GIS and Transportation

Fall 2011

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Washington State Transportation Center

Civil and Environmental Engineering

GIS for Transportation (GIS-T)

- Applications
  - Traffic Engineering
  - Transportation Planning
  - Technology / Intelligent Transportation Systems (ITS) Applications

- Sources of GIS data

What is Special about a GIS-T

- Reliance on network data
- Many GIS polygons (areas or zones) are defined by roads– which in transportation are features in themselves
- Require variable data along a network (pavement type, traffic volumes, crashes)
- Multiple lanes in a link (arc)
- Planar vis non-planar (intersection or overpass?)

GIS-T Software

- ArcView has a growing number of transportation functions
- Other specialized GIS-T packages such as TransCAD, Intergraph are available

A Powerful GIS for Transportation

TransCAD is a state-of-the-art GIS that you can use to create and customize maps, build and maintain geographic data sets, and perform many different types of spatial analysis. TransCAD includes sophisticated GIS features such as polygon overlay, buffering, and geocoding, and has an open system architecture that supports data sharing on local- and wide-area networks.

GIS and Traffic Engineering

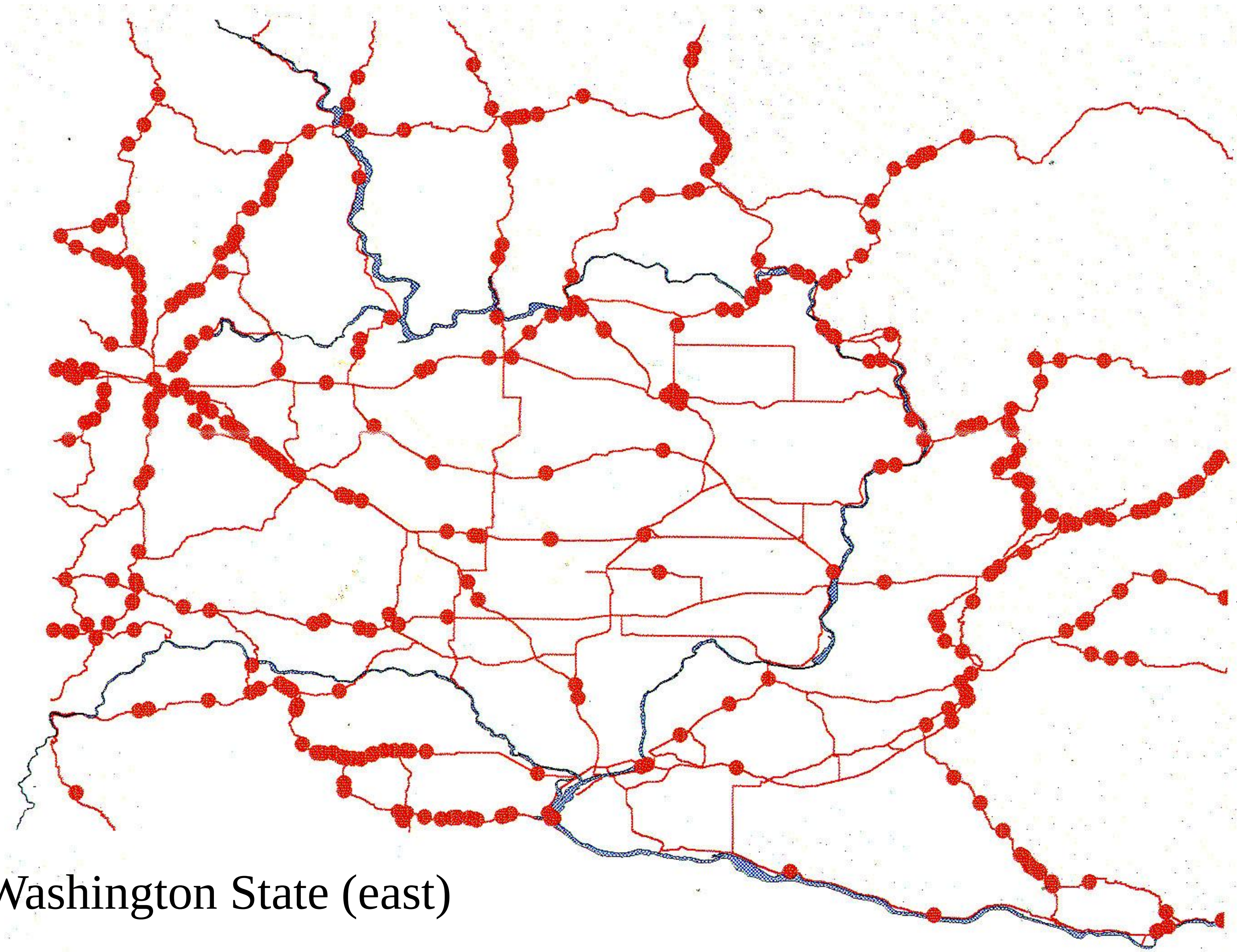
Traffic Safety Studies

- Crashes are recorded on an accident report form
- Location of crash is recorded
- Simple to use GIS to locate crash on roadway and then analyze by crash type, cause, severity, etc.

Crashes Involving Domestic Animals

Washington State (east)

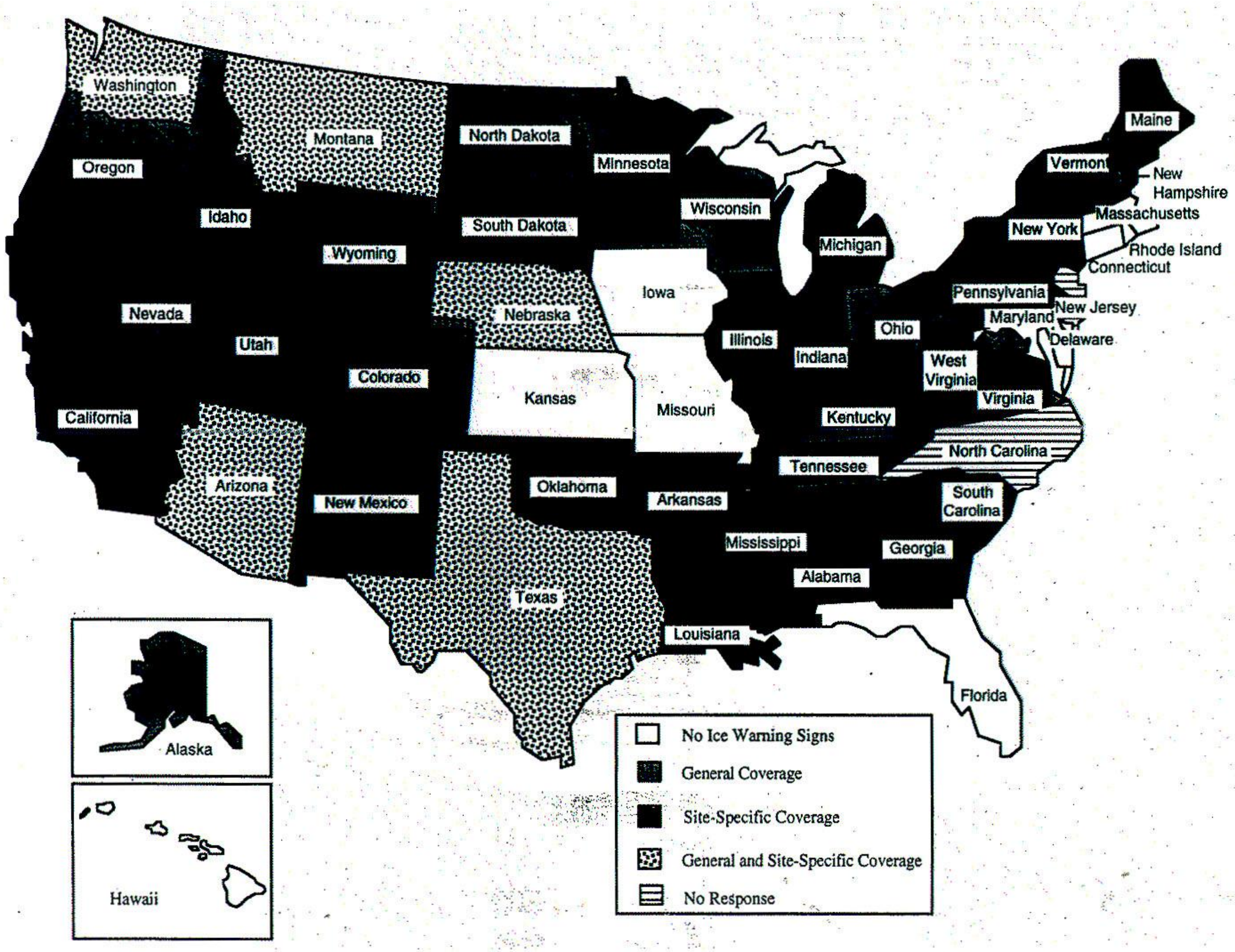
Crashes Involving Wild Animals



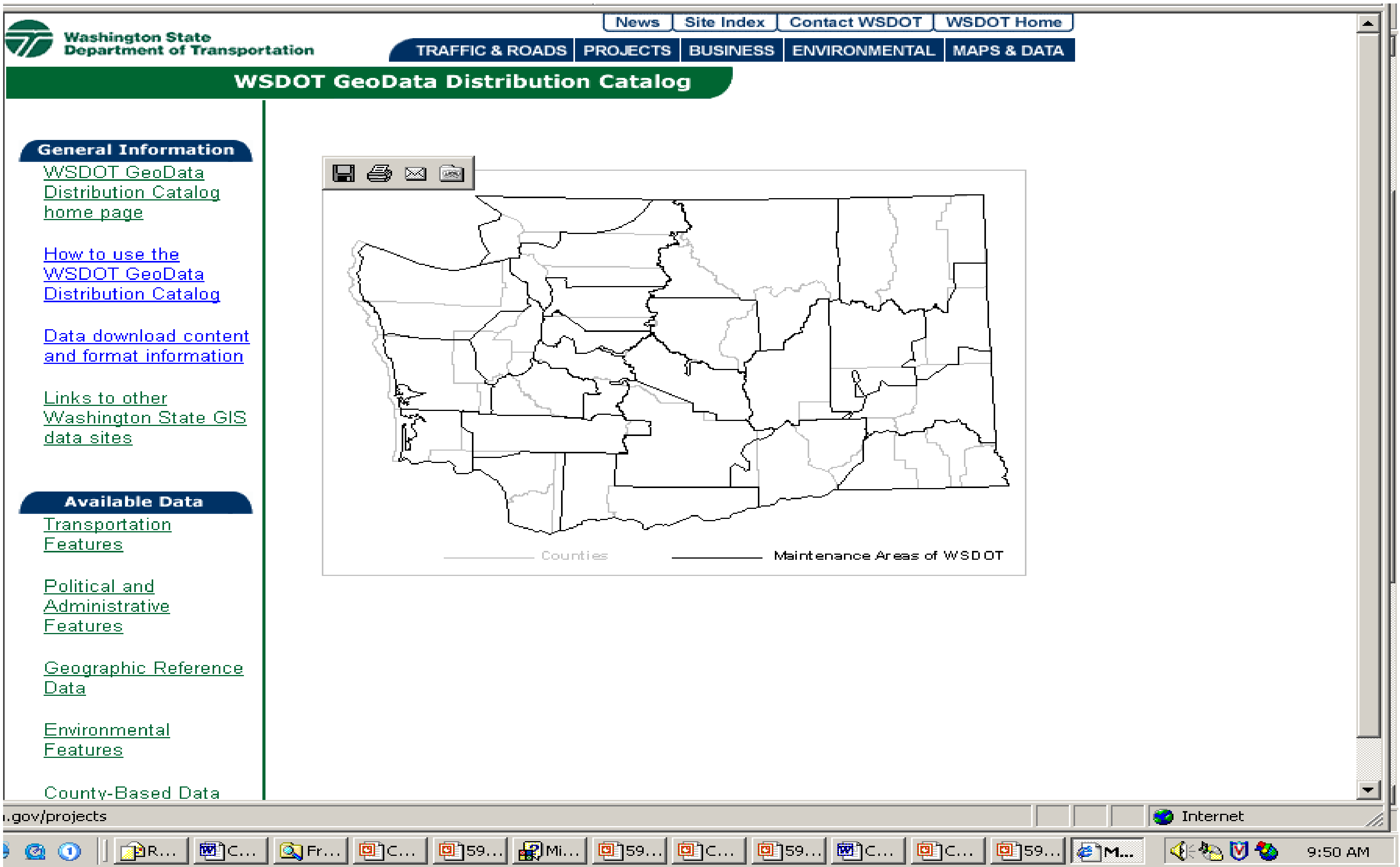
Washington State (east)

Ice Warning Sign

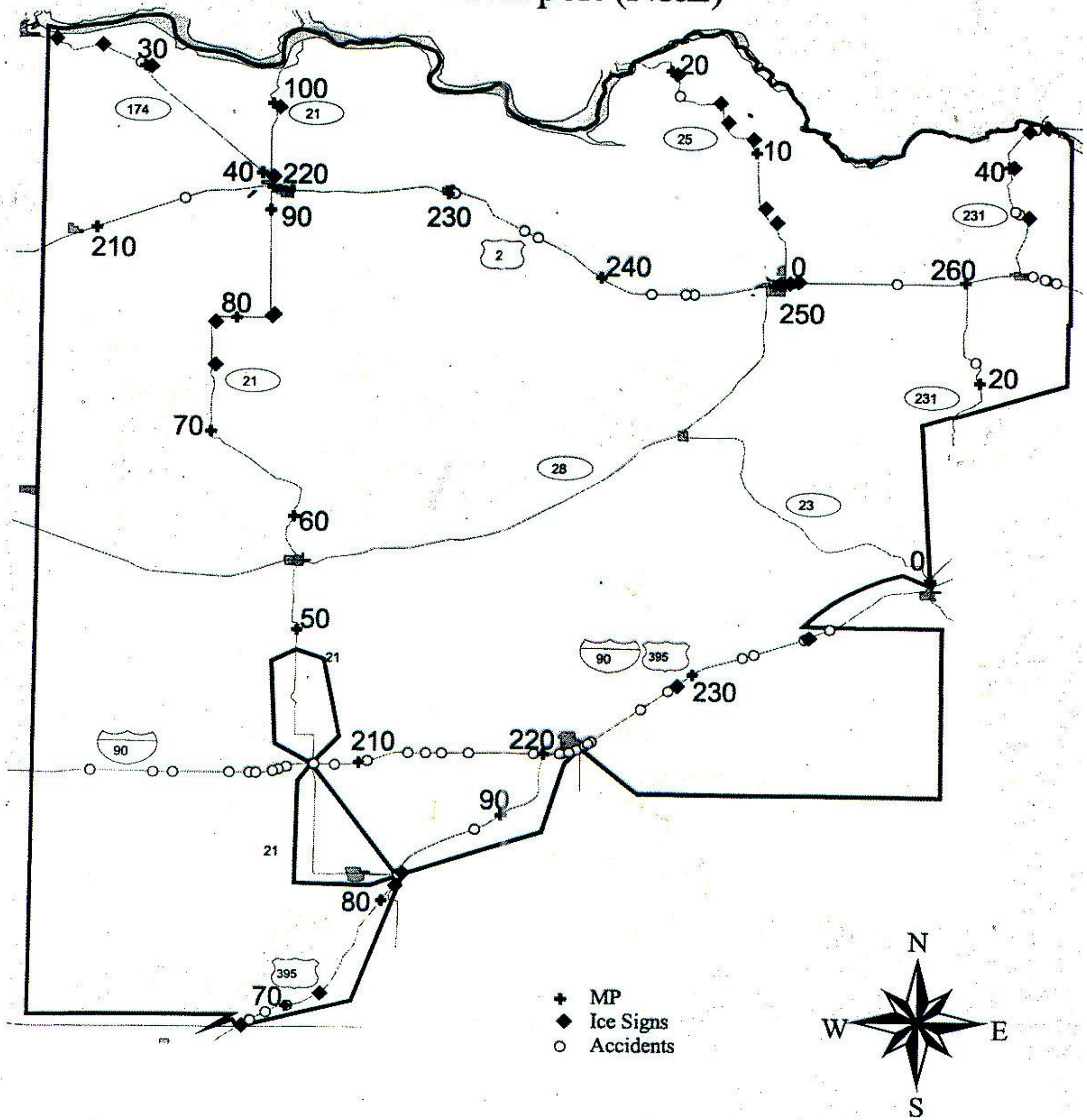
Ice Warning Sign Policy



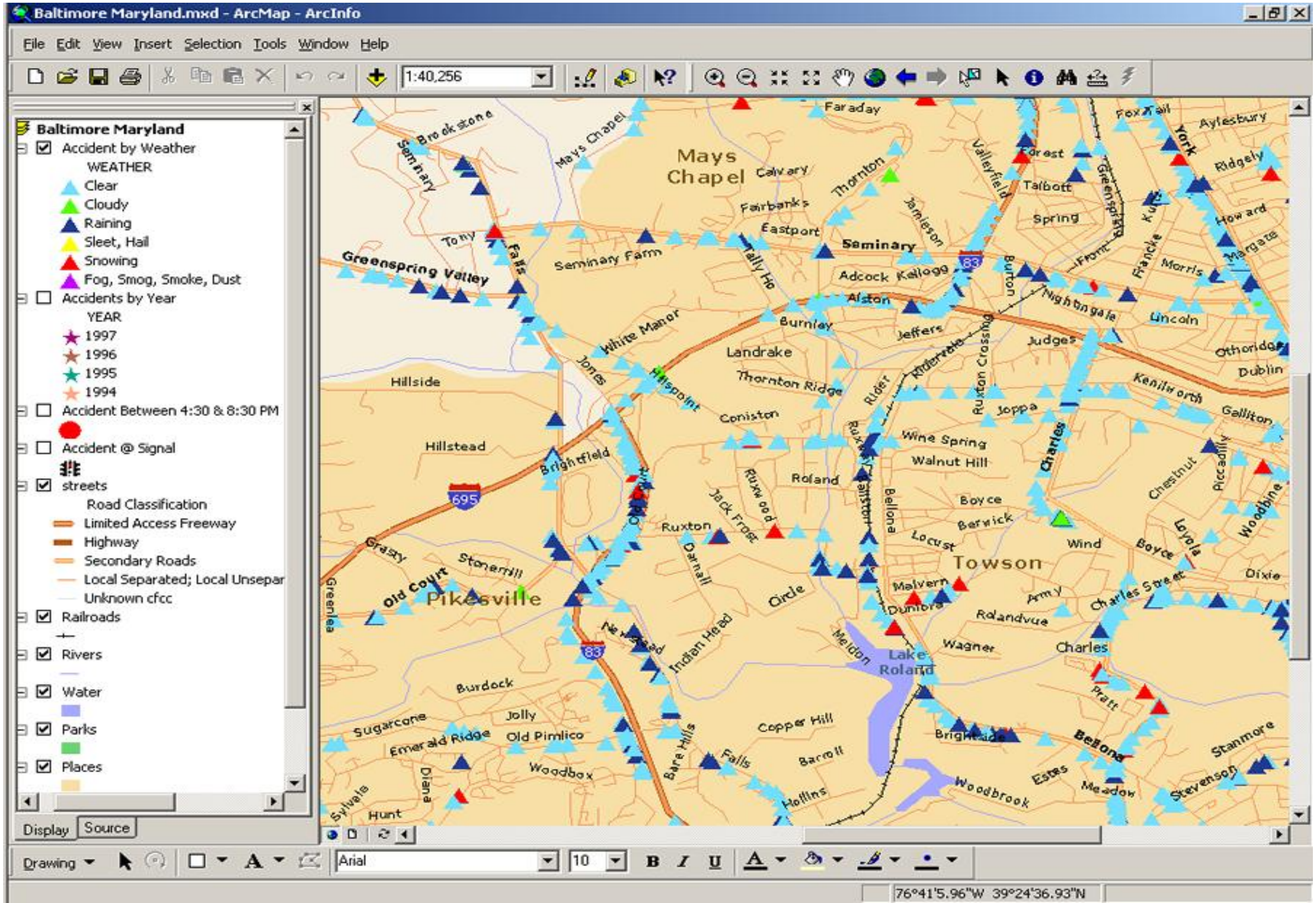
WSDOT Maintenance Areas



Davenport (N&E)



Many GIS Based Safety Applications



GIS-T Data Needs

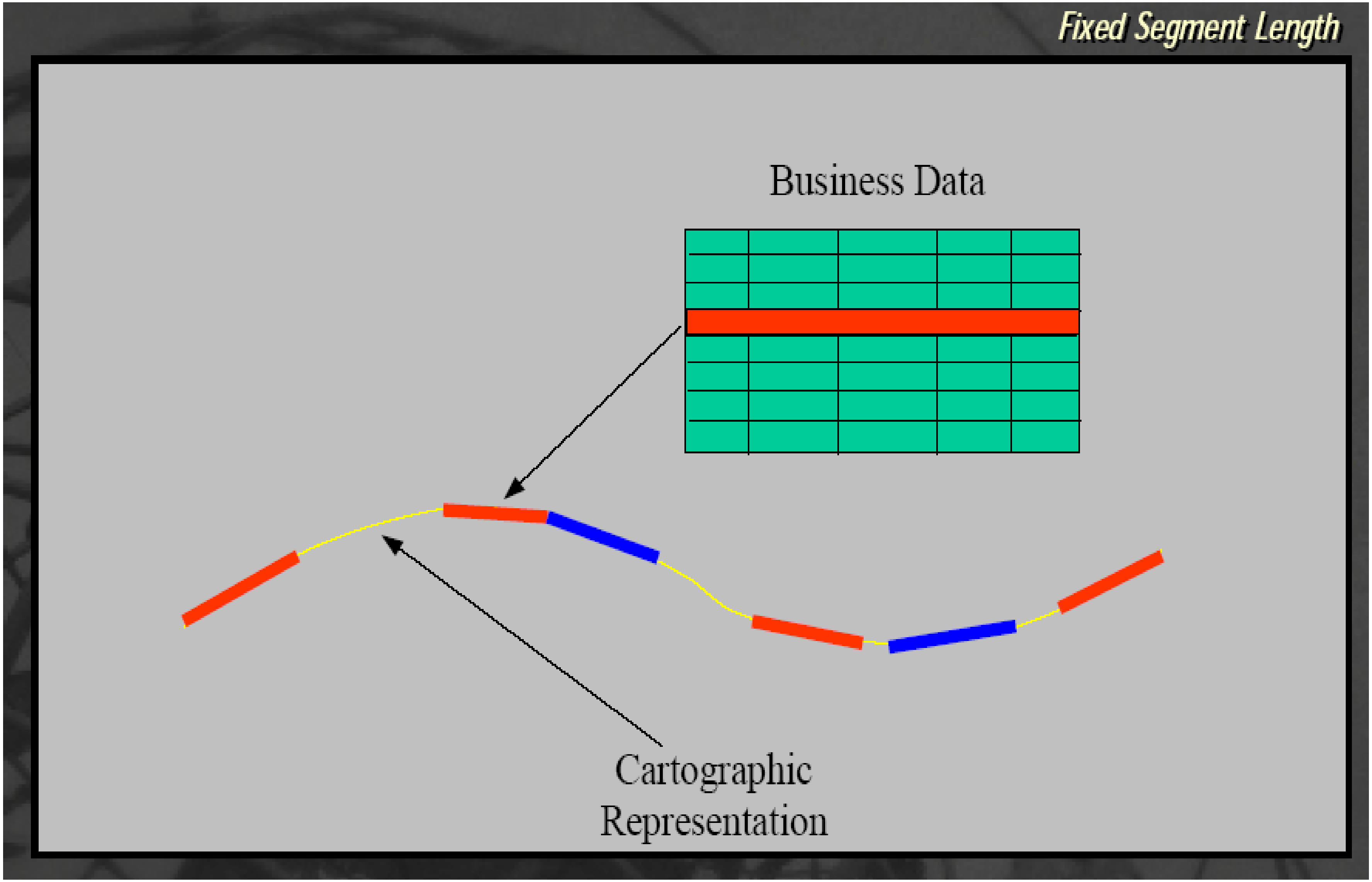
- Point data: sign location, crash site
- Length data: shoulder width, number of lanes
- Time data: new pavement in 2003
- Route data: I-90, Milepost 29.02, intersection of Brooklyn and 45th Street
- Zone Data: In the City of Seattle

Solutions to GIS-T Data Needs?

