



17 July 2015

Wrightson, Johnson, Haddon & Williams, Inc.
Designers and Planners for Sound, Video, Multi-Media
Telecommunications, Broadcast, Theatre & Acoustics
Dallas • San Antonio

Mr. John Katz
Columbia Professional Baseball
PO Box 8810
Columbia, SC 29202

VIA Email: jkatz@columbiaproball.com

**RE: Columbia Commons Baseball Stadium
Revised Environmental Sound Study**

Dear Gentlemen,

Wrightson, Johnson, Haddon, & Williams, Inc. has been retained to perform an assessment of the environmental sound impact of the new Columbia Commons baseball stadium in Columbia, South Carolina. This letter documents our analysis procedure, and the resulting sound contours showing predicted sound levels are attached.

To predict sound levels at properties surrounding the proposed stadium, we have utilized the internationally recognized, Sound Plan software program. This software develops sound level contours based on user inputs including location of sound sources (speakers), sound levels produced, relevant building construction and terrain in the mapped area. Specific inputs for the Columbia Commons model include the following.

- The speaker directionality patterns input to the Columbia Commons sound model were based on the EAW and JBL speakers shown in WJHW's basis of design sound system model.
- The speaker outputs were calibrated to 83-85 dBA in the stadium seating areas, based on the typical operating conditions of a minor league ball park. ***It should be noted that these levels will be intermittent, typically lasting in intervals of no more than 30 seconds at a time during the game.*** The frequency content of the speakers was based on maximum output levels of a typical pop music spectrum.
- Stadium geometry was input to the model from the 100% CD drawings and Revit model. The Babcock and Ensor buildings, existing buildings on the site which are to remain, were located in the model with heights estimated from satellite and mapping imagery. The new 4-story building along the first base line was also included within the model because it is being constructed at the same time as the baseball stadium. While we understand that there will be other buildings on the site, we have limited our analysis to those buildings which we understand will be completed at the same time as the baseball stadium in order to provide a conservative model of noise levels. Additional buildings on the site will provide additional "screening" of the sound system and will likely result in lower noise levels outside of the planned development.

- Terrain was input to the model from site topographical data, provided to WJHW by the civil engineer; this area is shown as the “small” graphics, attached. To provide a better understanding of the sound impact further away from the stadium, the topographical data was extrapolated outwards; this area is shown as the “large” graphics attached.
- Other environmental factors, such as foliage and winds, were not included within the model in order to provide an average scenario which is not dependent on season.

Crowd noise was not included as a source in our model, as these sound levels occur briefly and are dependent on field performance. Generally, the crowd noise is less offensive to surrounding properties and is not controlled by the facility. Additionally, because crowd noise consists of many individual sources at a lower level than a speaker system, crowd noise tends to travel a shorter distance than the amplified sound system.

Results

The Sound Plan computer model depicts sound levels as contours, with each line representing a different dBA sound level. The attached graphics present those contours overlaid on a satellite image of the site and on a zoning map to better understand the impact on the surrounding community.

As shown in those attached contours, sound levels directly outside the stadium are predicted to be 75-80 dBA. At the residential area to the west of Bull St/SC 277, sound levels are expected to be less than 50 dBA. At the commercial and residential areas south of Calhoun St, noise levels are anticipated to be approximately 55 dBA.

As noted in the previous section, the sound levels shown within the contours are representative of the sound over a short time during stadium events and, therefore, are not sustained, continuous sound levels.

Discussion

The City of Columbia, South Carolina Noise Ordinance prohibits any person from creating sound in excess of sound pressure levels noted in Article III: Noise, Division 2. - Noise Pollution, Table 1. For ease of comparison with the predicted data, we have calculated that the approximate maximum residential sound pressure level is 55 dBA, and the maximum commercial sound pressure level is 65 dBA.

At the commercial and residential areas surrounding the planned development, the maximum sound levels from the sound system are predicted to be less than or equal to the more stringent residential requirement of 55 dBA, even though the 65 dBA commercial ordinance level would apply to some of those locations. However, we advise that with high quality music and considering specific operating conditions and music selections, the predicted noise levels may be exceeded for a short period of time (typically 5 seconds or less).

While ambient sound measurements at the proposed project site are not available at this time, typical ambient levels in an urban neighborhood, especially near a state highway, are approximately 55 dBA (possibly higher depending on traffic patterns, time of day/year, other commercial equipment operations, etc). While the loudspeaker system could still be audible and

noticeable because of the speech content and musical/rhythmic components, typical stadium operations would not be louder than those ambient levels in the residential area.

