

# Report from the Washington State Department of Transportation

Environmental Services Office

**Lynn Peterson ,**  
Secretary of Transportation

**Transportation Research Board ADC40  
2014 Summer Meeting**  
Portsmouth, NH

July 20-23, 2014



## Washington State DOT

**The Environmental  
Services Office  
provides central  
support to six  
Regional Offices.**

Most Air, Acoustics, and Energy work is located in the Seattle metropolitan area, so that Program is located in Seattle at the Northwest Region Office. The rest of the Environmental Services Office is in Olympia (the State Capitol)



# Organizational Background

## Air, Acoustics, & Energy Program

HQ Environmental Services

**Policy  
Manager**

**Technical  
Manager**

Air Quality /  
Acoustics Specialist

Air Quality /  
Acoustics Specialist

Air Quality /  
Acoustics Specialist



### Noise & Vibration

- Ferry
- Transit
- Light Rail
- Heavy Rail
- High Speed Rail



**Federal Highway  
Administration**

### Noise

- Interstate Hwy
- State Hwy
- Major Arterials

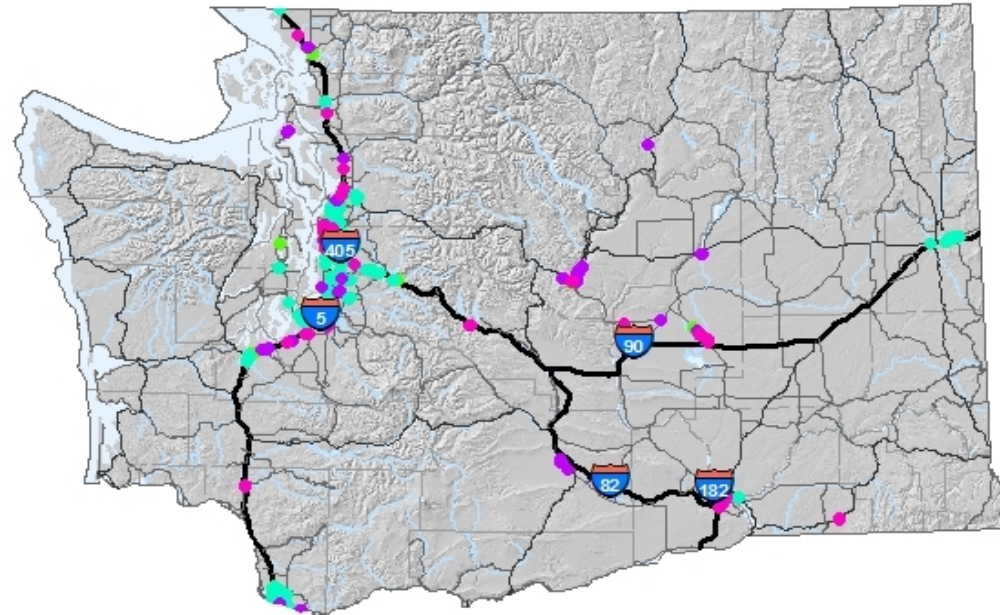


# Overview of Current GIS Workbench Noise Data

In **2005**, we had someone work through the project sheets and define locations for existing and proposed noise walls. Those locations were used to build two GIS data sets:

Proposed  
Existing

***These are maintained in coordination with the three year reporting to FHWA.***



# Noise Wall Data Fields

## Proposed Walls

Table

Proposed Retrofit Noise Walls

RETROFIT_STATUS	Ranking2009	REGION	COUNTY	SR	BEG_ARM	END_ARM	OFFSET	LOCATION
Proposed	5	Northwest	Island	020	32.32	32.75	-40	60th NW St.
Proposed	13	South Central	Benton	240	38.14	38.58	-40	Nevada Avenue to Short Avenue, Richland
Proposed	17	Northwest	King	005	170.1	170.3	-40	Ravenna
Proposed	10	South Central	Walla Walla	012	338.57	338.8	-40	Crawford Dr. to Fraizier Dr., Walla Walla north side

15 (0 out of 65 Selected)