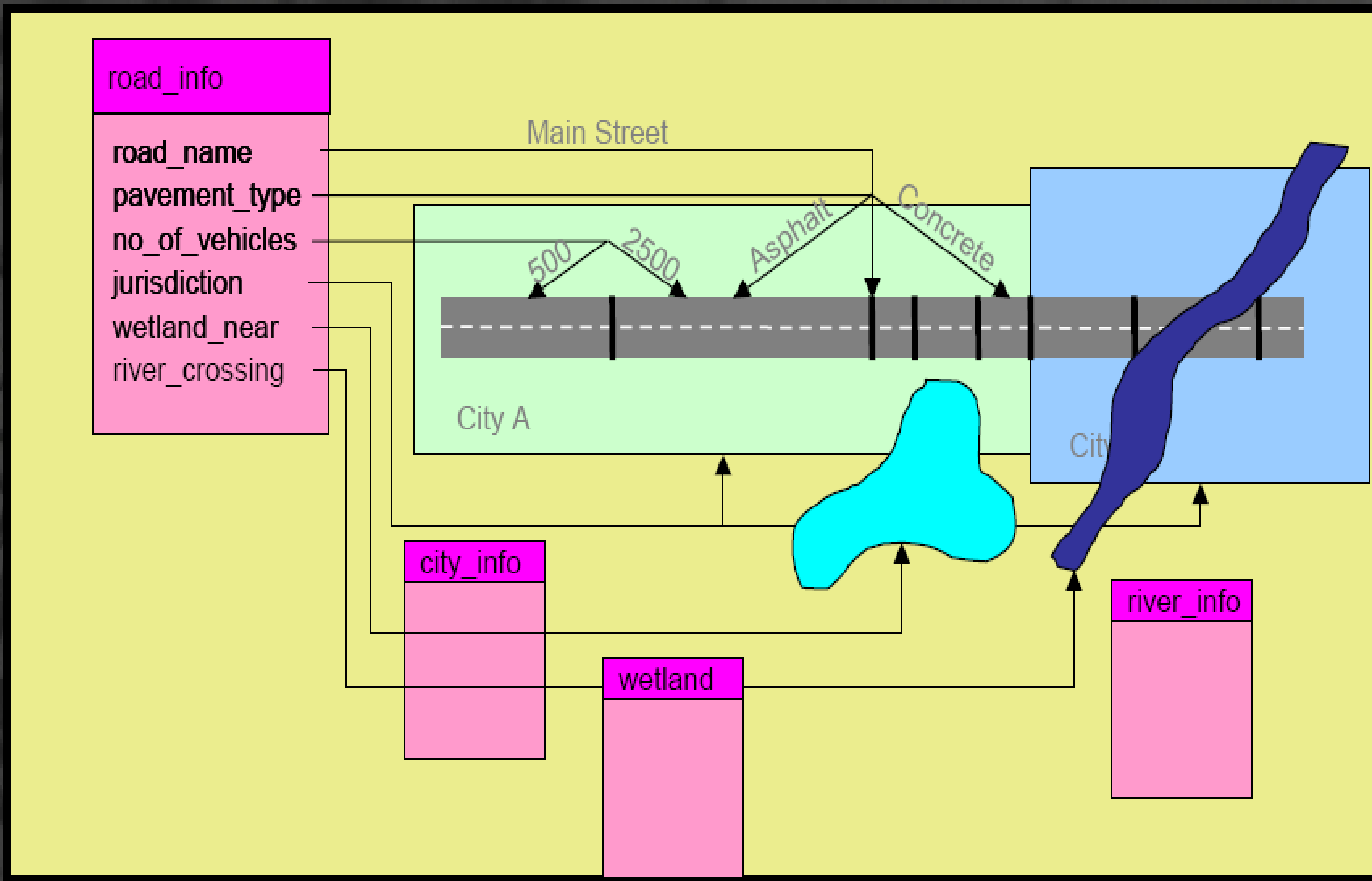
- Unique roadway database
- Change segment for each data change
- Fixed segments

Or

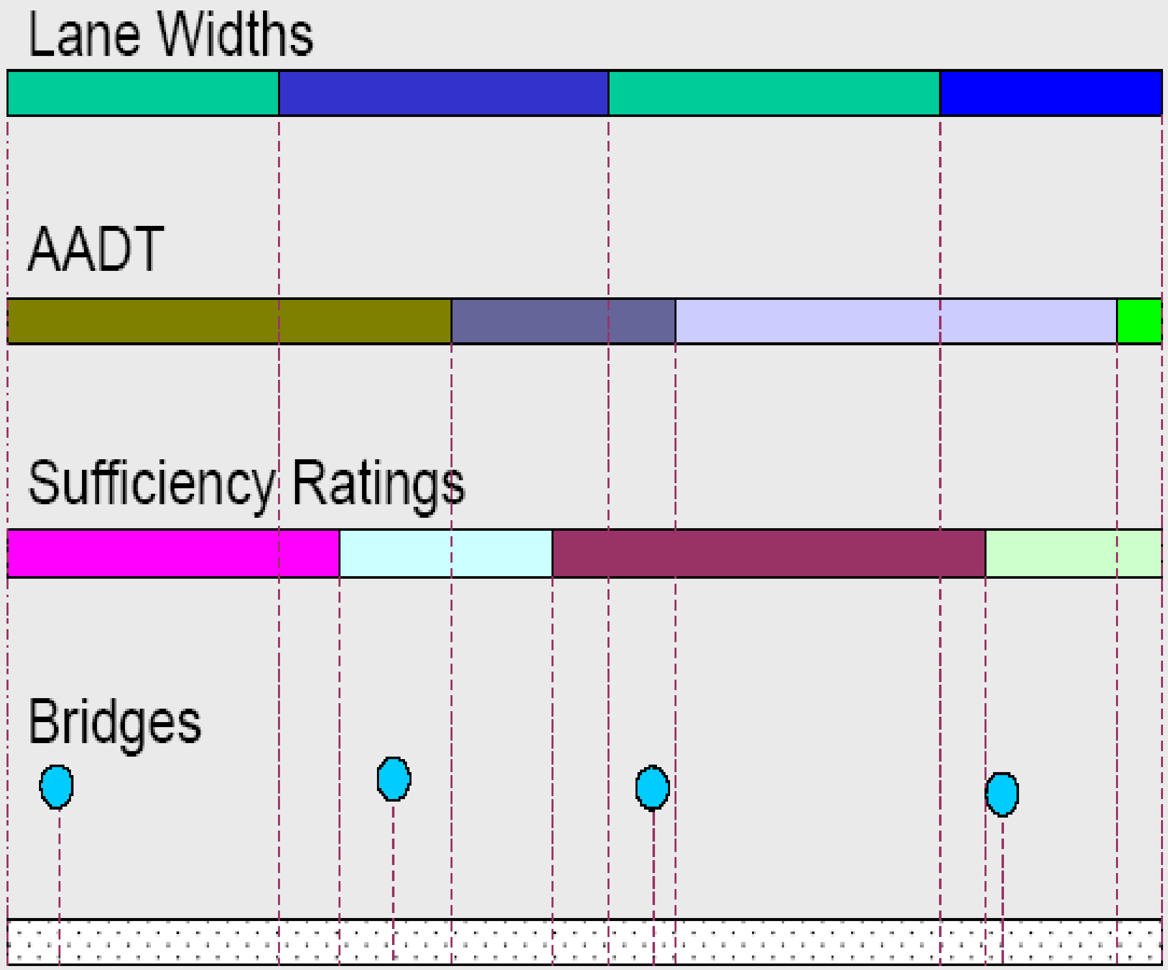
- Dynamic Segmentation


Fixed Segment Length
Business Data
Cartographic
Representation

Variable Length Segments



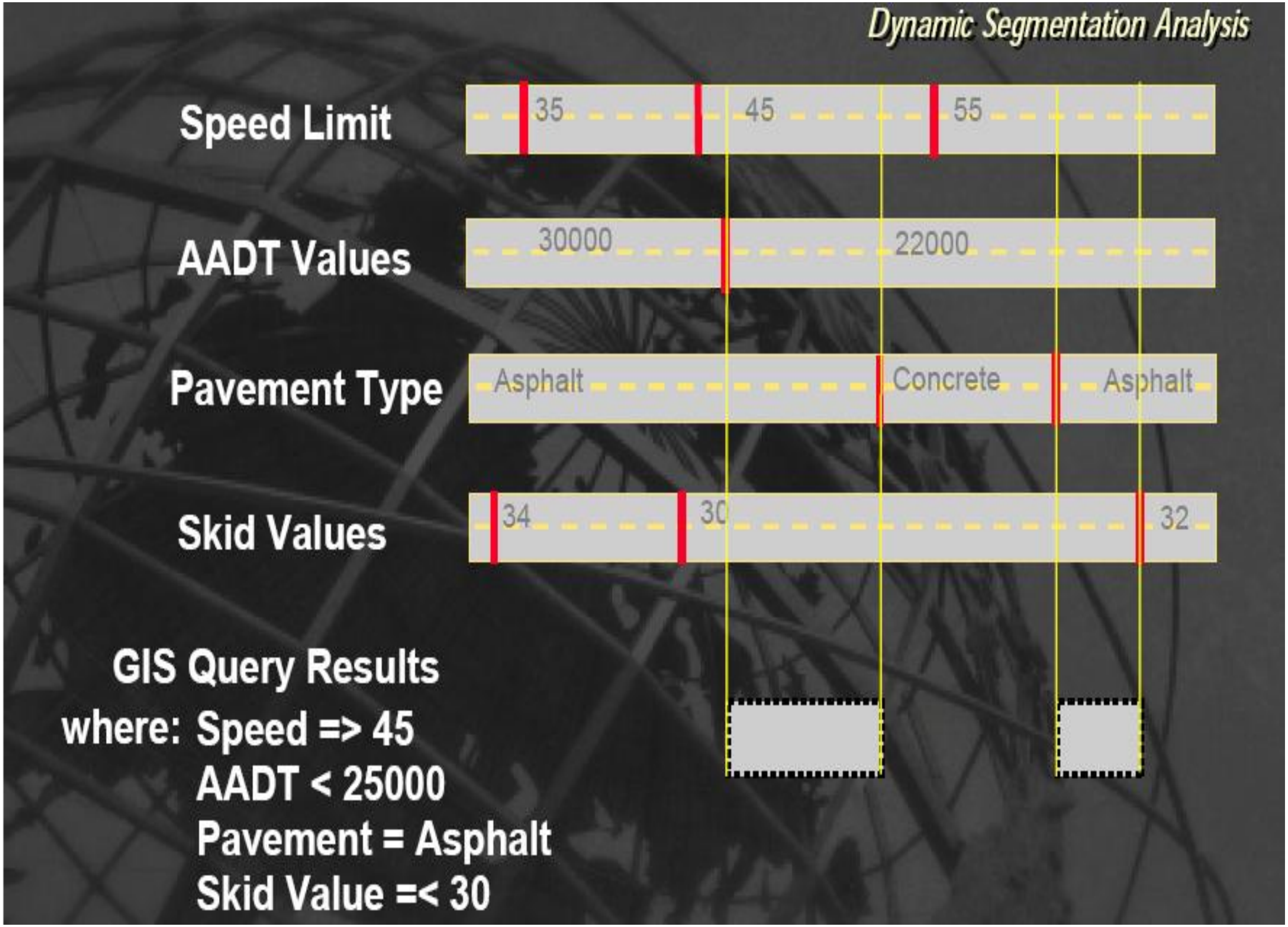
Dynamic Segmentation Approach



•Data are maintained in individual tables, limiting data redundancy

•Attributes describe varying extents along a section of roadway

•Graphic representations of attribute data are generated "on the fly"


Dynamic Segmentation Analysis
Speed Limit
35
45
55
AADT Values
30000
22000
Pavement Type
Asphalt
Concrete
Asphalt
Skid Values
34
30
32
GIS Query Results
where: Speed => 45
AADT < 25000
Pavement = Asphalt
Skid Value =< 30

Dynamic Segmentation

- Events (crashes, pavement type, etc) are related to a route segment where the segments are not pre-defined.
- The extent of the segments change based on the criteria used to define segments.

Dynamic Segmentation

- Uses a series of cross referenced tables to that link each type of information to the appropriate street segments.
- Uses a **linear or distance referencing** system such as mileposts
- GIS converts mileposts to lat-long and turns data into a “layer”

Why You Need Linear Referencing

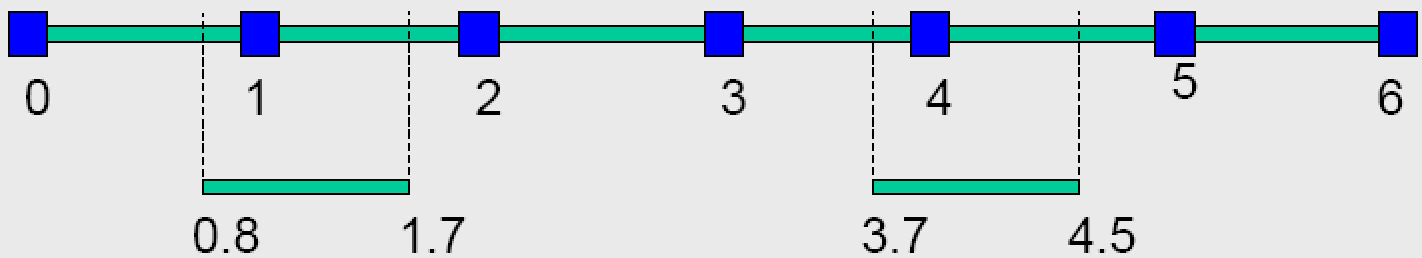
- Where are you on the roadway?
- A method to location attribute or events along a line (a road)

- A number of linear referencing methods

Linear Referencing Methods

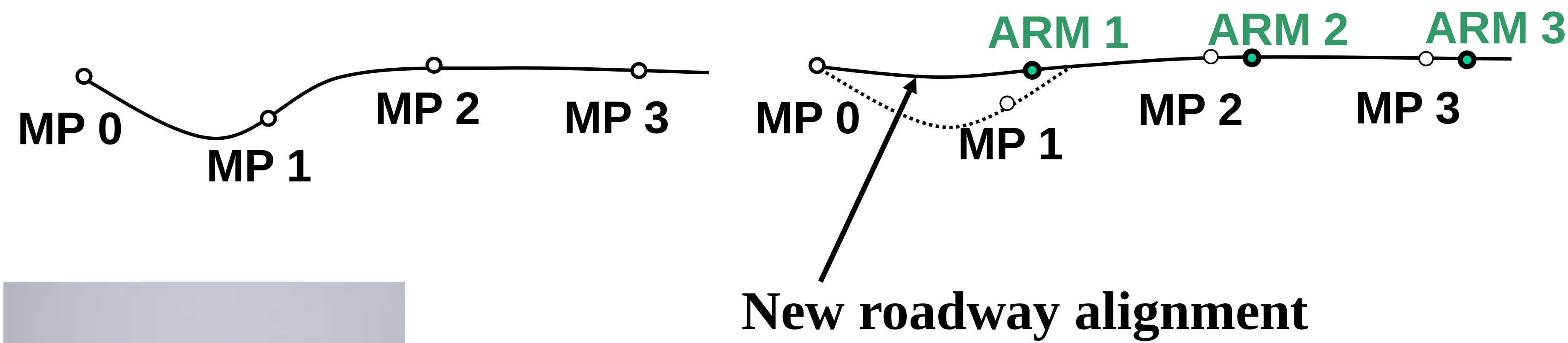
Example LRM - Distance Measure

Route 0023



ROUTE_ID	BEGIN_DISTANCE	BEGIN_SECID	END_DISTANCE	END_SECID	ATTRIBUTES
0023	0.8		1.7		...
0023	3.7		4.5		...

WSDOT - Mileposts and Accumulated Route Miles (ARMS)



