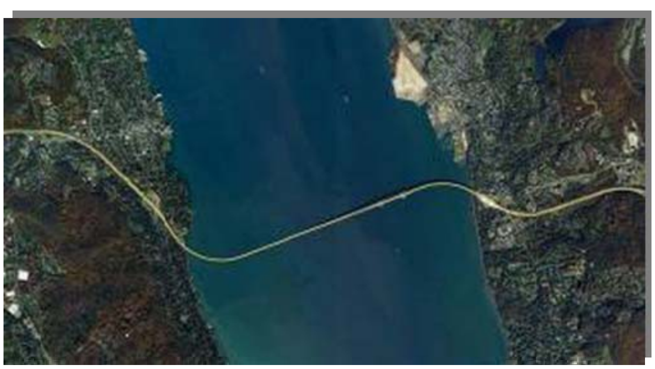
New York State Department of Transportation
Metropolitan Transportation Authority Metro-North Railroad
New York State Thruway Authority

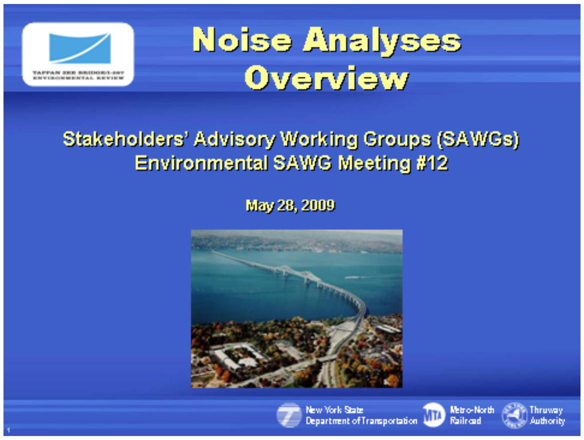
Presentation

Stakeholders' Advisory Working Groups (SAWGs)
Environmental SAWG Meeting #12

Tappan Zee Bridge/I-287 Corridor
Environmental Review



May 28, 2009



Slide 1

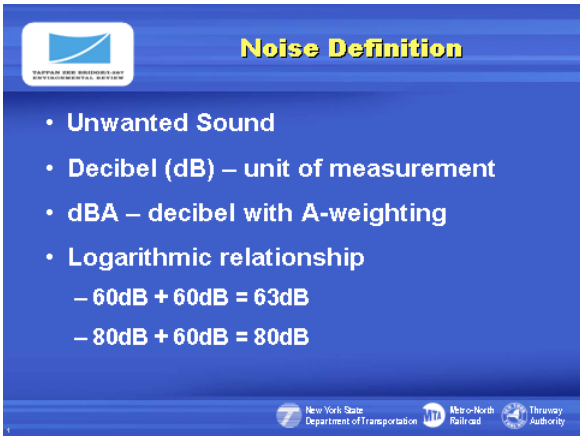
This presentation focuses on methods used to establish existing noise conditions in the project vicinity and methods for developing the impact analysis that will be presented in the EIS.

Slide 2

The topics to be covered include noise fundamentals, impact and abatement criteria, existing noise conditions along the I-287 corridor, impact analysis methodologies for both highway and transit components, construction noise, and abatement measures.

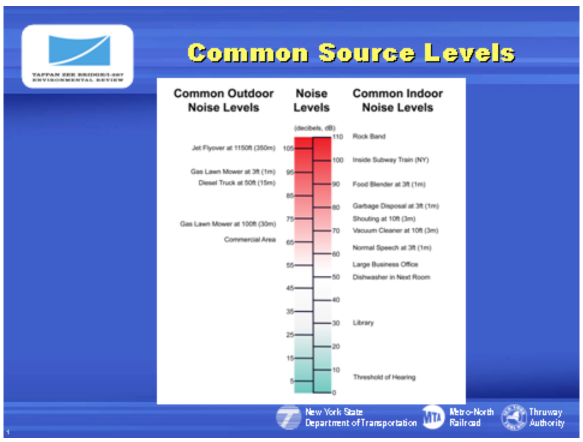
Slide 3

This topic discusses the characteristics of noise, particularly traffic noise, and the perception of noise by the listener.



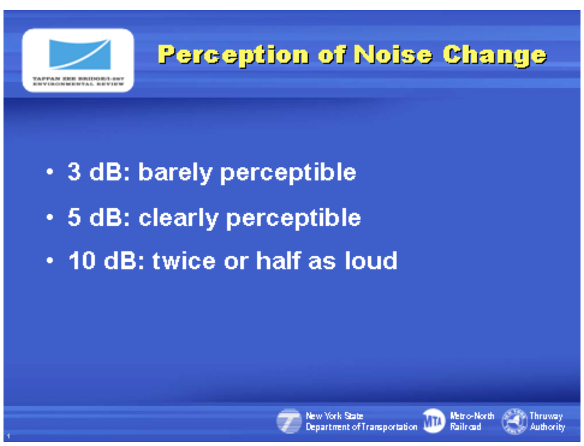
Slide 4

This slide defines noise, presents units of measurement, frequency weighting (A-weight) that best fits human perception of noise, and mathematical relationship applicable to adding and subtracting noise from different sources.



