

K. Noise and Vibration

1. Noise Analysis

a. Existing Conditions

To quantify the existing noise environment at the proposed project site, Cerami & Associates conducted a 24-hour noise study from 4:30 p.m. on Sunday, January 9, 2005, to 6:00 p.m. on Monday, January 10, 2005. This time period encompassed a weekend evening (when train activity was presumed to be lighter than a typical workday), and a typical workday. The microphone was installed roughly 6 feet off the ground at a parking lot light pole, opposite New Street. In addition to this data, spot check measurements were also collected, measuring ambient noise levels during various visits to the site. The complete analysis is included in [Appendix G](#) to this DEIS.

(1) Terminology

Statistical analysis is used to describe the time varying distribution of sound and to compute single number descriptors for the time-varying sound. L_X is the sound level exceeded X% of the time during the measurement period. For example, L_{10} is the sound level exceeded 10% of the time during the measurement period, or the relative maximum. L_{90} is the sound level exceeded 90% of the time, or the relative minimum. L_{eq} is the equivalent steady sound level, which provides an equal amount of acoustic energy as the time-varying sound. L_{max} is the maximum sound level experienced during the measurement period. Similar data was collected for L_1 , L_{50} and L_{min} conditions; all data is plotted on a graph in Appendix G.

(2) Stationary and Mobile Source Baseline Noise

Analysis of the late Sunday night and early Monday morning data indicates Metro-North train activity is the predominant noise source at the site. Kensington Road is not heavily traveled. During those overnight hours, one train event per hour was assumed. The relative minimum noise level, at around 42 dB(A), increases to in excess of 90 dB(A) during train events. Although brief, these events are substantially louder than the background. A difference of 10 dB is roughly equivalent to a doubling of loudness to the human ear; an increase of 40 dB+ is well more than quadruple the otherwise ambient.

An analysis of the Monday evening conditions reveals the relative maximum levels are consistent; all these levels are due to train activity. The L_{eq} average levels are higher, due to increased road traffic and more frequent trains. The relative minimum levels even

during daytime never rise much above 52 dB(A), indicating that regardless of time of day (or night) train events are a significant, and the dominant, noise source at this location.

Octave band noise level measurements taken during spot checks were consistent with these findings; octave band measurements indicate levels in the mid 80s dB for northbound trains (on track nearest the project site), and in the mid 70's dB for southbound trains (further track). Figure 1, included in Appendix G of this DEIS, presents the 24-hour noise levels measured at the site in terms of L_{max} , L_{eq} , L_{10} and L_{90} . The measurement periods were each 30 minutes in length.

b. Noise Requirements of the Village of Bronxville Code

The Code of the Village of Bronxville, v21, Part II General Legislation, Chapter 210 "Peace and Good Order" makes provisions regarding specifically prohibited noises, item 210-8. Paragraph E in this section states that no person shall engage in: "The erection (including excavation) or demolition or major alteration or repair of any building other than between 8:00 a.m. and 6:00 p.m. on Monday, Tuesday, Wednesday, Thursday or Friday, but not on any such day which is a state or national holiday."

Paragraph F in this section states that no person shall engage in: "The excavation with power machinery of any plot of land within a residence district, as defined in the Village Zoning Law, as amended, except in accordance with an excavation permit theretofore issued for that plot of land by the Superintendent of Buildings, in addition to the usual building permit for the construction of a building or buildings on that plot of land. Such excavation permit may specify a limited number of consecutive working days for the use of power machinery, according to the circumstances on the particular case, and such permit may be renewed..."

Paragraph G in this section states that no person shall engage in: "The creation of noise on any street adjacent to any school, institution of learning or church while the same is in session..."

c. Potential Impacts

(1) Existing Noise Impact to the Proposed Kensington

As the Kensington would be located directly adjacent to the Metro-North Railroad, some train noise will be audible from the proposed residences. Currently, train events raise exterior ambient levels by up to 50 dB; façade construction and building materials should

attenuate roughly 40 dB of that increase. Studies have shown that an increase of 10 dB is sufficient to rouse a person from sleep.

The Department of Housing and Urban Development (HUD) standards report for Environmental Criteria Title 24, Part 51, Subpart B, Noise Abatement and Control evaluates land use proposed for housing based on environmental noise levels and provide minimum standards. According to HUD, for the interior of a residence, the day-night average sound level, L_{dn} , should not exceed 45 dB(A). For this site to meet that goal, upgraded constructions for windows, as a minimum, would be required. Further, HUD lists site acceptability standards for exterior noise levels measured within 6.5 feet of the building façade. Sites having an L_{dn} above 75 dB(A) are considered unacceptable, and HUD would require special approvals, environmental review and attenuation. The L_{dn} , an average of the hourly L_{eq} noise levels, for this site was measured at 77. Without particular attention to mitigation, this would fall into the “unacceptable” category according to HUD.

