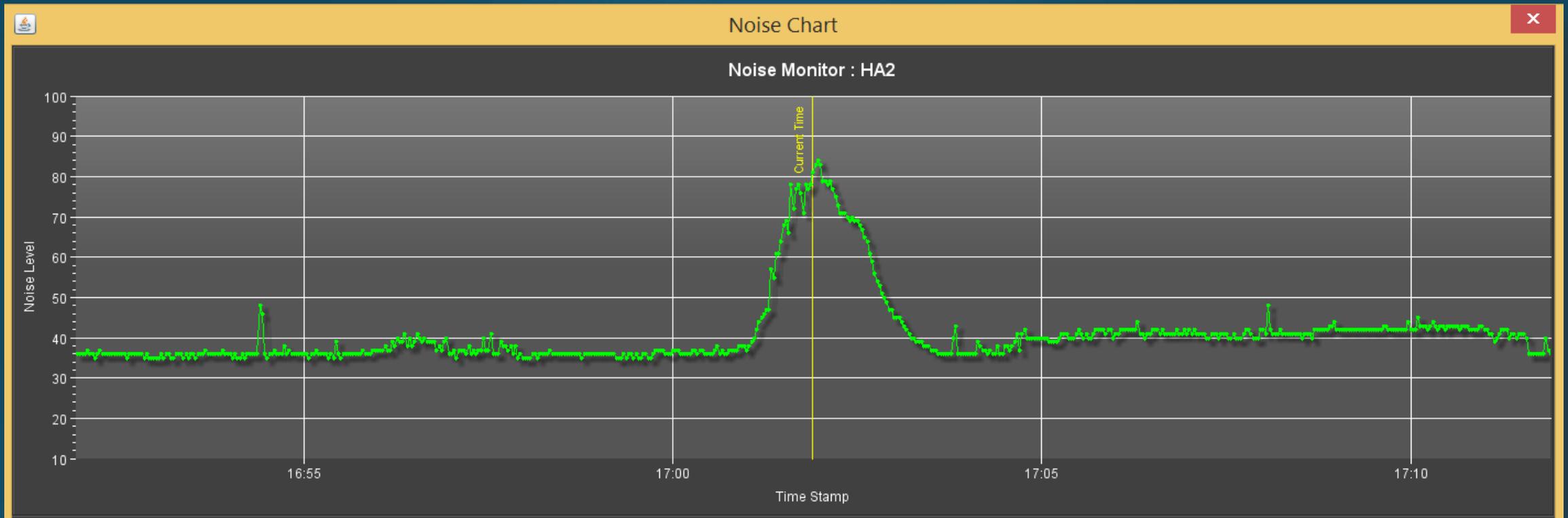
## Cumulative Average Metrics

- An averaging of noise over a certain time period.
- Does not represent how the human ear hears a single event.
- Basis for Land Use criteria.

## Primary Cumulative Average Metrics Analyzed

- Day Night Average Noise Level (DNL)
  - Averages noise from aircraft events over 24 hours.