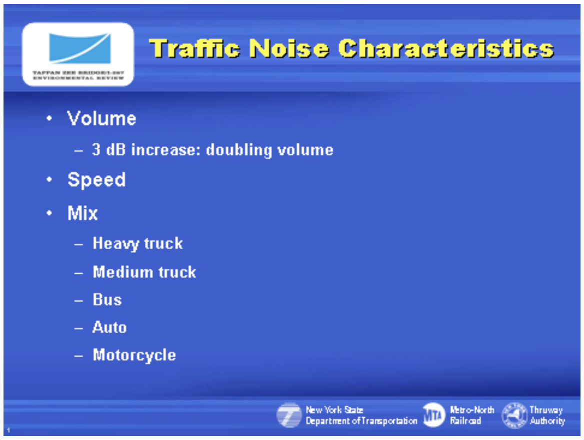
Slide 5

This chart provides a brief summary of typical exterior and interior noise levels from various common sources. For example, noise from normal speech would generate a sound level of around 63 dB at 3 feet.



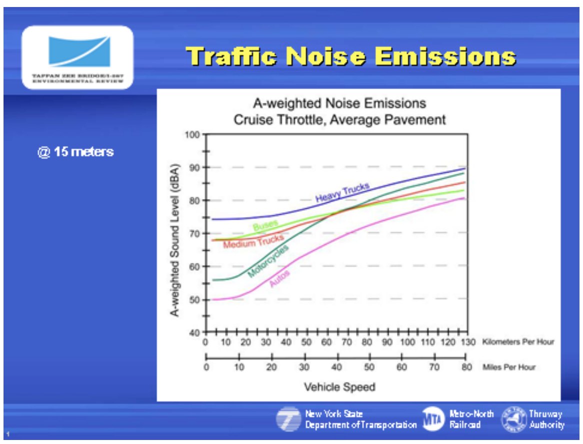
Slide 6

This slide summarizes human perception of noise change. A noise change (increase or reduction) of 3 dB is barely perceptible.



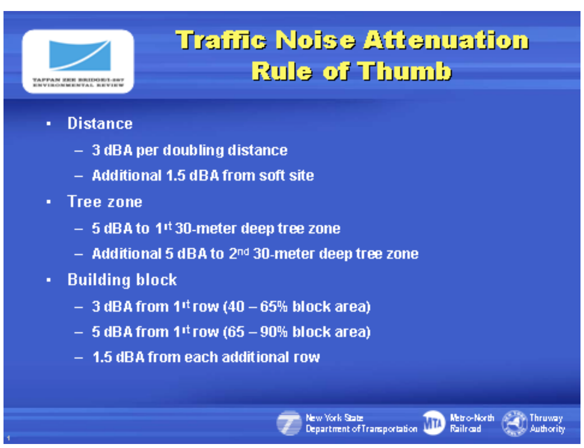
Slide 7

The level of highway traffic noise depends on 3 factors or parameters: traffic volume, traffic speed, and vehicle classification.



Slide 8

This chart shows that traffic noise increases when speed increases and heavy trucks generate the most noise as compared to other vehicle classes.

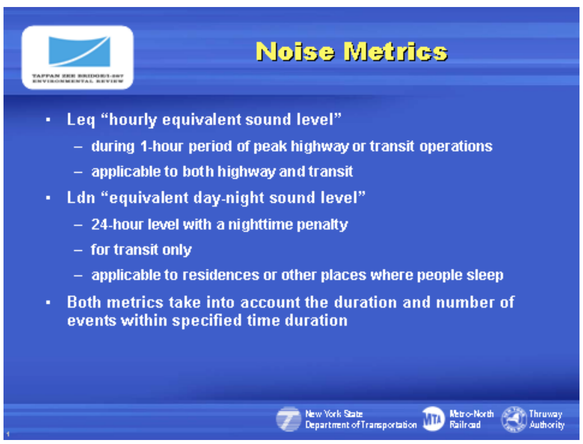


Slide 9

This slide provides a general sense for the level of noise attenuation that occurs when sound propagates from a source to a receptor.

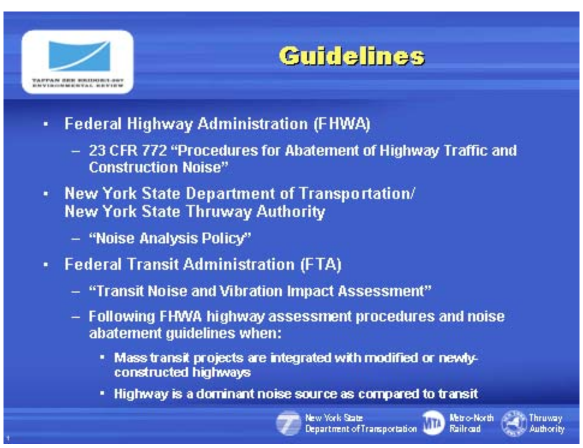
Slide 10

We now discuss noise metrics and impact criteria.



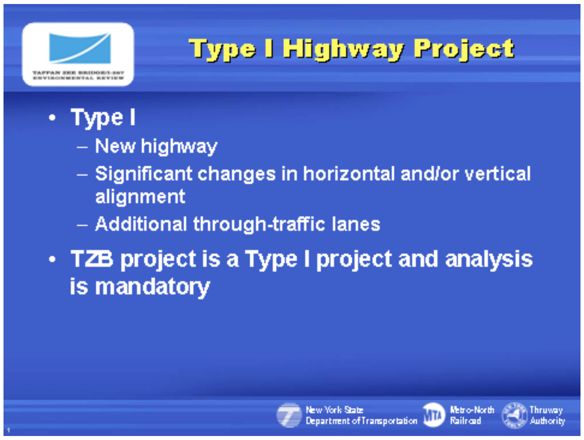
Slide 11

Leq is the standard noise metric used for highway projects. Transit projects use both Leq and Ldn metrics depending on the adjoining land use type.



