CLAYTON ACOUSTICS GROUP
Acoustics and Sound System Consulting for Houses of Worship and the Performing Arts

CLAYTON ACOUSTICS GROUP is an acoustics consulting firm specializing in projects for houses of worship, serving congregations across the spectrum of Christian and Jewish denominations. Our projects include new construction, renovations and historic restorations, and we are equally at home in a small parish church, neighborhood synagogue or large city cathedral.

Successful worship spaces share highly-valued qualities such as clarity for intelligible speech, reverberance for cantorial music, responsiveness for congregational participation, and low background noise for enhancement of all sounds. We offer a full scope of architectural acoustics services, including room interior acoustic design, sound isolation, mechanical equipment noise and vibration control, and speech-reinforcement sound system design.

We have designed and supervised installation of two new Shabbat speech-reinforcement sound systems for Orthodox congregations in New York. For Congregation Shearith Israel, in New York City, high-technology loudspeakers are sensitively integrated into the newly restored, historic 1897 Italianate-styled main sanctuary. At The Hampton Synagogue, in Westhampton Beach, Long Island, loudspeakers in the contemporary-styled sanctuary are discretely built into the walls, while a separate outdoor system brings every word of the Shabbat service to the overflow summer congregation. We recently designed a “Zomet-ready” speech sound system for future Shabbat implementation at Congregation Beth Sholom, in Lawrence NY.

DESIGN PHILOSOPHY FOR HOUSES OF WORSHIP

Clayton Acoustics Group’s design philosophy and consulting practice are acoustics-centered and engineering-based—the natural room acoustics must fully be part of the architectural design, and selection of materials must serve this goal exclusively. We support the theory that acoustics is architecture and always look for simple, flexible and elegant solutions which meet our clients’ needs.

Many of our projects are houses of worship, with a clear emphasis on synagogues and churches having traditional liturgies and strong music programs. Orthodox synagogues have become a specialty focus of this work. We most often serve those congregations which wish to retain or even enhance the natural worship-space acoustics yet also desire excellent speech intelligibility.

For many Orthodox congregations an electronic sound amplification system is simply not a consideration. In these cases our design approach is to optimize the natural acoustics for the best possible speech intelligibility without unduly compromising the existing musical acoustics.

For those Modern Orthodox congregations willing to consider electronic sound amplification we recommend a “Zomet” Shabbat speech-reinforcement sound system. We work closely with the Zomet Institute, of Israel, to ensure full compliance of these systems with Halachic restrictions of Jewish Law. For all of our projects, microphones and loudspeakers are installed in a discrete manner, consistent with the architectural and liturgical fabric of each sanctuary, without compromising the goal of excellent speech reinforcement. Halacha and high quality speech amplification are not mutually exclusive!

Noise in a worship space—even the background hum of traffic or whir of machinery—can be a potent enemy of speech and music. Any amount of background noise reduces speech intelligibility and music clarity, masking nuance of the spoken word and subtlety of a musical phrase. We advocate strongly for elimination of noise in the worship space, whether from environmental sources outside the building or mechanical systems inside.

Many worship buildings, old and new, can be challenging spaces in which to achieve the right acoustical balance between music and speech requirements. A practical and sensitive design based upon solid acoustics principles, with careful attention to detail and thoroughness of purpose, can achieve excellent results.

CONSULTING PRACTICE

As specialist acoustics consultants Clayton Acoustics Group brings considerable “value-added” services to every project. Our goal is to identify and design the best solution to meet the users’ needs, within the owner’s budget, and then see the project through to proper completion.

Architectural acoustics consulting for houses of worship typically includes room interior acoustics, sound-isolation, mechanical equipment noise and vibration control, and a speech-reinforcement sound system. We view these four disciplines as highly connected parts of a whole, as they are interrelated in complex ways and all are of critical importance to the success of a high-quality worship space project.
It is our standard practice to work vigorously for the full integration of all acoustics requirements into the architectural and liturgical fabric of each building design.

We are an independent professional consulting firm which works only for facility owners or other design professionals. We are consultants and designers, not contractors, installers or equipment resellers. We do not have financial or business interests in the product manufacturing companies or contracting firms we may recommend. This independence allows us the necessary freedom to best represent the needs of our clients throughout a project.

For each and every project Clayton Acoustics Group brings its considerable experience and singular expertise in the highly-specialized area of worship-space acoustics fully to bear on the concept, design and implementation.

**DESIGN & CONSULTING SERVICES**

For a house of worship project having critical music and speech requirements, the specialist, an acoustic consultant should initially take a leading role with the architect, engineers and liturgical consultant in design of the worship space to ensure acoustical excellence.

It is essential that strong criteria and guidelines be established for room acoustics, sound isolation, and noise and vibration control from the very beginning of the project. For these disciplines a large share of our value to the client and design team is usually realized in the early phases of design. Once these important goals are set, and the design lead moves to the architectural and engineering teams, concepts are developed into construction details and finally the bid documents are prepared.

Sound system design follows a similar but more involved and concentrated paths throughout the project. Our usual work plan begins with concepts and guidelines, followed by a significant engineering and documentation effort, continuing with supervision during installation, and concluding with hands-on consultant tuning of the completed system.

We participate fully in all phases of our projects: programming, design, documentation, bidding, construction administration and on-site commissioning.

