



WSPACOUSTICS

Acoustic, Audiovisual, Noise & Vibration Services

WSP have one of the world's largest teams of consultants delivering specialist acoustic, audiovisual, noise and vibration services.

We deliver pragmatic and cost-effective design solutions to architects, developers, engineers, planners and contractors. The diversity of our experience allows us to provide concept-to-commissioning consultancy across all sectors.

Highlights of our delivery include: The Presidential Palace in Abu Dhabi; The Shard of Glass in London; the Helsinki Metroline; and a new faculty building at Sydney University.

Our capability

- Over 100 experienced acousticians and AV engineers located across the world, offering local knowledge and an 'on the ground' response.
- Expertise that ranges from noise assessment and mitigation related to Masterplanning and EIAs, to architectural acoustics, audiovisual design and vibration studies.
- Our work covers residential and commercial developments, sporting and cultural arenas and education and healthcare facilities.

Our approach

- Uniquely we can combine our specialist acoustics expertise with the design and consultancy services provided by our colleagues from across WSP. This integrated service delivery for projects in the built environment can extend to include environmental planning, transportation development and planning, and mechanical, electrical and civil engineering.
- Our team prides itself on the quality of its delivery to clients. We commit to designing practical, commercial and sustainable solutions for our clients. Our approach is driven by ensuring a thorough understanding of our client's requirements, challenging established thinking and seeking innovative solutions where appropriate.
- Our commitment is to making people's living and working environments quieter and more comfortable.

WSP – defined

- WSP Group plc is a 9,000 strong global design, engineering and management consultancy. We specialise in delivering projects in the built and natural environment.
- Our business has worldwide expertise in mechanical, electrical and civil engineering; transportation planning and development; and environmental, energy and sustainability issues.
- In 2010 we were voted 'Environmental Adviser of the Year' by leading publication Acquisitions Monthly, reflecting our expertise and innovation in the areas of environmental and energy management and sustainability advice for our clients.

OUR SERVICES

Architectural Acoustics

We assist developers, architects, and contractors to design buildings with comfortable internal acoustic environments. These studies include:

- Advising on building layout to minimise the need for expensive acoustic countermeasures.
- Building façade acoustic design that minimises excessive road noise break-in to the working or living environment.
- Sound insulation design between private spaces such as offices, conference rooms, residential apartments, or hotel bedrooms.
- Designing rooms to the correct reverberation times to enable high levels of speech intelligibility or audibility.

By computer modeling the relevant rooms using specialist architectural simulation software, our programmes enable clients to hear or 'auralize' a room's acoustics long before designs are finalized and the building has been constructed. This allows for fine-tuning of the room's sound characteristics, potentially saving time and money on expensive remedial treatments that may otherwise be necessary following project completion.

We also undertake inspections and acoustic measurements within existing buildings. These include electro-acoustic system performance, airborne sound insulation, impact sound transmission, building services noise, and air and structure-borne sound and vibration measurements.

Building Services Noise and Vibration Control

WSP's Acoustics team can assess mechanical and electrical building services plant with respect to both internal and external noise breakout and vibration transmission. This expertise is particularly relevant to clients working with our mechanical and electrical engineering colleagues within WSP.

Our team will ensure that noise and vibration specifications and advice are tailored to a client's requirement. This means that the level of quality and performance from noise control hardware is actually what a client needs, rather than what a particular hardware supplier would like to sell.

AudioVisual Services

Audio visual technology is a key element of modern life in almost every building, providing a variety of challenges in terms of requirements, space allocations, budgets and applications. The in depth design knowledge of our audio visual specialists allows us to truly explore our client's functional requirements and deliver industry-leading, innovative solutions.

We can leverage experience gained from across sectors as diverse as: education, corporate, government, broadcast, public event venues and arts projects. This breadth of knowledge, experience and skills differentiates our offering and provides real value to our clients.

We work closely with interior design teams and services engineers to achieve a highly integrated solution and where appropriate provide infrastructure for future implementation of audio visual systems after the project is completed.

We utilise sophisticated 3D modeling for both electro-acoustic system design and camera angle planning amongst other design tools. We have team members with specific specialist areas of focus including Broadcast, Audio Systems, Control Systems and Networking.

Environmental Impact Assessment

Noise is very often a primary factor in determining the acceptability of a new residential or commercial development, with associated transportation development, within an environmentally sensitive area.