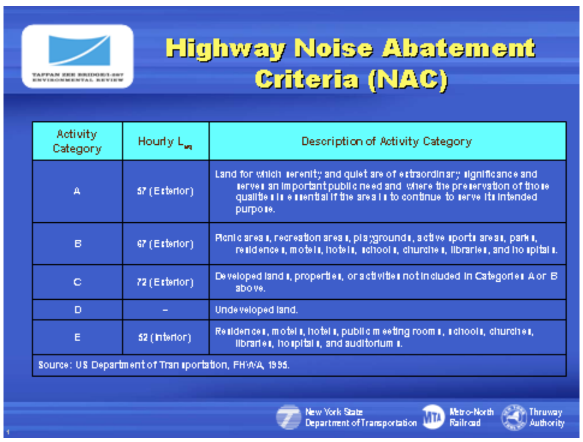
Slide 12

This slide summarizes regulatory guidelines to be followed for evaluating impacts. Since the project includes an integration of both highway and transit components, FHWA's analysis procedures and abatement guidelines will be used for the majority of study corridor. FTA methods will be used where the transit system diverges from the highway.



Slide 13

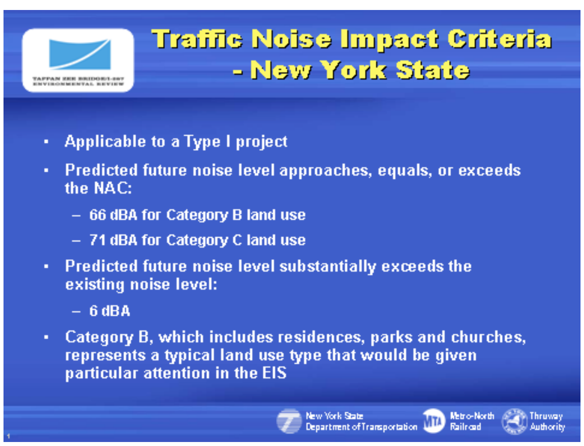
A Type I highway noise project is subject to the most intensive noise analysis requirements. TZB is a Type I project that would involve alignment changes and potentially adding through traffic lanes.



Activity Category	Hourly L_{eq}	Description of Activity Category
A	57 (Exterior)	Land for which serenity and quiet are of extraordinary significance and serves an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	–	Undeveloped land.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.
Source: US Department of Transportation, FHWA, 1995.		

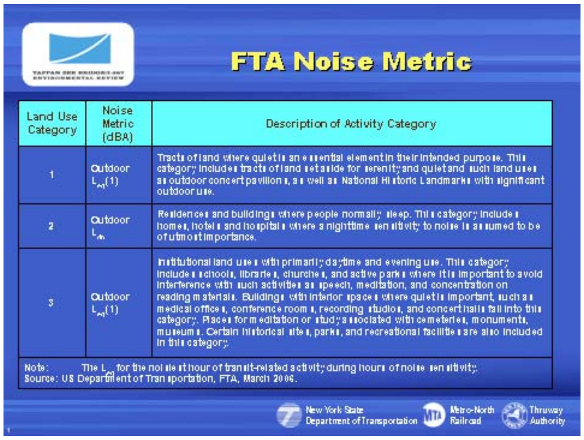
Slide 14

This table summarizes typical land use categories defined by FHWA and the associated Leq level that results in application of noise abatement measures for each land use type.



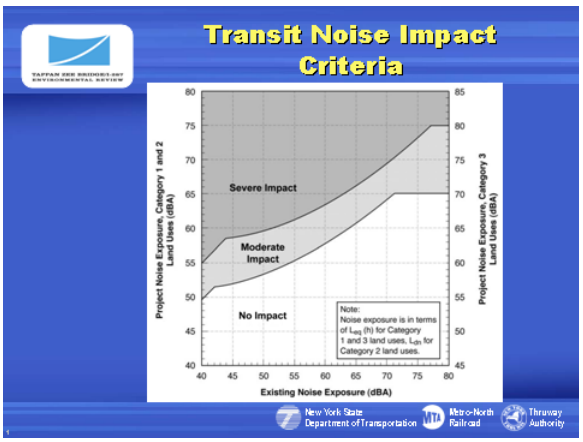
Slide 15

To follow up the FHWA general guidance, NYS DOT has established specific traffic noise impact thresholds based on 1) total future noise levels and 2) incremental noise levels over existing condition. The EIS will particularly focus on the impact on Category B land uses along the corridor.



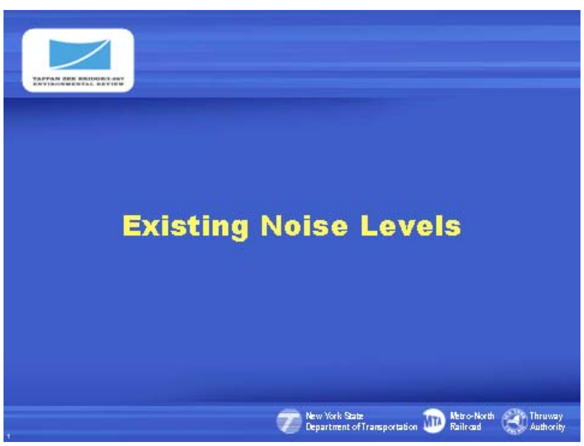
Slide 16

Since transit development could occur along non-highway corridor segments, the FTA noise metrics shown in the slide would be applied along such segments.



