



Session 2

23 CFR 772: Land Use Activity Categories and Evaluation Methodologies

- ▶ Facilitator: Greg Smith, North Carolina DOT
- ▶ Participants:
 - ▶ Greg Smith, North Carolina DOT
 - ▶ Danielle Shellenberger, Pennsylvania DOT
 - ▶ Cora Helm, Montana DOT

23 CFR 772: Land Use Activity Categories and Evaluation Methodologies



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Noise Summit Session 2

Baltimore, MD
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23 CFR 772: Land Use Activity Categories and Evaluation Methodologies

Table 1			
Noise Abatement Criteria			
Hourly Equivalent A-Weighted Sound Level (decibels (dB(A)))			
Activity Category	Activity Criteria Leq(h)	Evaluation Location	Activity Description
A	57	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve 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	Residential
C	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52	Interior	Auditoriums, day-care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F
F	--	--	Agriculture, airports, bus yards, emergency services, industrial, logging maintenance facilities, manufacturing, mining, rail yards, retail facilities, ship yards, utilities (water resources, water treatment, electrical), and warehousing
G	--	--	Undeveloped lands that are not permitted

From 23 CFR 772

A9. What is the focus of the FHWA Noise Abatement Criteria (NAC)?

The FHWA NAC focuses on levels where highway traffic noise could potentially interfere with speech communication in exterior areas. 23 CFR 772's primary focus is on determining traffic noise impacts and considering noise abatement for exterior areas of frequent human use.

23 CFR 772: Land Use Activity Categories and Evaluation Methodologies

Aa	57a	Exteriora	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
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- Could this definition not include every cemetery, military park, and natural area?
- In NC, we have had the public question why their local cemetery is not considered to be in NAC Category A.
- Per it's guidance, the FHWA "must approve a land use as Activity Category A before a noise analysis on an Activity Category A is initiated".
- What is the FHWA criteria for allowing Category A Land Uses?

23 CFR 772: Land Use Activity Categories and Evaluation Methodologies

B ³ a	67a	Exteriora	Residentiala
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- Generally no problems here, but certainly open for discussion.
- Should extended-stay hotels and motels considered residences?
- Per FHWA guidance, “The highway agency should develop a method to evaluate the number of receptors used to represent (associated common areas at multi-family dwelling units). The number of receptors for common areas includes all users or potential users of the impacted common area(s)”.

23 CFR 772: Land Use Activity Categories and Evaluation Methodologies

C-3a	67a	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
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- Are active sports areas and playgrounds really noise-sensitive?
- Are golf courses and public swimming pools included here? If so, are they noise-sensitive?
- How are equivalent receptor calculations best applied for trails, golf courses, parks, cemeteries, etc., when no real usage data is available?
- Is a funeral home a place of worship, an office or a retail facility?

23 CFR 772: Land Use Activity Categories and Evaluation Methodologies

Do	52a	Interior	Auditoriums, day-care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or non-profit institutional structures, radio studios, recording studios, schools, and television studios
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- When should interior noise level data be collected ?
- How are equivalent receptor calculations best applied for trails, golf courses, parks, cemeteries, etc., when no real usage data is available?
- Consider previous funeral home question.

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E-30	720	Exterior0	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F0
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- Per FHWA guidance, “When determining the number or receivers for Activity Category E land uses, the highway agency should make this determination in the same manner that the number or receivers were determined for multi-family residences.
- Is it really reasonable to treat hotels and motels the same as multi-family residences?
- If no pools, playgrounds or other exterior areas of frequent human use, then no need to assess?

23 CFR 772: Land Use Activity Categories and Evaluation Methodologies

Fo	--o	--o	Agriculture, airports, bus yards, emergency services, industrial, logging maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousingo
Go	--o	--o	Undeveloped lands that are not permittedo

- No noise analysis is required for Category F Land Uses. Should they be given receptor numbers?
- If no other exterior areas of frequent human use are present at a hospital but an emergency entrance is present, is the hospital area now considered an “emergency service” and no analysis is required?
- Are TNM-generated noise contours sufficient to provide noise levels for local governments?

23 CFR 772: Land Use Activity Categories and Evaluation Methodologies

- Does your state have similar issues and questions?
- What have you done to address them?
- What has – and/or has not - worked for you?