(2) Kensington Noise Impact to Area

The noise and vibration analysis also considered the impact that the proposed project would have on neighboring land uses, including Christ Church, the multi-story apartment buildings along Sagamore Road, and the Alger Court (Northgate, Southgate, Rivermere) residences on the west side of the Metro-North Railroad tracks. The Kensington should reduce intrusive train noise to the Christ Church, as it will provide a barrier between the Church and the trains. Considering the multi-story building, the noise abatement would be more noticeable at the lower floors, as compared to higher floors that will look directly over the top of Kensington. Considering the Alger Court residences, if all sound energy from the trains reflected off Kensington façade and was incident to Northgate, Southgate and Rivermere, an increase of +3 dB is the most that could be expected, a change considered barely perceptible to the human ear. However, as the Alger Court residences are set farther back from the tracks, and the ground floor level of Kensington will be several feet above a similar location at Rivermere, the increase would be more on the order of 1dB, which is imperceptible. We note that as the Alger Court residences are a private community, no data was measured or collected at that site.

(3) Stationary Noise Sources

Stationary noise sources at the proposed development would include exterior mechanical equipment, or louvers for ventilation

of interior mechanical equipment, garage ventilation, and/or individual residential air conditioning equipment.

(4) Mobile Noise Sources

It is generally accepted that 3 dB represents a perceptible change in noise level. Sound is added on a logarithmic basis: two sources each at 65 dB would be measured at 68 dB when occurring simultaneously. Thus, one way for traffic to result in a perceptible, or 3dB increase, would be for the volume of traffic to double. Other ways for traffic noise to result in such an increase would be if the speed was significantly increased, or if an existing area of landscape, between source and receiver, was decreased.

In this case, the roadway speed will not be increased, and the distance between source (roadway) and receiver (existing residences) will not be changed. That leaves an evaluation of traffic changes to determine if a perceptible increase in noise level will occur.

The New York State Department of Transportation states that if the difference in noise levels (Build vs. No-Build) is within 5 dB, such conditions would not be considered substantially different. As stated, to incur a +3 dB perceptible increase, traffic volume would have to double, and would have to nearly quadruple to result in a +5 dB difference.

Existing, Future Build and Future No Build traffic volumes were reviewed. The traffic analysis indicates increases in traffic volumes for both morning and evening peak hours along Kensington Road and Sagamore Road. However, none of the counts indicate even a doubling of traffic volume. Therefore, the Build condition will not represent a perceptible increase in noise level as compared to a No-Build condition.

(5) Construction

During the early phases of construction, site work will result in noise impact to adjacent properties. The noise producing activities will include demolition and removal of existing parking lot surface, preparing for foundations, truck activity to and from the site, etc.

With regard to Christ Church, noise impact should be limited to the main sanctuary area behind the stained glass windows and other areas with windows looking directly onto the construction site. Interior partitions to other church spaces, such as offices and/or the child care center should render construction noise non-intrusive.

A detailed discussion of noise impacts resulting from construction of the proposed project is included in Chapter IV. Significant Impacts that Cannot be Avoided, of this DEIS.

d. Proposed Mitigation

The project goal should be that intrusive train noise (with windows closed) is less than 10 dB above ambient. The proposed exterior wall and roof construction will be evaluated for sound transmission loss projections to ensure they will meet this requirement.

For this site to meet the HUD goal, upgraded constructions for windows, as a minimum, would be required. It would be necessary to provide upgraded constructions for all windows, as the transmission loss for standard 1" insulating glass (1/4" glass, 1/2" air space, 1/4" glass) is around 25 dB. To attenuate train noise within 10 dB of interior ambient, all windows (and sliding doors) will need to use heavier/thicker glass, at least one lite of laminated glass, and preferably wider air spaces between panes. Reducing the overall percentage of glass at some areas will also be considered. Further, at the common areas theater, either acoustically rated window constructions (together with frame) will be provided, or perhaps the windows deleted depending on the expectation for this space use.

(1) Construction Noise Mitigation Plan

With regard to environmental noise transmission of stationary sources, the project development team will review all equipment proposed and scheduled for the proposed Kensington development to ensure that it complies with all applicable local noise codes, including the Village of Bronxville. Construction noise will be limited as much as possible through use of modern methods and equipment to conduct site work as expeditiously as possible. Truck noise will be greatest during morning hours when the site noise levels are already elevated due to increased train and commuter vehicular activity. Occasional events such as blasting should occur during midday to reduce impact to neighbors. Once the shells of the buildings are erected, this will provide a natural shield to noise exposure from interiors construction. Additional detail on plans to mitigate noise impacts to adjacent properties is included in Chapter IV. Significant Impacts that Cannot be Avoided, of this DEIS.