Because the baseball stadium is part of a planned development, we anticipate future construction will alter the sound contours, including potential “shielding” of the surrounding commercial and residential areas from the stadium sound, especially to the south of the stadium. As stated previously, this will likely result in lower noise levels outside of the planned development. The attached contours, which do not include most of those planned buildings, represent a conservative prediction of noise levels before the rest of the construction is completed.

I trust you will find this information helpful. If you have any questions, please do not hesitate to contact us.

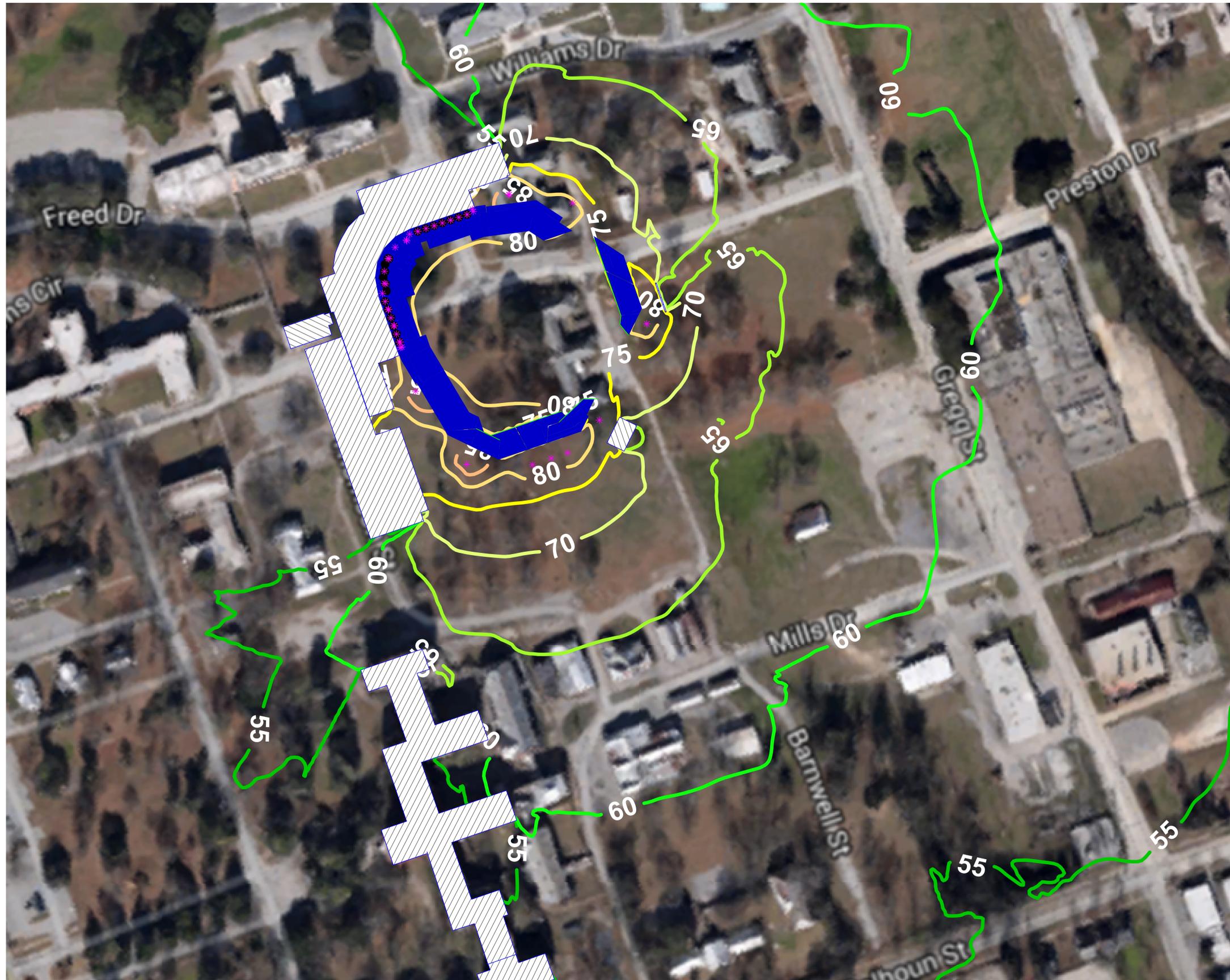
Sincerely,
Wrightson, Johnson, Haddon, & Williams, Inc.