23 CFR 772: Land Use Activity Categories and Evaluation Methodologies

- Participants for Session 2:
 - Danielle Shellenberger
Pennsylvania DOT
 - Cora Helm
Montana DOT

THANK YOU

FOR YOUR PARTICIPATION

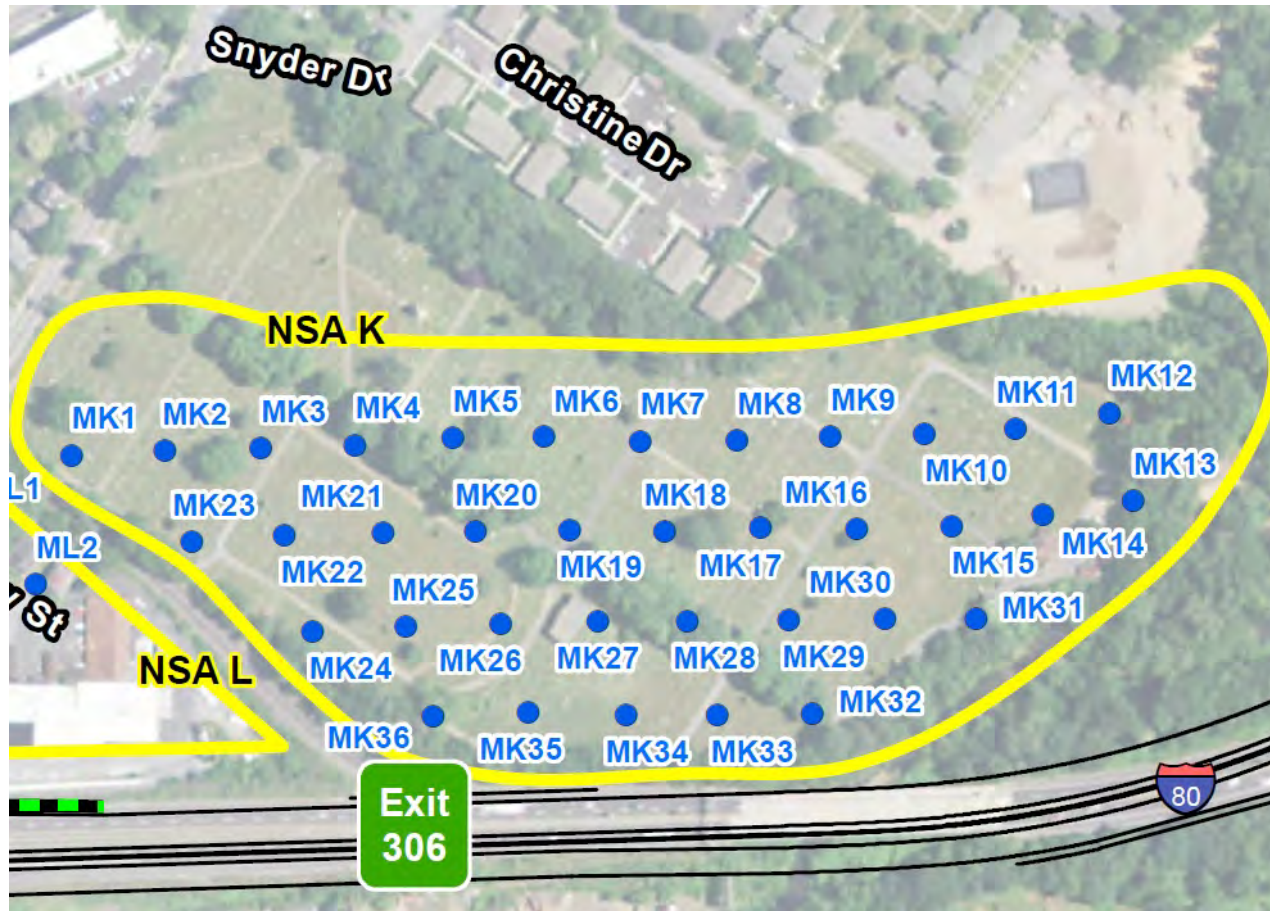




Methodologies for Determining Non-Residential Land Use Values



Grid Method





Category B ERU

APPLICABLE CRITERIA ASSOCIATED WITH ACTIVITY CATEGORY B		Category B Exterior Locations	
Exterior design year Leq noise level equal to or exceeding 66dBA with the Build condition or design year exterior Build condition Leq 10 dBA or greater than existing exterior Leq noise level.			
ROW NUMBER	POSSIBLE INPUT PARAMETERS	Single Family Residence	Duplex Dwelling
A	Number of units in building	1	2
B	Number of units exposed to project-related noise		
C	Capacity of Site		
D	Average Use Factor		
E	Hours Available Per Day	15*	
F	Persons Using Per Day	2.48*	
G	Person-Hours Per Day	37.2*	
H	Days Per Year Used	365*	
I	Person-Hours Used Per Year = GxH	13578*	
J	Equivalent Residential Units (ERU) = Row I Value divided by 13578	1	2



A closer look at an Apartment Pool

APPLICABLE CRITERIA ASSOCIATED WITH ACTIVITY CATEGORY B		Category B Exterior Locations	
Exterior design year L_{eq} noise level equal to or exceeding 66dBA with the Build condition or design year exterior Build condition L_{eq} 10 dBA or greater than existing exterior L_{eq} noise level.		Single Family Residence	Apartments or Condominium Complex
			Apartment Pool
A	Number of units in building	1	
B	Number of units exposed to project-related noise		
C	Capacity of Site		150
D	Average Use Factor		0.3
E	Hours Available Per Day	15*	10
F	Persons Using Per Day	2.48*	
G	Person-Hours Per Day	37.2*	450
H	Days Per Year Used	365*	110
I	Person-Hours Used Per Year= GxH	13578*	49500
J	Equivalent Residential Units (ERU) = Row I Value divided by 13578	1	4



A closer look at a Playground using a Single location