Crash Data into a GIS

Crash Data

Located by milepost (in the field) →

Calculation Process

Converts Mileposts to Accumulated Route Miles (ARMs) →

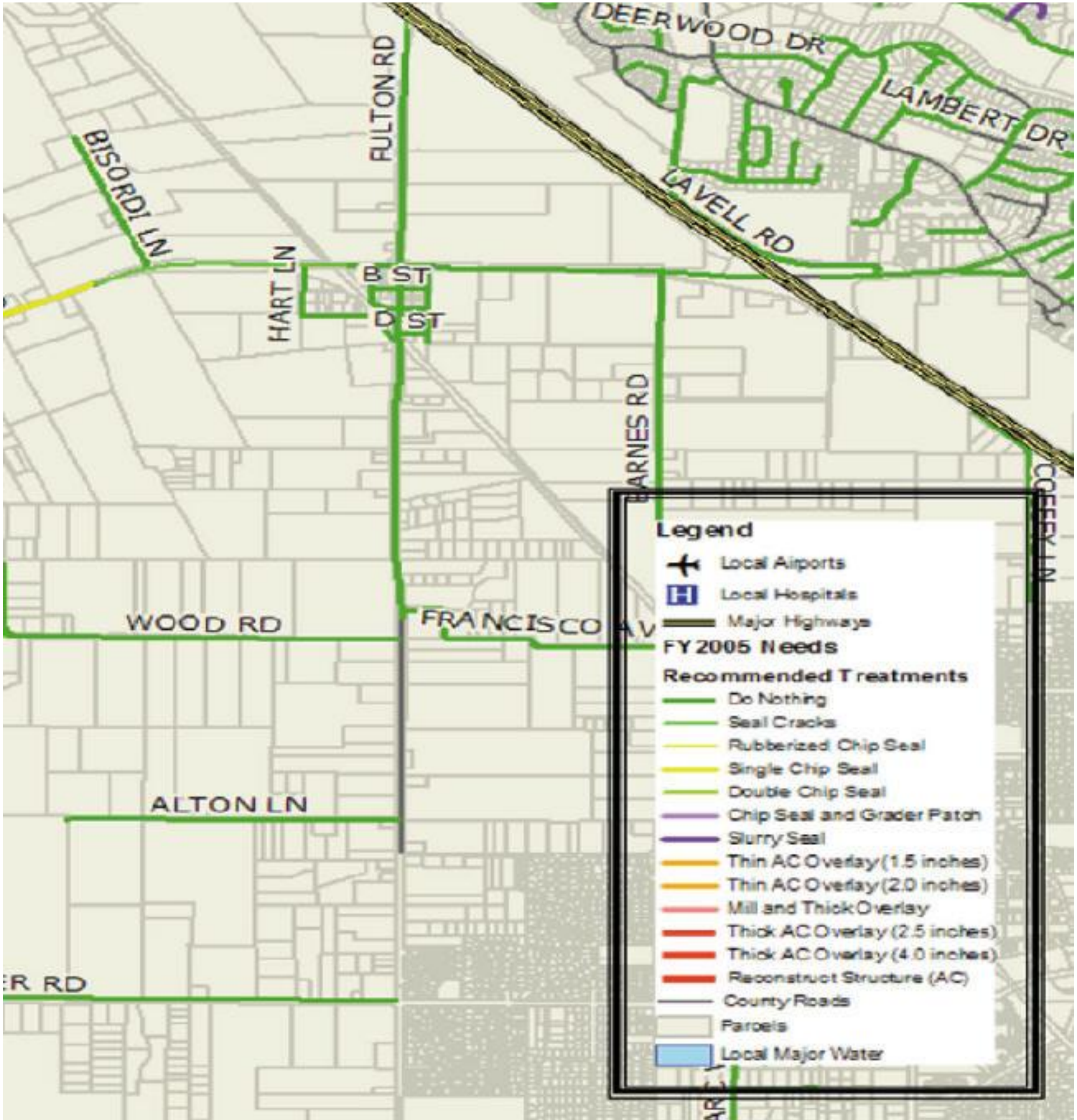
ArcView

Maps crash locations to state routes using ARMs

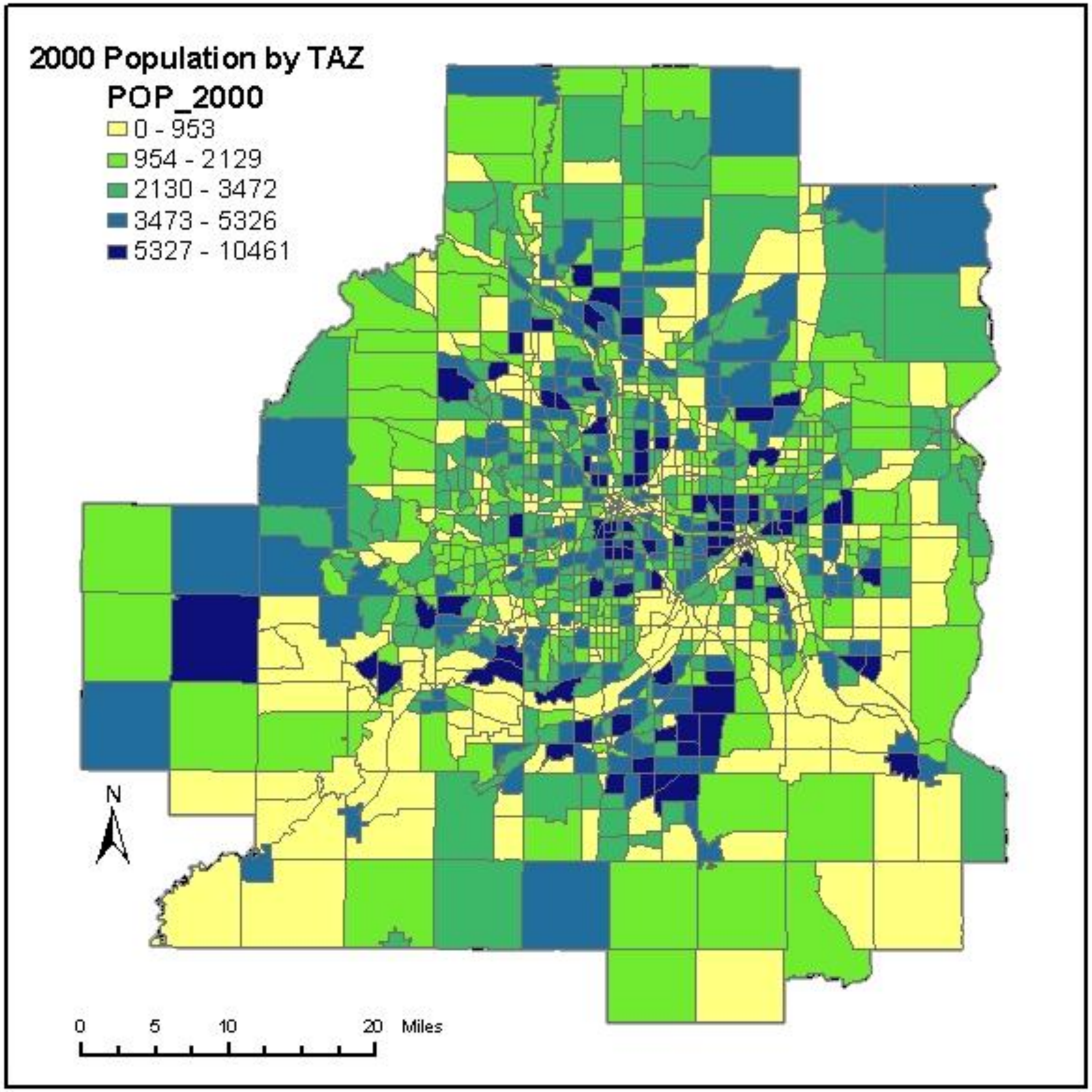
GIS and Transportation Planning

GIS and Transportation Data Inventory

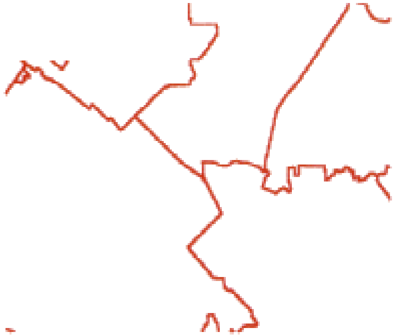
- GIS are used to keep databases of physical elements and characteristics of transportation systems
- Many possible data elements
  - Streets and highway
  - Signal and signs
  - Pavement
  - Vegetation
  - Traffic volumes
  - Many more


DEERWOOD DR
LAMBERT DR
LAVELL RD
FULTON RD
BISORDI LN
HART LN
B ST
D ST
BARNES RD
COFFEY LN
WOOD RD
FRANCISCO AV
ALTON LN
ER RD
Legend
Local Airports
Local Hospitals
Major Highways
FY 2005 Needs
Recommended Treatments
Do Nothing
Seal Cracks
Rubberized Chip Seal
Single Chip Seal
Double Chip Seal
Chip Seal and Grader Patch
Slurry Seal
Thin AC Overlay (1.5 inches)
Thin AC Overlay (2.0 inches)
Mill and Thick Overlay
Thick AC Overlay (2.5 inches)
Thick AC Overlay (4.0 inches)
Reconstruct Structure (AC)
County Roads
Parcels
Local Major Water

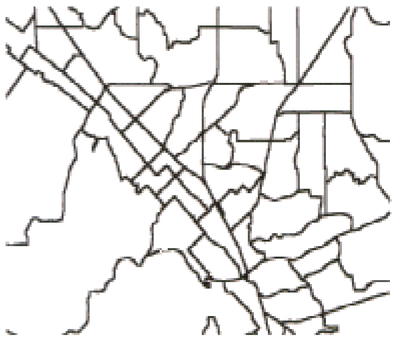
Transportation Planning and Zones



Different Scales of Zones



Regional Zone Structure

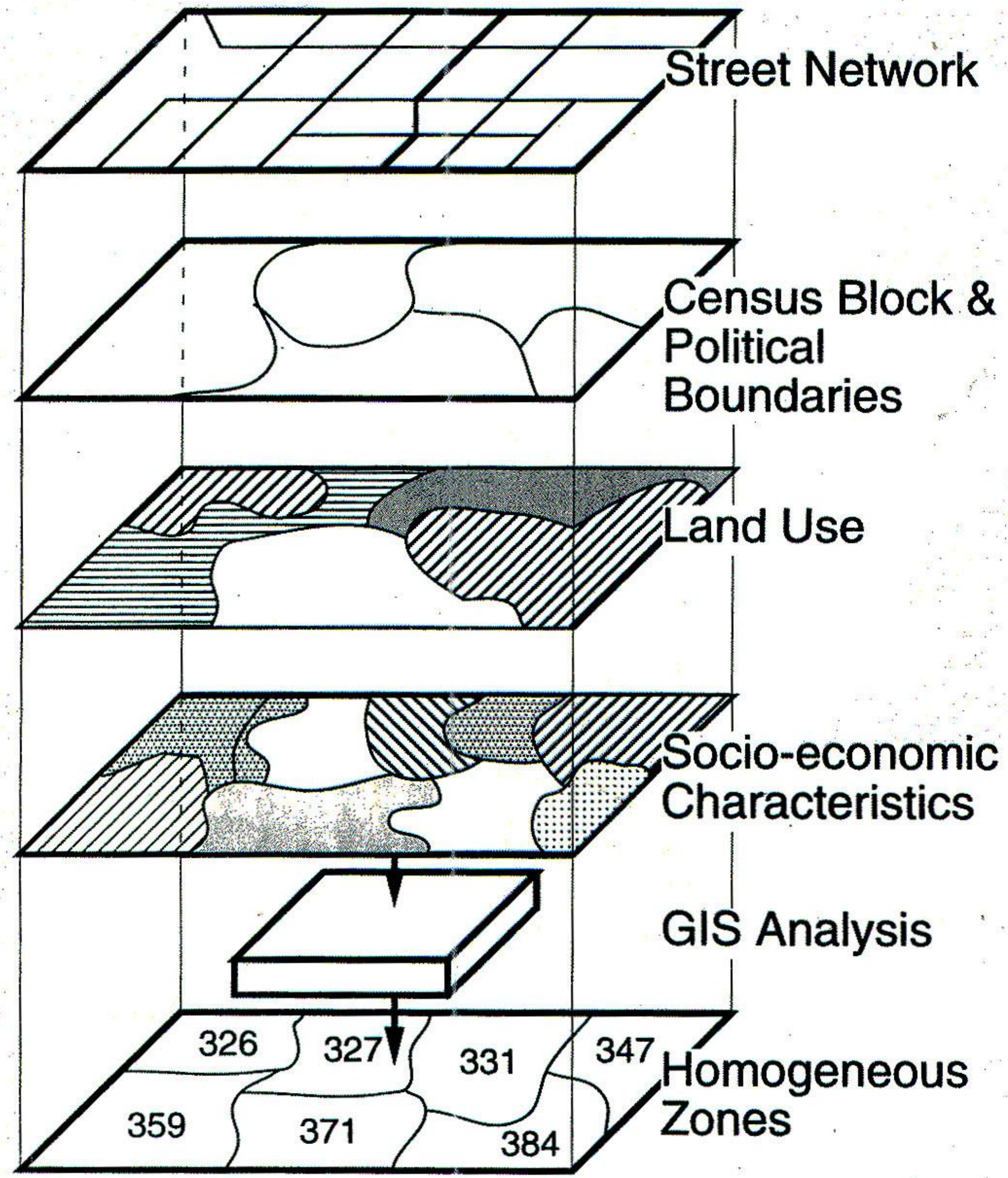


County Zone Structure

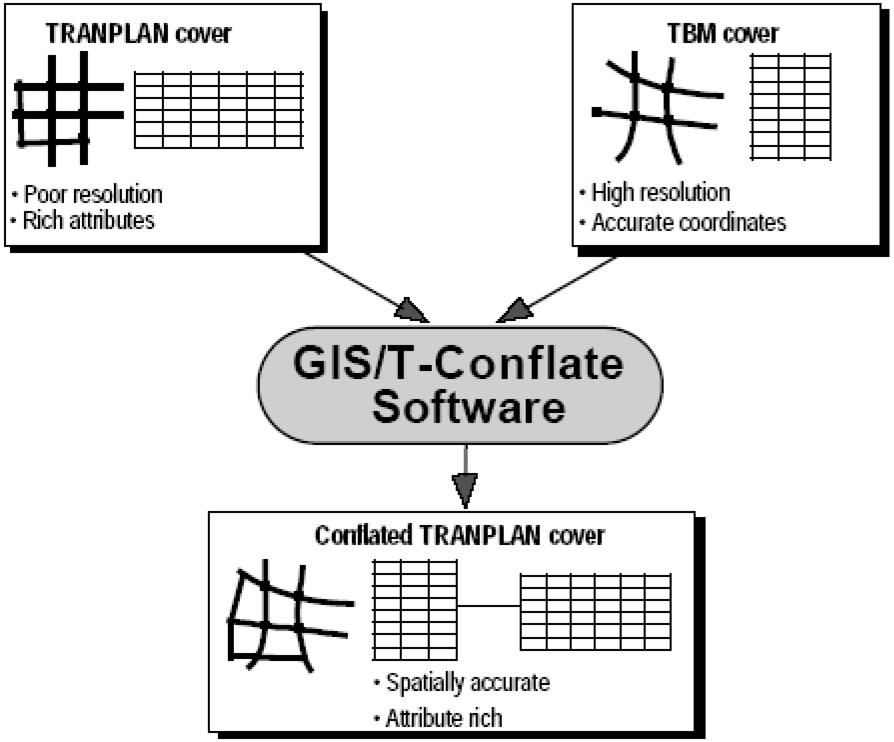
Local Zone Structure

WRCOG, 1

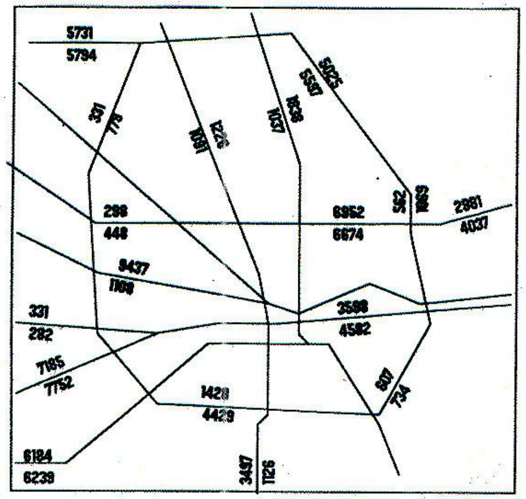
Zone Construction



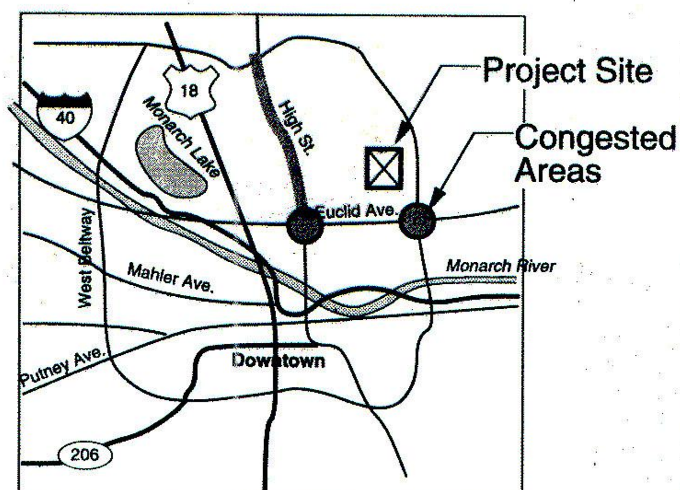
Network Conflation



Model Output



Graphics for Presentation



Transportation Planning Application - Mixed Use Neighborhoods

Suburban

New Urbanism

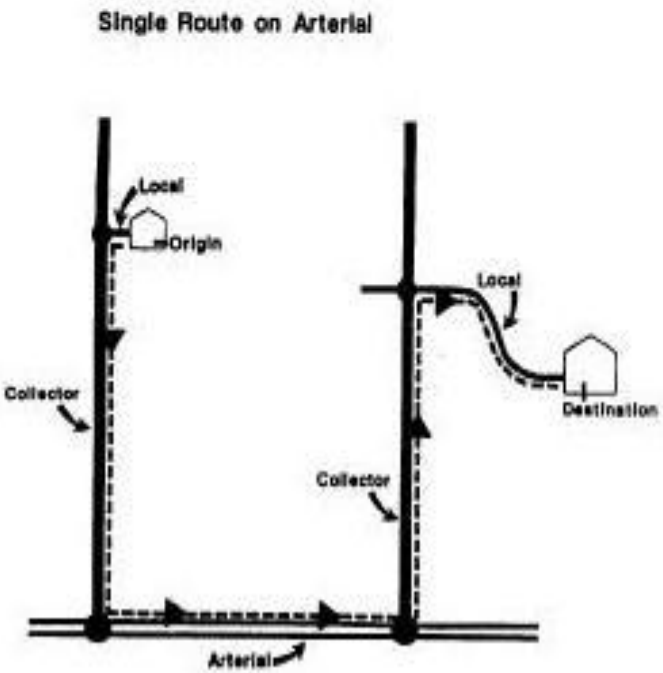
New Urbanism

- compact
- high density
- sidewalk
- pedestrian
- Main Street
- 5 minute walk
- buildings close to street
- parallel street parking
- grid streets
- mixed use land use

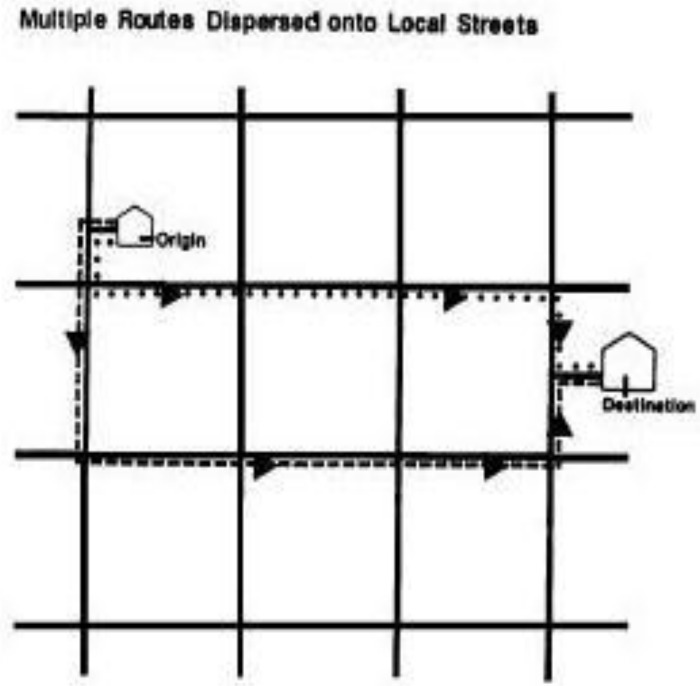
Suburbs

- spread out
- low density
- highway
- car
- shopping mall
- car trip
- buildings set back
- parking lots
- cul-de-sacs
- segregated land use

TYPICAL STREET HIERARCHY VERSUS TND NETWORK PATHS



A. Typical Street Hierarchy



B. Dense Gridded Network

Source: Traditional Neighborhood Development, Will the Traffic Work?, Kulash, 1990.

The Seattle Area Travel Diary

- Respondents contacted using random dialing
- Respondent asked for address of trip start and trip end
- Covered the travel of 900 households over two day

1. I STARTED THE DAY AT:

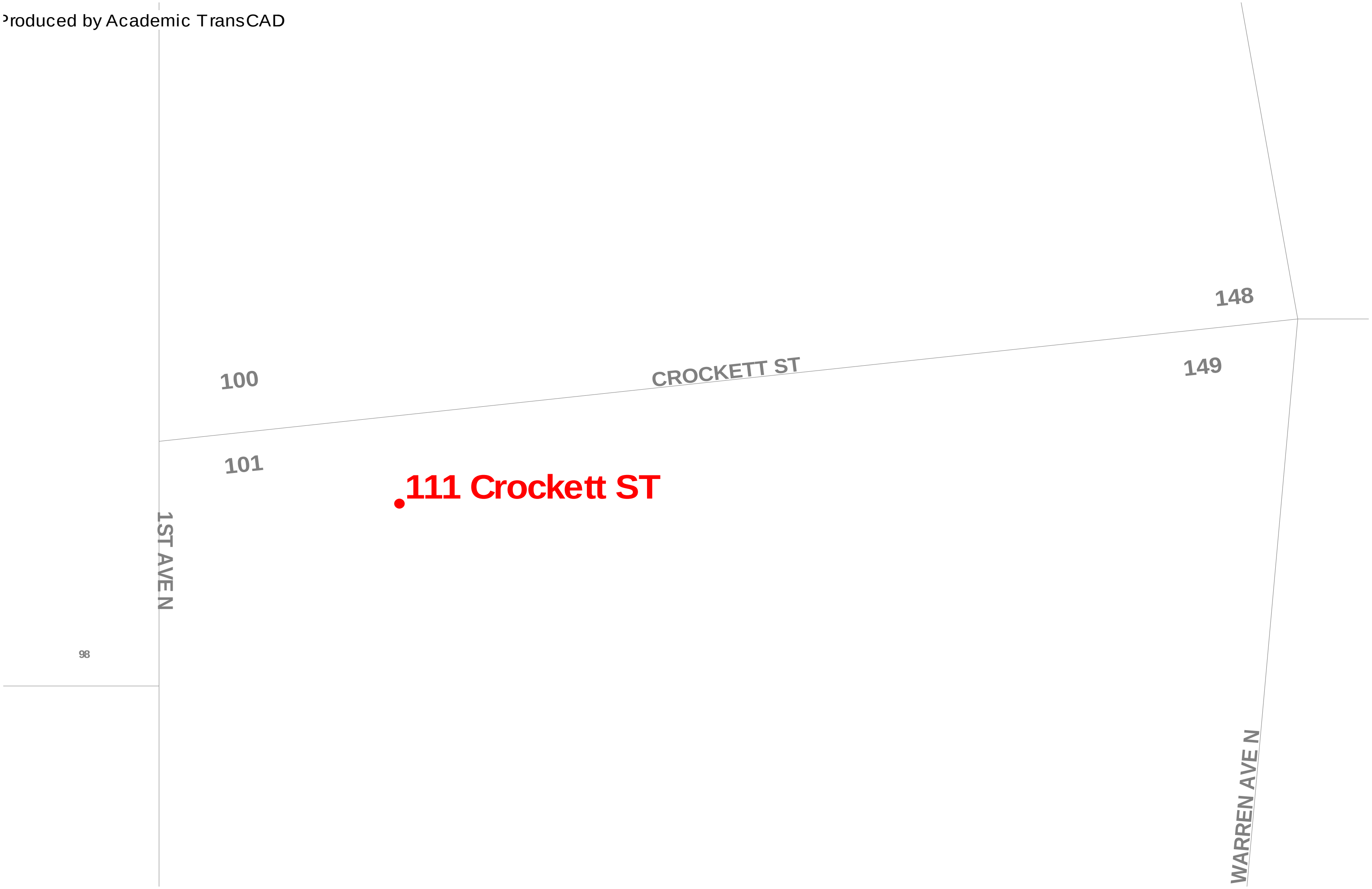
address: ____________
or cross streets: ____________
city: ____________