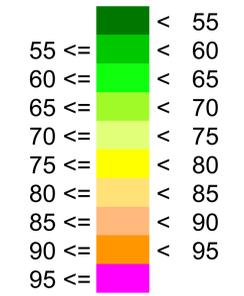
Emily Piersol, P.E.
Senior Designer
LEED Green Associate

Cc: Gary White WJHW, Inc.
Jason Freier Hardball Capital
Steve Caudle Populous

Columbia Commons Baseball Stadium
 Columbia, South Carolina
 Sound Systems levels set at 83-85 dBA in seating areas



Noise levels dBA



Signs and symbols

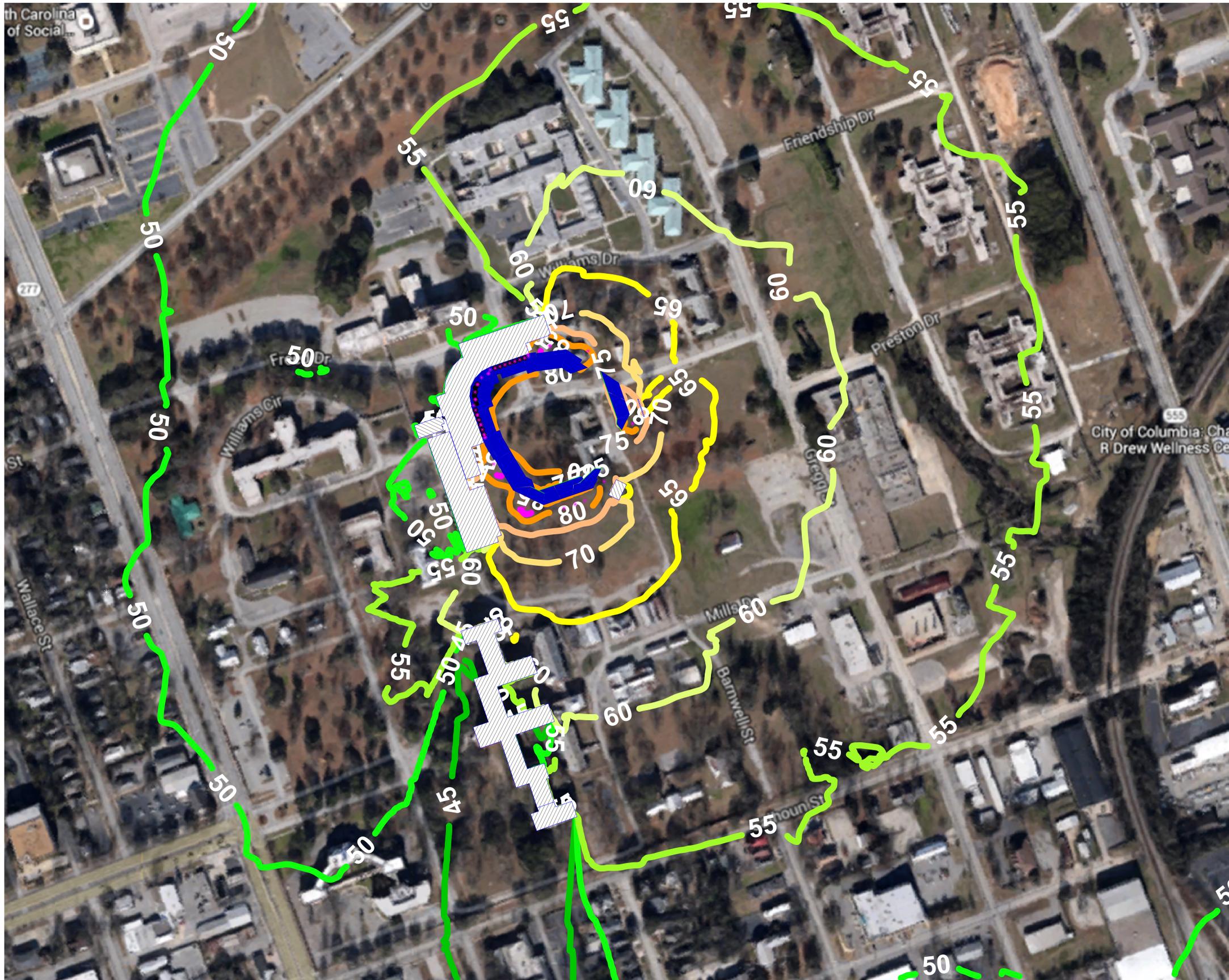
- * Speaker Array
- ▨ Buildings
- Seating Areas

Length Scale 1:75



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Columbia Commons Baseball Stadium
 Columbia, South Carolina
 Sound Systems levels set at 83-85 dBA in seating areas



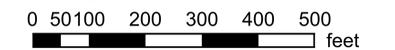
Noise levels dBA

| |
|------------|
| < 45 |
| 45 <= < 50 |
| 50 <= < 55 |
| 55 <= < 60 |
| 60 <= < 65 |
| 65 <= < 70 |
| 70 <= < 75 |
| 75 <= < 80 |
| 80 <= < 85 |
| 85 <= < 90 |
| 90 <= |

