



DATE: February 13, 2012

TO: Christopher P. Kovac, P.E., LEED® AP

FROM: Adam C. Jenkins, INCE, PE(OR)

RE: Big Finn Hill Park Field Conversion Project – Noise Study Peer Review

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INTRODUCTION

This document includes a Peer Review of the noise analysis performed by the City of Kirkland for the Big Finn Hill Park Field Conversion Project (“Project”) in Kirkland, Washington. The following documents were reviewed:

1. City staff appeal response memorandum, dated February 7, 2012
 - a. Eric Shields, Planning Director, SEPA Responsible Official, City of Kirkland
 - b. Jon Regala, Senior Planner, City of Kirkland
 - c. Section VI.B. Noise
2. City staff recommendation memorandum, dated December 1, 2011
 - a. Jon Regala, Senior Planner, City of Kirkland
 - b. Section II.C Noise
3. Final Environmental Impact Statement, Sand Point Magnuson Park Drainage, Wetland/Habitat Complex and Sports Field/Courts Project, July 2002
 - a. MFG, Inc. (Section author)
 - b. Sections reviewed: 3.6 Noise
4. City of Kirkland Comprehensive Land Use map, January 3, 2012
 - a. City of Kirkland
 - b. Areas reviewed: Big Finn Hill Park and surrounding land use zones
5. City of Kirkland Zoning Code
 - a. Sections reviewed: Chapter 115
6. Washington State Administrative Code
 - a. Sections reviewed: 173-60

SUMMARY AND RECOMMENDATIONS

The noise analysis presented by the City of Kirkland represents an essentially reasonable assessment of environmental noise emissions from the Project site. However, the assessment does not address noise emissions from vehicles accessing the parking lot, as governed by the State Noise Code, or existing environmental sound levels at the site.

In order to provide more information as a basis for analysis, it is recommended that sound level measurements be made near the Big Finn Hill Park property line at not less than two locations (one north of the site, one south of the site), adjacent to the nearest Residential receivers. These measurements should document sound levels from field use, parking lot activity, and ambient conditions up to 11:00 p.m. Data should be collected for not less than three consecutive days, including one weekday and one weekend day. Both measurement locations should be periodically manned, so that noise sources not associated with field or parking lot use can be noted and excluded from the data set.

BACKGROUND

According to the City Staff Recommendation Memorandum dated December 1, 2011 (“Recommendation Memo”), Kirkland Youth Lacrosse and King County Parks (“Applicant”) is proposing to include the following as part of the Project:

1. Construction of paved field access pathways and the addition of eight parking Stalls
2. Construction of field curbing, fencing (including gates), bleachers, and netting
3. Construction of a field under drainage which includes a large sand filter for water quality treatment
4. Installation of field lights
5. Identify the future location of a scorekeepers hut and field house
6. Stabilization of construction areas

The noise analysis was performed by City Staff and concluded that the Project satisfies King County and Washington State Code requirements for environmental noise. The noise analysis in the Recommendation Memo is largely based on noise levels associated with sports teams as documented in the Final Environmental Impact Statement for the Sand Point Magnuson Park Drainage, Wetland/Habitat Complex and Sports Field/Courts Project, dated July 2002 (“Magnuson Park FEIS”). A Determination of Nonsignificance (“DNS”) was recommended based on the staff analysis..

On December 5, 2011, the City of Kirkland issued a DNS for the Project. After the DNS was issued, an Appeal to the DNS was filed by Concerned Neighbors of Big Finn Hill Park. Several concerns were raised in the appeal, one of which was noise. The City of Kirkland issued an Appeal Response Memorandum (“Appeal Memo”) on February 7, 2012 that includes an updated noise analysis based on specific concerns expressed in the Appeal. The Appeal Memo represents the most recent analysis performed by City Staff and is the focus of this Review.

REVIEW OF NOISE ASSESSMENT

Our findings on the facts presented in the Appeal Memo are as follows:

Fact a. The document cites Washington Administrative Code (WAC) 173-60 as the governing noise regulation for the Project, as adopted by the City.

Finding a1. This is a correct statement; Chapter 115 of the City of Kirkland Zoning Code adopts WAC 173-60, by reference.