Proposed Retrofit Noise Walls

## Existing Walls

Table

Existing Noise Walls

RETROFIT_S	TYPE_	YEAR_RETROFIT_FIX	MATERIAL	SPEC_MAT	LENGTHFEET	MaxHeightFt	MinHeightFt	COSTORIG	COST2005	SOURCE	
Fixed	I/S	2006	Precast Conc	<Null>	1300	22	<Null>	1110829	<Null>	Project Office	Roanoke to S
Fixed	I	1995	Concrete/Pre	<Null>	823	9	<Null>	221573	263197.5	Plan Sheet	196th ave SE
Fixed	I	1999	Concrete/Pre	<Null>	1856	11	<Null>	612414	649652.4	Plan Sheet	Bothell to Sw

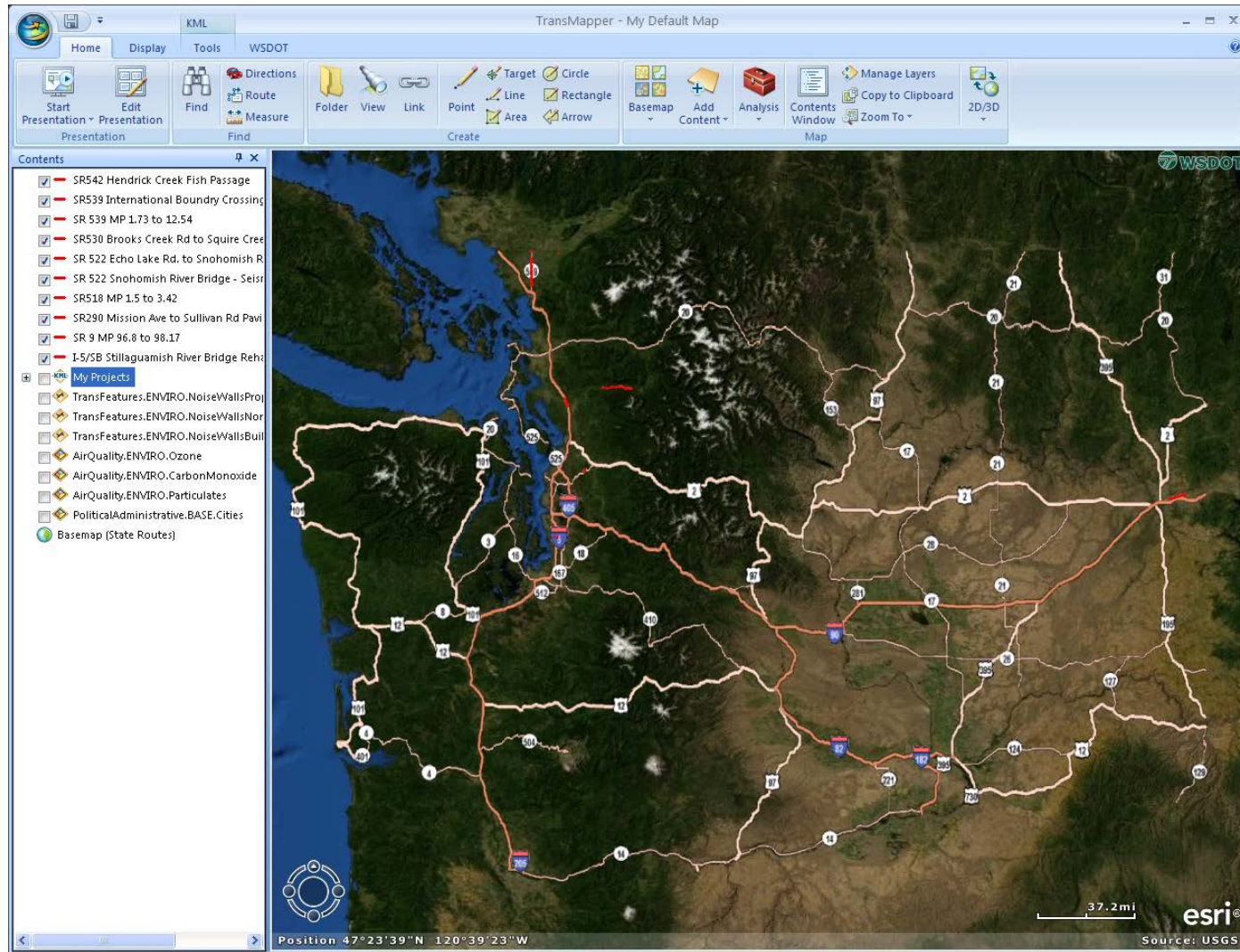
0 (0 out of 244 Selected)