APPLICABLE CRITERIA ASSOCIATED WITH ACTIVITY CATEGORY C		BASE	Category C Exterior Uses Represented by a Single Location on the Property
Exterior design year L_{eq} noise level equal to or exceeding 66dBA with the Build condition or design year exterior Build condition L_{eq} 10 dBA or greater than existing exterior L_{eq} noise level.		Single Family Residence	Playground
A	Average Event Attendance of Outside Use Area		
B	Average Time Used by Each Person Per Event (hours)		
C	Average Number of Events per Event Day		
D	Capacity of Site		
E	Average Use Factor		
G	Hours Available Per Day	15*	1
H	Persons Using Per Day	2.48*	150
I	Person-Hours Per Day	37.2*	150
J	Days Per Year Used	365*	300
K	Person-Hours Used Per Year = IxJ	13578*	45000
L	Equivalent Residential Units (ERU) = Row K Value divided by 13578	1	3



> A combination of Grid and ERU

APPLICABLE CRITERIA ASSOCIATED WITH ACTIVITY CATEGORY C		BASE VALUE	Adjustments to Grid Point Values Within Category C Exterior Use Area Represented by Grid Points (130' Grid)	
Exterior design year Leq noise level equal to or exceeding 66 dBA with the Build condition or design year exterior Build condition Leq 10 dBA or greater than existing exterior Leq noise level.		Single Family Residence	Cemetery (Case 1)	Cemetery (Case 2)
A	Number of units in building	1		
B	Average Event Attendance of Outside Use Area			2
C	Average Time Used by Each Person Per Event (hours)			1
D	Capacity of Site		2000	2000
E	Hours Available Per Day	15*	1	
F	Persons Using Per Day	2.48*	200	
G	Person-Hours Per Day	37.2*	200	
H	Days Per Year Used	365*	365	1
I	Person-Hours Used Per Year = GxH	13578*	73000	4000
J	Equivalent Residential Units (ERU) = Row I Value divided by 13578	1	5	0.295
K	Grid Points Within Overall Land Use Activity Area		80	80
L	Apply specific site's ERU Value to this number of points within 130' grid			
M	Retain ERU Value of 1 for the following number of points within 130' grid			
N	Apply this value equally to each grid point in 130' grid		0.0672	0.0037