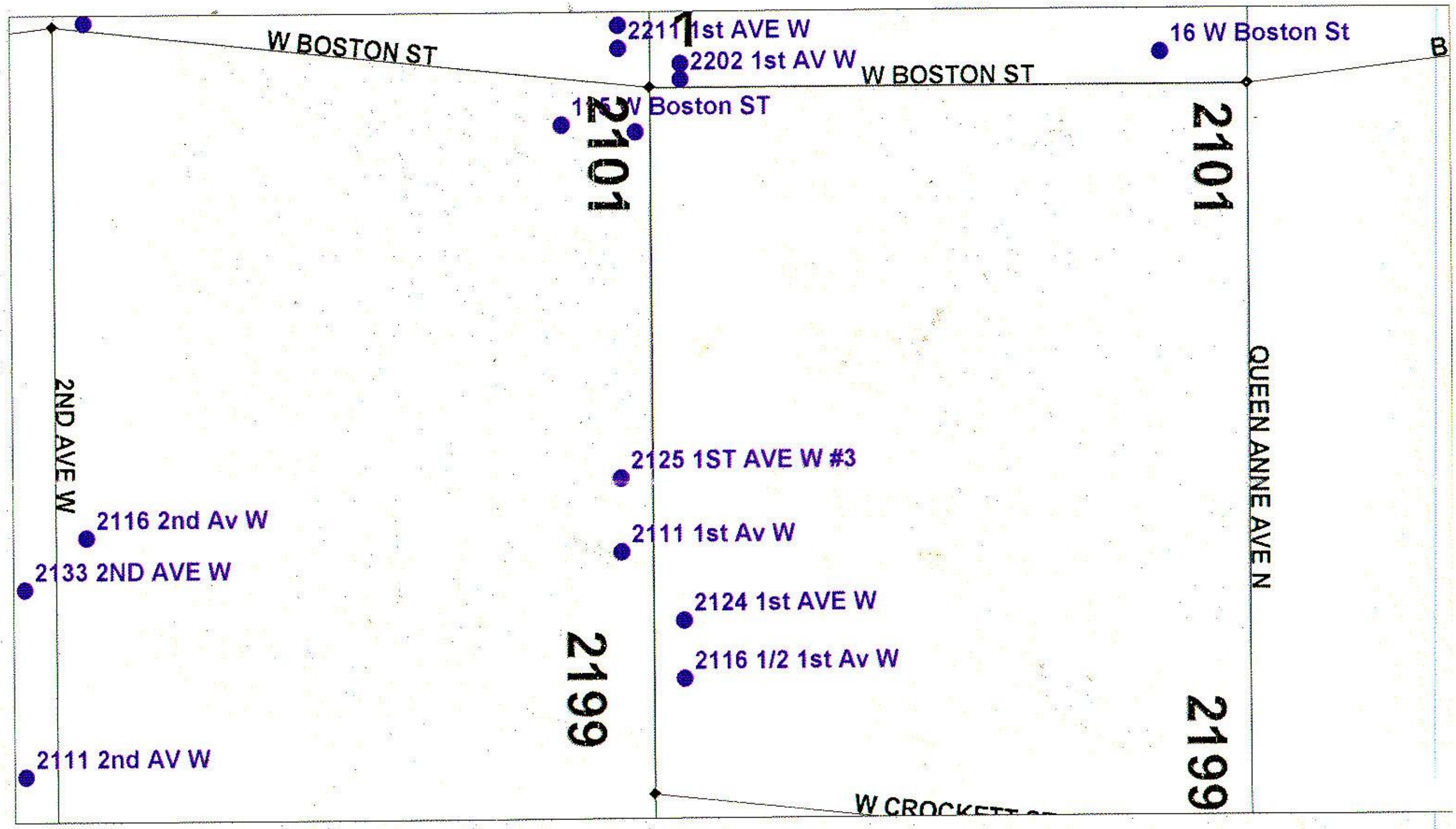
	I LEFT AT:	TO GO TO	PURPOSE
2	am or pm	address: or cross streets: city:	
3	am or pm	address: or cross streets: city:	
4	am or pm	address: or cross streets: city:	
	am	address:	

Geocoding

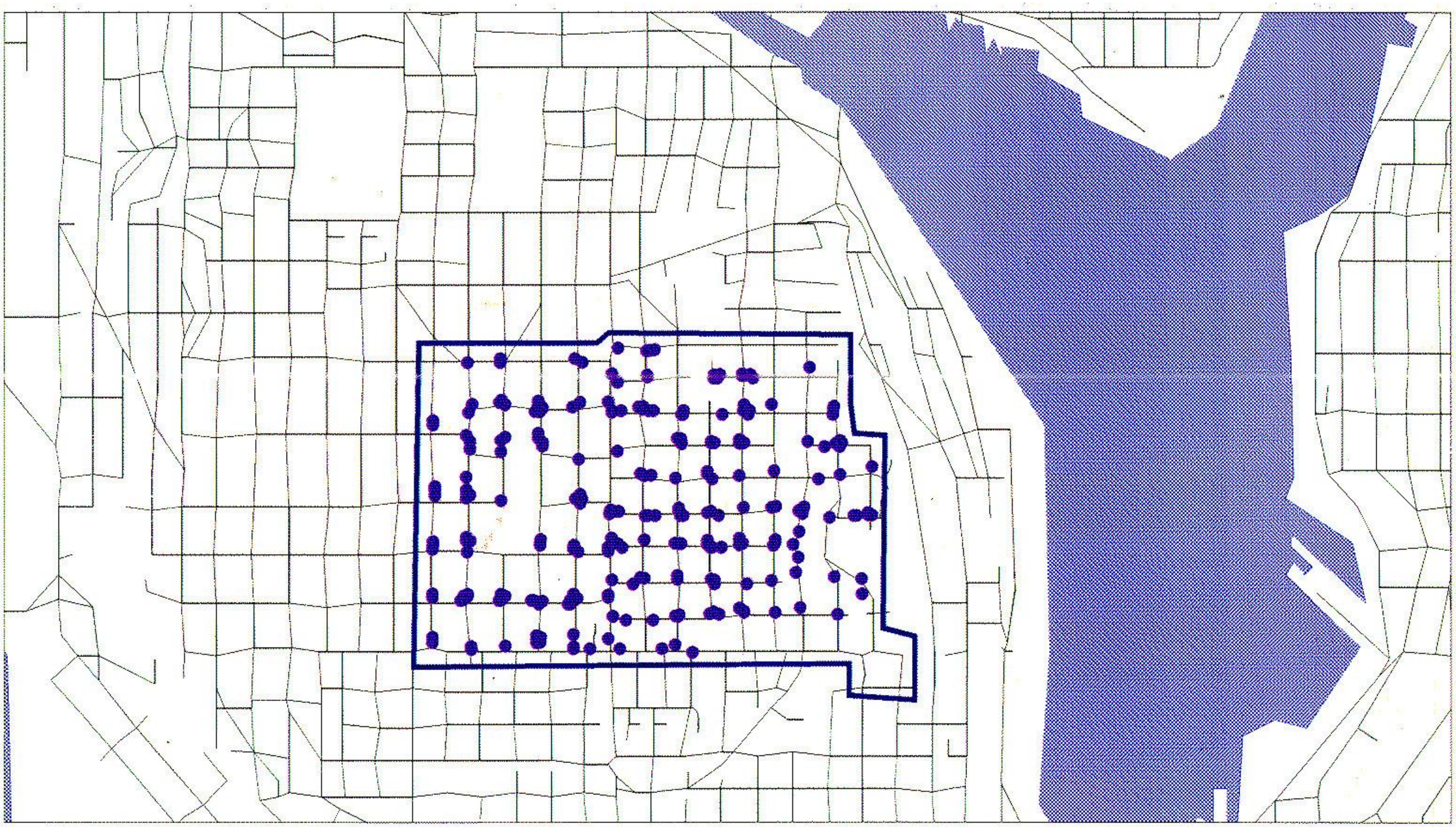
- Conversion of an address into a point specified by a latitude and longitude

Address Ranges

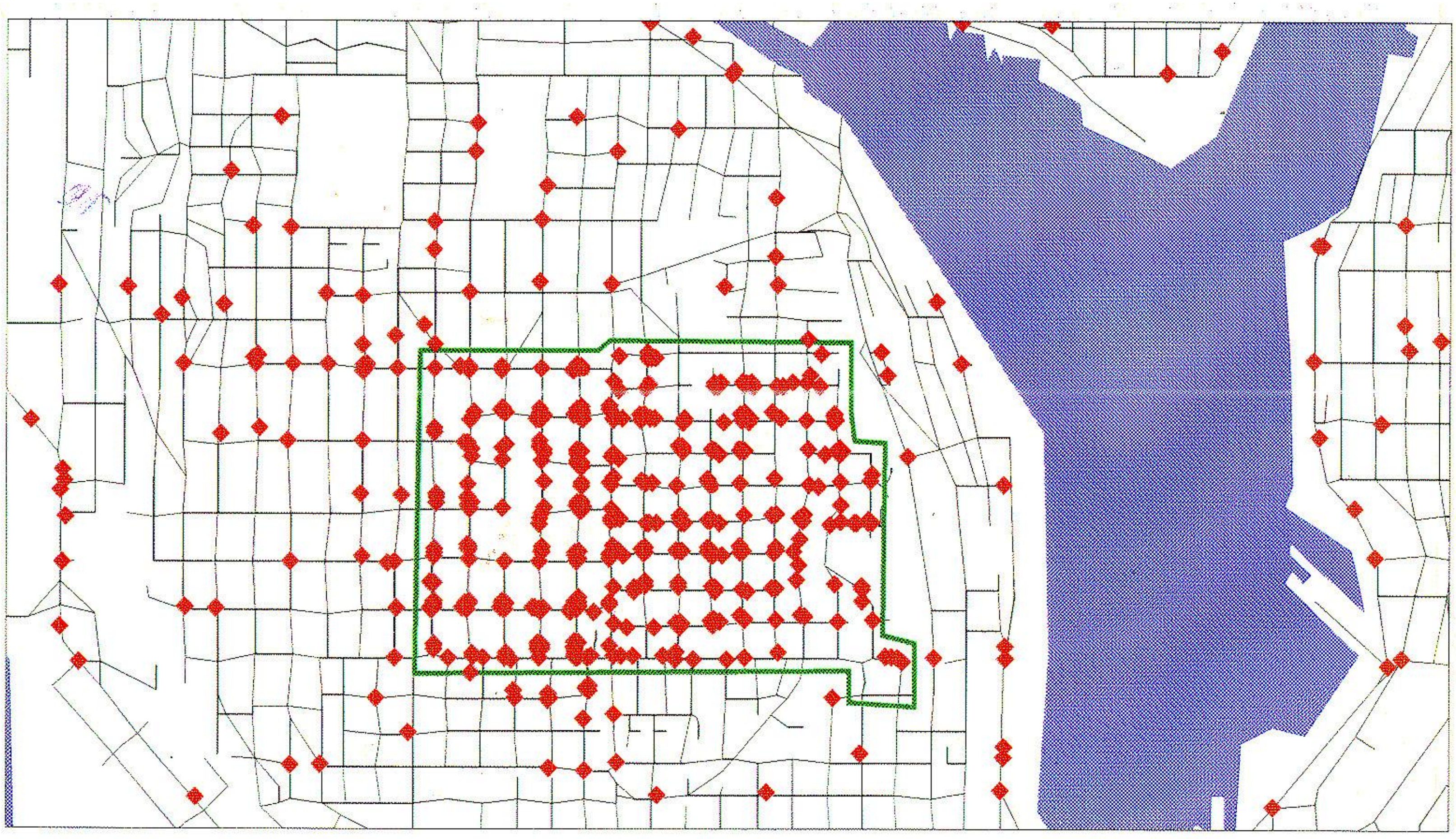



W BOSTON ST
2211 1st AVE W
2202 1st AV W
W BOSTON ST
16 W Boston St
B
115 W Boston ST
2101
2101
2ND AVE W
QUEEN ANNE AVE N
2125 1ST AVE W #3
2116 2nd Av W
2111 1st Av W
2133 2ND AVE W
2124 1st AVE W
2199
2116 1/2 1st Av W
2199
2111 2nd AV W

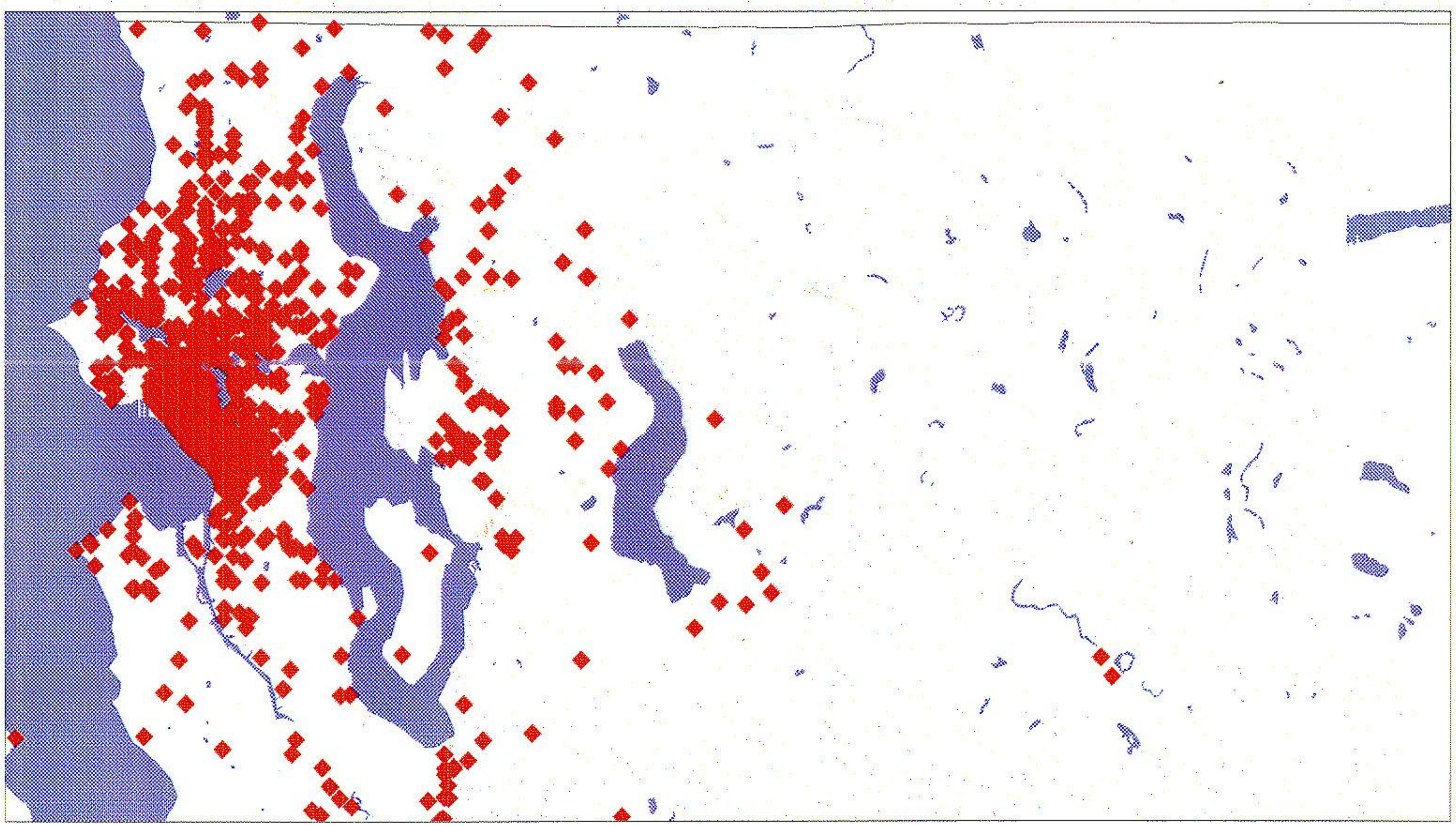
Queen Anne Survey Household



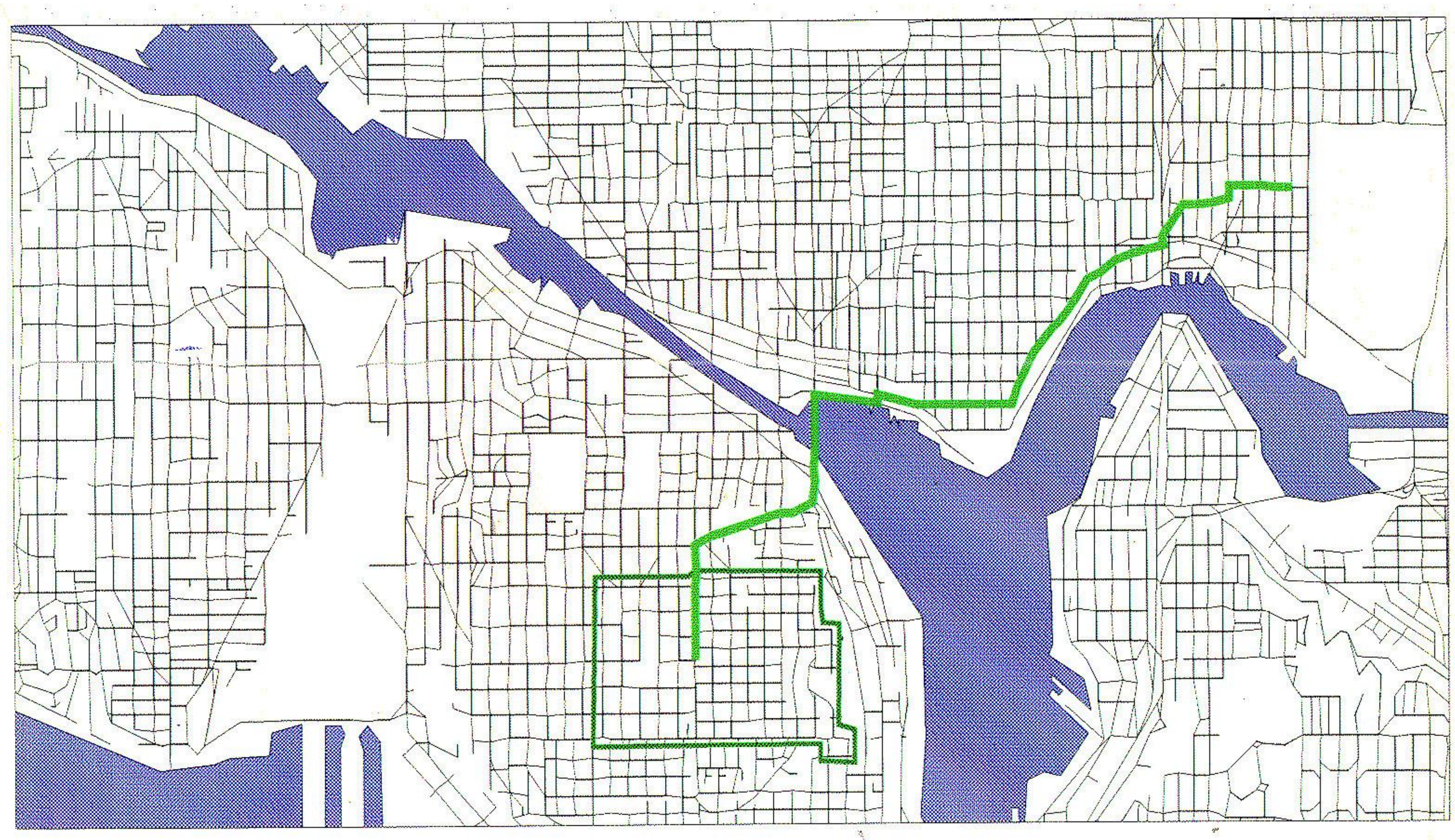
Queen Anne Trip Origins and Destinations