Existing Noise Walls

*Not shown - fields on location and details on source document*



# My Projects map



# Example Project

The screenshot displays the TransMapper software interface, titled "TransMapper - My Default Map". The interface includes a top menu bar with "Home", "Display", "Tools", "Appearance", and "WSDOT". Below the menu is a toolbar with icons for "Find Address", "Location Information", "Map SRMP / ARM", "Find Nearest Route Location", "Find a State Route", "Locate Route Segment", and "Launch SRView at selected location".

On the left, the "Contents" pane lists various project layers, including "I-5/SB Stillaguamish River Bridge Rehab", "SR 9 MP 96.8 to 98.17", "SR290 Mission Ave to Sullivan Rd Paving", "SR302 Elgin Clifton Rd to SR16", "SR518 MP 1.5 to 3.42", "SR 522 Echo Lake Rd. to Snohomish R. Brd", "SR 522 Snohomish River Bridge - Seismic", "SR 539 MP 1.73 to 12.54", "SR530 Brooks Creek Rd to Squire Creek Vi", "SR539 International Boundry Crossing", "SR542 Hendrick Creek Fish Passage", "My Projects", "TransFeatures.ENVIRO.NoiseWallsPropose", "TransFeatures.ENVIRO.NoiseWallsNonSR", "TransFeatures.ENVIRO.NoiseWallsBuilt", "AirQuality.ENVIRO.Ozone", "AirQuality.ENVIRO.CarbonMonoxide", "AirQuality.ENVIRO.Particulates", "PoliticalAdministrative.BASE.Cities", and "Basemap (State Routes)".

The main map area shows an aerial view of a region with red and yellow lines indicating project routes. Two data tables are overlaid on the map:

**Tukwila**

Name	Tukwila
County Seat	
GNIS	2412106
LastUpdate	5/31/2010 12:00:00 AM
County FIPS	33
Major City	
City FIPS	5372625WA
CityCode	1320
Shape.area	266558502.974447
Shape.len	130913.499093432

**SeaTac**

Name	SeaTac
County Seat	
GNIS	2411855
LastUpdate	
County FIPS	33
Major City	
City FIPS	5362288WA
CityCode	1139
Shape.area	286436705.728548
Shape.len	101031.890926085

The bottom status bar shows the position "47°27'41"N" and the source "Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community". The Esri logo is visible in the bottom right corner.