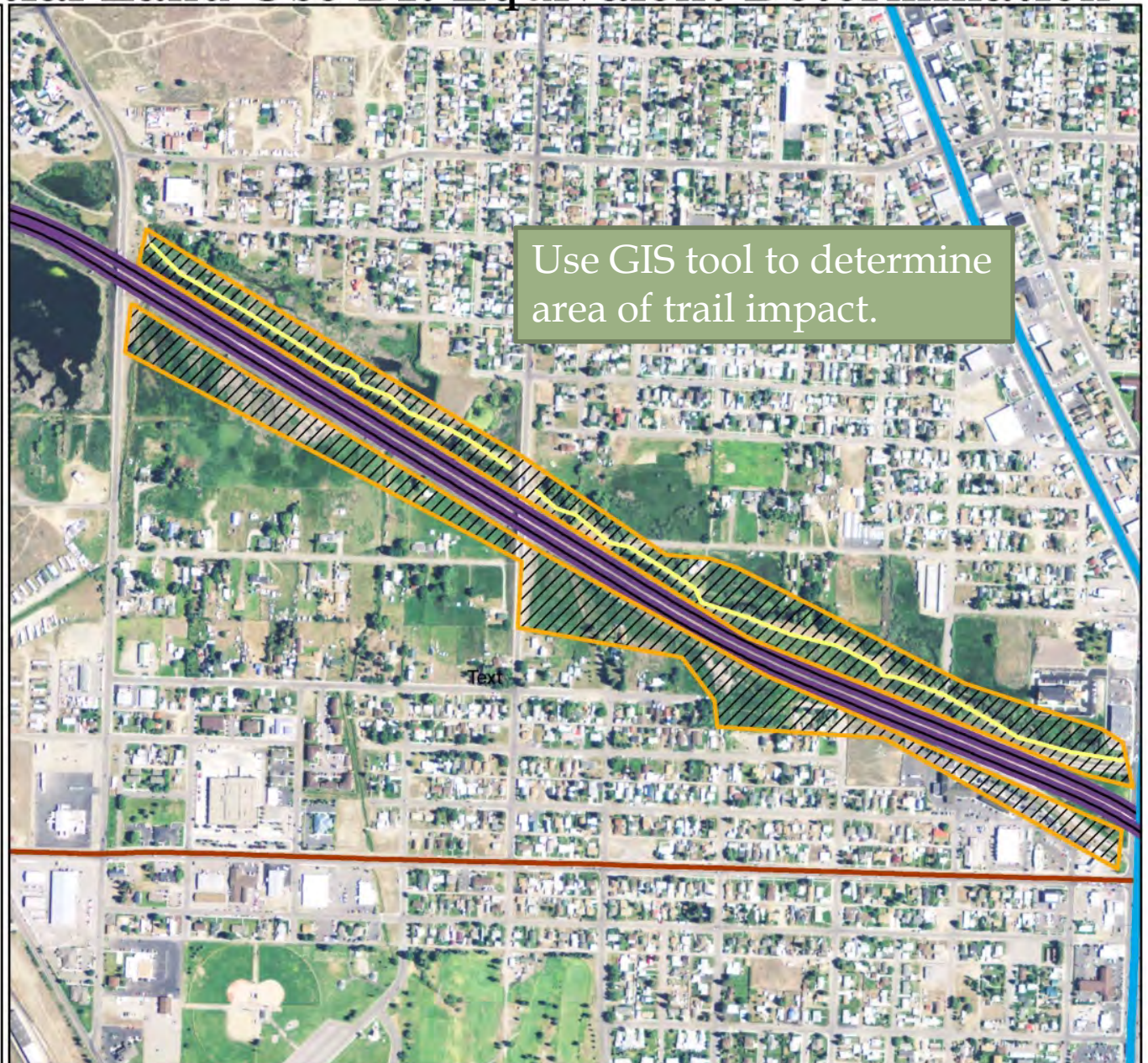
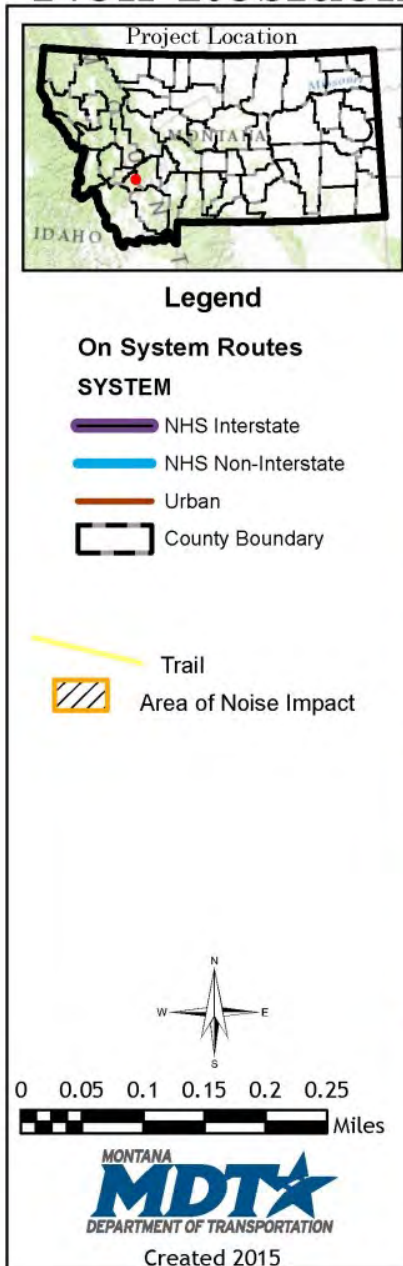
NON-RESIDENTIAL BENEFITED RECEPTOR EQUIVALENT

