

**Acoustical Society of America
156th Meeting in Miami
Nov. 10 - 14, 2008**

**Rehabilitation of Rugby Hall
Harvard Westlake School
North Hollywood, CA
Marshall Long**

In 1983 I was contacted by Robert Johnson of the architecture firm of Johnson and Sylvestri about a project at a private boy's school in North Hollywood. The Harvard School, which at that time was an all male college preparatory school, had a flat floored rectangular room 73 feet long by 48 feet wide with an 18 foot ceiling, which had a series of 8" x 8" false wooden beams at right angles to the main axis. There was a low raised platform on the short wall at one end of the room, which served as a stage. Figures 1, 2, and 3, show the original configuration.

The room was used for lectures, plays, and musicals and performed poorly for all uses. The sightlines were poor due to the flat floor. The false beams were a particular problem since they kept sound from reflecting to the rear and instead reflected it back to the front. The ceiling height was too low for effective shaping even without the false beams and there were heavy structural beams above, supporting the roof and ceiling. The school wanted the acoustics improved so that it could be used as a multipurpose space.

Fortunately the building was located on a hill so that the natural grade dropped in the direction of the stage. There was a basement below the existing floor which could be used

to slope the floor. I proposed a solution in which the floor would be excavated and a new sloped floor would be installed with a 36" high stage platform and a pit in front. The school vetoed the pit proposal, preferring to leave a flat floor in front of the stage for moveable seating or orchestra use. This left a space with 24' from the low point of the floor to the underside of the structural beams. I developed a segmented ceiling design based on ray tracing from the stage, which jogged up and down as required to get around the beams. Even with the raked floor the ceiling had to be raised to allow for a 16' high proscenium and a sound system. The proposed floor plan is shown in Figure 4.

The new design was matched to a unique side wall design shown in Figure 5. The idea was to use the lower portions of the wall to reflect direct sound to the audience, while the upper areas of the wall were designed to be diffusive. The breaks in the wall design were matched to the breaks in the shaped ceiling.

In order to help with the have direct reflections from the wall, the top of the wall was tilted towards the centerline of the room as shown in Figure 6. This allowed the construction of diamond shaped segments at regular intervals but at varying heights. The side walls were easier to build than it would appear. They were all supported from regularly spaced metal studs angled in towards centerline at the top.

After my pit suggestion was vetoed, I suggested extending the stage out for a thrust. This idea was also turned down in favor of the flat floor. A few months after the hall was completed the first thing the theater department did was to construct a roughly built thrust

