Evaluation of FDOT's "Special Land Use" Methodology

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FDOT's "Special Land Use" Methodology for calculating barrier reasonableness is based on research:

- Report titled : "A Method to Determine the Reasonableness and Feasibility of Noise Abatement at Special Use Locations" (1997, Updated in 2009)
- "Special Land Use" = non-residential

Methodology based on a "cost abatement factor" that takes into consideration:

- Average height per barrier: 14 ft.
- Assumed frontage of a residential lot: 100 ft.
- Average cost per sq. ft. of barrier: $30/sq. ft.
- Established maximum cost per benefited residence/receptor:

  [(14 ft.)(100 ft.)/benefited receptor]($30/sq. ft.) =
  $42,000/ benefited receptor

- Assumed use of one residence/receptor = 24 hours per day
- Average number of people/residence = 2.46 persons/residence

  (2000 Census)

Abatement Cost Factor

- Quantifies:
  - Typical residential usage
  - Hypothetical barrier occupying the assumed frontage of a residence
- Translates the $42,000/benefited receptor to a cost that can be applied to special land uses.

  ($42,000/residence)(residence/2.46 persons)(usage/24 hours)=

  $711.38/person-hr

Cost Reasonableness for Special Land Uses:

Abatement cost factor adjusted for actual barrier size "X" to come up with the "abatement cost factor":

($42,000/residence)(residence/2.46 persons)(usage/24 hours) X =

$/person-hour/sq. ft.

To calculate the maximum "abatement cost factor":

X = (14 ft.)(100 ft.)

$$\frac{\$42{,}000}{\text{Residence}} * \frac{\text{Residence}}{2.46\ \text{persons}} * \frac{\text{Usage}}{24\ \text{hours}} * (14\text{ft} * 100\text{ft}) = \mathbf{\$995{,}935/\text{person-hour/ft}^2}$$

- This translates the $42,000/benefited residence into a factor that accounts for site usage and actual barrier size.

So in essence for barrier specific calculation, the formula is:

$42,000	X	facility	X	usage	X	sq. ft. of proposed barrier
= residence		# persons using*		hours		

$/person-hr./sq. ft.

*benefited by 5 dB(A) reduction (not part of this presentation)

Use result to compare to the max. of $995,935/person-hr./sq. ft.

A Method to Determine Reasonableness and Feasibility of Noise Abatement at Special Use Locations

Directions: Enter the requested values in the space provided below for items 1, 2, 4, and 5, respective to the units desired. The results will be generated automatically in the table below the black line.

Item	Criteria	Input	
		English Units	SI Units
1	Enter length of proposed noise barrier (ft/m)		
2	Enter height of proposed noise barrier (ft/m)		
4	Enter the average amount of time that a person stays at the site per visit (In hours)		
5	Enter the average number of people that use this site per day that will receive at least a 5 dB(A) benefit from abatement at the site		

*** Do not input any information below this line. Results will be generated automatically in this table based on information input above.**

Item	Criteria	English Units		SI Units	
1	Enter length of proposed noise barrier	0	ft	0	m
2	Enter height of proposed noise barrier	0	ft	0	m
3	Multiply item 1 by item 2	0	ft^2	0	m^2
4	Enter the average amount of time that a person stays at the site per visit	0	hours	0	hours
5	Enter the average number of people that use this site per day that will receive at least a 5 dB(A) benefit from abatement at the site	0	people	0	people
6	Multiply item 4 by item 5	0	person-hour	0	person-hour
7	Divide item 3 by item 6	#DIV/0!	ft^2/person-hour	#DIV/0!	m^2/person-hour
8	Multiply item 7 by $42,000	#DIV/0!	$/person-hour/$ft^2$	#DIV/0!	$/person-hour/$m^2$
9	Does item 8 exceed the "abatement cost factor" of: English Units = $995,935/person-hour/$ft^2$ or SI Units = $92,647/person-hour/$m^2$	#DIV/0!		#DIV/0!	
10	If item 9 is no, abatement is reasonable	#DIV/0!		#DIV/0!	
11	If item 9 is yes, abatement is not reasonable	#DIV/0!		#DIV/0!	

- To date, only one noise barrier constructed by FDOT using this methodology
- Usage data can be difficult to obtain
  - Leads to “back calculation” method
- Some consultants feel method not “one size fits all”

- Currently reviewing updates to parameters
  - Average # of people per residence has increased to 2.63
    - Would *decrease* the allowable cost to $931,559/person-hour/ft^2
- Current formula assumes 24 hours per day of use
  - If reduced to 12 hours, allowable cost would double
- Current average height of noise barriers may change based on latest noise barrier inventory which may change the 1400 sq. ft./benefited receptor factor.

- FDOT contemplating Programmatic Agreement (PA) with FHWA
  - "Special use" facilities that will never have enough use to justify cost reasonable noise abatement
    - "Single use" recreational facilities
    - Recreational facilities within residential areas
    - Trails
    - Exterior use areas at places of worship
    - Golf courses
    - Cemeteries
    - Restaurant outdoor seating areas
    - Hotel/motel pools

- Data collection to support development of PA
  - 71 project-specific examples
    - 62 Activity Category C
    - 2 Category D
    - 7 Category E
  - Larger gap between calculated and allowable costs when actual usage data used
- FDOT deciding how to proceed with PA

Thank You!

Questions?