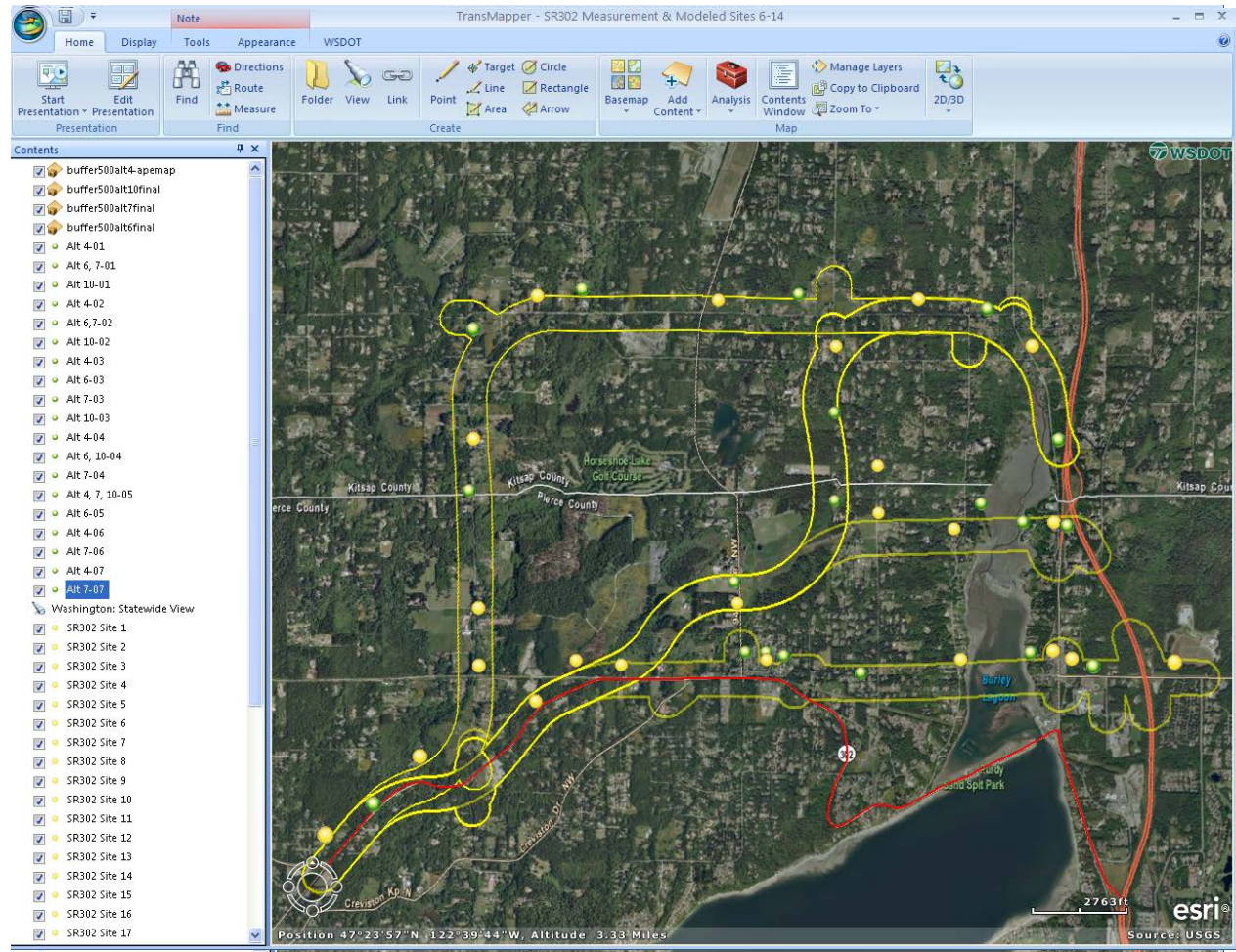


# Working the Noise Analysis

Select Preliminary  
Measurement sites

Produce Project  
Alternative Areas of  
Influence

Select Additional  
Noise Receptors to  
Model





## Noise GIS Effort In Progress...

To assist project scoping, we are developing noise abatement zone data to flag areas that will likely need abatement structures so we can plan an estimate for wall design and construction costs.

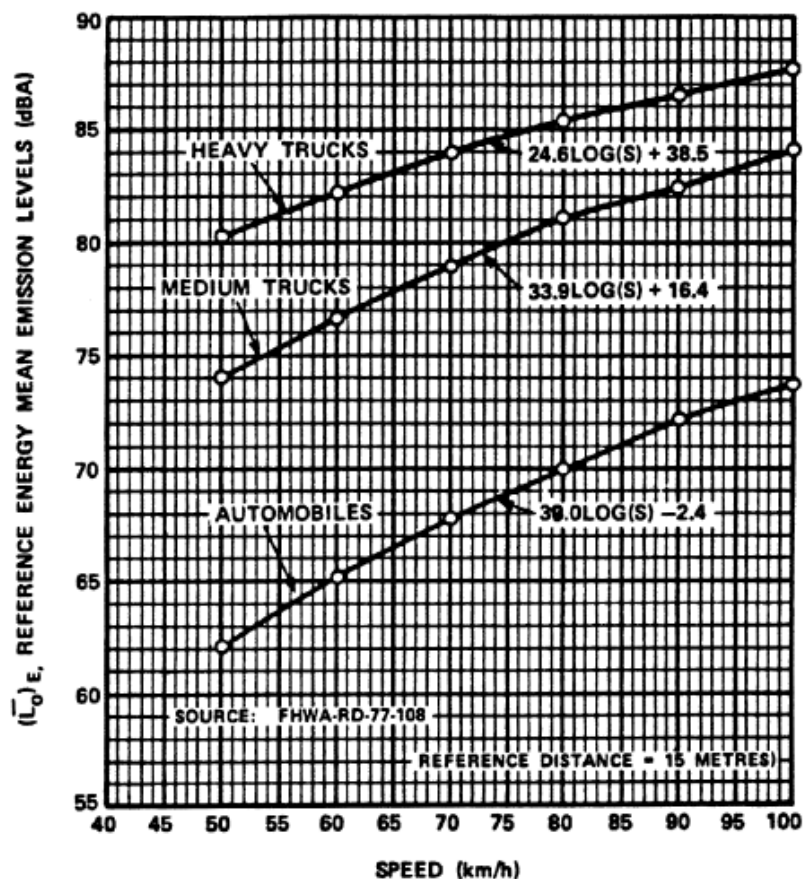
Using AADT, speed limits, road class, and vehicle class to estimate the distance to 65 dBA and create a buffer zone for use in project scoping.

