GKM Consultants

Noise Modelling

Acoustic modelling is crucial for construction work, especially when projects are carried out in sensitive areas. In addition to ensuring compliance with standards, it optimizes performance by anticipating and minimizing negative noise impacts.

APPLICATIONS

Acoustic modelling is a vital tool for:

- preventing and reducing noise pollution,
- ensuring compliance with noise standards,
- optimizing the use of noise reduction technology,
- increasing public acceptance of the project,
- reducing long-term noise impacts.

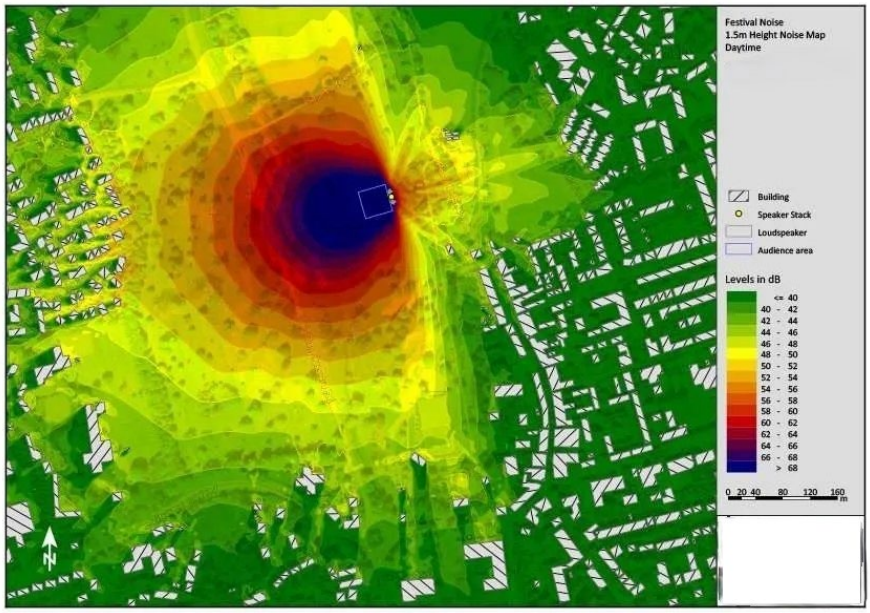
ACOUSTIC SIMULATION

Defining measurement points: Measurement points are selected based on sensitive areas that require monitoring (residential areas, schools, hospitals, etc.). These points must be representative of the different environments where noise levels will be assessed, both next to the site and in neighboring areas.

Defining a reference point: To ensure accuracy, a reference point is identified in a stable area that will not be directly affected by construction (e.g., a residential or protected area). This point is used to calibrate the model, by serving as the benchmark for the acoustic environment prior to the start of work.

Collecting input data: Before the simulation can be run, all data relevant to the acoustic model must be collected, such as:

- project site characteristics (sources of noise, types of equipment, working hours);
- weather conditions (wind, temperature, humidity, etc.);
- local topography (elevations, natural or artificial barriers);
- buildings and other structures (to simulate the effects of reverberation and sound reflection).



Festival noise - Noise map Daytime

Calibrating the acoustic model: At this stage, a digital model is created to represent how sound travels from the identified sources. This model accounts for the diffusion of sound and related factors (natural attenuation, barriers, weather conditions).

Simulating noise levels: The simulation makes it possible to estimate noise levels at different measurement points and at different times of day. These estimates are based on input parameters and collected data. The simulation can also be run for different scenarios (e.g., noise generated by machinery, trucks, or periods of intense work).

Analyzing results: After the simulation has been run, the results are analyzed to identify areas where noise levels exceed applicable limits. This helps identify critical areas where mitigation measures will need to be implemented.

Designing mitigation solutions: Based on the results, appropriate mitigation solutions will be proposed, such as:

- installing noise barriers,
- adjusting work schedules to avoid high noise levels at night,
- rescheduling certain project phases to minimize noise at sensitive times.

Validating and fine-tuning the model: The simulation is then validated by adjusting the parameters based on feedback received or real data collected at the start of construction. Fine-tuning may be necessary to improve the accuracy of the model and refine proposed solutions.

Implementing solutions and ongoing monitoring: Once mitigation solutions are implemented, regular noise monitoring will confirm that the measures have been effective. Changes may be required based on feedback from residents or additional measures taken during the project.

ASSESSING NOISE POLLUTION

Construction work can generate high levels of noise associated with machinery, heavy equipment, and even the delivery of materials.