# Continuous Measurement of Noise

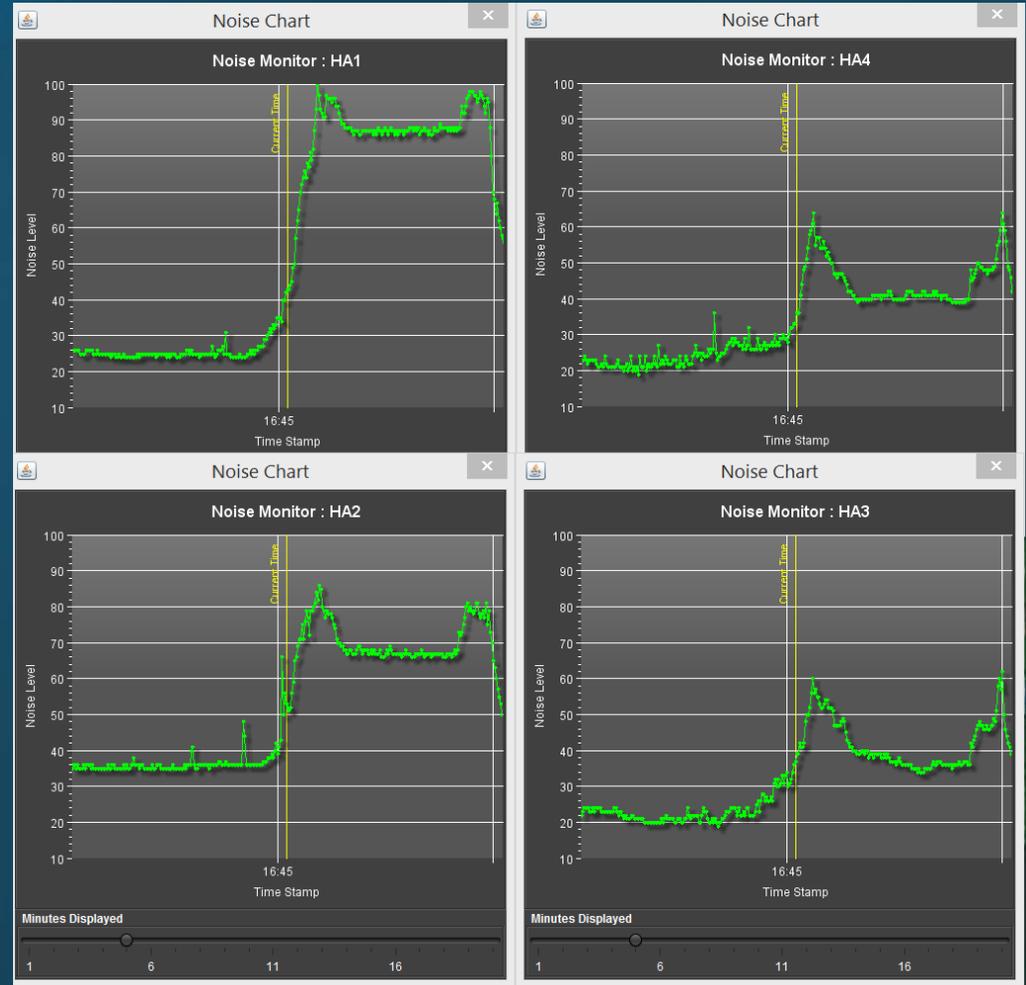
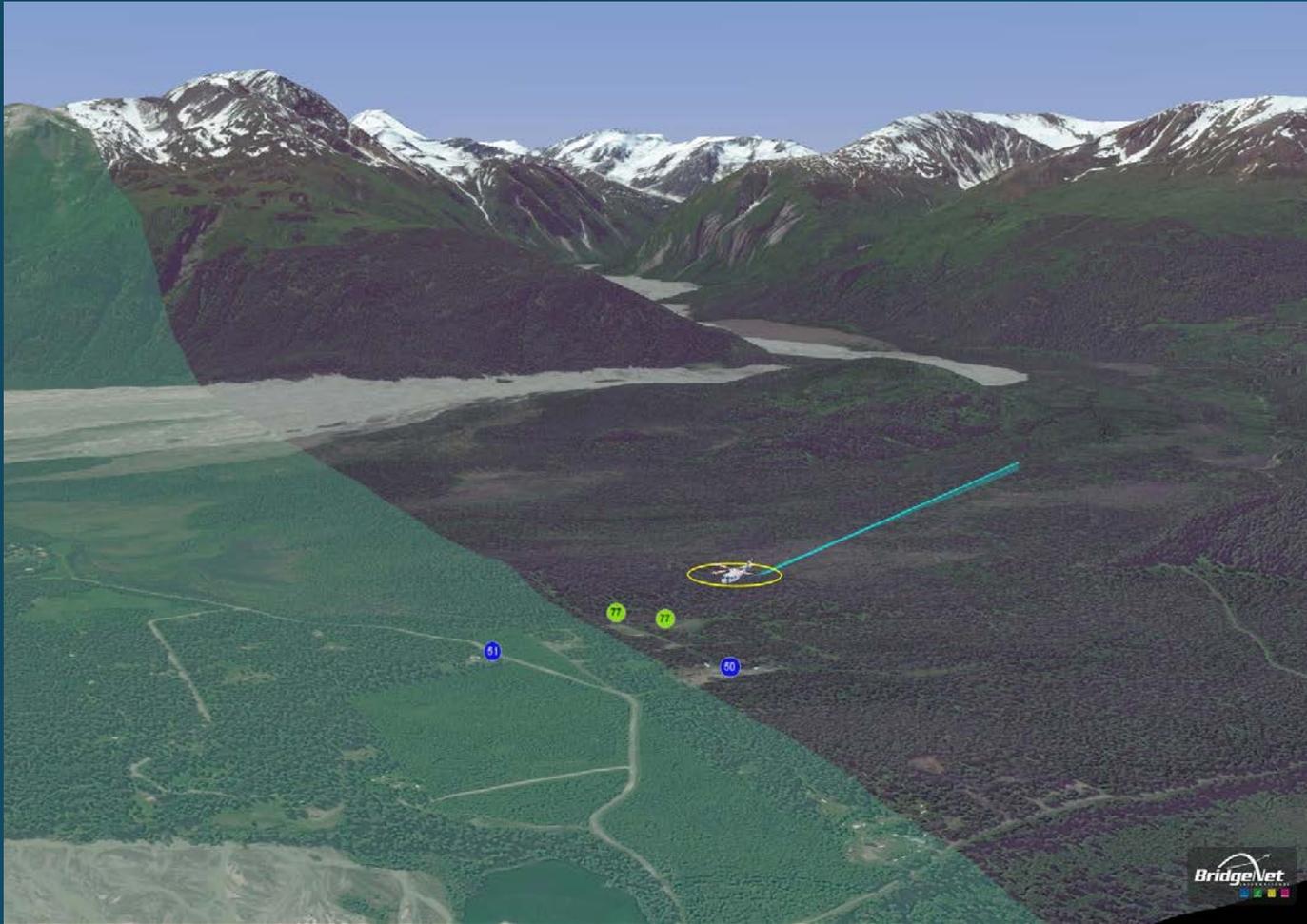


# Aircraft Flight Information



Slide 8

# Correlating Noise and Flight Data



# Measured Aircraft Events

- Nine flight events between Mile 26 and the Heliski location.
- Number of events influenced by weather and flight demand.
- Additional flight events occurred outside of the scope of this project at Haines airport and the Mile 33 SEABA base.