Fact b. The document states that the Applicant will prohibit the use of an amplified sound system on the soccer/lacrosse field, and is formalizing this restriction in a use agreement currently undergoing a County review and approval process.

Finding b1. This type of restriction is appropriate, especially during evening and nighttime hours.

Fact c. The document states that soccer and lacrosse have similar noise emission characteristics, with the exception of air horns used instead of field whistles during lacrosse games. The Applicant will prohibit the use air horns on the soccer/lacrosse field, and is formalizing this restriction in a use agreement currently undergoing a County review and approval process.

Finding c1. This type of restriction is appropriate, especially during evening and nighttime hours.

Fact d. The document states that the maximum permissible environmental noise levels for the Project (Class A EDNA), when received by a residential property (Class A EDNA), are defined to be 55 dBA between 7 a.m. and 10 p.m. and 45 dBA between 10 p.m. and 7 a.m in WAC 173-060-040. The document also cites exceedances of the 55 and 45 dBA limits as follows: 5 dBA for 15 minutes, or 10 dBA for 5 minutes, or 15 dBA for 1.5 minutes, in any one hour period.

Finding d1. The EDNA classification assessments are accurate. WAC 173-60-030 defines land used for “recreational and entertainment” and “residential” purposes as Class A EDNA. Since the State Code does not define a metric (average, maximum, etc.), the 55 and 45 dBA limits, are often implemented as L_{25} limits in environmental noise studies under State Code. The L_{25} descriptor is the sound level exceeded 25% of the time, or 15 minutes in an hour.

Finding d2. The citation of allowed exceedances from WAC 173-60-040 are accurate. These limits are often implemented with L_{08} (+5 dBA) L_{02} (+10 dBA) and L_{max} (+15 dBA) descriptors in environmental noise studies under State Code.

Fact e. The document states that using the Magnuson Park FEIS as the basis for analysis was appropriate because it contains sound levels measured 100 feet from a soccer game during peak use time of 7 p.m.

with no barriers between the soccer game and sound level meter. The document presents predicted sound levels at residential receivers near the Project at 354 feet to the southwest, 486 feet to the southeast, and 772 feet to the north, the document states that the calculations were very conservative in nature since they do not include lower crowd attendance, topography, vegetation, and sound absorption from the air and ground.

Finding e1. It is our assumption that the sound level measurements reported in the Magnuson Park FEIS were 100 feet from the edge of the playfield at the midfield line. If this is the case, and the playfield where the measurements were conducted was 210 feet wide and 375 feet long, there is a potential that the application of the Magnuson Park FEIS sound levels could under-predict L_{max} sound levels received in the community.

For example, if the L_{max} reading of 75 dBA for a youth soccer presented in the Magnuson Park FEIS was due to a sound source at the opposite corner of the field from the measurement device located 100 feet from the field edge, the sound source could have been as much as 362 feet from the microphone. In this worst-case scenario, sound levels at 354 feet could be under predicted by as much as 11 dBA. This could increase predicted L_{max} values from youth games to 75 dBA at 354 feet, which would exceed the daytime State Code L_{max} limit of 70 dBA and nighttime limit of 60 dBA, although the youth are not scheduled to play during the defined nighttime hours. Similarly, sound levels from adult games could be as much as L_{max} 69 dBA at 354 feet, which would satisfy the daytime limit of 70 dBA, but exceed the nighttime limit of 60 dBA.

The L_{25} metric represents sound occurring more frequently than the L_{max} , with the sound sources fairly evenly distributed throughout the playfield. Under this scenario, the microphone in the Magnuson Park FEIS could have been 205 feet from the sound source, not the 100 feet assumed, which could result in under-prediction of sound levels at 354 feet by as much as 6 dBA. This could increase predicted L_{25} values from youth games to 50 dBA, which would satisfy the daytime limit of 55 dBA, but exceed the nighttime limit of 45 dBA. Again, youth are not scheduled to play during the nighttime hours. Similarly, sound levels from adult games could be as much as to 43 dBA at 354 feet, which would satisfy both the daytime limit of 55 dBA and the nighttime limit of 45 dBA.