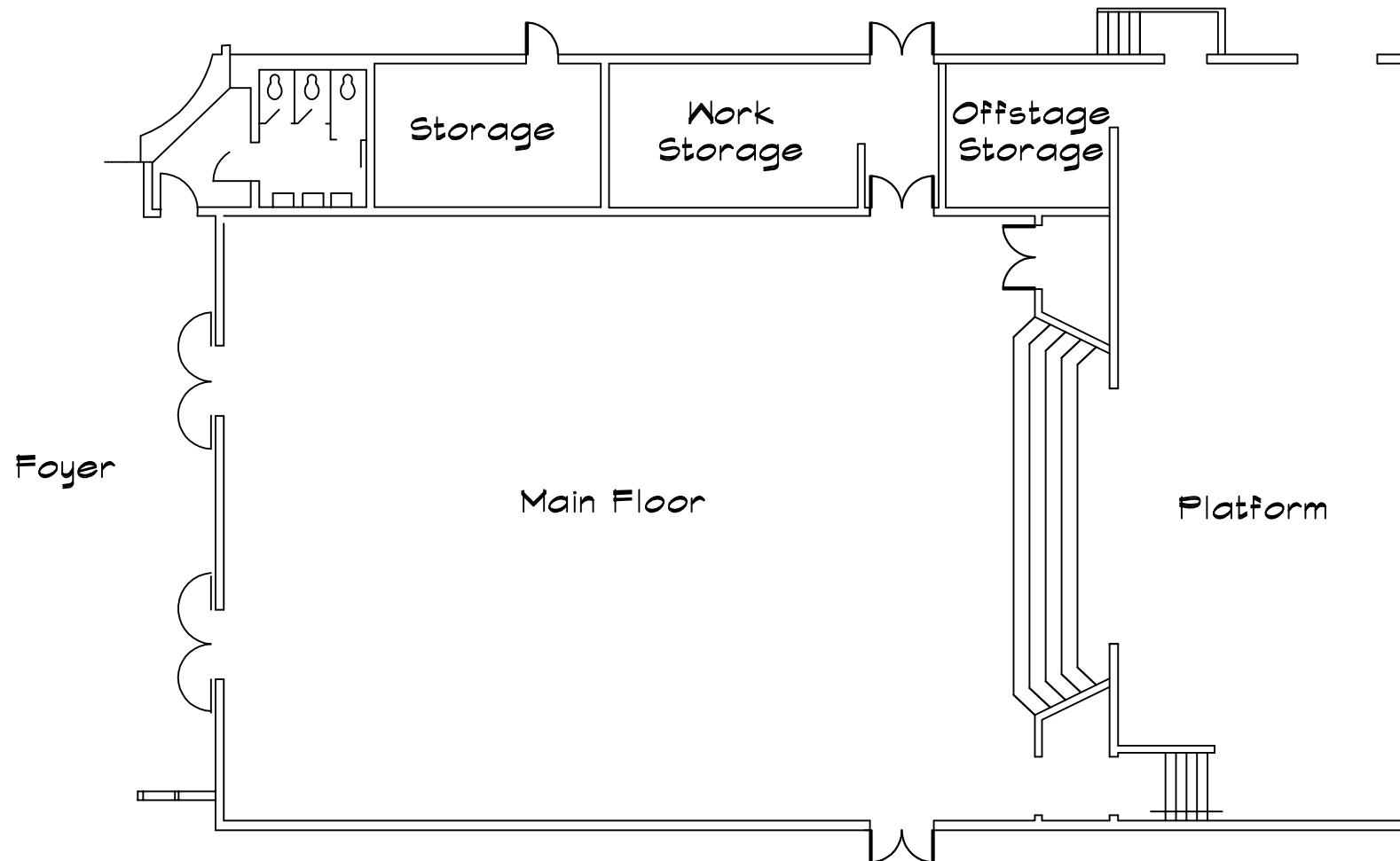
stage in the flat floor area. This pushed the front edge of the stage into the field of coverage of the sound system and led to feedback problems. Later loudspeakers were mounted on the lighting catwalk, which improved the feedback control.

Since the level floor area was no longer available for the orchestra, an orchestra mezzanine was built at the rear of the platform. This works quite well acoustically since the orchestra, being at the back, does not overwhelm the singers. The shell I designed was never built.

The resulting hall which seats 386 has served the school well for over 20 years as a mixed use facility with a unique jewel-like appearance which is both attractive and functional. The question I get asked most is why didn't you design in a pit?

