

Noise Control in Pump Station Designs

Designing a pump station can be a fairly straightforward task, unless it's located in a residential neighborhood or near some other noise-sensitive area. That's where the acoustical consultant gets involved. A qualified consultant can be a valuable member of the design team, especially when brought on board early in the design process. Too often, though, the acoustical consultant is hired after the pump station is operational and the neighborhood is already up in arms. Then the repairs can get costly.

Standards and Design Goals

Most communities have standards that specify the noise level that may not be exceeded by the pump station. Sometimes, however, the standards may not be adequate. The mechanical equipment at a typical pump station can generate tones or low frequency "beats" that significantly increase the annoyance potential of the station's operation. In addition, people will react if the noise level of the pump station is significantly higher than the background ambient noise level, regardless of any standard. The acoustical consultant can assess the situation and develop an appropriate design noise goal for the facility that effectively balances the needs of the developer and the local community.

Noise Sources

There are several noise sources associated with a typical pumping station. These include the pumps, diesel engines, backup generators, exhaust pipes, ventilation fans, and gearing mechanisms. Of these, the pumps and the diesel engines are the primary noise sources.

Noise Control

The typical pump station consists of a concrete block building, built-up roof and openings for ventilation. This design provides many ways for the noise within the building to escape to the neighboring community.

When designing the noise control for a pump station the acoustical consultant will look at three areas: controlling the noise buildup within the station, controlling noise transfer through the building shell, and controlling the equipment noise. An effective design can reduce the pump station noise levels by 20 to 30 dB or more.

To control noise buildup, the pump station can be lined with sound absorptive panels, and particularly noisy items can often be enclosed. Noise transfer through the building shell can be controlled with improved wall and roof construction, sound rated doors, and acoustical louvers. Residential-class exhaust silencers are usually required at pump stations to minimize the low-frequency “throbbing” typically associated with diesel engines.

With these noise control items in place, there’s no reason why the pump station can’t be a good neighbor. But, it must start with the design, where the potential benefits and cost savings can be enormous.

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