Noise and Vibration Mitigation

The following sections identify potential noise and vibration mitigation strategies for the FasTracks program. These potential strategies cover the construction and operational phases of the implementation of the FasTracks program. Within each of the corridor’s final decision document or environmental evaluation, mitigation measures must be developed for each impact to ensure compliance with Federal, State and Local regulations. This Noise and Vibration Strategy presents suggestions and potential mitigation that can be used. This discussion is not complete and exclusive, and can be modified and refined for each specific impact identified by the individual corridors.

**NOISE**

The following sections identify strategies that may be applied to individual FasTracks corridors to mitigate noise impacts. Source: Chapter 6.8: Mitigation of Noise Impact: *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06, May 2006.

Mitigation of noise impact from transit projects may involve treatments at three fundamental components of the noise problem: 1) at the source; 2) along the path, and; 3) at the receiver.

**Source**
- Stringent vehicle and equipment noise specifications
- Operational restrictions
- Resilient or damped wheels
- Vehicle skirts
- Undercar absorption
- Spin-slide control (prevents flats)
- Wheel truing (eliminates wheel flats)
- Turn radii greater than 1,000 feet
- Rail lubrication on sharp curves
- Movable-point frogs

**Path**
- Sound barriers close to vehicles
- Sound barriers at right-of-way line
- Alteration of horizontal and vertical alignments
- Acquisition of buffer zones
- Ballast on at-grade guideway
- Ballast on aerial guideway
- Resilient track support on aerial guideway

**Receiver**
- Acquisition of property rights for construction of sound barriers
- Building noise insulation
**VIBRATION**

The following sections identify strategies that may be applied to individual Fastbacks corridors to mitigate vibration impacts.

The specific identification of the type of vibration mitigation must be identified prior to the time anticipated that FTA will sign an FFGA. Mitigation for vibration often requires a significant amount of geotechnical information in order to evaluate the effectiveness of the mitigation proposed. This may be accomplished in PE or in Final Design. It is most time and cost effective if it is accomplished before a final decision document is obtained.

When the geotechnical information becomes available to identify the effectiveness of vibration mitigation, the detailed vibration evaluation will be completed and mitigation measures assessed for their potential effectiveness. For those corridors that are federally funded or involve a federal action; this can be accomplished in the EA, DEIS, FEIS or ROD but must be accomplished before the FFGA.

For those corridors not federally funded, this should be accomplished before the decision document is obtained. If not, additional environmental documentation will be required before Final Design can be completed with the appropriate public notification of any changes. Projects cannot proceed into construction until the appropriate vibration mitigation measures have been designed into the project and vetted through the public process.

If the geotechnical information is not available until after the decision document, the project sponsor, In the DEIS and FEIS (and EA or EE as appropriate), will commit to the final detailed vibration evaluation in Final Design including the assessment of the feasibility of the mitigation. Please note that committing to mitigation after a decision document may require additional environmental evaluation and documentation that will have a project schedule and cost impact.

The FasTracks Environmental Resource Group recommends that sufficient geotechnical work be completed in order to assess the most appropriate vibration mitigation before the decision document is obtained (or in the case of projects with no federal funding or action, before the environmental evaluation is completed).


**Maintenance**

- Rail grinding to avoid corrugated surfaces
- Wheel truing to recontour the wheel, provide a smooth running surface and remove wheel flats
- Implement a vehicle reconditioning program for components such as suspension system, brakes, wheels, and slip-slide detectors
- Install wheel-flat detection systems to identify vehicles in need of wheel truing
Planning and Design of Trackwork

- Re-locate special trackwork to a less sensitive area, when possible to do so without impeding operations
- Review crossover and turnout locations during preliminary engineering stage
- Use special devices at turnouts and crossovers that incorporate mechanisms to close the gap between running rails (especially frogs with spring loaded mechanisms and frogs with moveable points)

Special Track Support Systems

- Ballast Mats -- Consists of a pad made of rubber or rubber line material placed on an asphalt or concrete base with the normal ballast, ties and rail on top.
- Floating slabs -- Thick concrete slabs supported by resilient pads on a concrete foundation. These are typically used for subway treatments or when ballast mats are ineffective and are extremely expensive.
- Resilient fasteners: Special direct-fixation fasteners (fastening the rail to concrete track slabs) with vertical stiffness of 30,000 lb/inch will reduce vibration by as much as 5 to 10 dB at frequencies above 30 to 40Hz
- Resiliently supported ties: Concrete ties supported by rubber pads, use resiliently supported ties to reduce low-frequency vibration in the 15Hz to 40Hz range.
- Shredded tires or tire derived aggregate -- Consists of 12 inches of tire shreds or chips wrapped with filter fabric and then covered with sub ballast and ballast. The vibration attenuation characteristics of this treatment are midway between that of ballast mats and floating slab track (described below).

Building Modifications

- Property Acquisition or Easements -- Residences that are likely to be impacted by vibration or noise could be purchased or easements could be required by paying the homeowner to accept the future train vibration conditions. These mitigation measures should only be used in isolated cases.
- Support the building foundation on elastomer pads similar to bridge bearing pads (usually only possible for new construction)

Operational Changes

- Reduce the speed
- Use the equipment that generates the lowest vibration levels only during the nighttime hours
- Adjust nighttime schedules to minimize movements in the most sensitive hours