FIGURE 1 RUGBY AUDITORIUM, HARVARD WESTLAKE SCHOOL
NORTH HOLLYWOOD, CA, USA

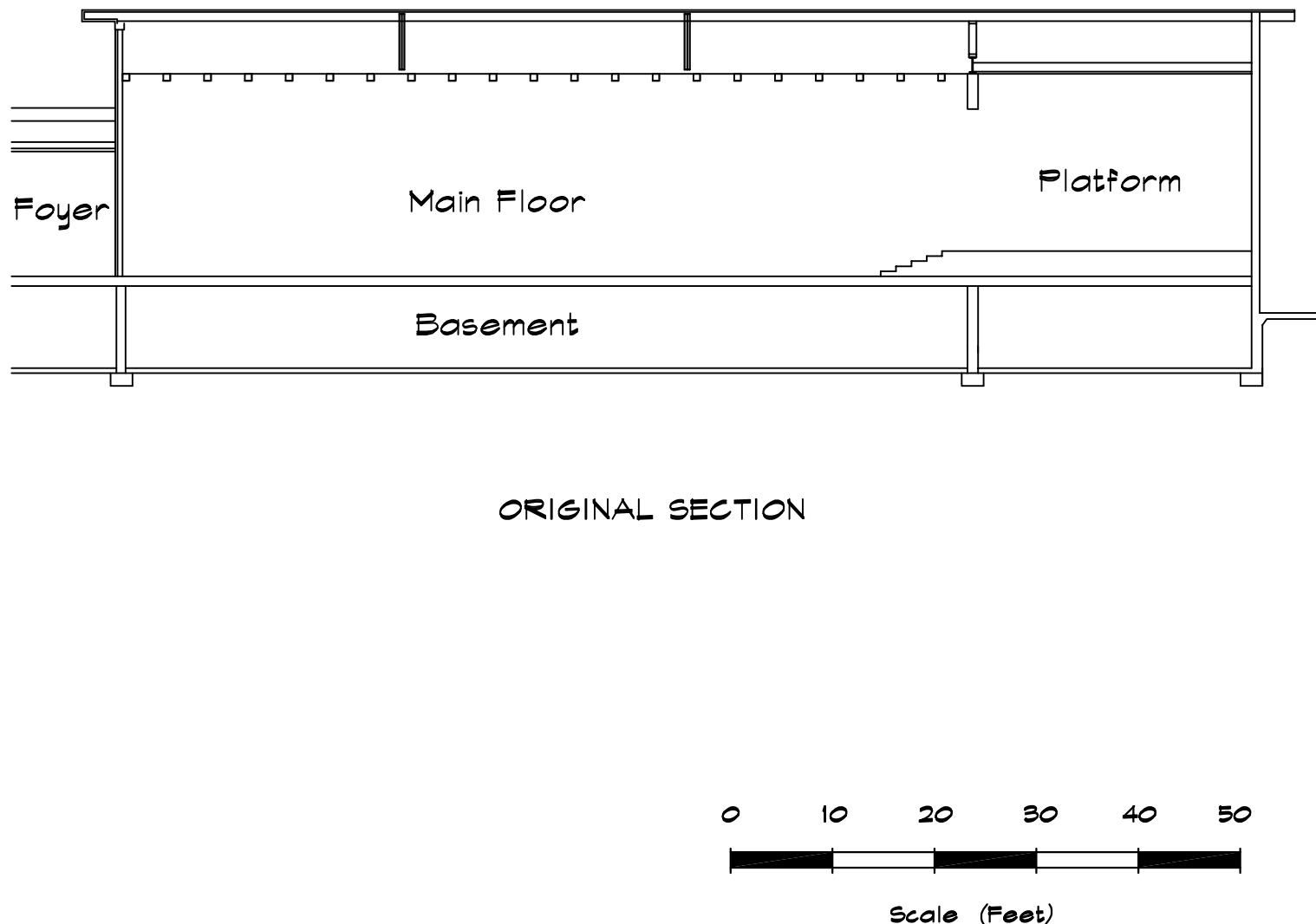
(Acoustician: Marshall Long Acoustics)
(Architect: Johnson and Sylvestri)