It should be noted that the Magnuson Park FEIS states measurement data were “somewhat contaminated by other nearby human activities, traffic, and airplane noise... Therefore, the measured source noise levels ... are somewhat higher than

would be likely.” Given the challenges of acquiring clean measurement data of sporting events, it is likely that the source data used in this analysis represent conservative levels for both adult and youth soccer. However, the Appeal memo does not address other possible source/receiver distances given the diversity of possible source locations on the athletic field during the Magnuson Park FEIS sound level measurements.

- Finding e2. A review of the City of Kirkland Comprehensive Land Use Map (“ City Zoning Map”) and satellite imagery of the existing playfield confirms the receiver analysis distances.
- Finding e3. Attenuation due to factors such as topography, vegetation, and sound absorption from the air and ground can easily be negated by downward-refracting conditions due to thermal inversions and down-wind receiver locations. However, the analysis methodology is a reasonable method of analysis given the available sound source data. It is possible that lower attendance at an adult soccer games could reduce noise emissions, if crowd noise was a dominant factor. Additional measurement data would be beneficial to confirm this.
- Fact f. The document presents a diagram of comparative sound levels from 0 dBA (threshold of hearing) to 110 dBA (aircraft takeoff and rock band in subway train). The chart also shows a “quiet suburban” nighttime sound level of approximately 40 dBA.
- Finding f1. The chart presents reasonable descriptions of typical sound levels and is an appropriate reference tool. However, without measured ambient noise data at the Project site, the existing ambient noise levels at Big Finn are unknown. The “quiet suburban nighttime” level of 40 dBA shown in the chart likely approximates the average ambient noise conditions at properties near the Project site between 10 p.m. and midnight.
- Fact g. The document presents a prediction of existing traffic noise levels 375 and 750 feet from Juanita Drive for a typical automobile, medium truck, and heavy truck, based on information presented in Handbook of Environmental Acoustics, by James P. Cowan.
- Finding g1. It is likely that this analysis used reference sound levels for single vehicles and 6 dBA reduction per doubling of distance. Roadway noise is largely a function of traffic density, distance, and roadway surface and diminishes at a rate of 3 dBA per doubling of distance due to cylindrical spreading, not 6 dBA as for spherical spreading. In order to accurately predict existing traffic noise levels, vehicle count data, knowledge of the roadway surface type, and computer simulation would be necessary. Measurement of existing ambient conditions would be another method of determining existing traffic noise conditions at nearby residential properties.

Our comments on conclusions presented in the Appeal Memo are as followings:

Conculsion a Both youth and adult soccer will comply with daytime limits and only adult soccer will take place after 10 p.m., complying with nighttime limits.

Comment a1. Sound level predictions from youth and adult soccer activities presented in the document are considered to be a reasonable assessment of environmental noise from the athletic fields. However, given the lack of specific information related to the geometry of source/receiver distances during measurements for the Magnuson Park FEIS, and potential increases due to wind and thermal inversions, the analysis has a large margin of uncertainty.

Conculsion b Noise from motor vehicles is exempt from the State Noise Code

Comment b1. While traffic on public roadways is regulated by different regulations (WAC 173-62) and not bound to the State Code limits discussed in the document, vehicles “operated off public highways ... when such sounds are received in Class A EDNAs” (WAC 173-060-4-l) are bound to the limits in WAC 173-060-040. Therefore, sound emissions from the existing parking lot and eight additional parking stalls, are bound to comply with State Code limits. This parking lot is approximately 320 feet south of Class A EDNA properties. Additional analysis is required to quantify the noise levels from the increased capacity and extended hours.

Conculsion c Noise impacts do not create a significant adverse impact to wildlife habitat due to existing traffic noise from Juanita Bay Drive

Comment c1. Traffic sound level predictions require additional analysis. Two methods of determining existing traffic noise levels from Juanita Drive would include computer modeling with known traffic count, road surface, and lane geometry, or field measurement of traffic noise during the same time of day undergoing analysis.

Conculsion d Projected noise levels from the field at the property lines are similar to a “quiet suburban nighttime”

Comment d1. The predicted sound level presented in the report (L_{25} between 30 and 44 dBA) are considered consistent with a quiet, suburban nighttime environment. However, without ambient noise monitoring data of the existing noise environment, comparing these levels to existing ambient conditions at receiving properties surrounding the Project site is not possible.