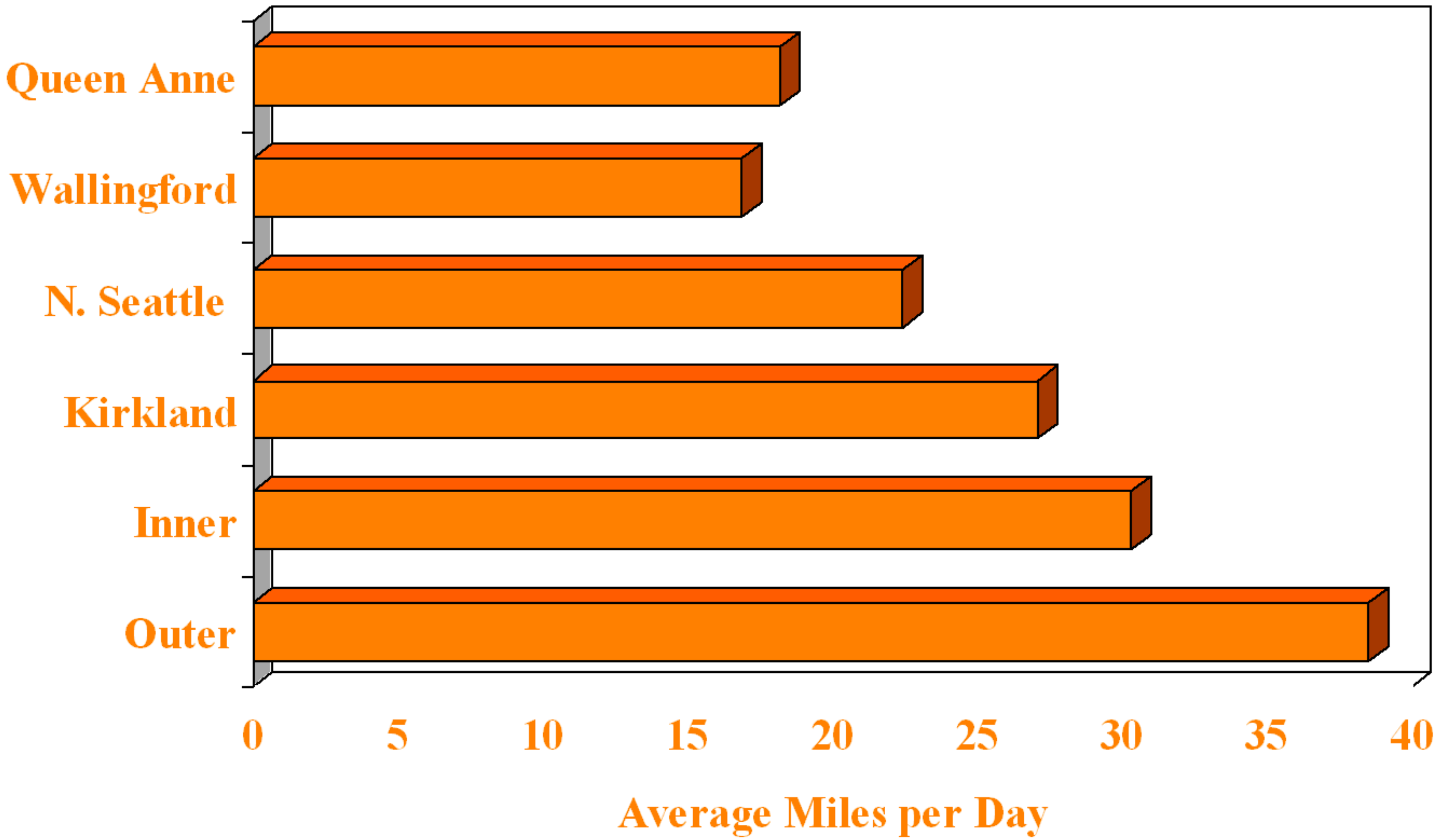
Queen Anne Regional Origins and Destinations



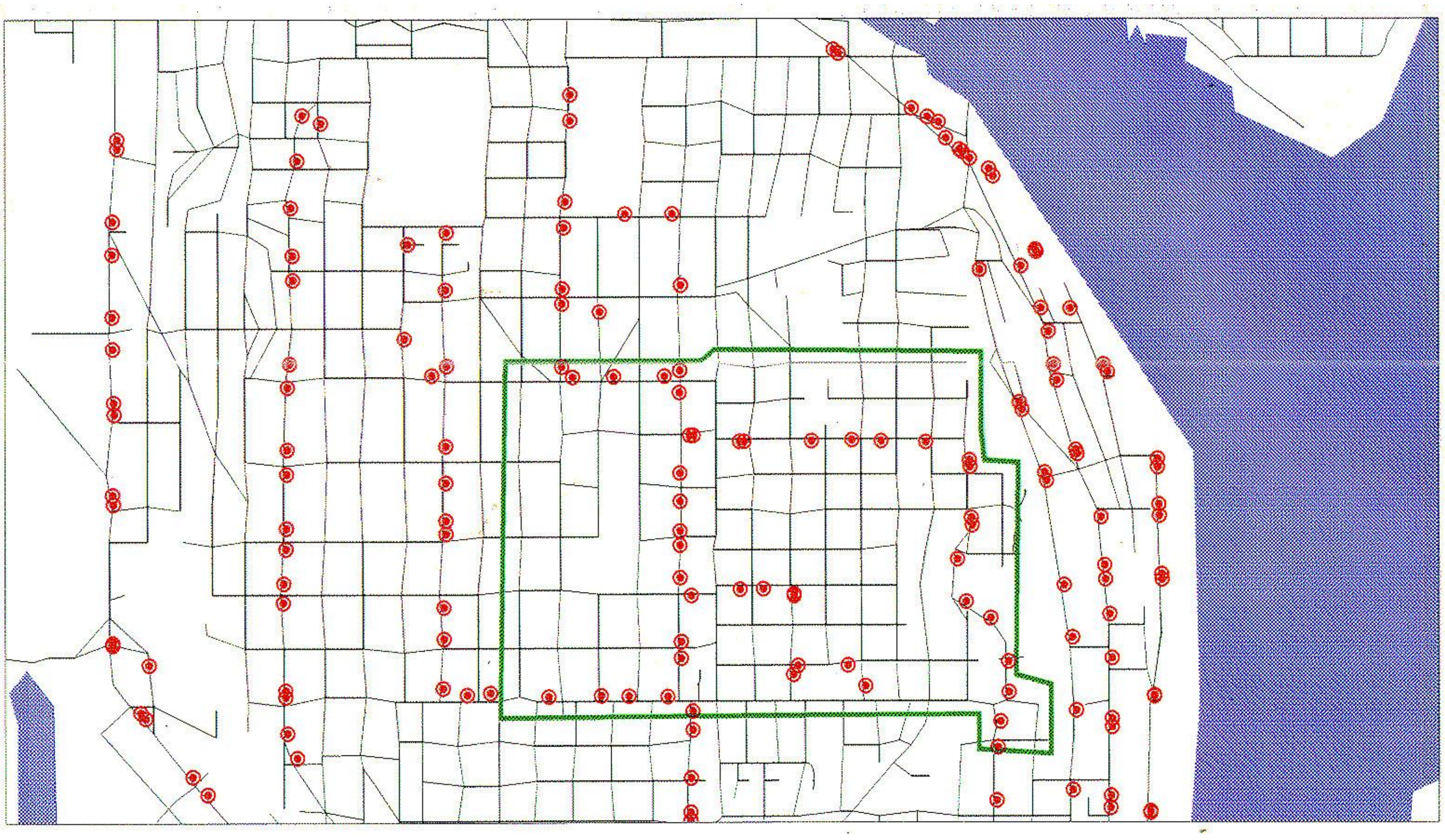
Shortest Path Trips



Average Daily Travel Mileage



Bus Stops



GIS and Technology - Intelligent Transportation Systems (ITS)

GIS and ITS

- GIS interface between Internet user and spatial data
- GIS used with global positioning system (GPS) data

Interactive GIS Map

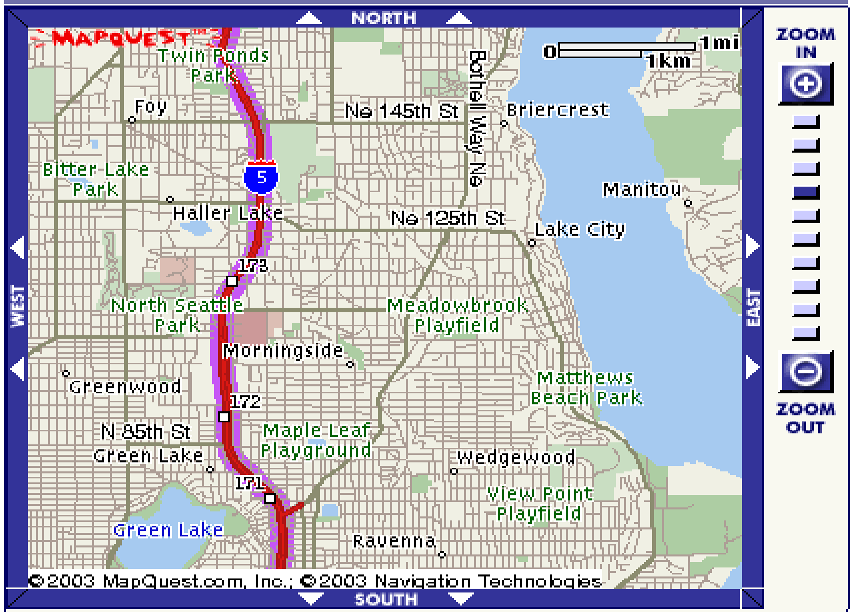
7:	Turn SLIGHT LEFT onto 5TH AVE NE.	0.06 miles
8:	Turn LEFT onto NE 45TH ST.	0.29 miles

Total Estimated Time: 16 minutes **Total Distance:** 9.32 miles

Need a place to stay?

Find a local hotel!

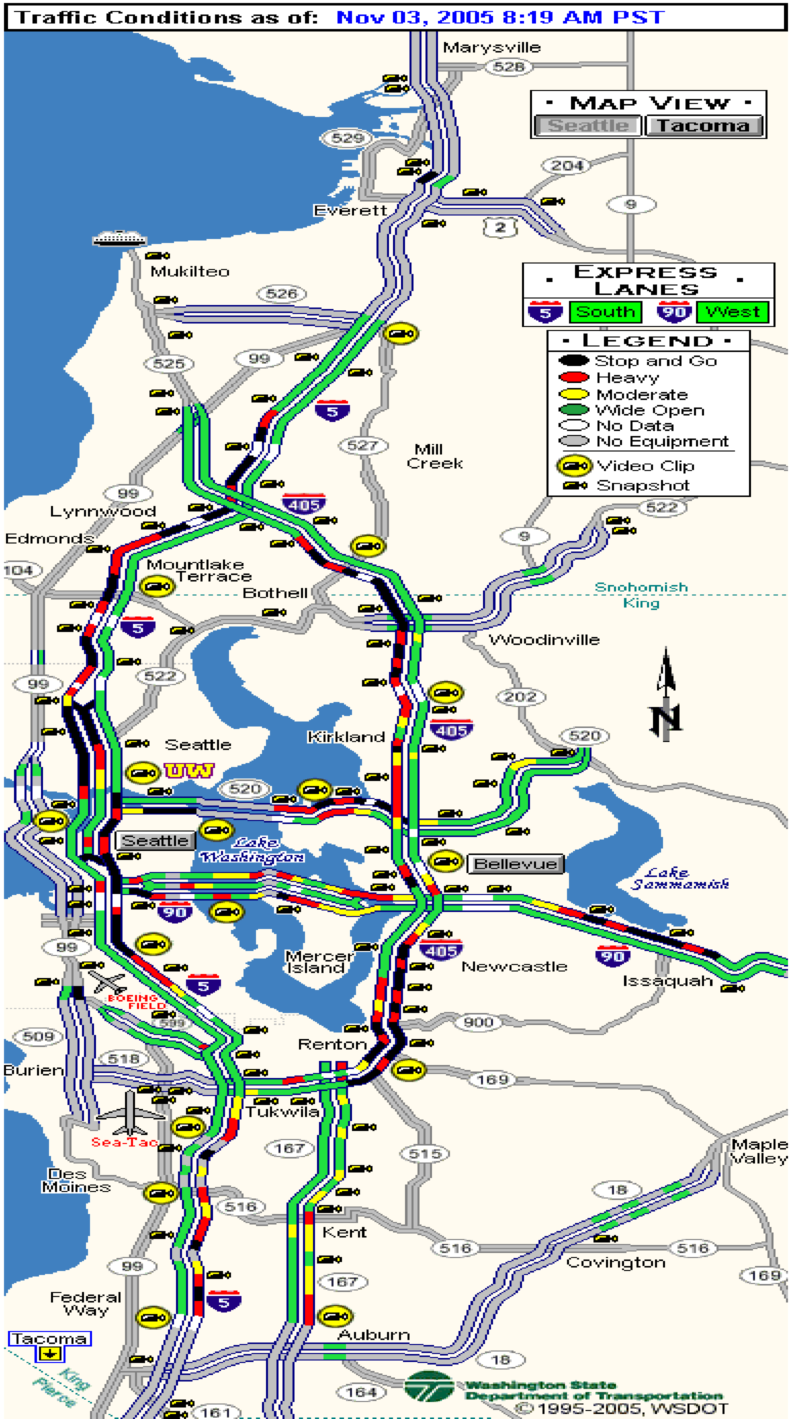
ROUTE OVERVIEW:

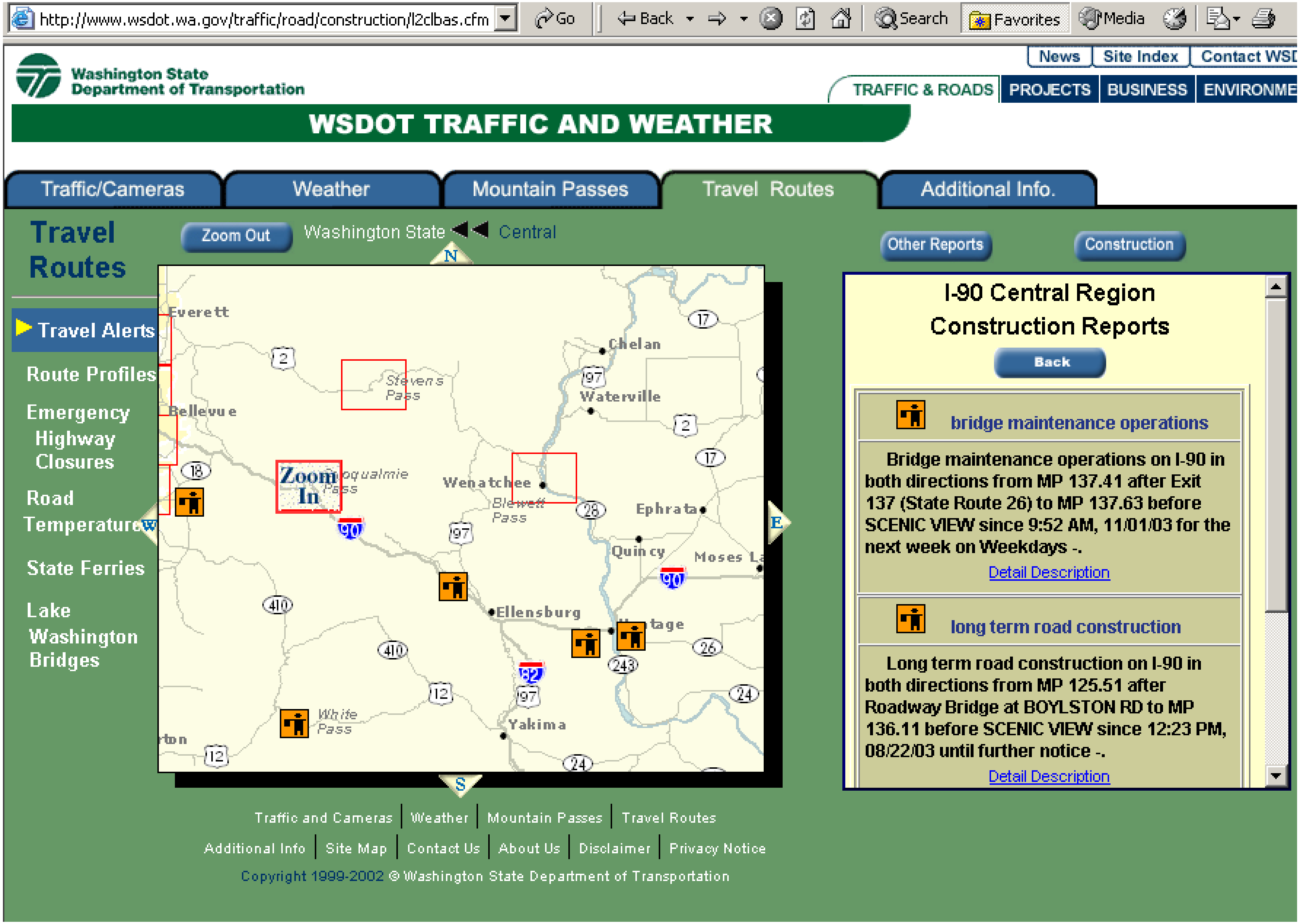


Click on a map will: ○ Zoom In ◉ Re-center

Map Legend NAVTECH ON BOARD

GIS for real-time information on traffic conditions




http://www.wsdot.wa.gov/traffic/road/construction/l2clbas.cfm
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PROJECTS
BUSINESS
ENVIRONME
WSDOT TRAFFIC AND WEATHER
Traffic/Cameras
Weather
Mountain Passes
Travel Routes
Additional Info.
Travel Routes
Zoom Out
Washington State
Central
Other Reports
Construction
Travel Alerts
Route Profiles
Emergency Highway Closures
Road Temperatures
State Ferries
Lake Washington Bridges
Everett
Chelan
Stevens Pass
Waterville
Bellevue
Zoom In
Snoqualmie Pass
Wenatchee
Blewett Pass
Ephrata
Quincy
Moses La
Ellensburg
Vantage
White Pass
Yakima
N
S
E
W
I-90 Central Region Construction Reports
Back
bridge maintenance operations
Bridge maintenance operations on I-90 in both directions from MP 137.41 after Exit 137 (State Route 26) to MP 137.63 before SCENIC VIEW since 9:52 AM, 11/01/03 for the next week on Weekdays -.
Detail Description
long term road construction
Long term road construction on I-90 in both directions from MP 125.51 after Roadway Bridge at BOYLSTON RD to MP 136.11 before SCENIC VIEW since 12:23 PM, 08/22/03 until further notice -.
Detail Description
Traffic and Cameras | Weather | Mountain Passes | Travel Routes
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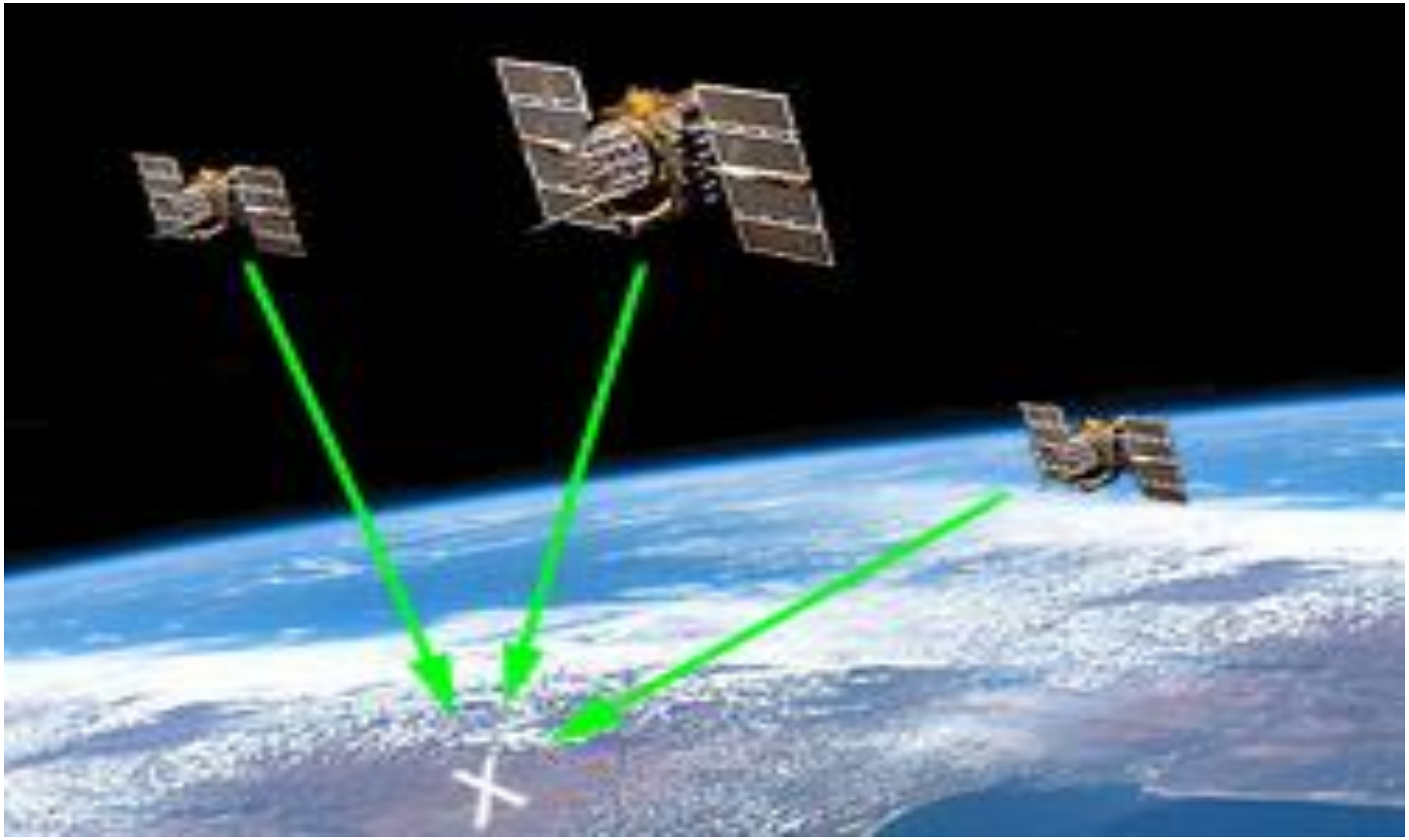
GPS is an important source of transportation GIS data