# Buffer based upon Reference Emission Equations

Federal Highway Administration, DOT

Pt. 772, Nt.

APPENDIX A TO PART 772—NATIONAL REFERENCE ENERGY MEAN EMISSION LEVELS  
AS A FUNCTION OF SPEED



LEGEND:

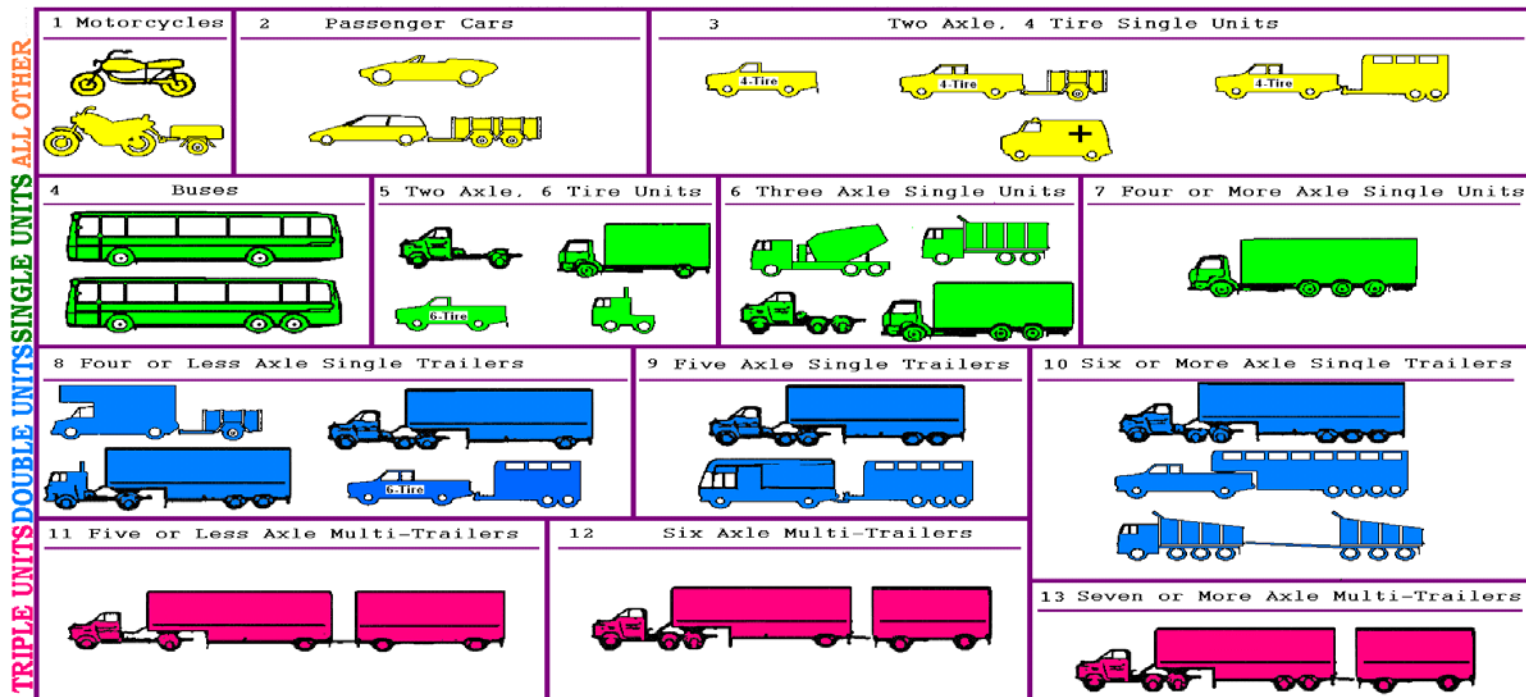
1. AUTOMOBILES: ALL VEHICLES WITH TWO AXLES AND FOUR WHEELS.
2. MEDIUM TRUCKS: ALL VEHICLES WITH TWO AXLES AND SIX WHEELS.
3. HEAVY TRUCKS: ALL VEHICLES WITH THREE OR MORE AXLES.