WSP undertake environmental noise impact assessments in line with National Standards, Approved Codes of Practice, Planning Policy Guidance, and Building Bulletins. In addition to generating appropriate noise and vibration evidence to support planning applications, we are able to provide expert witnesses at planning inquiries to support our Environmental Statements.

Environmental Noise Mapping

Noise free or 'tranquil' areas are increasingly hard to find and is a notable environmental factor. For example, in Europe, 20% of the population (80 million people) are exposed to noise levels that could, in the long term, potentially damage their health. Another 170 million people are adversely disturbed by noise.

WSP has undertaken both city and rural noise mapping projects in response to the EU Environmental Noise Directive (END). These studies have included the provision of guidance to clients, such as the National Assembly for Wales and the City of Helsinki, on what steps need to be taken to satisfy the END requirements.

Noise mapping studies are also often included within our Environmental Impact Assessments to aid the understanding of how noise disperses around a new development. We have a selection of noise prediction software to generate easy-to-read and understandable colour presentations and noise maps.

Industrial Noise

Large industrial sites can be very complex. There are often a multitude of noise sources contributing to the overall noise environment. These sources range from small roof mounted ventilation fans to large power generation centres.

In these cases WSP undertakes detailed 3D computer modeling of industrial noise sources to determine likely causes of noise complaints, and develop suitable and cost effective remedial measures. At complex industrial sites, and where noise sources are inaccessible, we use 'acoustic cameras' to visualize the dominant sources of noise.

Through our Norwegian affiliate Multiconsult we have extensive expertise in the special noise and vibration requirements for oil and gas projects, including engineering, quality control and verification of Public Alarm Systems, both offshore and onshore.



Road and Rail Traffic Noise

Road and rail traffic noise impacts are one of society's major environmental problems, with many people exposed to noise levels 20-30 dB higher than are considered acceptable in the World Health Organisation Guidelines for Community Noise.

Many sound attenuation techniques are available to reduce noise from roads and railways. These include:

- Acoustic screens or barriers along the transportation corridor
- Consideration of route planning
- Use of 'low noise' road surfaces
- Lower speed limits

We provide assessments of noise exposure within an environment and assess the effect of mitigation measures using three-dimensional colour-coded noise maps.

Once created, the noise map can be altered and updated as design proposals change, and the final result can be imported into modern GIS applications, which allows further detailed demographic data analyses to be undertaken.

Aircraft Noise

The extent of the impact of aircraft noise is dependant upon the types of aircraft which use a particular airport (the 'fleet mix'), their destination (high fuel loads result in noisier aircraft departures), and the overall level of aircraft activity.

Aircraft noise investigations are commonly undertaken in connection with environmental impact assessments of sites around airports.

We use specialized software to determine the likely noise effects taking into account land use within the affected area and the number of potentially affected inhabitants in the locality.

Vibration Studies

Many new buildings are constructed beside or above major railway routes. This often leads to concerns about the transmission of vibration and structure borne noise into acoustically sensitive developments.

Our detailed vibration studies will address these concerns. However, some sites are found where train vibration is an influencing factor in the design of the building. In some instances, buildings need to be vibration-isolated from the surrounding ground structure. Such 'floating' buildings are becoming more and more common in urban development areas.

At WSP we offer consultancy services to advise architects and developers when and how to install the complex and expensive (but necessary) vibration isolation systems.

We also undertake investigations and risk analysis of construction and demolition works including blasting, piling, and tunneling. Excessive vibration and the resultant structure-borne noise from such sources can be controlled through continuous supervision, analysis, and assessment. Our expertise enables us to liaise effectively with the main contractors to ensure disturbance from such sources is minimised.



WSP Acoustics – snapshot of services

- Architectural acoustics
- Building services noise and vibration control
- Audiovisual services
- Environmental impact assessment
- Environmental noise mapping
- Industrial noise
- Road and rail traffic noise
- Aircraft noise
- Vibration studies



OUR TRACK RECORD

Profiled below is just a small selection of some of our project work from around the world:

Mirdif City Centre, Dubai

We were commissioned to assess and deliver acoustic design up until shell and core stage for the 3.1 million sq ft of lettable space at the Mirdif City Centre. This mall includes 450 retail outlets and an entertainment complex including Cinestar cinema and Magic Planet family entertainment centre.

In addition to the acoustic design of the mall the project requires the construction of a new 132kv substation and its own district cooling plant which results in another set of noise issues to be managed. WSP is also providing fit-out advice to the cinema and family entertainment centre.