- GPS data increasingly common
- GPS data increasingly accurate

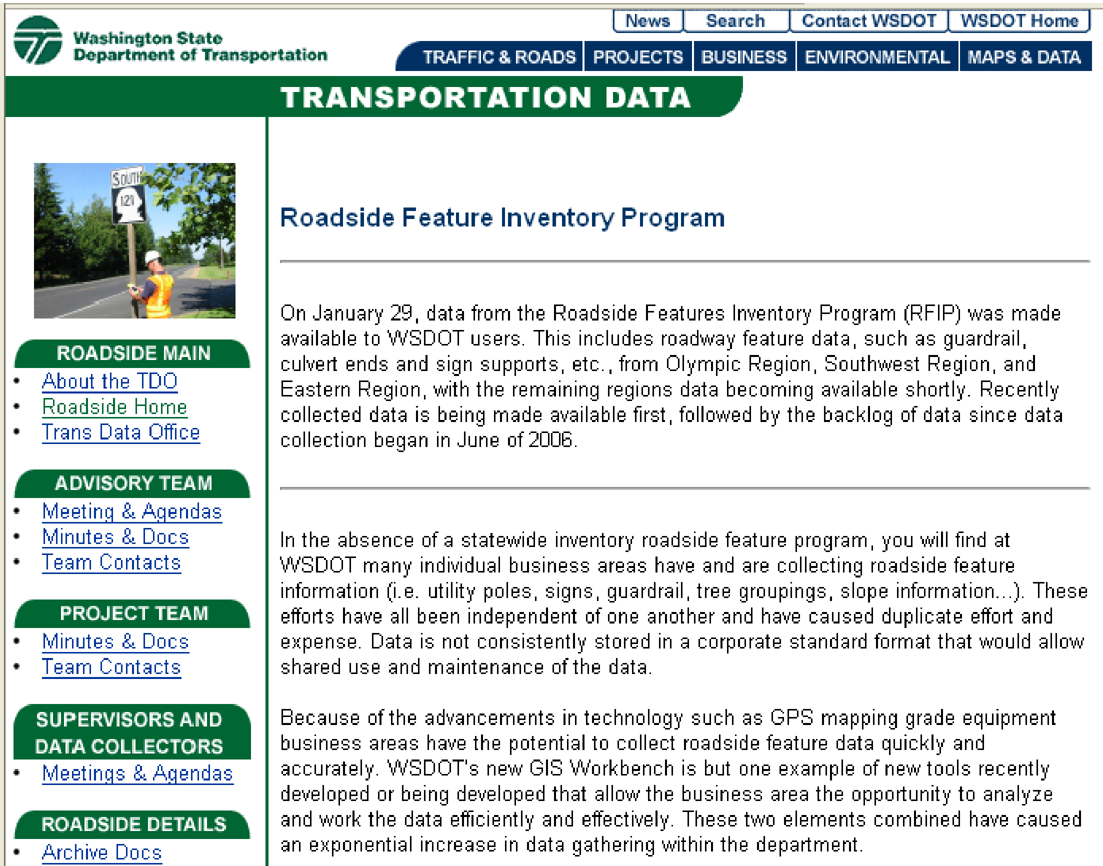
- Examples:
  - Handheld GPS with barcode reader for sign inventory
  - Pavement conditions
  - Fleet management for trucks
  - Many other sources of GPS data

Global Positioning Systems Use Triangulation



WSDOT Roadside Feature Inventory

- GPS data collection in clear zone
- Locate objects to one foot accuracy



GIS used to crunch GPS data

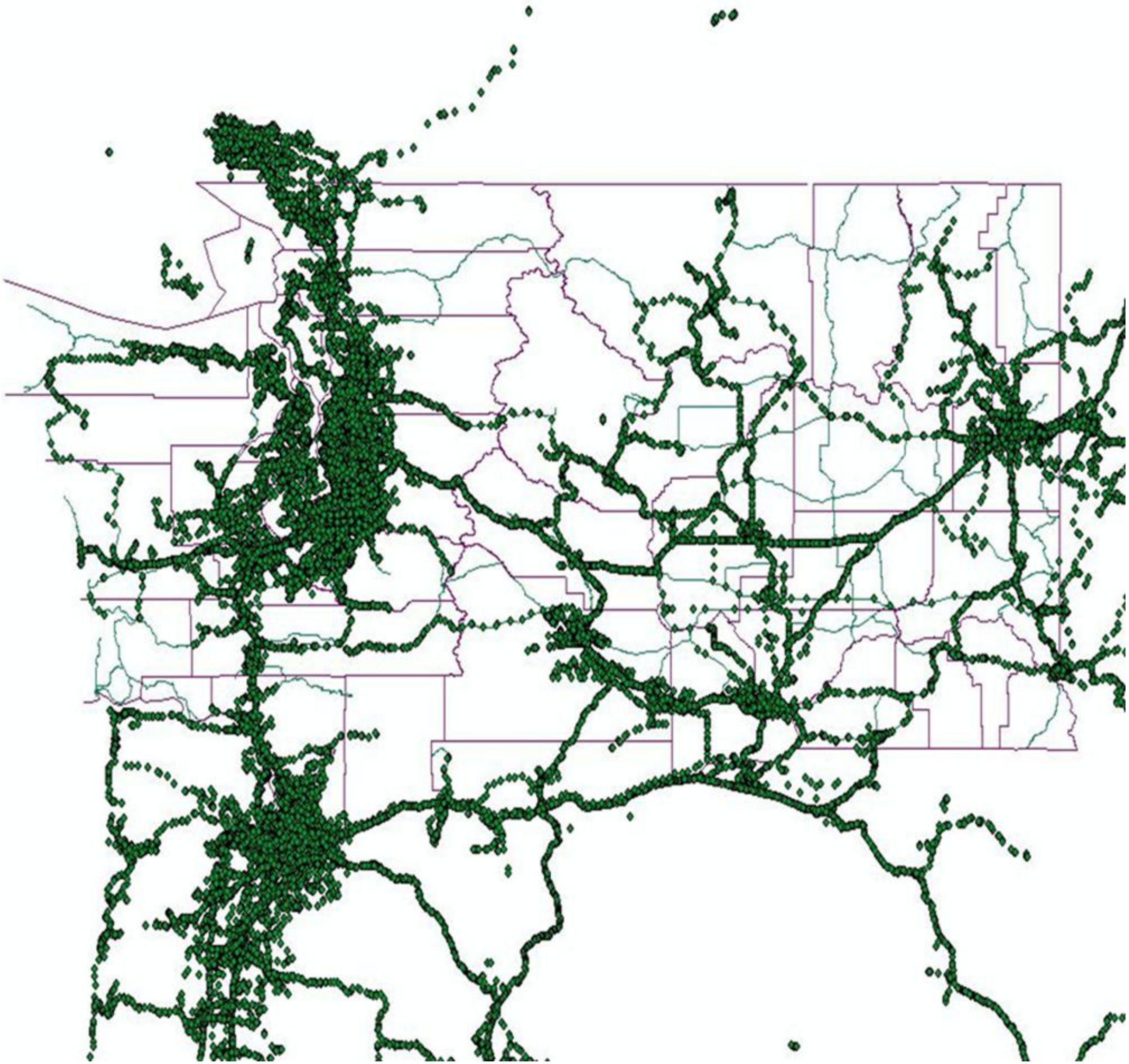
- GPS from Probe vehicles
  - Travel time
  - Travel speeds
  - Identify roadway bottle necks
  - Check loop accuracy
- GPS from Fleet Management System


GeoStats
TECHNOLOGY FOR
A MOBILE WORLD
GeoStats
GPS Data Logger™
If found, please call
U.S. 404-588-1004

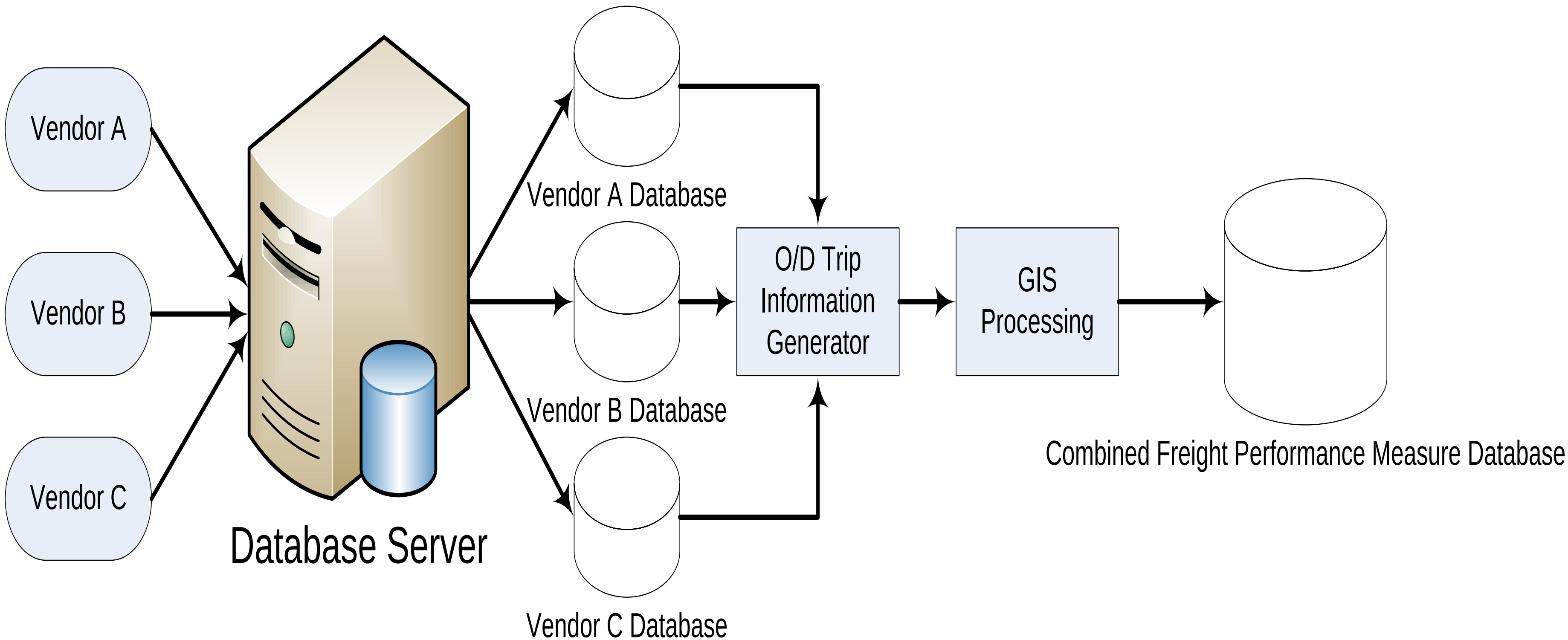
Identify Bottlenecks

Area of Recurring Delay

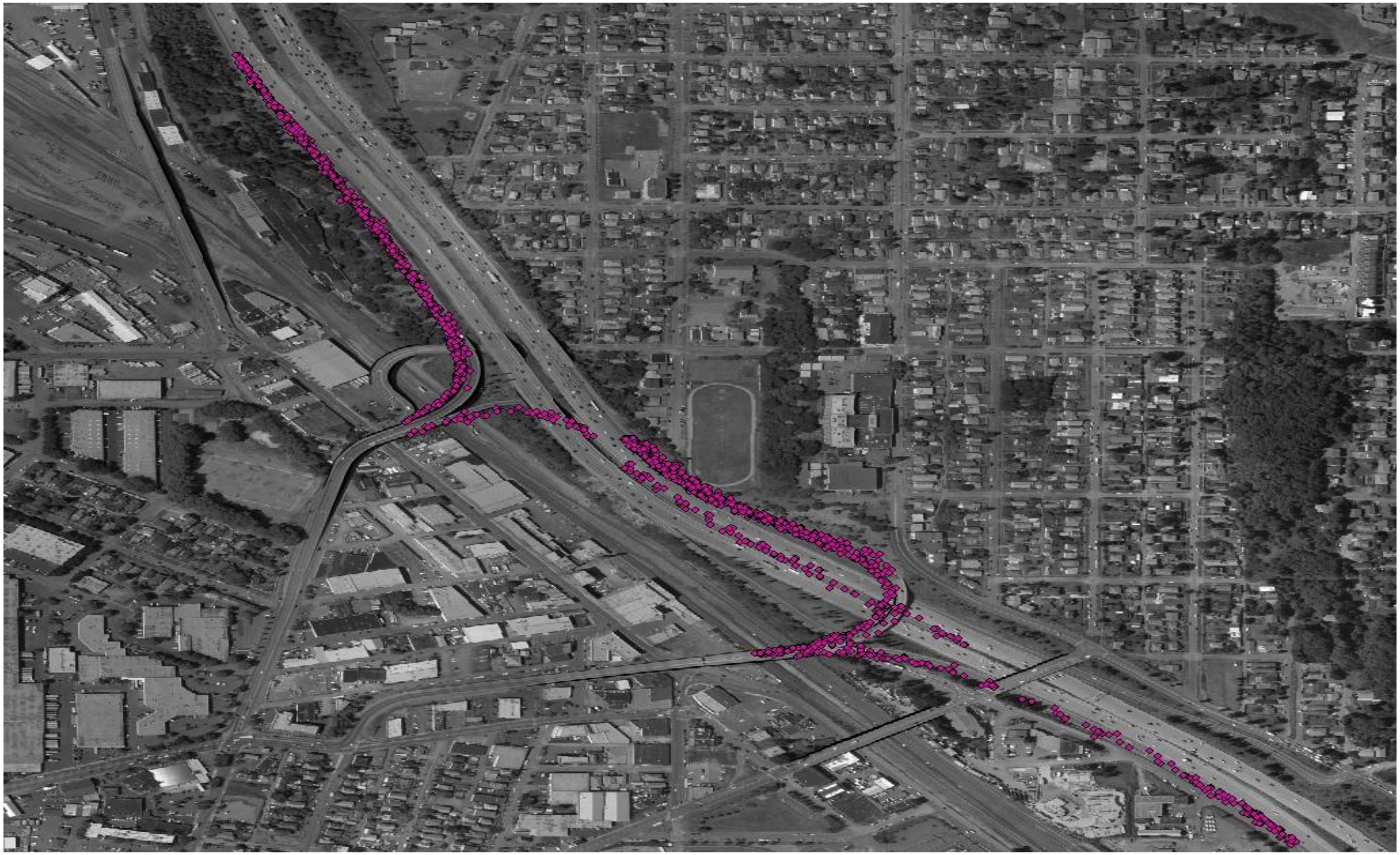
GPS and GIS in Trucks

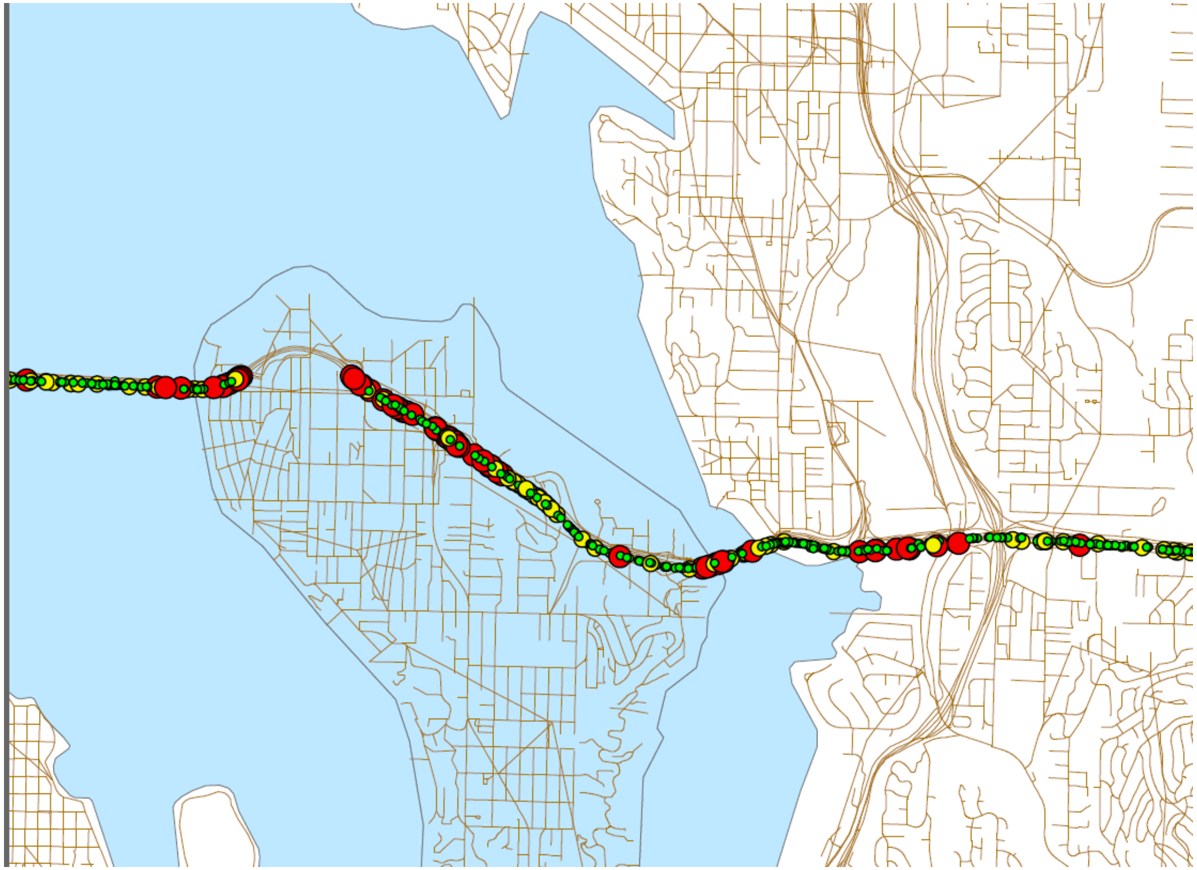


GIS Process GPS data



GIS to Analyze Ramp & Interchanges

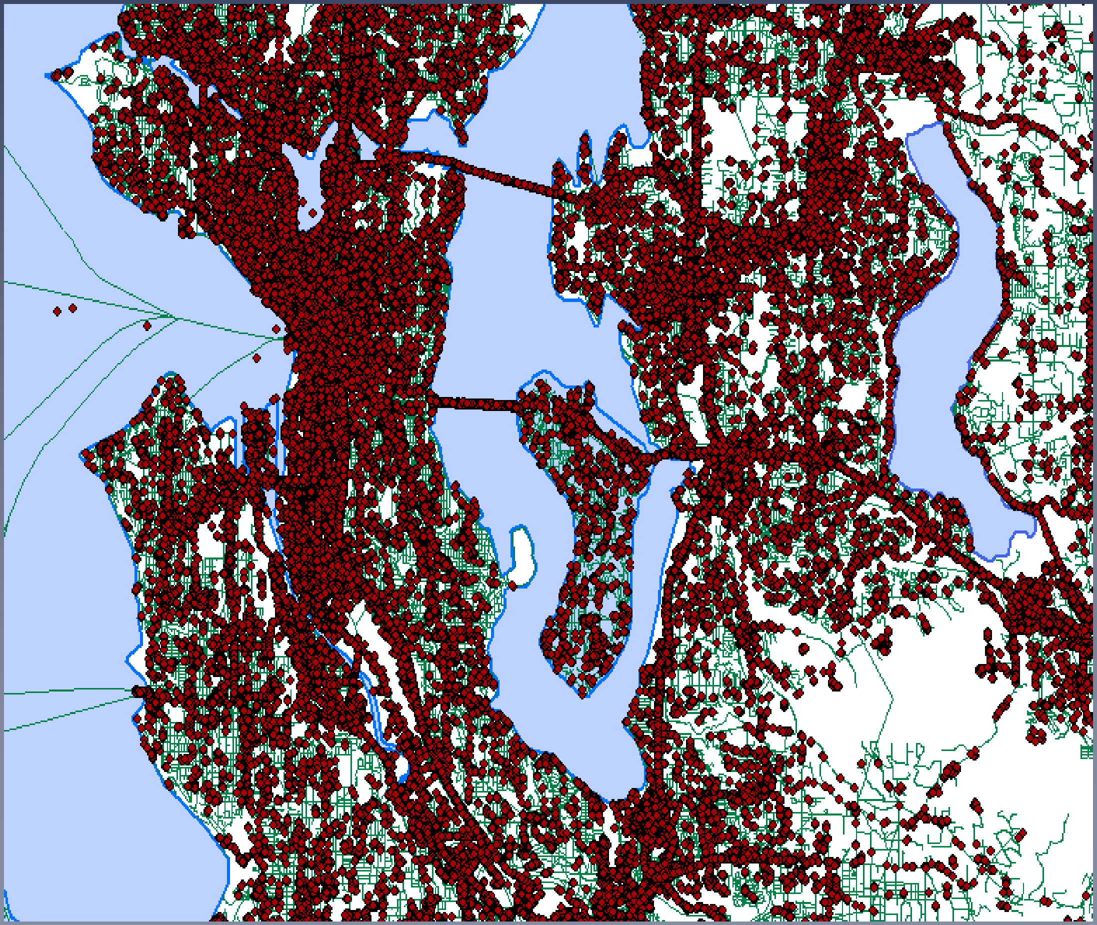




Identifying truck bottlenecks

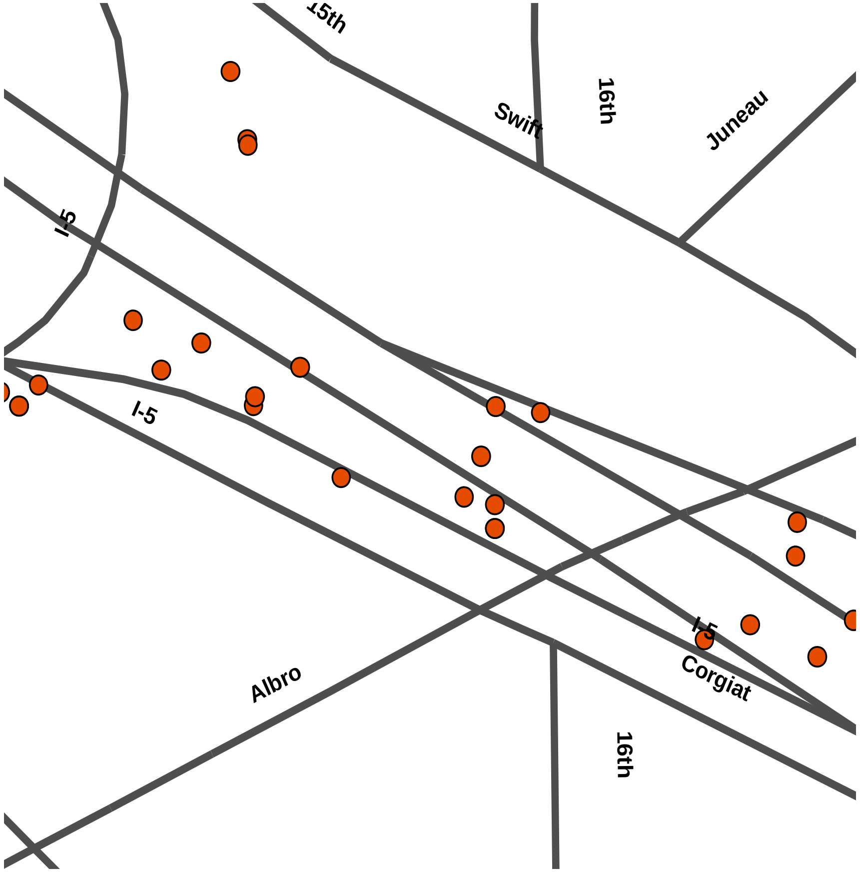
Step 1 - Code truck Global Positioning System (GPS) data to Washington State's freight corridors.