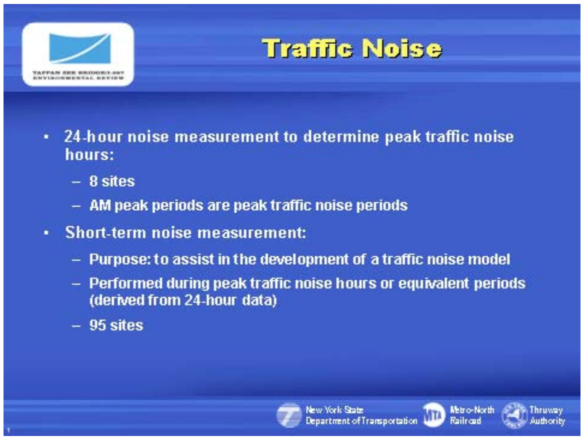
Slide 17

FTA transit noise impact criteria shown in the chart are based on a comparison of project noise levels to existing noise levels.



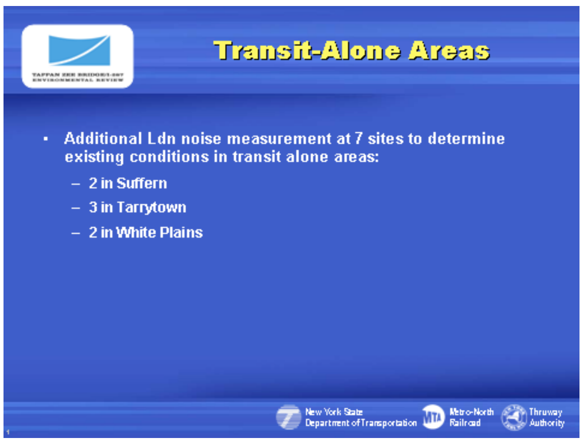
Slide 18

This section of the presentation addresses existing noise levels along the corridor.



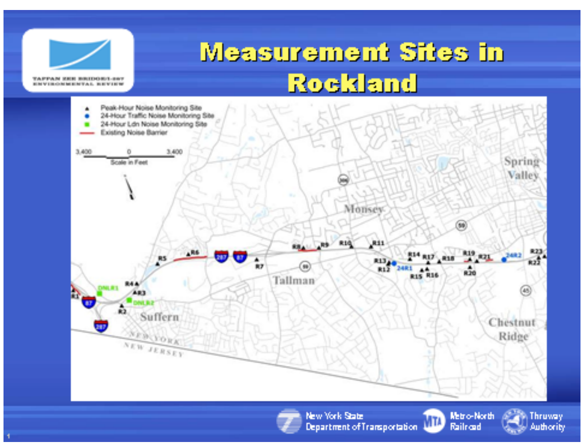
Slide 19

Since noise abatement measures are based on absolute noise levels, it is important to establish the peak hour traffic noise condition. Full day noise measurements taken along the corridor are the basis for selecting a peak noise hour for the analysis. Furthermore, short-term measurements assisted in development of a noise model for the corridor.



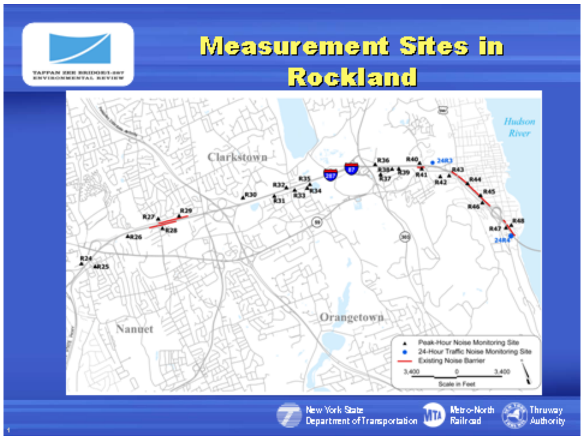
Slide 20

In order to address the case where transit is not along the highway corridor, several sites were also selected for Ldn measurements so that FTA criteria could be applied.



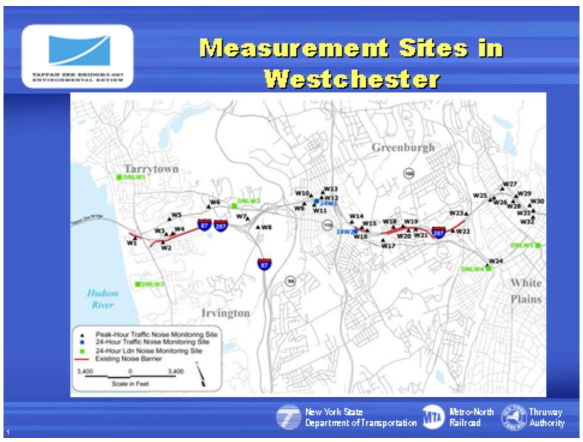
Slide 21

This slide identifies noise measurement sites selected on west side of Rockland.



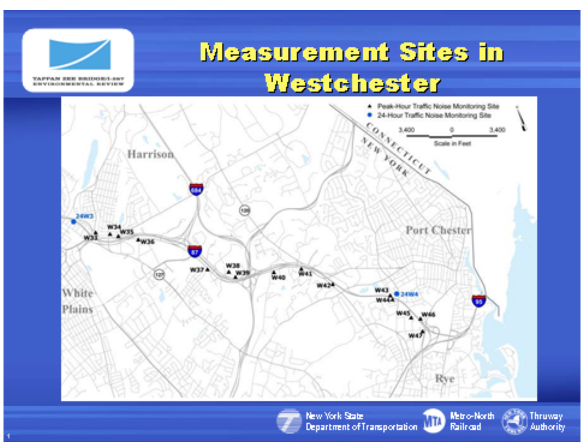
Slide 22

This slide shows noise measurement sites selected on east side of Rockland.