# Analysis Results – Ambient Noise

- Ambient Noise Levels
- Ambient Noise Levels are often very low

**AMBIENT NOISE MEASUREMENT RESULTS**  
*Borough of Haines Spring 2015 Helicopter Noise Survey*

Site #	Name	Description	Statistical Noise Levels (dBA)				
			LMax	L10	L50	L90	LMin
1	HA1	Helipad	104	37	24	22	14
2	HA2	Home By Helipad	94	38	35	30	21
3	HA3	Roadway	77	32	20	18	16
4	HA4	Neighboring Estate	90	37	21	17	15

# Analysis Results - Lmax

- Measured noise from each helicopter operation at the four monitors

## MEASURED LMAX NOISE LEVELS OF IDENTIFIED HELICOPTER EVENTS

*Borough of Haines Spring 2015 Helicopter Noise Survey*

Period: March 9, 2015 to March 15, 2015

Event	Time	Operation	Maximum Noise Level (LMAX) dBA			
			HA1	HA2	HA3	HA4
1	3/9/2015 2:00 pm	Departure	100	84	73	64
2	3/9/2015 2:21 pm	Quick Turn	102	85	72	64
3	3/9/2015 4:45 pm	Quick Turn	100	87	63	65
4	3/9/2015 5:01 pm	Arrival	100	84	63	61
5	3/11/2015 8:12 am	Departure	101	86	69	68
6	3/14/2015 11:15 am	Arrival	100	85	65	63
7	3/14/2015 3:28 pm	Departure	100	82	62	66
8	3/14/2015 4:18 pm	Arrival	103	83	64	66
9	3/15/2015 8:21 am	Departure	104	85	68	71
<b>Average</b>			<b>101</b>	<b>85</b>	<b>66</b>	<b>65</b>

# Analysis Results – Audible Duration Noise

- Time Above Ambient – number of minutes aircraft noise was above ambient levels

## MEASURED TIME ABOVE AMBIENT NOISE MEASUREMENT RESULTS

*Borough of Haines Spring 2015 Helicopter Noise Survey*

Event	Time	Operation	Time Above Ambient (TAA) - Minutes			
			HA1	HA2	HA3	HA4
1	3/9/2015 2:00 pm	Departure	5	5	8	8
2	3/9/2015 2:21 pm	Quick Turn	11	10	12	12
3	3/9/2015 4:45 pm	Quick Turn	6	6	6	8
4	3/9/2015 5:01 pm	Arrival	3	3	3	2
5	3/11/2015 8:12 am	Departure	6	7	5	5
6	3/14/2015 11:15 am	Arrival	3	4	4	2
7	3/14/2015 3:28 pm	Departure	5	5	5	5
8	3/14/2015 4:18 pm	Arrival	3	3	4	3
9	3/15/2015 8:21 am	Departure	7	7	10	9
<b>Average</b>	<b>(Minutes)</b>		<b>5</b>	<b>6</b>	<b>6</b>	<b>6</b>

# Analysis Results - DNL

- Average noise level at each monitoring site with aircraft & ambient noise.

**AIRCRAFT DNL NOISE MEASUREMENT RESULTS**  
*Borough of Haines Spring 2015 Helicopter Noise Survey*

Site #	Name	Description	Aircraft DNL
1	HA1	Helipad	69
2	HA2	Home by Helipad	51
3	HA3	Roadway	30
4	HA4	Neighboring Estate	43*

# Comments

- Citizens submitted comments on the draft report.
- Comments included concerns regarding:
  - Noise monitoring methodology
  - Data analysis
  - Helicopter altitudes
  - Small data sample of nine flights
  - Lack of location regulations for acceptable land uses re: 65 DNL
  - A-weighted used instead of C-weighted
  - Raw data not included in report
  - Average metrics not useful
  - Single event metrics more useful for decision making

# Observations

- Loudest events at Site 1 closest to the helipad. Quietest events at Site 4 furthest from the helipad
- Helicopter events can be audible for long periods in an environment of low ambient
- “Quick Turn” operations are audible for extended periods
- As typical for Heliports, cumulative DNL noise levels are below the federal criteria
- 9 noise events during measurement period can be extrapolated to show higher activity

**POTENTIAL DNL AND TAA LEVELS WITH VARIOUS LEVELS OF ACTIVITY**  
*Borough of Haines Spring 2015 Helicopter Noise Survey*

Flights Events Per Day	Day Night Noise Level (DNL)				Daily Time Above Ambient (TAA), minutes			
	HA1	HA2	HA3	HA4	HA1	HA2	HA3	HA4
2	70	52	31	31	11	11	12	12
5	74	56	35	35	27	28	31	29
10	77	59	38	38	53	55	62	59
15	79	61	40	40	80	83	93	88
20	80	62	41	41	106	111	124	117