Montana's Method



Cora Helm - MDT

Non-Residential Land Use BR Equivalent Determination



Non-Residential Land Use BR Equivalent Determination



Legend

On System Routes

SYSTEM

- NHS Interstate
- NHS Non-Interstate
- Urban

Cadastral by Property Type

Other

Property Type

- Commercial Urban
- Residential Urban
- Exempt Property
- Non-Valued Property
- Townhouse Urban
- Vacant Land Rural
- Vacant Land Urban
- County Boundary

Area of Noise Impact

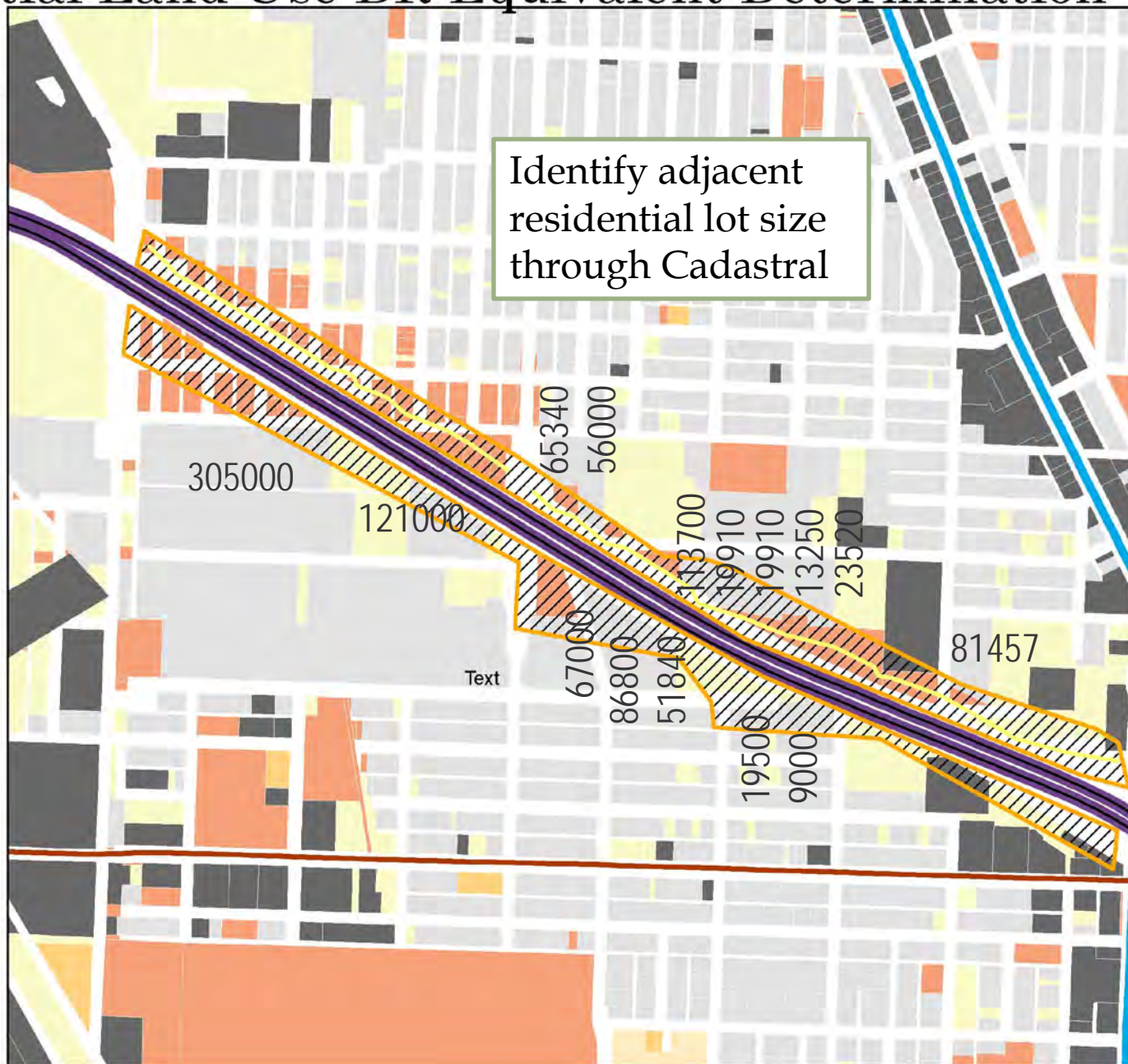
Trail



0 0.05 0.1 0.15 0.2 0.25
Miles



Created 2015



1

Residential Lot
size (sq ft)

305000

121000

67000

86800

51840

19500

9000

81457

23520

13250

19910

19910

113700

56000

65340

2

Average Lot size
70,215 sq ft

3

Area of Trail
Impact (sq ft)

1,150,000

4

Benefited
Receptor Equiv:

$$\frac{1150000}{70215} = 16$$

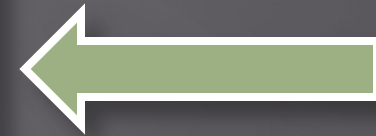
5

If there is seasonal
use, apply seasonal
multiplier...

5 Seasonal multiplier

Month	Average Hours Of Sunlight	Month	Average Hours of Sunlight
January	9.00	July	15.50
February	10.33	August	14.25
March	12.00	September	12.50
April	13.67	October	10.83
May	15.25	November	9.25
June	16.00	December	8.50

Season	Hours	Seasonal Multiplier
Year-round	147.08	None
Jun-Jul-Aug	45.75	0.31
Sept-June	101.33	0.69
Apr-Oct	98.00	0.67



Benefited Receptor Equivalents
 $16 \times 0.67 = 10.7 \sim 11$



Session 2 - Questions

- ▶ Waldman, CO: Does your state have any designated Activity Category A's? (772.11(c)(2)(i))