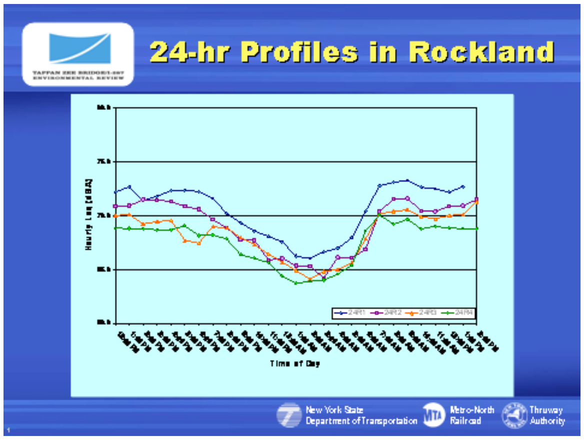
Slide 23

This slide identifies noise measurement sites selected on east side of Westchester.



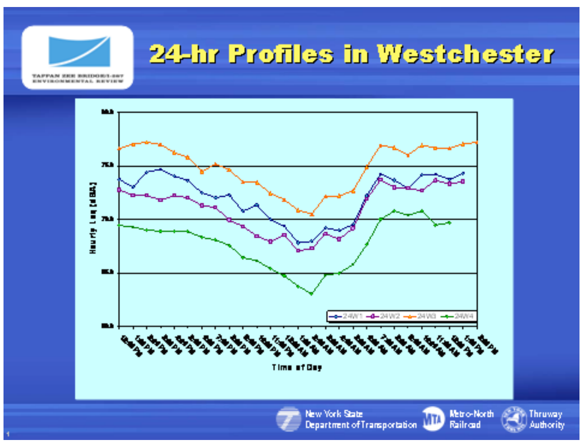
Slide 24

This slide shows noise measurement sites selected on west side of Westchester.



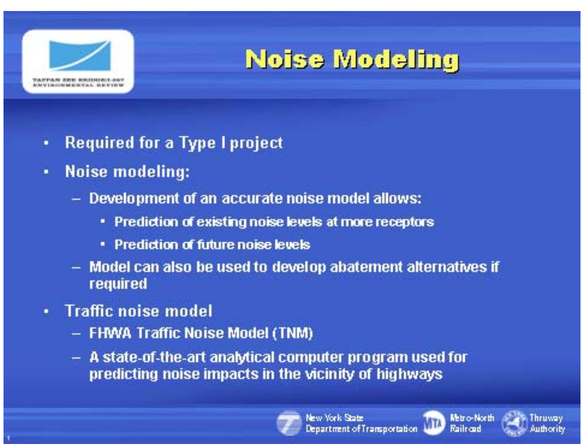
Slide 25

This chart shows the 24-hour noise profiles in Rockland at 4 sites. AM peak hours have the highest noise levels.



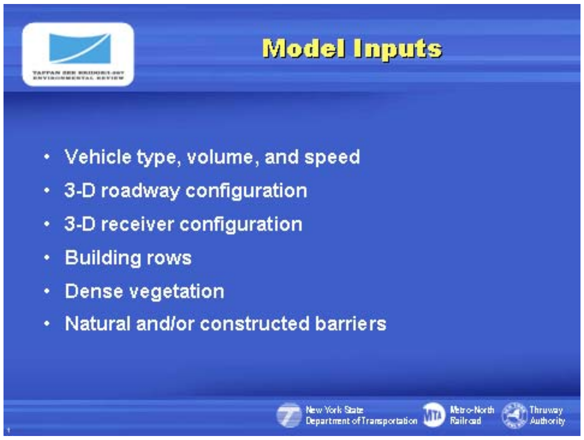
Slide 26

This chart shows the 24-hour noise profiles in Westchester at 4 sites. AM and mid-day peak hours are the worst and have comparable noise levels.



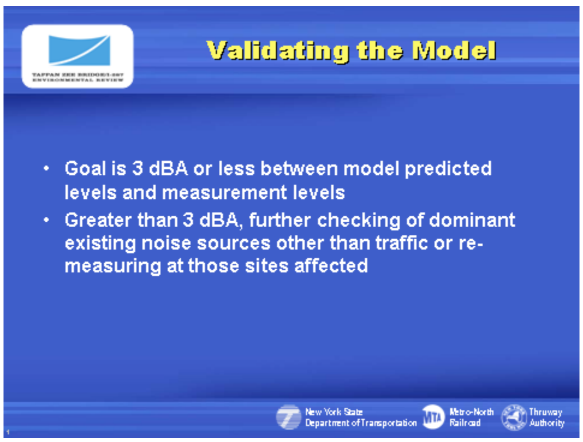
Slide 27

This slide discusses the purpose for modeling noise levels and identifies the model to be applied to estimating project impacts.



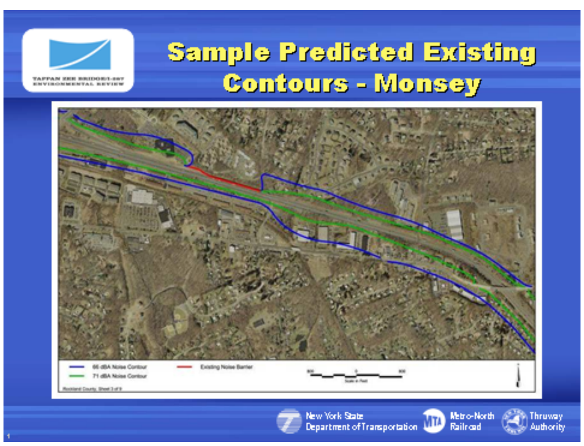
Slide 28

This slide summarizes the input parameters considered in the noise model.