## National Reference Energy Mean Emission Levels as a Function of Speed

EFFECTIVE DATE NOTE: At 75 FR 39834, July 13, 2010, part 772 was revised, effective July 13, 2011. For the convenience of the user, the revised text is set forth as follows:

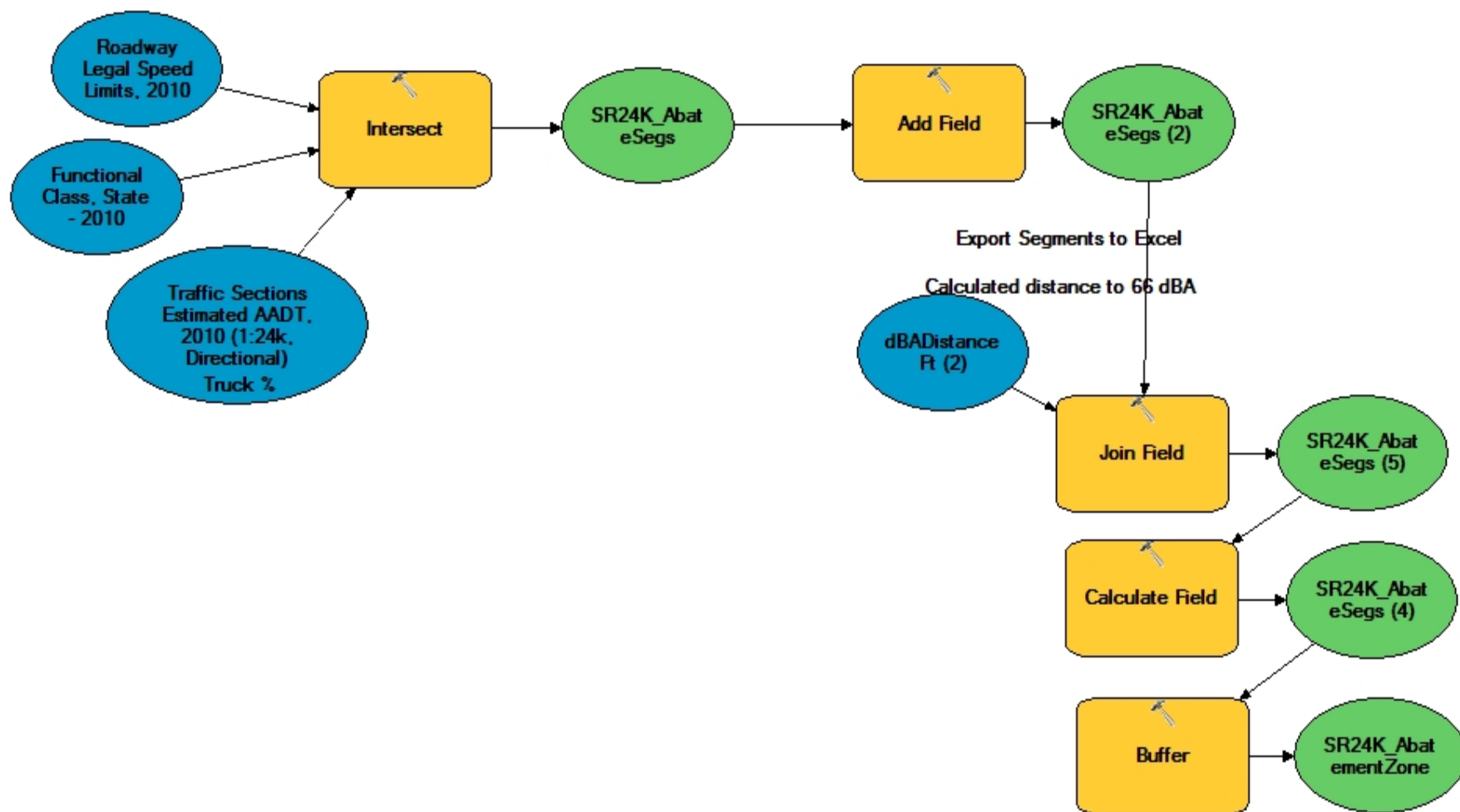


# Calculation Development



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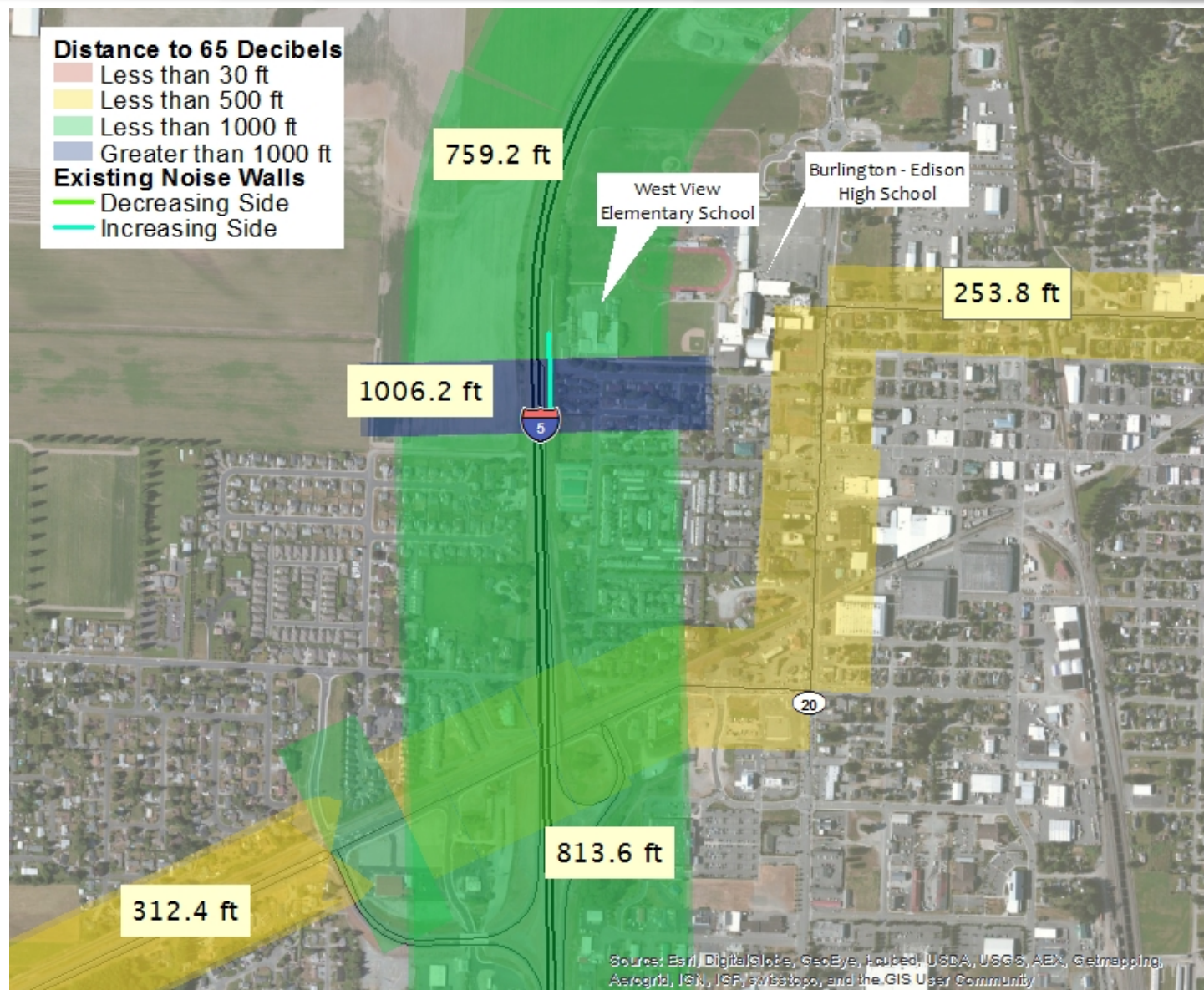
# GeoProcessing Model