We have data from 6,000 trucks each day

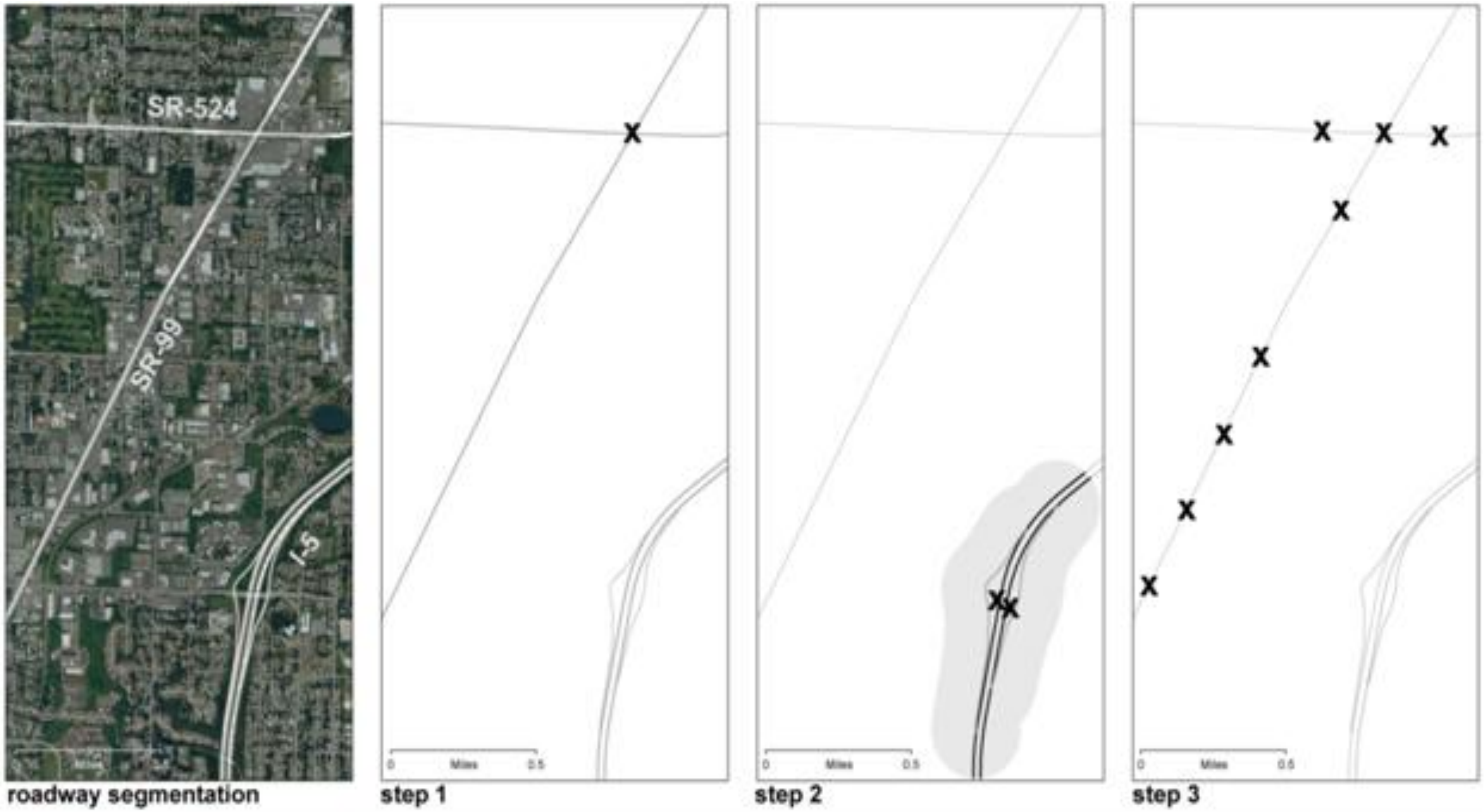


Centerline Database Problem

- Many agencies improving their network data with centerline surveys
- Air Photo
- GPS in vehicles



GIS and Roadway Segmentation



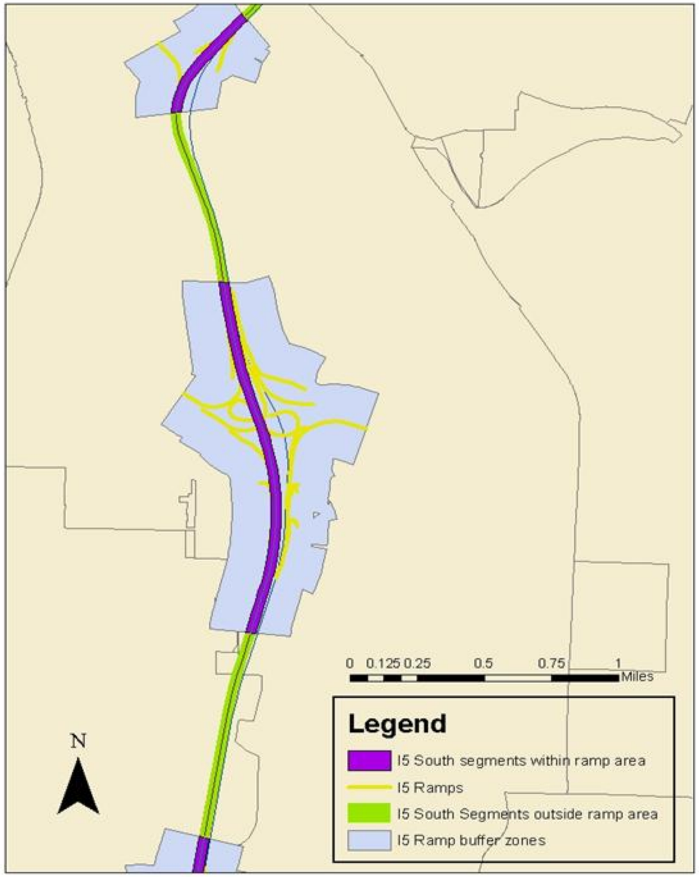
Identifying truck bottlenecks

Step 2 – Pre-determine segments to analyze on the state's major truck corridors

We divided the state highway system into segments according to:

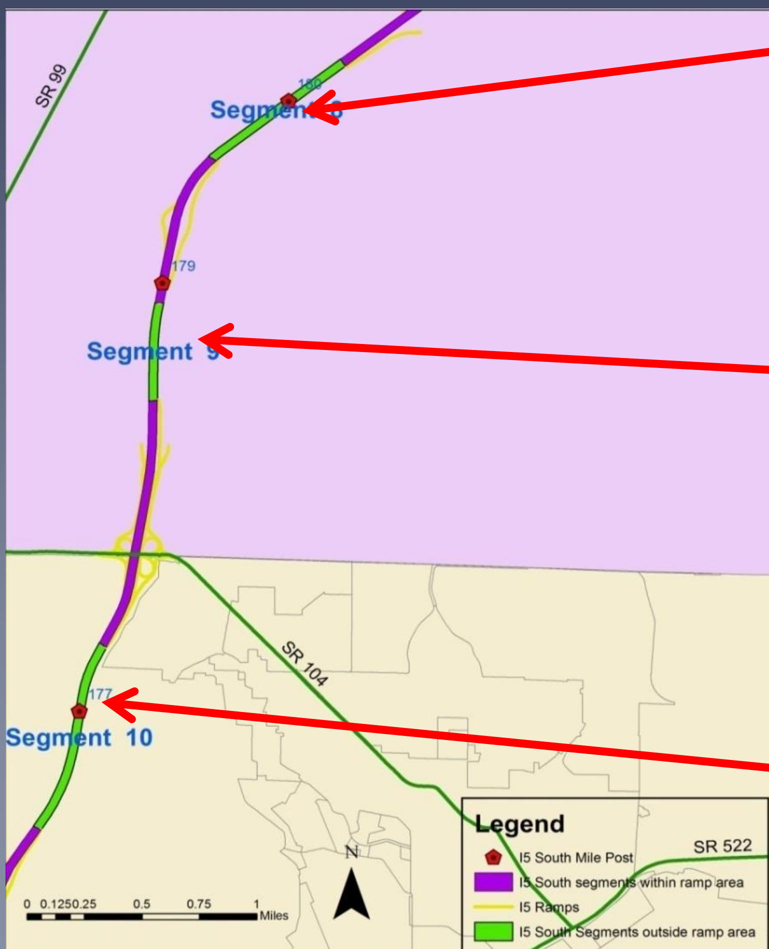
- location of ramps and major (signalized) intersection,
- speed limit changes, and
- Urban/rural boundaries.

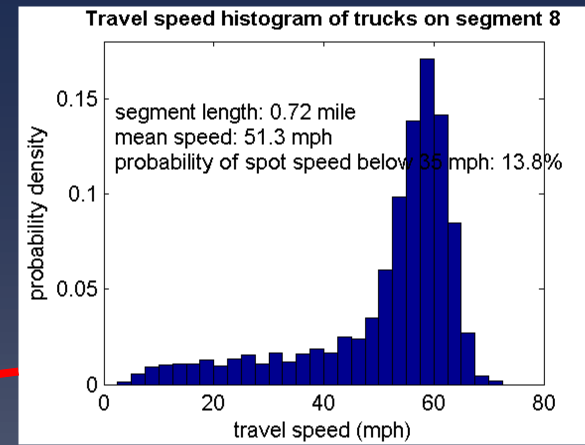
22,000 segments in Washington

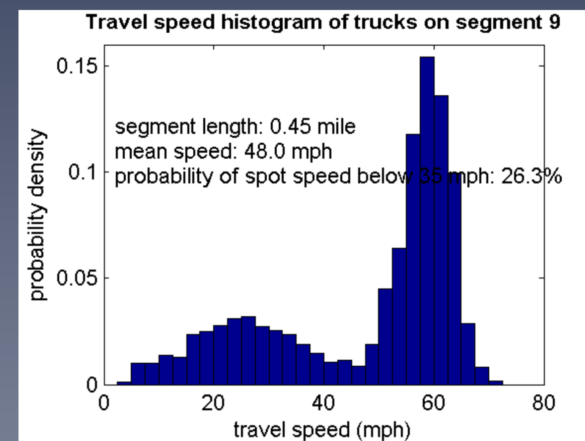


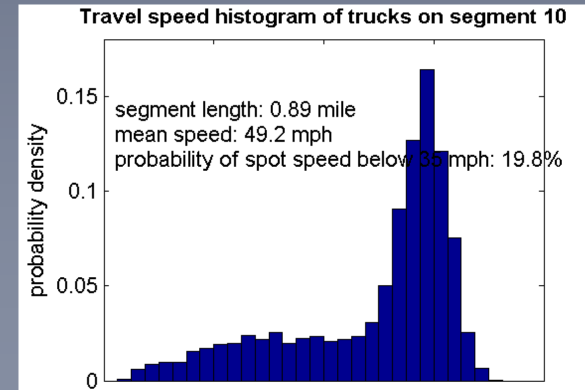
Identifying truck bottlenecks

Step 3 – Automatically pull GPS data from trucks traveling for each segments.







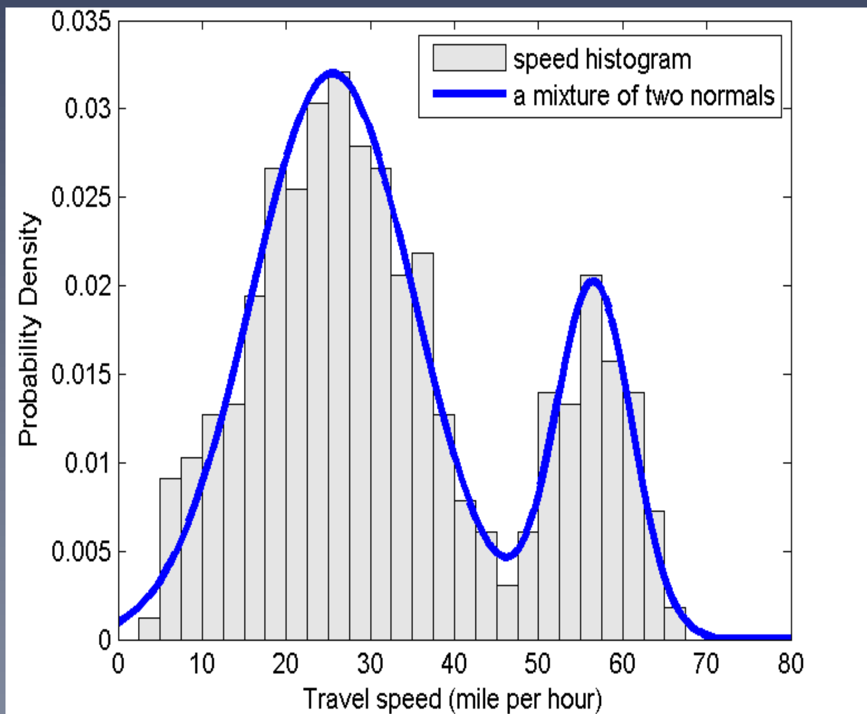


Identifying truck bottlenecks

Step 4 – Determine each segment's reliability by analyzing truck speed data by time-of-day

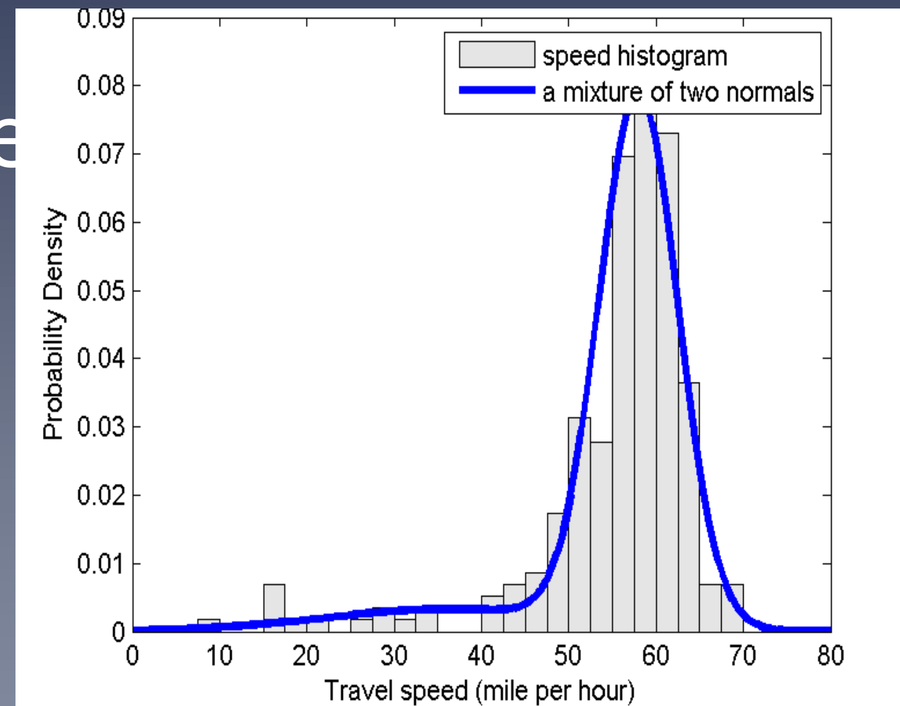
AM Peak

Speed distribution for SB I-5 (Snohomish County between 220th SW and 236th SW)



PM Peak

Speed distribution for SB I-5 (Snohomish County between 220th SW and 236th SW



The diagram on the left shows a highway segment that is unreliable in the AM peak. The diagram on the right shows that trucks reliably travel at 50 to 65 miles per hour in the PM peak on the same segment.

Identifying truck bottlenecks

Step 5 – Define and apply criteria to rank the highway bottlenecks

We developed four criteria to identify and rank truck bottlenecks:

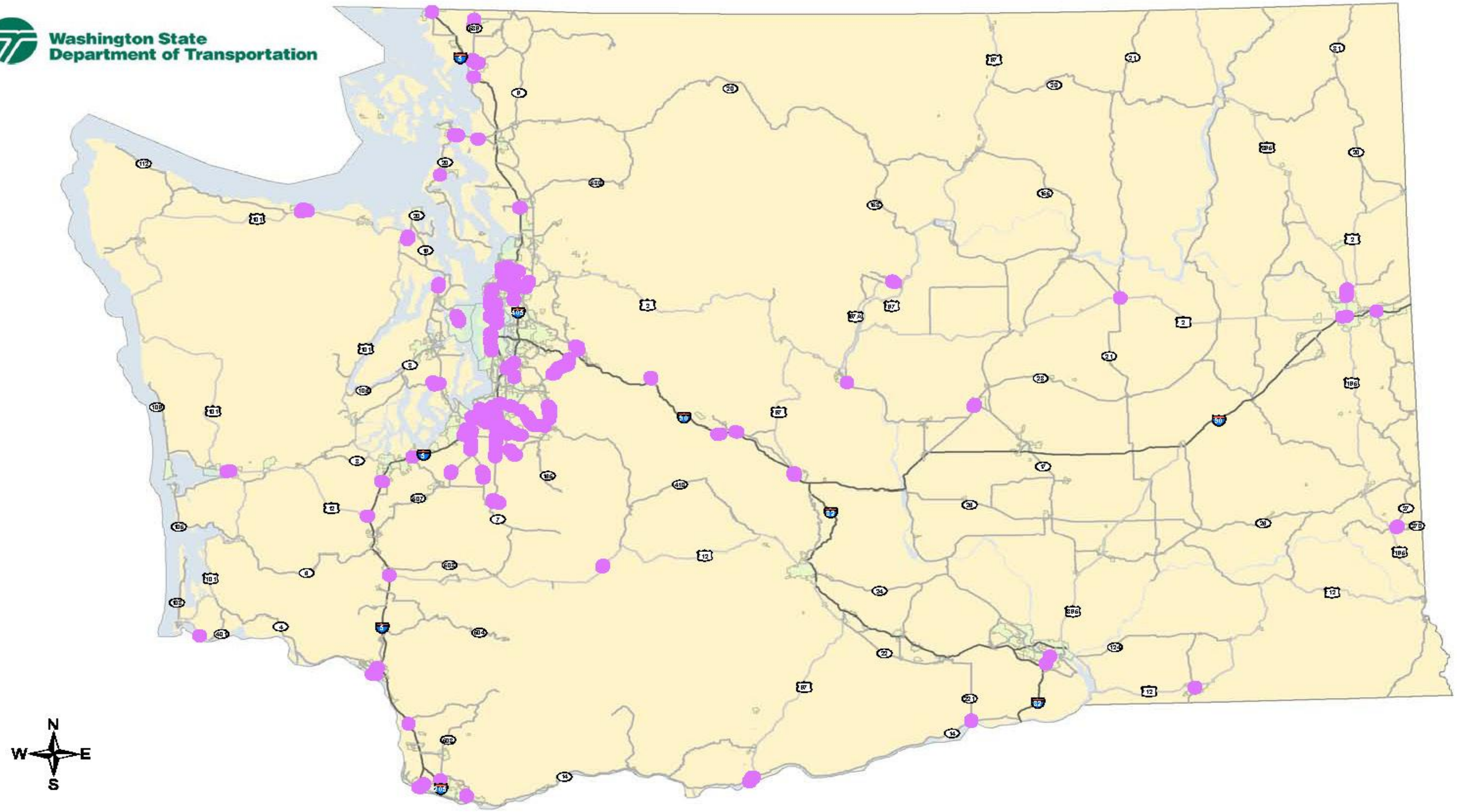
1. Truck speed below severe congestion threshold, which WSDOT has defined as 60 percent of posted speed (35 miles per hour on urban freeways),
2. Average speed,
3. Speed distribution (reliability), and
4. Truck volume.