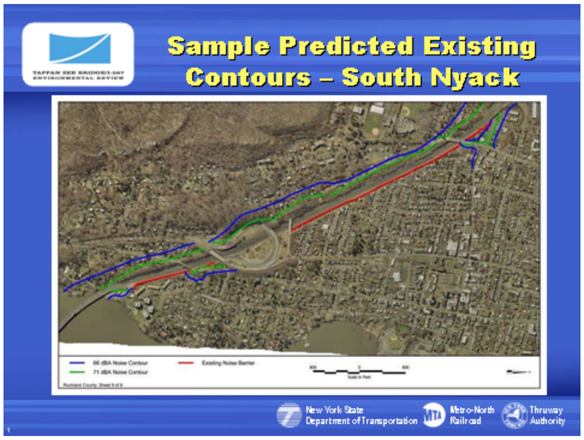
Slide 29

A barely perceptible noise change, i.e. 3 dBA, provides the model validation threshold.



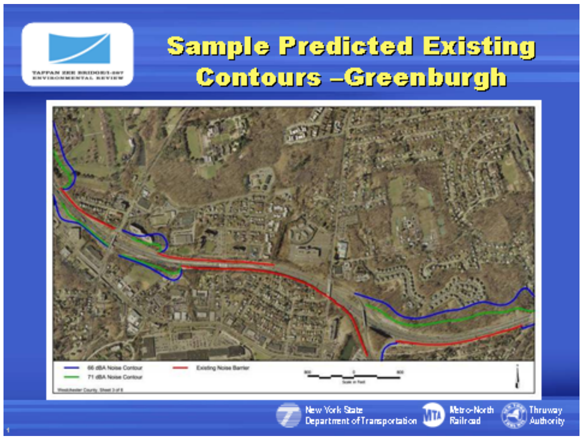
Slide 30

These are model predicted 66 dBA and 71 dBA contours along the corridor near Monsey based on 2005 collected traffic data.



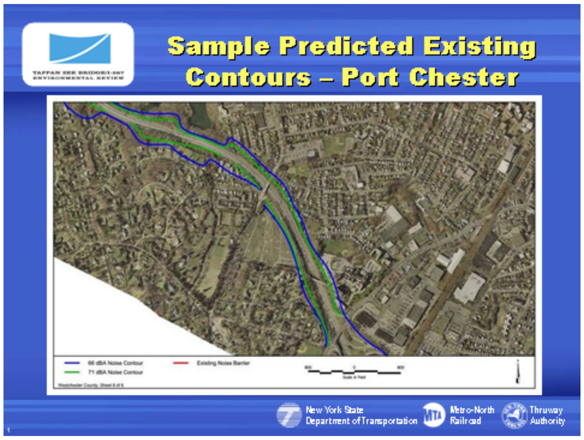
Slide 31

The figure shows 66 dBA and 71 dBA contours along the corridor in South Nyack.



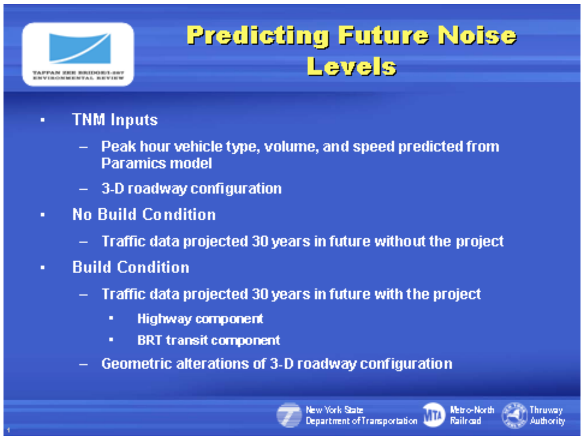
Slide 32

The figure shows 66 dBA and 71 dBA contours along the corridor in Greenburgh.



Slide 33

The figure shows 66 dBA and 71 dBA contours along the corridor in Port Chester.

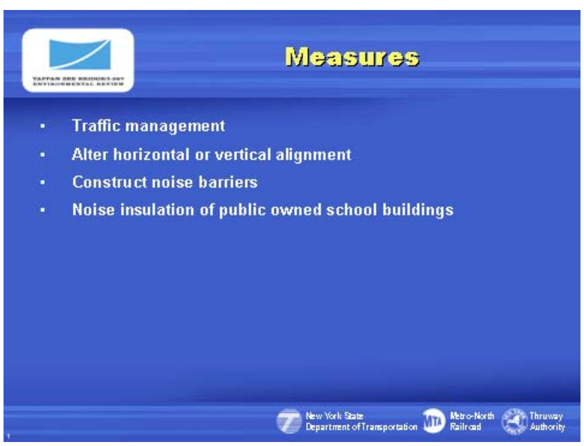


Slide 34

Traffic noise model inputs to be considered under the future no build and build conditions.