2. Vibration Analysis

An analysis of vibration levels due to passing trains was also completed. Data reflects northbound and southbound trains, as well as trains that stop at the Bronxville station and express through. 24-hour noise data were collected by hammering a metal stake in the ground, and mounting an accelerometer atop using a magnet.

a. Existing Conditions

Ambient vibration levels were measured on January 10 and 18, 2005, as well as the resultant vibration levels due to train pass-by events. On both dates, ambient vibration levels were imperceptible. However, there is significant clearly perceptible vibration (and vibration-induced audible noise) due to each train pass-by event. The impact is slightly less for southbound trains on the far track, as compared to the northbound near track. Based on these levels, the interior spaces of a construction built without isolation would readily radiate vibration.

Figures 6 and 7 included in Appendix G, plot the ambient vibration levels obtained January 10 and 18, 2005, as well as the resultant vibration levels due to train pass-by events.

b. Potential Impacts

Existing on-site vibration acceleration levels are in the 90's – to be reduced to barely perceptible conditions, a reduction of roughly 30 dB would be required

c. Proposed Mitigation

As noted above, existing vibration levels on the proposed project site would need to be reduced by some 60 dB to render them imperceptible. Such a reduction is not feasible with common building isolation methods. To even approach this amount of reduction, the project would likely have to isolate each building structure, then provide a secondary isolation system within the residential units, such as floating floors with interior partitions built atop, which is an impractical and excessive approach for a remedy. Based on the close proximity of the residences to the train tracks, however, a great deal of reduction will be required to adequately address the situation. Methods to reduce this vibration will be further explored.

3. Impact to Christ Church

The noise and vibration analysis specifically examined the impact the proposed project would have on Christ Church, located opposite the site on Kensington Road. Of specific concerns are the noise and vibration impacts of construction/blasting activity on the Church during services, on the stained glass windows, and the future impact of the development itself.

a. Existing Conditions

To quantify the existing conditions at the church, Cerami & Associates took noise and vibration measurements on February 11, 2005. Measurements were collected at the site during several Metro-North events. The data indicates that vibration is measurable, but imperceptible. Also, the vibration manifests itself as audible noise, such that one can

hear, rather than feel, when there is train activity. Figures 9 and 10 included Appendix G present this activity.

Cerami & Associates also examined the Church's stained glass windows, which are made of small panes of glass each held in their own section of the overall decorative frame, their installation is more damped than a large pane, and they are therefore less susceptible to ground vibration. At present, that there is a low level of vibration at the site due to the train activity.

b. Potential Impacts

Due to the close proximity of the Church to the project site, noise and vibration transmission from construction/blast activities will likely impact the church and its windows. The limited sound barrier performance of glass, roughly 20 dB, will allow for transmission of construction noise to the main sanctuary, and any other Church areas with windows looking onto the construction site. Interior spaces within the church having partitions separating them other perimeter spaces, should therefore find construction noise non-intrusive due to the additional noise reduction afforded by the interior walls, etc.

The construction activities generating the most impact will be any blasting (though unlikely), and pneumatic drills and equipment used to break pavement and/or rocks. These activities generate noise levels of approximately 90 dB(A) at distances of three feet. Considering distance to the Church, and noise reduction through the windows, the Applicant would expect blasting and pavement breaking (if they were to occur at the same time) to result in noise levels between 60 and 70 dB(A) inside the Church, at perimeter areas with windows. Interior spaces should find conditions at least 10 dB less. Levels of 70 dB(A) would be intrusive to, and likely disrupt, ongoing Church services (once again, if these activities were to occur at the same time). Any blasting (if required) and pavement breaking could be suspended during services such as the Wednesday 7:00 am and Thursday 11:00 a.m. and occasional events such as funerals. The Applicant will coordinate with the Church to understand their events calendar and manage construction activities accordingly.

c. Proposed Mitigation

A study can be undertaken to evaluate how loud various construction activities would be, with test samples measured to set parameters for construction activities. The project will coordinate with church personnel to help manage the situation, for example, those activities found to have greatest impact might be suspended during services such as funerals, etc. The Kensington development should assist in reducing train noise impact to the church, as the height of the residences should provide a sound barrier effect to the trains.

III.K. Noise and Vibration

Discussions with a stained glass consultant have indicated that in general, stained glass seems to handle ground vibration better than other types of windows. Before construction, the stained glass windows will be evaluated to determine their condition, and may be protected with insulation and/or foam between the glass panes and boards. If the windows are not sound within their frames, the windows could be temporarily removed as a further precaution. The Applicant and its contractors will be responsible for protecting the stained glass window.