

**City of
Warrenville**

**SOUND MITIGATION
REIMBURSEMENT PROGRAM**

**JANUARY 1, 2010 TO
DECEMBER 31, 2011**

**WINDOW AND DOOR UPGRADE
TIPS BOOKLET**

For those residents choosing to mitigate sound by replacing windows and doors, the following outlines some of the things you can do to your home to decrease (not eliminate) the effects from train noise. Please understand, however, this is not an installation procedure manual.

Windows

Old, loose-fitting windows that rattle when a train goes by are probably the greatest source of noise transmission in a home since windows are in every room. Quality windows, installed in accordance with sound reduction construction procedures, will give you the greatest benefit. If you do not wish to purchase new windows, adding storm windows or merely sealing your existing windows will help alleviate some air and noise transmission.

Replacement Windows

Replacement windows should be acoustically-rated windows with an STC (sound transmission class that denotes a material's ability to resist sound transmission) rating of at least 40. The combination of the glass layers, glass thickness and the air spaces between the glass give the windows the acoustical rating. There are few window manufacturers that make "acoustic" windows. Genuine acoustic windows are tested by an accredited laboratory to obtain a certified Sound Transmission Class (STC) rating. When looking for acoustic windows, be sure to request a window with a minimum STC rating of 40.

If you purchase thermal pane windows that do not have the storm windows built into the window unit, you should make sure they have wood or metal frames. Windows with wood or metal frames tend to be more compatible with storm windows. Vinyl windows typically are not as compatible with separate storm windows.

Storm windows with laminated glass provide better protection from noise than a non-laminated pane of glass. Increasing glass thickness also improves acoustical performance. Be sure to check with your window manufacturer concerning compatibility regarding storm windows and your existing window units. Placing a storm window over any existing window may cause damage to either the storm or prime window.

As important as the quality of the window itself, is the method of installation. *Most window installers do not install windows following sound reducing techniques.* To obtain the full acoustical benefit, all voids around the windows must be filled with insulation and wood blocking, and the perimeter of the windows must be thoroughly caulked so no air can leak through. Since this is not a typical window installation, you may want to have your purchase agreement with the window company state that the windows will be installed To obtain the full acoustical benefit.

Storm Windows

The combination of glass and air spaces increases the acoustical rating of window units. The addition of storm windows over your existing windows will increase the acoustical rating. It should be noted that storm windows should not be installed over vinyl-framed windows. The heat build-up from the sun between the panes of glass may cause the vinyl to warp. Acoustical storm windows are usually constructed with 3/16" or 1/4" laminated glass.

Maintenance to Existing Windows

Windows that rattle are a source of air and noise infiltration. Replace any pieces of glass containing cracks. Apply a thin bead of clear silicone caulk around the glass to secure the glass to the frame. Apply caulk around the window frame to prevent air and noise from leaking in around the window.

Skylights

Sound is decreased when it has to travel through mass. By adding a skylight, the mass of the shingles, roof decking and insulation are replaced with a sheet of glass. Typically, skylights are a substantial source for sound transmission. Adding a storm window unit to an existing skylight will reduce some noise transmission. There are some storm window manufacturers that make units which mount on the inside of the existing skylight. There are also a limited number of window companies that sell complete acoustically-rated skylight replacement units. Follow the manufacturer's instructions regarding proper installation to ensure the best performance.

Doors

Doors are another common source for noise and air infiltration. A prime door and a storm door act much like the thermal pane windows and storm windows in that the combination of the doors with the air space in between increases the acoustical integrity of the unit. The installation of new doors with weather-stripping, a new threshold and a bottom sweep will give you the greatest benefit; however, any of the following modifications will give you some decrease in noise and air infiltration. Acoustically rated prime doors, or doors that carry an STC rating around 40 or higher, can be very expensive. If cost is a concern, or if you purchase a door with an STC rating below 40, install a prime and storm door combination.

Replacing Prime Doors

Pre-hung wood solid-core doors should be used. Steel or metal doors are generally not acoustically acceptable because they are constructed of a thin outer layer of metal filled with cork or foam, and do not have sufficient mass to provide adequate sound reduction. A pre-hung door has less tendency to warp than a solid core door that is installed into an existing frame. The installation technique should include removing the existing door and jamb, filling all voids around the door with wood blocking and insulation, and installing the pre-hung unit. Weather-stripping should be applied around the top and side frames, and a sweep installed on the bottom of the door.

Two critical aspects to look at when choosing a prime door are: (1) the seals and (2) the weight or mass of the door. The better the seals and the greater mass the door has, the better the door will perform against noise. When looking at the seals of the prime door, make sure there is good contact between the weather-stripping on the door frame and the top and sides of the door itself. Make sure the door sweep is made of a durable material and that it makes solid contact with the threshold. Check to make sure that there is no light infiltration along any of the perimeter seals.

Replacing Storm Doors

As with prime doors, the acoustical performance of a storm door is also dependent on the door's seals and mass. There are acoustically-rated storm doors available from several manufacturers. However, if you're willing to sacrifice some acoustic reliability for a more cost-effective

alternative, a solid core storm door that has a minimum of 3/16" laminated glass is preferred. Once the storm door is completely installed, there should be no light penetration around the perimeter of the door. Keep in mind that a storm door only has acoustical benefit when the storm window is in place. Consider self-storing glazing units if you occasionally want to use the screens for ventilation purposes.

Weather-stripping Existing Doors

A properly weather-stripped door will provide resistance when you close the door. It is important that weather-stripping be applied on both the prime and the storm doors. Most hardware stores and lumber yards carry weather-stripping intended for homeowner installation. We recommend that the weather-strip be of sufficient thickness to compress at least 3/8" when the door closes against it. To check existing weather-stripping, close the door from the inside and carefully inspect the entire perimeter of the door where it meets the frame and sill. There should be no light visible. If there is, the weather-strip must be adjusted until no light is visible or new weather-stripping should be installed.

Door Installation and Maintenance

Cracks in doors should be filled, sanded and covered with paint or an exterior grade stain sealer. When installing new prime doors, make sure there is no spacing or gaps greater than 1/2" between the door frame and the existing wall framing (rough opening). Gaps less than 1/2" wide should be filled. A method that provides good insulation and sound attenuation includes using fiberglass wrap insulation, polyethylene foam backing rod and caulking. All of these materials should be available at your local hardware store.

Sidelights

If your existing sidelights are not in vinyl frames, add an additional layer of glass to the existing sidelights – preferably a pre-fabricated storm unit. Manufacturers of acoustic storm doors typically manufacture matching storm units for sidelights. Otherwise, mounting a minimum 3/16" thick interior tempered laminated glass panel in a custom wood frame approximately 2" from the existing sidelight will also help. If you choose to build your own storm unit, mount the storm on the inside of the existing sidelight. If purchasing a unit, follow the manufacturer's installation instructions for either interior or exterior applications.