# Initial Results

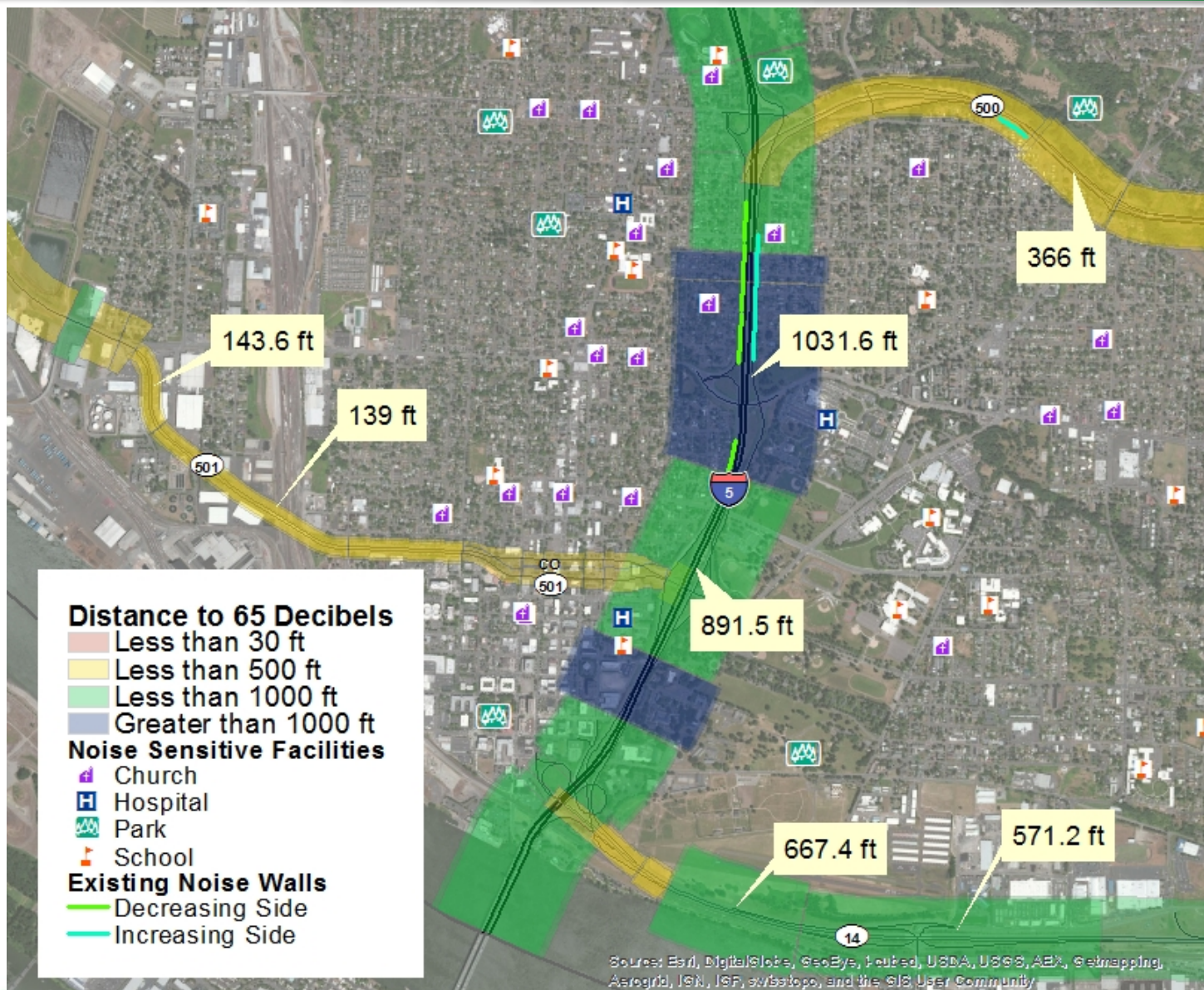
Burlington





# Initial Results

Vancouver





## More Ideas, Improvements, ....

- ✓ Improve our data update & mapping consistency (existing data).
- ✓ Improve display (use offsets) on the existing wall data.
- Update Equations to current modeling technology.
- Integrate noise wall decision documentation with GIS to improve access on record of decisions.
- Start working on more project scale solutions.
- Expand the user base.

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