ORIGINAL FLOOR PLAN

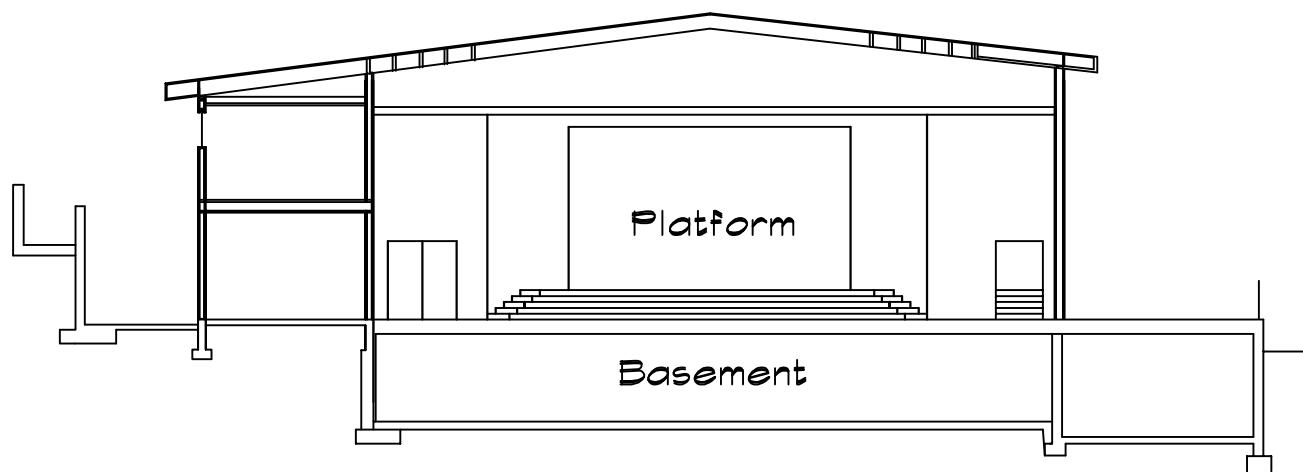


**FIGURE 2 RUGBY AUDITORIUM, HARVARD WESTLAKE SCHOOL
NORTH HOLLYWOOD, CA, USA**
(Acoustician: Marshall Long Acoustics)
(Architect: Johnson and Sylvestri)



**FIGURE 3 RUGBY AUDITORIUM, HARVARD WESTLAKE SCHOOL
NORTH HOLLYWOOD, CA, USA**

(Acoustician: Marshall Long Acoustics)
(Architect: Johnson and Sylvestri)



ORIGINAL ELEVATION

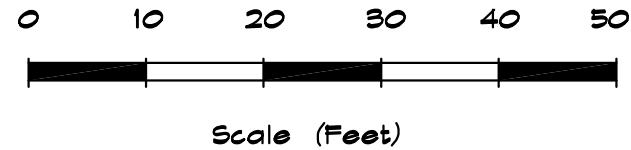
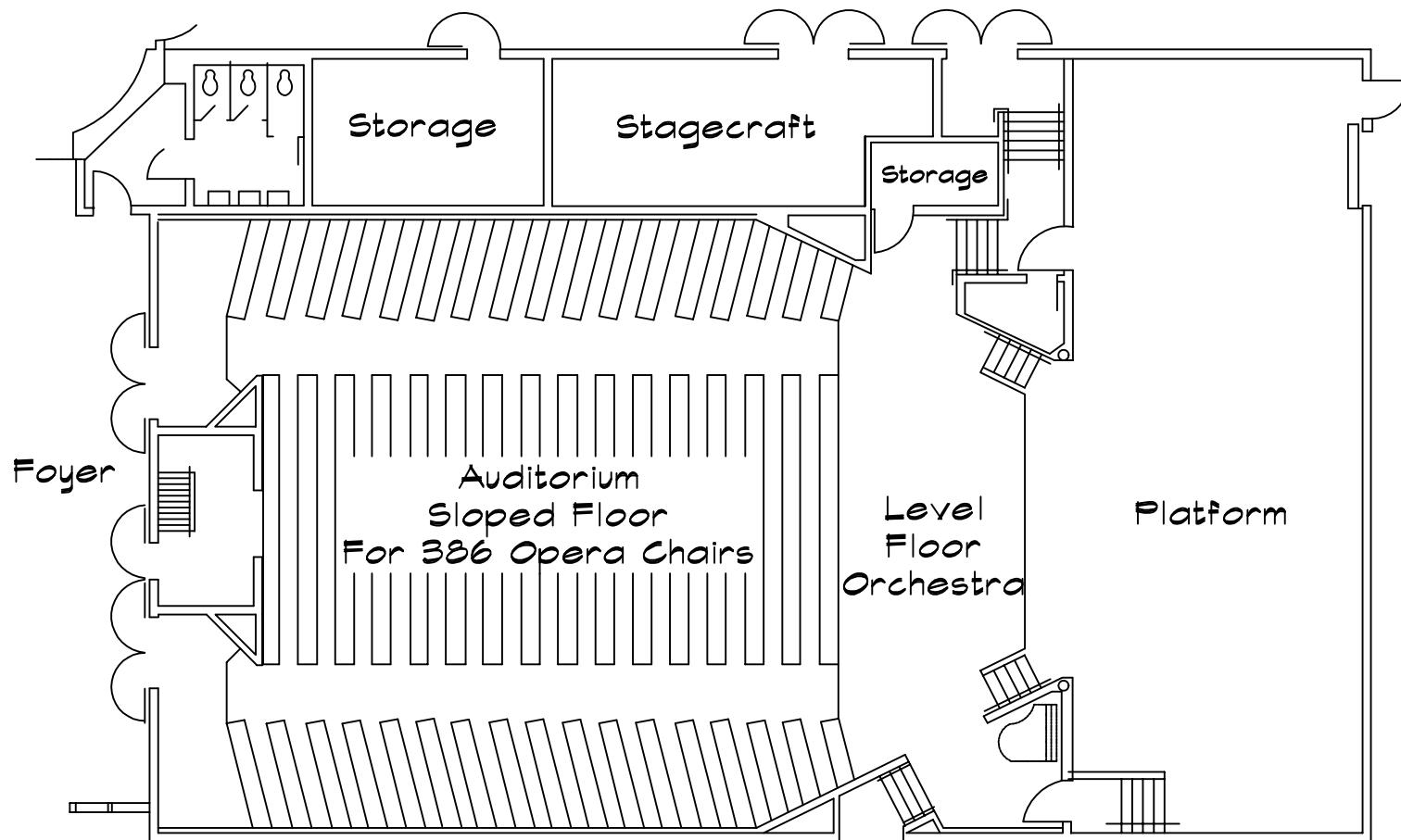
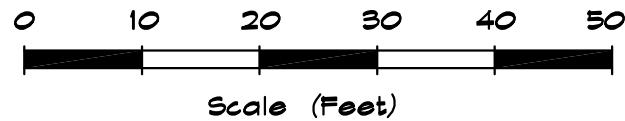