Faculty of Law Building, University of Sydney

WSP provided integrated services on this project including electrical, mechanical, lighting design and audio visual systems. The project comprised over 30 audio visual systems from standardised seminar rooms to a congress lecture theatre and a dedicated Moot Court facility.

Over 5 years our audio visual team in Sydney was involved from the initial space planning for each room to the final commissioning of systems.

The project has won a variety of awards and the standard audio visual systems we developed with the client form the basis for their ongoing rollout to existing and new buildings.

Bank of Mauritius Headquarters, Port Louis

Working with our South African MEP colleagues, and a US architect, our acoustics team assisted in the design and build of this new headquarters building in Mauritius. A full building services noise/vibration control and architectural acoustics design service was provided.

The tower comprised 23 storeys of office development including a challenging executive suite in this busy island capital.

London Bridge Tower, 'The Shard', London

Sellar Properties famous 'Shard of Glass' – western Europe's tallest residential building - will be a unique multi-purpose 310 metre structure dominating the London skyline. The Shard will be a sharp and light presence, welcoming more than 8,000 workers, residents and hotel guest per day, and more than 2 million public visitors a year.

Throughout the six-year project, WSP have undertaken full acoustic design studies, including environmental, architectural and building services noise & vibration control.

Al Ain Resort Hotel & Mall, UAE

Assessment and design of the acoustics for the refurbishment and extension of the existing mall which includes cinemas, public performance space, family entertainment centre along with stores, restaurants and food court. The development also includes a hotel resort and spa and a new Mosque.

The objective was to provide complete acoustic design advice through all phases as well as site inspections during the construction and post construction phases.



Shongweni Landfill Site, Durban

We undertook acoustic modelling to determine the noise impact associated with this huge landfill site on the outskirts of Durban in South Africa.

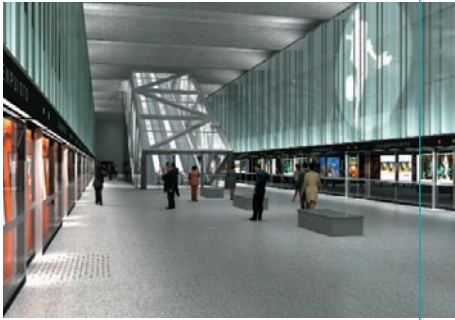
Computational modelling, in addition to a valuable baseline noise survey, was undertaken to determine noise from landfill service vehicles within the site and refuse vehicle's movements on the wider road network.

Landvetter airport, Gothenburg

WSP assisted the Swedish airport operator, Swedavia with noise abatement in dwellings located close to Landvetter airport and other Swedish airports.

Recent legislation has created a demand to reduce aeroplane noise inside dwellings in Sweden. An inventory has been made of a large number of dwellings near some of Sweden's major airports, and detailed advice to reduce noise from aeroplane traffic has been presented to the client.

The documentation provided to the client is at a level of detail that it can be used directly to acquire bids from contractors.



Helsinki Metroline

Finland's largest current infrastructure project comprises two 14 km metro tunnels, seven new stations and the removal of around three million cubic metres of blasted rock. The West Metro (Länsimetro) will be built during 2010–2014.

Our acoustics specialists performed the planning for the abatement for structure borne noise in dwellings close to the metro line. The project has required detailed instructions on the need for damping materials under the tracks in order to obey guidelines concerning structure borne noise levels in dwellings. A study was also carried out comparing different products that can be used as damping materials. Our specialists have also carried out the noise level calculations for construction sites above ground, and they will monitor the indoor and outdoor noise levels during construction.

The SS Great Britain

Designed by Isambard Kingdom Brunel, one of the world's greatest engineers, the SS Great Britain was the first iron-hulled passenger steam ship of its kind.

Now residing in a glazed dry dock in Bristol, the SS Great Britain is conserved in a controlled, conditioned environment to prevent further erosion of its iron hull. WSP provided full acoustic design of the dock, including noise control assessments of the air conditioning system to minimise the impact on the audio visual experience for visitors.



LET'S TALK

We would be delighted to talk to you further about any acoustic, audiovisual, noise or vibration challenges you have with your development, building or transportation projects.

Simply get in touch with one of our consultants from around the world, or alternatively:

Email us at: acoustics@wspgroup.com

And to understand more about our global business, please visit either:

www.wspgroup.com or our specialist environmental business at: **www.wspenvironmental.com**