- ▶ Are any NAC approach levels set at 2 or more dB(A) less than the Federal NACs? If yes, for which NACs and what are the approach levels?; 772.11(e)
- ▶ Tedford, CT: How do other states address special areas within Activity A (i.e. swimming pool areas or communal areas within a larger complex, etc.)? This would imply being a single receiver but how many receptors are used to count the impacts and benefited?



Session 2 - Questions

- ▶ Hanf, MI: Is a farm house on land that is zoned “agricultural” considered a “residence” or categorized with the land use?
- ▶ Burcham, MO: Have state using the frontage method found that it produces a lot of counter intuitive results? How many states have moved away from the method?
- ▶ Jordahl-Larson, MN: Guidance on noise analysis for cemeteries and on modeling/evaluating interior noise, abatement choices, cost limitations, etc.
- ▶ Moch, ND: NDDOT had an issue with ‘Man Camps’ or transient homes that were considered temporary and not treated as permanent residences.



Session 2 - Questions

- ▶ Alcala, OH: Questions with equivalent receptor calculations for trails, golf courses, parks, schools, cemeteries, etc.
- ▶ Newvine, OR: How are other DOTs dealing with ‘grandfathered’ uses?
- ▶ Berrios, FL: Are there programmatic agreements with FHWA Div. Office for state specific activity categories for which abatement is typically not reasonable (e.g. golf courses).
- ▶ Missing or unclear land uses (e.g., campground/RV parks)? Need changes?
- ▶ Methods for calculating use of trails or other areas where data is not readily available. How do you obtain daily use data?