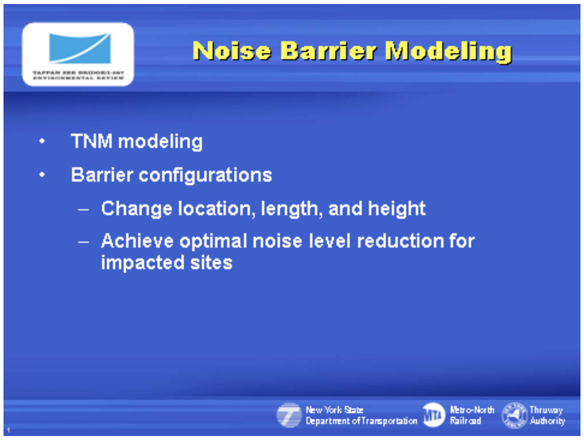
Slide 35

Now the presentation will address highway traffic noise abatement measures.



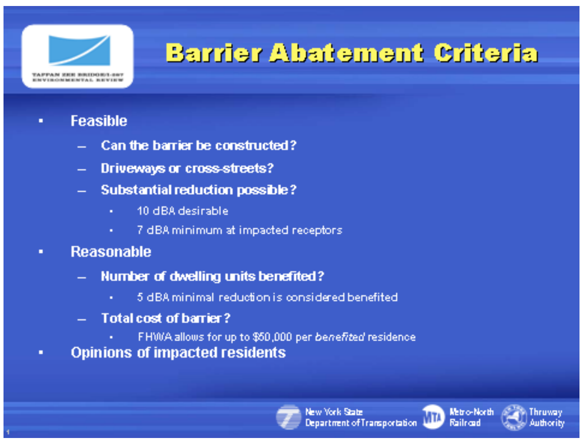
Slide 36

There are four abatement measures that are typically considered for a highway improvement project.



Slide 37

The option of constructing a noise barrier to abate traffic noise is the most common measure. Barrier configurations will be built into the future noise model to determine the optimal length and height to effectively abate noise.



Slide 38

A barrier is effective when it is feasible and its cost is reasonable to achieve the abatement goals for impacted and benefited residences. Opinions from impacted residents are also important for making a final decision on constructing a noise barrier.

Slide 39

A view of barrier installation site.

Slide 40

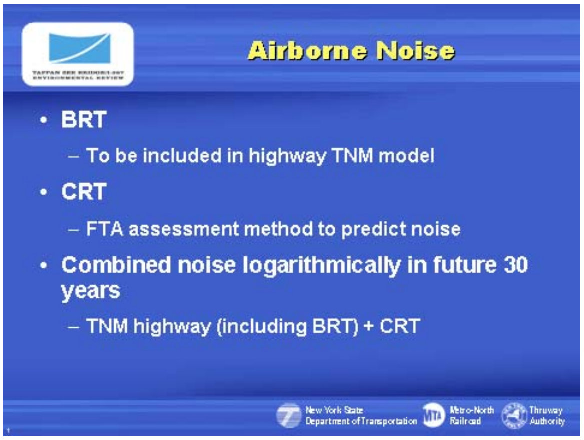
A view of a sample barrier type.

Slide 41

The presentation topic now moves to transit noise and vibration where transit is not in the highway corridor.

Slide 42

This is the analysis guideline book from FTA.

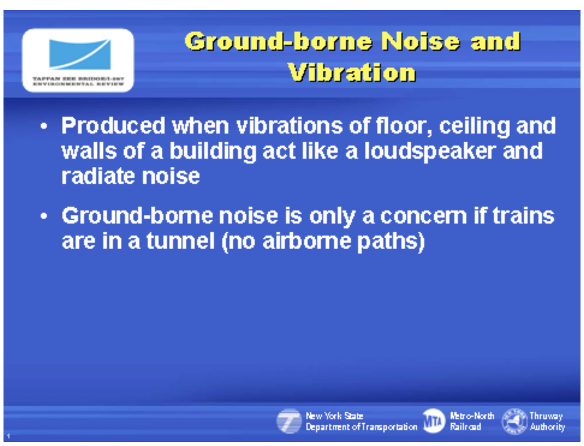


Slide 43

This slide summarizes the methodologies to be used to predict airborne noise from various transit components.

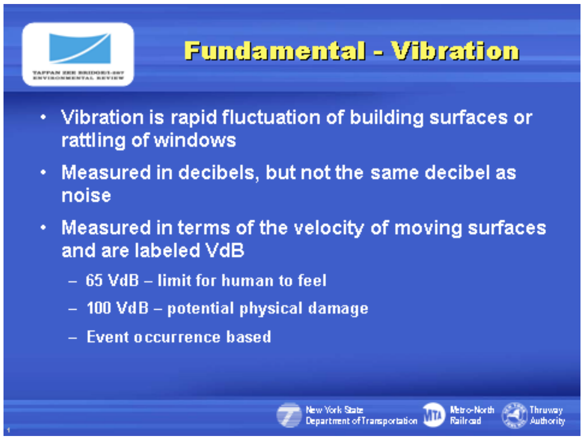
Slide 44

Transit noise mitigation measures are shown in this slide.



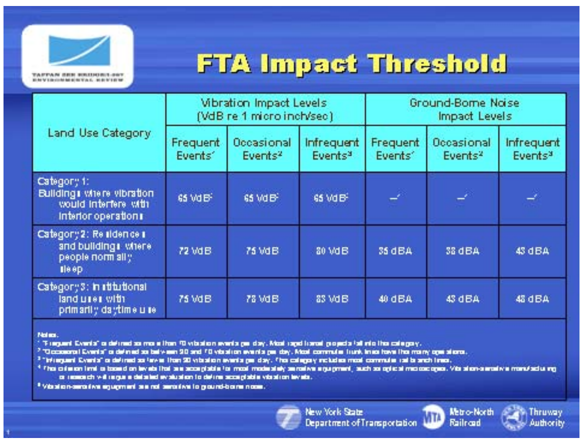
Slide 45

Transit vehicles also generate ground-borne vibration and noise.



