MILLER HENNING ASSOCIATES, INC.
CONSULTANTS IN ACOUSTICS, VIBRATION, & A/V DESIGN

April 20, 1994

Mr. J. Eric Moss
Ayers Saint Gross
1518 K Street, NW
Washington, DC 20005

Re: GW UNIVERSITY HEALTH AND WELLNESS CENTER
Evaluation of Noise Transmission to Community

Dear Mr. Moss:

Summarized herein are the results of the evaluation of noise transmission generated from activities associated with the proposed George Washington University Health and Wellness Center to the surrounding community.

SURVEY RESULTS

On April 19, 1994 between 3:15 p.m. and 4:15 p.m., ambient noise measurements were conducted at two locations at the site of the proposed GW University Health and Wellness Center in Washington, District of Columbia.

One location was approximately 25 ft from the edge of the pavement and 50 ft from the centerline of 23rd Street N.W. at the northeast corner of the GW University property near St. Mary's Church. This is approximately the same distance from 23rd Street as the front building face of St. Mary's Church.

At this location an average noise level of 65 dBA was measured as a result of roadway traffic noise. In addition, maximum levels from buses measured 74 dBA and 79 dBA. A maximum level from a motorcycle measured 78 dBA.

The other measurement location was approximately 175 ft from the centerline of 23rd street at the guard rail of the parking lot at the north end of the property. At this location an average noise level of 56 dBA was measured. Also, a maximum level of 79 dBA was measured from the siren of an ambulance traveling on 23rd Street.

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CASE NO.0226
EXHIBIT NO.40
Case 0226
Exhibit 40

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EVALUATION

Indoor Activities

Of the indoor activities proposed for the center including the bouncing of basketballs, aerobics music is by far the activity with the highest potential for noise transmission to the surrounding community. Based on an analysis of the proposed exterior building construction, the windows are acoustically the weakest building element. The standard 1 in. insulated glass windows proposed (¼ in. plate - ½ in. air space - ¼ in. plate) are marginal for controlling aerobics music levels to meet the strictest interpretation of the District of Columbia noise code. To provide a noticeable 5 dBA improvement in the performance of the windows use laminated safety glass in the window system instead of the plate glass proposed.

With the laminated safety glass in the window system of the multipurpose room where aerobics classes will be conducted, aerobics music levels as well as all activity generated noise levels will meet the DC noise code and be compatible with ambient noise levels measured at the site proposed for the Health and Wellness Center.

Evaluating the noise transmission from the proposed Health and Wellness Center into St. Mary's Church, the acoustical criterion for a studio would be met. Any noise levels from the Center would be insignificant compared to the noise levels transmitted into the church from the roadway traffic.

Delivery Trucks

Based on the average ambient noise levels measured at the site near St. Mary's Church, the average noise levels from three panel delivery trucks per day would have an insignificant impact on the church. Even the maximum levels of the panel trucks as they pass by the church are expected to be comparable to the maximum roadway traffic noise levels measured at the site proposed for the Health and Wellness Center.

Sincerely,

Gerald H. Henning
Vice President

MILLER HENNING ASSOCIATES, INC.
CONSULTANTS IN ACOUSTICS, VIBRATION, & A/V DESIGN

October 28, 1995

RECEIVED
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AYERS SAINT GROSS

Mr. J. Eric Moss
Ayers Saint Gross
1518 K Street, NW
Washington, DC 20005

Re: GW UNIVERSITY HEALTH AND WELLNESS CENTER
Evaluation of Noise Transmission to St. Mary's Church

Dear Mr. Moss:

Summarized herein are the results of the noise measurement surveys, analyses, and evaluations further demonstrating (see our April 20, 1994 letter) that noise generated from basketball and aerobics activities in the proposed George Washington University Health and Wellness Center and transmitted out of the facility will have no impact to an insignificant impact on the church.

APPROACH

To determine the noise transmission out of the proposed GWU Health and Wellness Center, the approach consisted of measurement outside a similar facility the sound from basketball and aerobics music generated in that facility, comparison of the acoustical performances of the building constructions of the two facilities, and adjustment of the sound levels measured according to the difference in the acoustical performances of the two facilities.

To determine the noise levels transmitted into the church, the noise reduction of the exterior building construction of the church was measured and subtracted from the exterior noise levels determined at the church property.

UNITS AND PERCEPTIONS OF SOUND

The A-weighted decibel (dBA) was measured and used in the analyses and evaluations. Because people do not hear frequencies of sound equally, it simulates the way we hear by rolling off the low frequencies and the very high frequencies of sound. It is the sound level descriptor most often used in noise codes.