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STANDARDS AND REGULATORY COMPLIANCE

Strict noise standards and regulations apply to construction sites and related work. For example, different noise limits apply to specific times of day and at night. Acoustic modelling makes it possible to confirm that a project will meet these requirements and to obtain the authorizations needed to start work. If noise levels exceed applicable limits, corrective measures can be taken. For example, noise barriers can be installed, or the use of specific equipment can be restricted to certain hours.

IMPROVING SUSTAINABILITY AND INCREASING PUBLIC ACCEPTANCE

By addressing noise issues from the very start of the design process, acoustic modelling facilitates planning and helps avoid unforeseen costs associated with changing course after work is underway. It helps make the project more sustainable and acceptable to the local community. More than ever, public acceptance is a key factor for the success of construction projects. A proactive approach to dealing with noise issues is one way of ensuring acceptance.

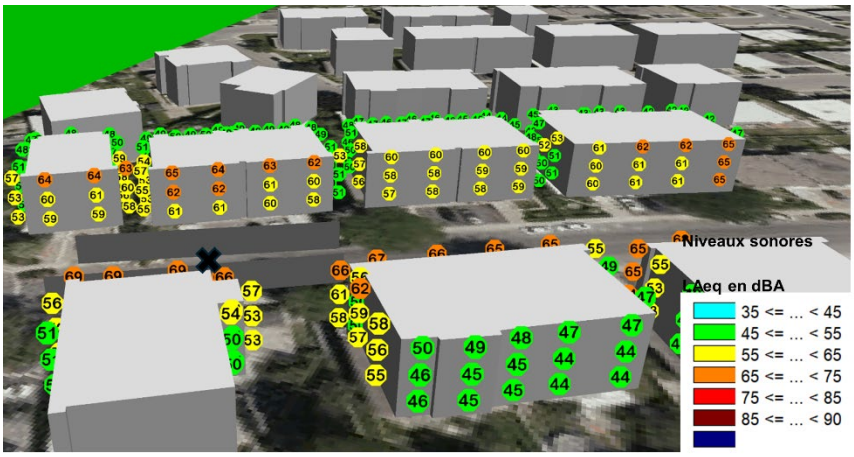
REDUCING THE LONG-TERM NOISE FOOTPRINT

Finally, the benefits of acoustic modelling are not limited to the construction period. It also helps predict a project's post-completion noise impact. For instance, if the project involves the installation loud equipment (ventilation systems, industrial machinery, commercial infrastructure, etc.), acoustic modelling can help determine whether these features will introduce additional nuisance factors for occupants or neighbours.

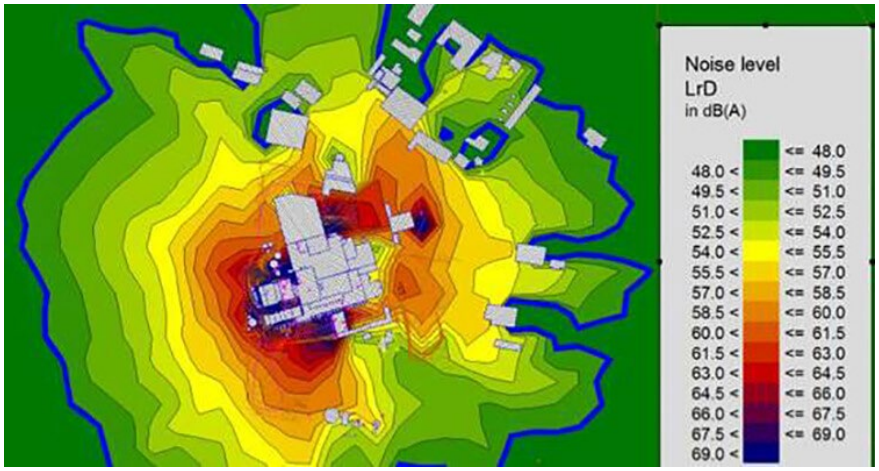
In summary, **acoustic modelling for construction work is critical for:**

- preventing and reducing noise pollution,
- ensuring regulatory compliance,
- increasing public acceptance of the project,
- optimizing the use of noise reduction technology.

It provides a solid basis for proactive noise and nuisance management, ensuring the project blends in with its surroundings.



Noise modelling – 3D view



Noise contour map of industrial plant. Bold blue contour outlines perimeter where compliance with relevant regulation is achieved.

You require assistance or have any questions, call or email our team of specialists. We look forward to discussing your project.