Slide 46

This slide discusses vibration and its measuring metric.



Land Use Category	Vibration Impact Levels (VdB re 1 micro inch/sec)			Ground-Borne Noise Impact Levels		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations	65 VdB[4]	65 VdB[4]	65 VdB[4]	–[5]	–[5]	–[5]
Category 2: Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB	35 dBA	38 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use	75 VdB	78 VdB	83 VdB	40 dBA	43 dBA	48 dBA

Slide 47

The table presents FTA the impact threshold to measure ground-borne vibration and noise.

Slide 48

A summary of various vibration mitigation measures is shown in this slide.

Slide 49

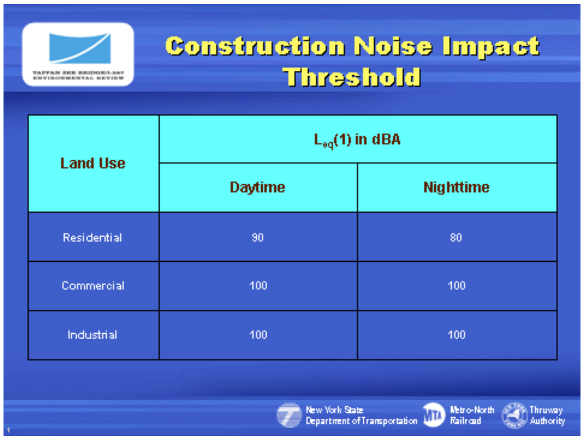
The last topic discussed this evening is construction noise. Construction noise in the project vicinity will be quantified and the applicable abatement measures will be discussed in the EIS.

Slide 50

A typical construction site.

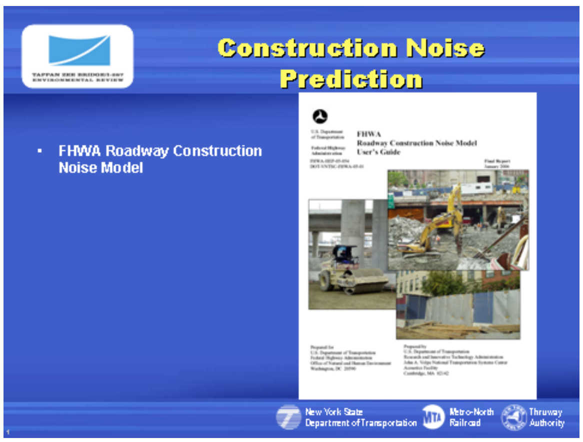
Slide 51

A sample bridge associated construction site.



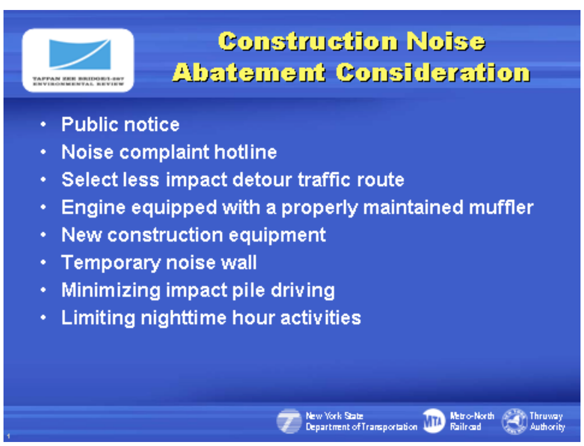
Slide 52

FTA-established construction noise impact thresholds will be used to determine construction noise significance.



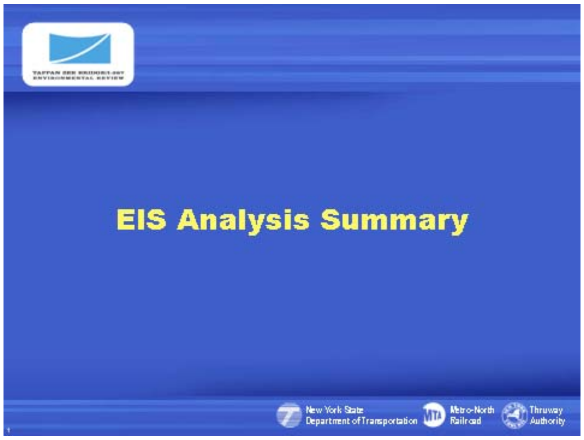
Slide 53

Construction noise levels will be predicted using FHWA model.



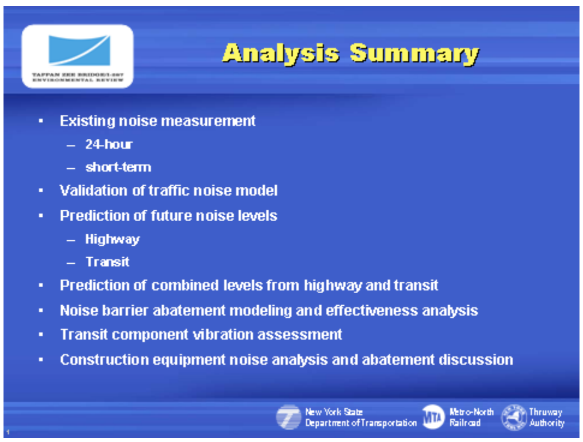
Slide 54

A list of construction noise abatement measures that will be discussed in the EIS.



Slide 55

A summary slide follows.



Slide 56

This slide provides a summary of the analyses to be carried through the EIS.

Slide 57