To help relate the A-weighted decibel (dBA) system to subjective perceptions, a noise level decreased by 10 dBA is perceived to be roughly one-half as loud. Conversely, a noise level increased by 10 dBA is perceived to be roughly twice as loud.

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A difference of 3 dBA is generally the minimum perceivable difference between noise levels. For reference, a normal speech level is approximately 60 dBA at a distance of 3 ft from the speaker.

It is noted that even though the levels of sound from sources such as basketball and aerobics activities are lower than background noise levels, we can still hear the sound from such sources because the characters of the sounds are different from the background noise.

ACOUSTICAL EVALUATION OF THE TWO FACILITIES

The GWU Smith Center which houses activities including basketball and aerobics was the facility selected for the comparison. It is located near the southeast corner of the intersection of G Street and 23rd Street N.W., diagonally across from the site of the proposed Health and Wellness Center on the northwest corner of the intersection.

The exterior wall construction of the Smith Center consists of masonry and single glazed windows. For noise generated by basketball and aerobics activities, the estimated noise reduction performance for this wall construction 35 ft from the building at ground level is approximately 45-50 dBA.

The exterior wall construction of the Health and Wellness Center consists of double masonry and 1 in. insulated laminated glass windows. For noise generated by basketball and aerobics activities, the estimated noise reduction performance for this wall construction 35 ft from the building at the St. Mary's Church windows is also approximately 45-50 dBA. Even though the acoustical performances of the individual wall and window components of the proposed Health and Wellness Center are substantially higher than those in the Smith Center, the areas of the windows, which are the weakest component, are greater than those in the Smith Center.

SURVEY RESULTS

On October 24, 1995 an on-site survey was conducted at the Smith Center. Noise levels were measured outside the multipurpose room where a basketball game and individual practice were occurring. The following table summarizes the results of the measurements.

	Inside Rm.	Outside Rm.
Average	63 dBA	58 dBA
Maximum	79 dBA	67 dBA
Minimum	--	53 dBA

The sound levels of the basketball activities could not be measured because the ambient noise dominated the noise measurements. The ambient noise levels measured outside the multipurpose room and shown above were primarily generated by aircraft and roadway traffic. The noise from basketball activities 3 ft from the exterior wall was essentially inaudible.

On October 26, 1995 an on-site survey was conducted at the Smith Center. Noise levels were measured outside the multipurpose room where aerobics music was played. The following table summarizes the results of the measurements.

	Inside Rm.	Outside Rm.
Average	90 dBA	58 dBA
Maximum	94 dBA	66 dBA
Minimum	--	52 dBA

The sound levels of the aerobics activities could not be measured because the ambient noise dominated the noise measurements. The ambient noise levels measured outside the multipurpose room and shown above were primarily generated by aircraft and roadway traffic. The noise 3 ft from the exterior wall was inaudible to slightly audible depending on the level of the ambient noise.

Also, on October 26, 1995 the noise reduction performance of the St. Mary's Church exterior building construction was measured. The ambient noise level (primarily generated by aircraft and roadway traffic) was measured outside St. Mary's Church at the side facing the site of the proposed Health and Wellness Center (as well as in the outdoor contemplation area) at 65 dBA, and inside the church near the same side at 46 dBA. Subtracting the two levels indicates that the St. Mary's Church exterior construction will reduce sound from basketball and aerobics activities approximately 19 dBA.

ANALYSIS, EVALUATION, AND CONCLUSIONS

Because the noise reduction performance of the Smith Center and the proposed Health and Wellness Center are evaluated as being comparable, the basketball and aerobics sound levels transmitted out of the Smith Center are a good indication of the levels which would be transmitted out of the proposed Health and Wellness Center. Since the levels are only slightly audible during quiet ambient noise periods, the levels will have no significant impact on St. Mary's Church.

With a 19 dBA reduction of the sound levels provided by the church exterior building construction, the levels inside the church are expected to be below 25 dBA and would meet acoustical criteria

superior to the acoustical criteria normally acceptable for a church. Inside the church the primary sources of noise would be the aircraft and roadway traffic. From the proposed Health and Wellness Center, the noise from basketball activities would be inaudible and the sound from aerobics activities would be normally inaudible. However, during periods of quiet background ambient noise levels, aerobics music levels may be barely audible.

Rarely, even in the highest standards of acoustical isolation, is the criterion of absolute inaudibility met. Therefore, the acoustical isolation of the sound from basketball and aerobics activities provided by the proposed GWU Health and Wellness Center meets the highest standards for acoustical isolation in an environment where people live and work together.

Sincerely,

Gerald H. Henning
Vice President