FIGURE 4 RUGBY AUDITORIUM, HARVARD WESTLAKE SCHOOL
NORTH HOLLYWOOD, CA, USA
(Acoustician: Marshall Long Acoustics)
(Architect: Johnson and Sylvestri)

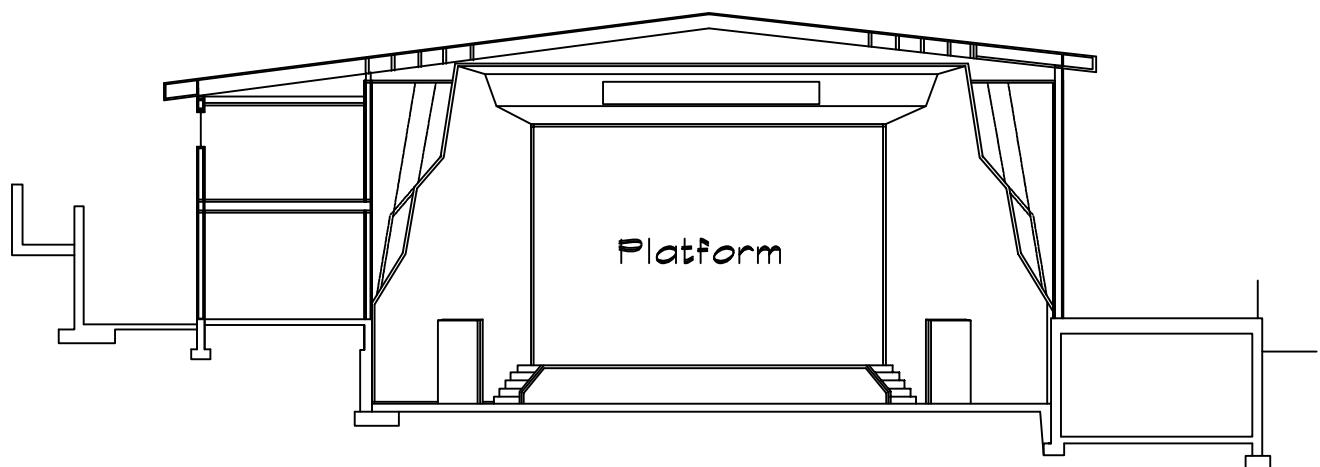


ORIGINAL FLOOR PLAN



**FIGURE 6 RUGBY AUDITORIUM, HARVARD WESTLAKE SCHOOL
NORTH HOLLYWOOD, CA, USA**

(Acoustician: Marshall Long Acoustics)
(Architect: Johnson and Sylvestri)



AUDITORIUM ELEVATION



FIGURE 5 RUGBY AUDITORIUM, HARVARD WESTLAKE SCHOOL
NORTH HOLLYWOOD, CA, USA
(Acoustician: Marshall Long Acoustics)
(Architect: Johnson and Sylvestri)