**ACOUSTICS TECHNOLOGY**

Clayton Acoustics Group has invested heavily in hardware and software technology in order to give its staff the necessary tools to work on the cutting edge of architectural acoustics. We use 2D and 3D CAD drafting to produce all our drawings, plus we use computer modeling extensively for design and prediction of room acoustics as well as loudspeaker and audio system performance. A portable “acoustics field-measurement lab” supports all our on-site work.

**SELECTED PROJECTS FOR HOUSES OF WORSHIP**

| Congregation Beth Sholom (Orthodox), Lawrence NY | St. Martin-in-the-Fields Episcopal Church, Philadelphia PA |
| Church of the Redeemer, Chestnut Hill MA | Congregation Agudas Achim (Conservative), Austin TX |
| St. Paul’s Episcopal Church, Rock Creek Parish, Washington DC | Cathedral of St. John the Baptist (Roman Catholic), Savannah GA |
| Church of the Holy Cross (Roman Catholic), New York NY | Christ Church Cathedral (Episcopal), Louisville KY |
| The Hampton Synagogue (Orthodox), Westhampton Beach NY | St. John’s Seminary Chapel (Roman Catholic), Brighton MA |
| Cathedral of Christ the King (Roman Catholic), Atlanta GA | Presbyterian Church of Chestnut Hill, Philadelphia PA |
| Temple Emanu-El (Reform), New York NY | West Market Street United Methodist Church, Greensboro NC |
| Congregation Shearith Israel (Orthodox), New York NY | St. James’s Episcopal Church, Richmond VA |
| First Presbyterian Church, New Bern NC | Park Avenue Synagogue (Conservative), New York NY |

**CONTACT INFORMATION**

We are always delighted to talk to prospective clients about their acoustics needs and project goals. Please contact:

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CONGREGATION SHEARITH ISRAEL
NEW YORK, NY
This magnificent neoclassical-styled synagogue was consecrated in 1897, and restored in 2002. In the Orthodox and Sephardic traditions of the original Spanish and Portuguese members, worshipers sit in antiphonal pews facing the central bema—men on the first floor, women in the balcony above—from which the Torah is read during services. Sermons are given from the pulpit at the far east end of the large and reverberant sanctuary, resulting in poor speech intelligibility for most listeners. We designed a Shabbat speech-reinforcement sound system, suitable for use on the Sabbath and Holy Days in an Orthodox synagogue. Working with the Zomet Institute in Israel, we identified equipment and methods meeting strict Halachic restrictions of Jewish law. Loudspeakers blend into the historic style and fabric of the sanctuary. Speech reinforcement of the pulpit adds loudness and clarity to the spoken word, yet the loudspeakers are completely “invisible to the ear”; the rabbi’s voice is carried effortlessly throughout the sanctuary. Acoustics considerations focused on materials and finishes to assist the cantor’s unamplified voice while improving liveliness of the sanctuary for congregational participation.

CONGREGATION BETH SHOLOM
LAWRENCE, NY
Founded by Orthodox Jews who had been part of the demographic shift from New York City to the suburbs in the mid 20th century, this elegant neogeorgian-styled synagogue was inspired by Congregation Shearith Israel, in Manhattan. The original 1950s era building was expanded in the 1970s to include a larger sanctuary and overflow multi-purpose space, and enlarged again in 2004 for the steadily growing congregation. As part of a major sanctuary renovation we designed new architectural features to efficiently distribute the cantor’s voice to listeners at the front and rear from a movable central bimah, specified materials and finishes for responsive congregational acoustics, and suggested noise reduction methods for the mechanical systems. All of these features work together to enhance unamplified speech. A speech reinforcement sound system was designed for non-Shabbat use initially, but prepared for upgrade to full Zomet compliance for Shabbat use in the future.
The Hampton Synagogue
Westhampton Beach, NY

The Berman Sanctuary is an intimate, 200-seat contemporary-styled worship space built in 1993. While used year-round by the small local Orthodox Jewish community, in summer months the congregation—drawn from many nearby summer homes and vacation communities—swells to three or four times the sanctuary’s seating capacity. Large folding glass doors, forming the north and south sanctuary walls, are opened onto awning-covered outdoor porches to accommodate the overflow worshipers.

When the porch doors are closed, the sanctuary has supportive natural acoustics appropriate for the spoken word. Both the rabbi, speaking from the ahmud at the east wall, and the cantor, from the central bimah, can be heard and understood throughout. When the porch doors are opened, however, acoustical characteristics of the sanctuary change dramatically, compounded by the introduction of significant environmental noise from the neighborhood, with the result that congregants both inside and outside have great difficulty hearing and understanding the rabbi and cantor.

We were asked to design a Shabbat speech-reinforcement sound system which would bring every word of the worship service to listeners inside and outside the sanctuary. The congregation was particularly concerned that our design both meet the strict Halachic requirements of Jewish Law and be as visually inconspicuous and unobtrusive as possible. Loudspeakers in the sanctuary are discretely built into the walls. Porch loudspeakers are mounted under the sanctuary roof soffit and appear to be part of the awning structure.

We worked closely with the Zomet Institute, of Alon Shevut, Israel, to ensure that the sanctuary sound system is in full compliance with Halachic restrictions of Jewish Law, and used only in accordance with guidelines set by the synagogue rabbis. Our sound system design is consistent with the architectural and liturgical fabric of the sanctuary, but does not compromise the goal of excellent speech reinforcement.

At The Hampton Synagogue, Halacha and high-quality speech reinforcement are no longer mutually exclusive!