Signs and symbols

- Speaker Array
- Buildings
- Seating Areas

Length Scale 1:125



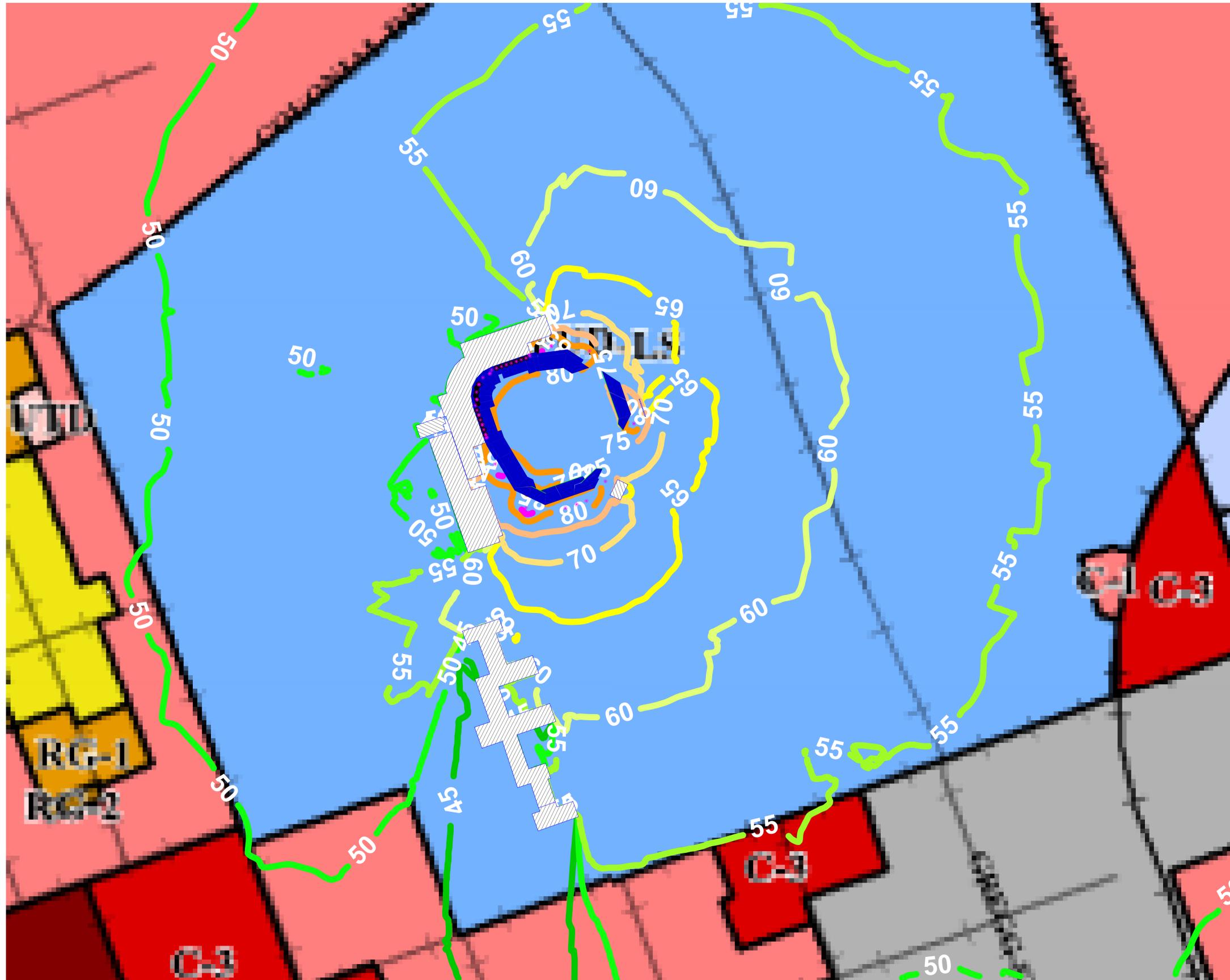
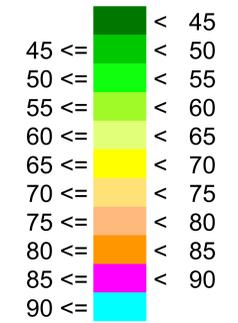
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Columbia Commons Baseball Stadium
 Columbia, South Carolina
 Sound Systems levels set at 83-85 dBA in seating areas

Noise levels dBA



Signs and symbols

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