Percentage of truck speeds falling below severe congestion threshold on southbound I-5

Segment Location	6AM-9AM	9AM-3PM	3PM-7PM	7PM-6AM	Average
NE 63rd St and NE Pacific Ave E	53.9%	51.7%	80.1%	6.9%	48.2%
NE Pacific St and Eastlake Ave E	39.9%	41.8%	78.3%	7.7%	41.9%
NE 75th St and NE 63rd St	43.2%	43.9%	69.4%	8.1%	41.2%
NE 80th St and NE 75th St	37.4%	41.1%	66.6%	7.1%	38.0%
NE 90th St and NE 79th St	29.1%	39.2%	56.3%	2.0%	31.7%
Eastlake Ave E and SR 520	13.7%	26.0%	82.8%	4.1%	31.6%
SR 520 and I-90	20.2%	22.4%	66.4%	5.0%	28.5%
NE 95th St and NE 90th St	19.1%	35.1%	57.0%	1.7%	28.2%
NE Pacific St and Eastlake Ave E	7.6%	38.4%	57.9%	3.5%	26.8%
NE 123rd St and NE 117th St	14.9%	19.7%	34.3%	2.8%	17.9%

Truck Bottlenecks on the Strategic Freight & Goods Transportation System

Washington State
Department of Transportation

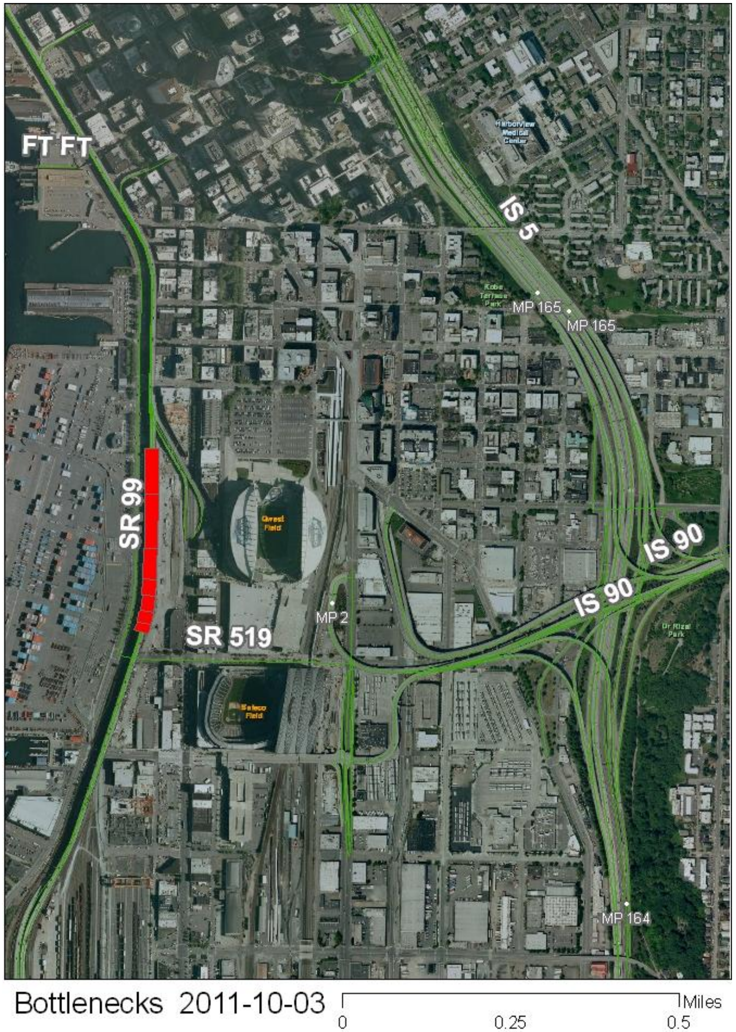


Truck Bottleneck
City Limits

Filters:
Truck speed less than 60 percent of Posted Speed Limit (Top 40 segments in Puget Sound and the rest of the state for a total of 80)
Length of grade greater than 1.00 mile where grade is 3.5 percent or greater
Truck AADT less than 250

cpe/freight_final.mxd

Severe truck bottleneck in Central Puget Sound :
SR 99 northbound



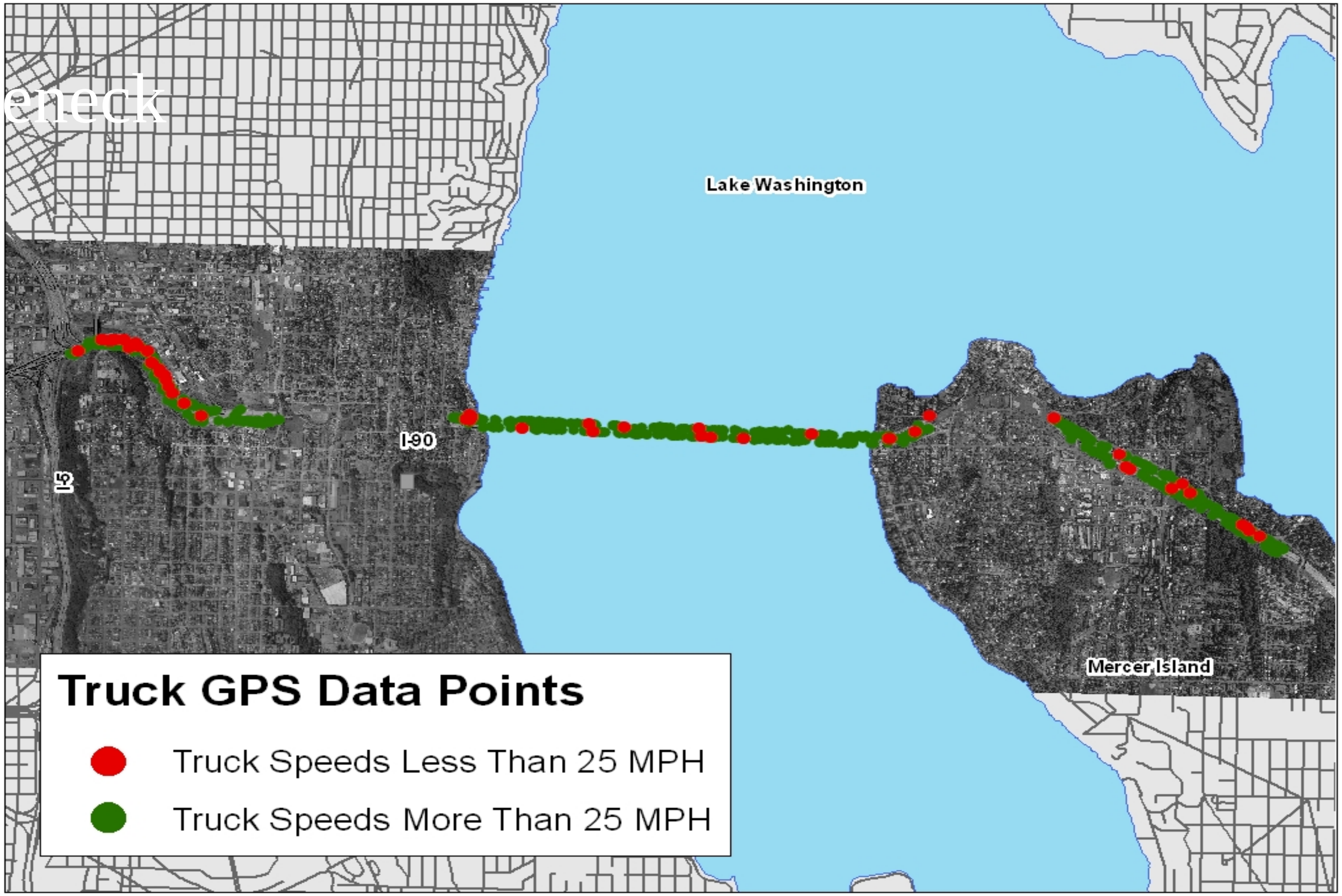
- Location: SR-99 northbound, north of SR-519, SeaTac, WA
- Length: 0.28 mile
- Daily Truck Volume: 3,100

- Average truck travel speed: 21 mph
- Percentage of travel speed below 60% of posted speed limit: 72%

Time Period	Reliability
AM	Unreliable
Midday	Unreliable
PM	Unreliable

Washington State Department of Transportation

We Can Locate Problem Areas



GIS-T in the Future

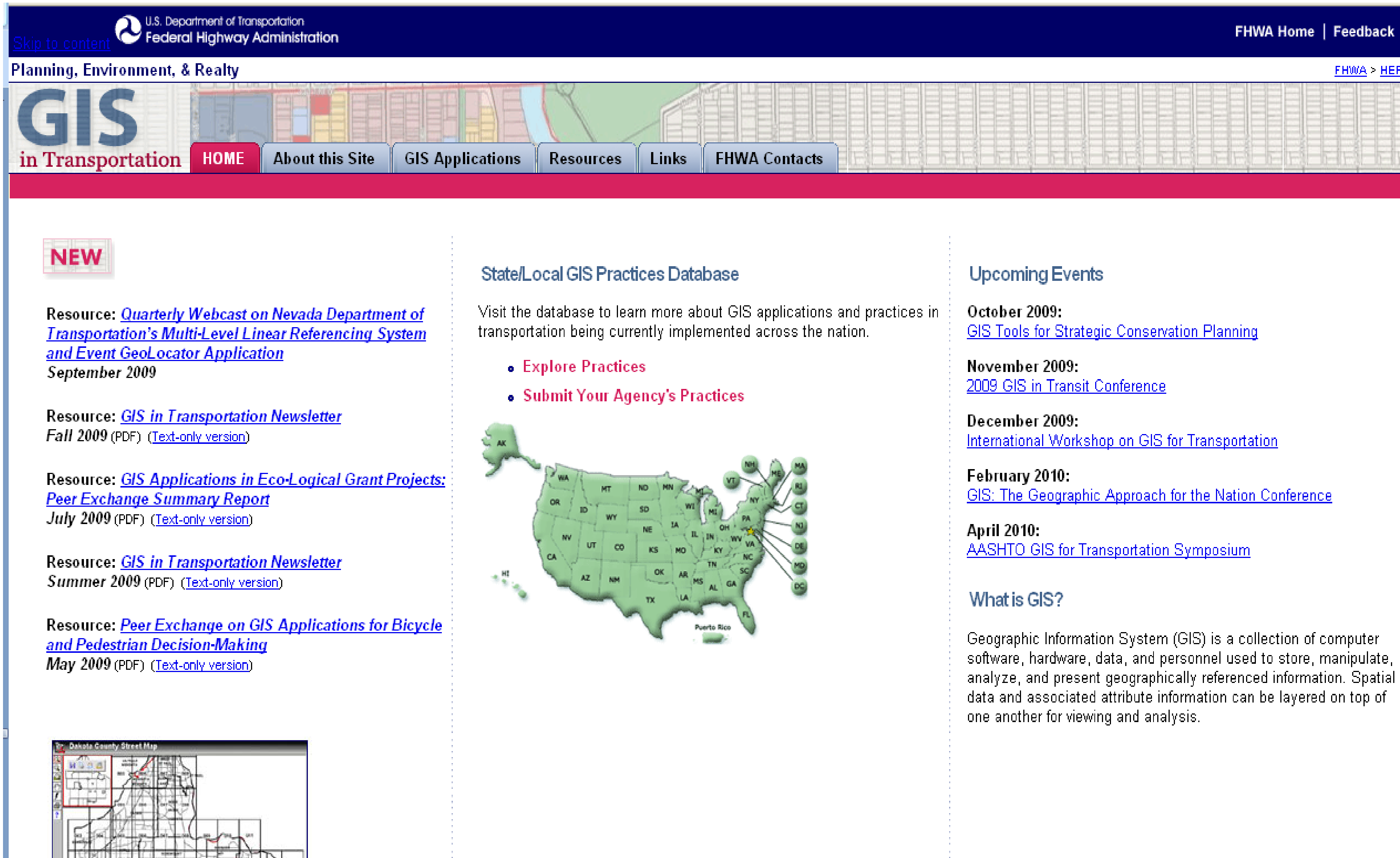
- Expansion beyond use by transportation professionals (911, yellow pages, travel planning, vehicle tracking, etc)
- New interfaces (3D, voice activation, virtual GIS)
- Better GPS (Russian and European systems)
- More linked to remote sensing (satellites) - Google Earth
- Better interoperability with other data systems
- More on the Internet and real-time

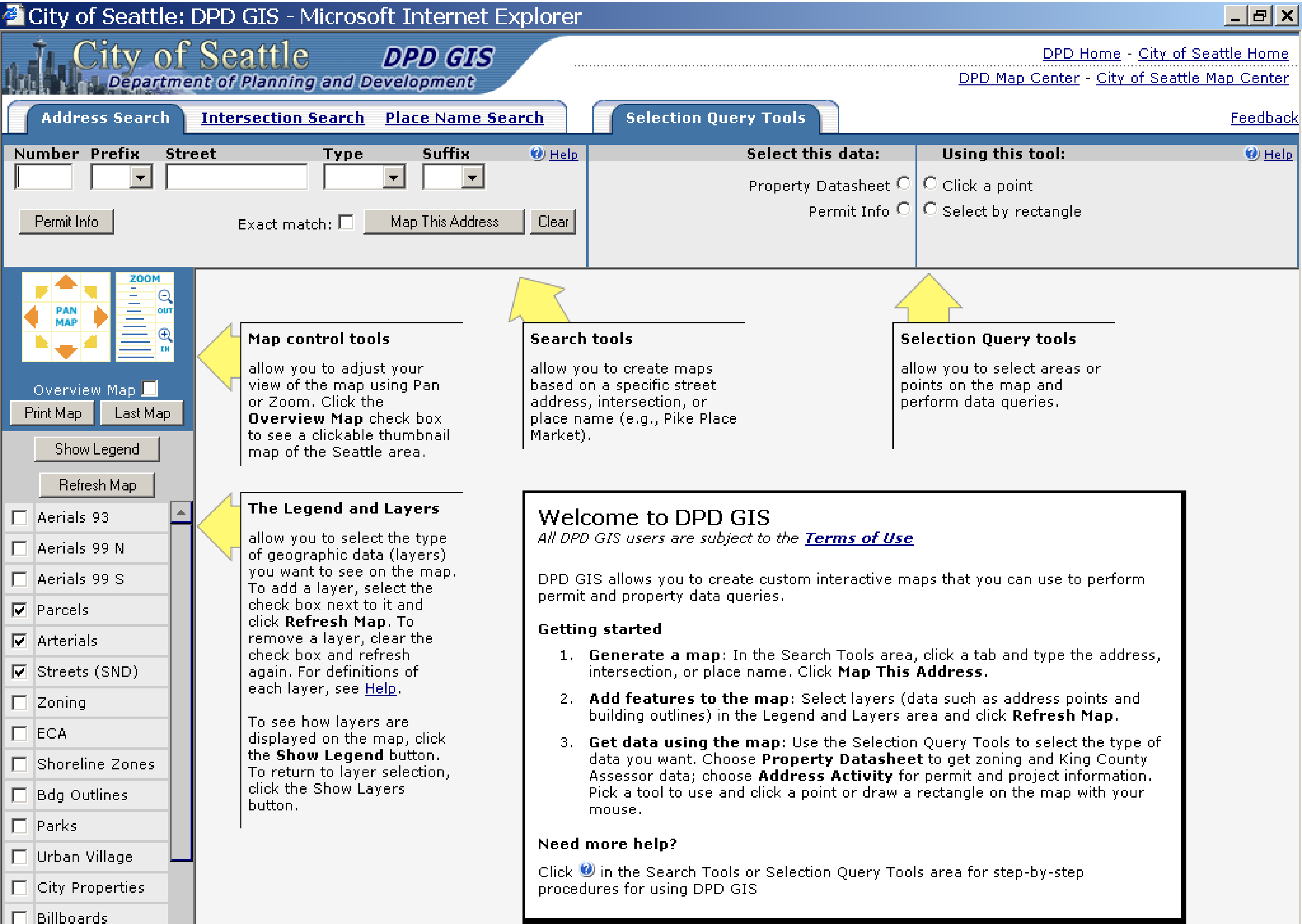
GIS-T Data Sources on the Internet

Transportation Agency GIS/spatial data

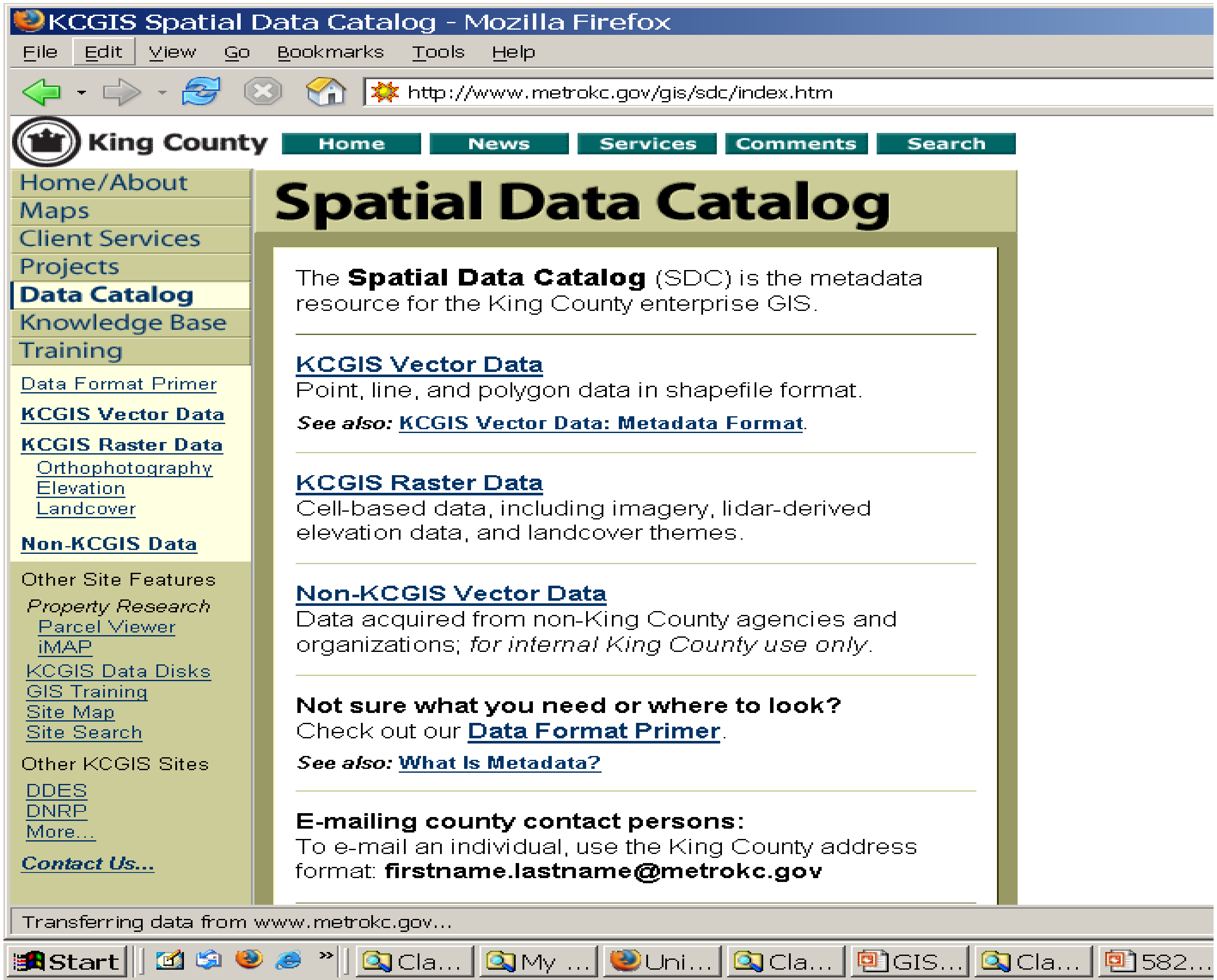
- All state DOTs have road center line database
- Many agencies maintain geo-spatial database (layers)
  - railroads
  - political boundaries
  - Etc.
- Sometimes web-based

http://www.gis.fhwa.dot.gov/




City of Seattle: DPD GIS - Microsoft Internet Explorer
City of Seattle DPD GIS
Department of Planning and Development
DPD Home - City of Seattle Home
DPD Map Center - City of Seattle Map Center
Address Search
Intersection Search
Place Name Search
Selection Query Tools
Feedback
Number
Prefix
Street
Type
Suffix
Help
Permit Info
Exact match:
Map This Address
Clear
Select this data:
Property Datasheet
Permit Info
Using this tool:
Help
Click a point
Select by rectangle
ZOOM
PAN MAP
OUT
IN
Overview Map
Print Map
Last Map
Show Legend
Refresh Map
Aerials 93
Aerials 99 N
Aerials 99 S
Parcels
Arterials
Streets (SND)
Zoning
ECA
Shoreline Zones
Bdg Outlines
Parks
Urban Village
City Properties
Billboards
Map control tools
allow you to adjust your view of the map using Pan or Zoom. Click the Overview Map check box to see a clickable thumbnail map of the Seattle area.
Search tools
allow you to create maps based on a specific street address, intersection, or place name (e.g., Pike Place Market).
Selection Query tools
allow you to select areas or points on the map and perform data queries.
The Legend and Layers
allow you to select the type of geographic data (layers) you want to see on the map. To add a layer, select the check box next to it and click Refresh Map. To remove a layer, clear the check box and refresh again. For definitions of each layer, see Help.
To see how layers are displayed on the map, click the Show Legend button. To return to layer selection, click the Show Layers button.
Welcome to DPD GIS
All DPD GIS users are subject to the Terms of Use
DPD GIS allows you to create custom interactive maps that you can use to perform permit and property data queries.
Getting started
1. Generate a map: In the Search Tools area, click a tab and type the address, intersection, or place name. Click Map This Address.
2. Add features to the map: Select layers (data such as address points and building outlines) in the Legend and Layers area and click Refresh Map.
3. Get data using the map: Use the Selection Query Tools to select the type of data you want. Choose Property Datasheet to get zoning and King County Assessor data; choose Address Activity for permit and project information. Pick a tool to use and click a point or draw a rectangle on the map with your mouse.
Need more help?
Click in the Search Tools or Selection Query Tools area for step-by-step procedures for using DPD GIS

King County


KCGIS Spatial Data Catalog - Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://www.metrokc.gov/gis/sdc/index.htm
King County
Home
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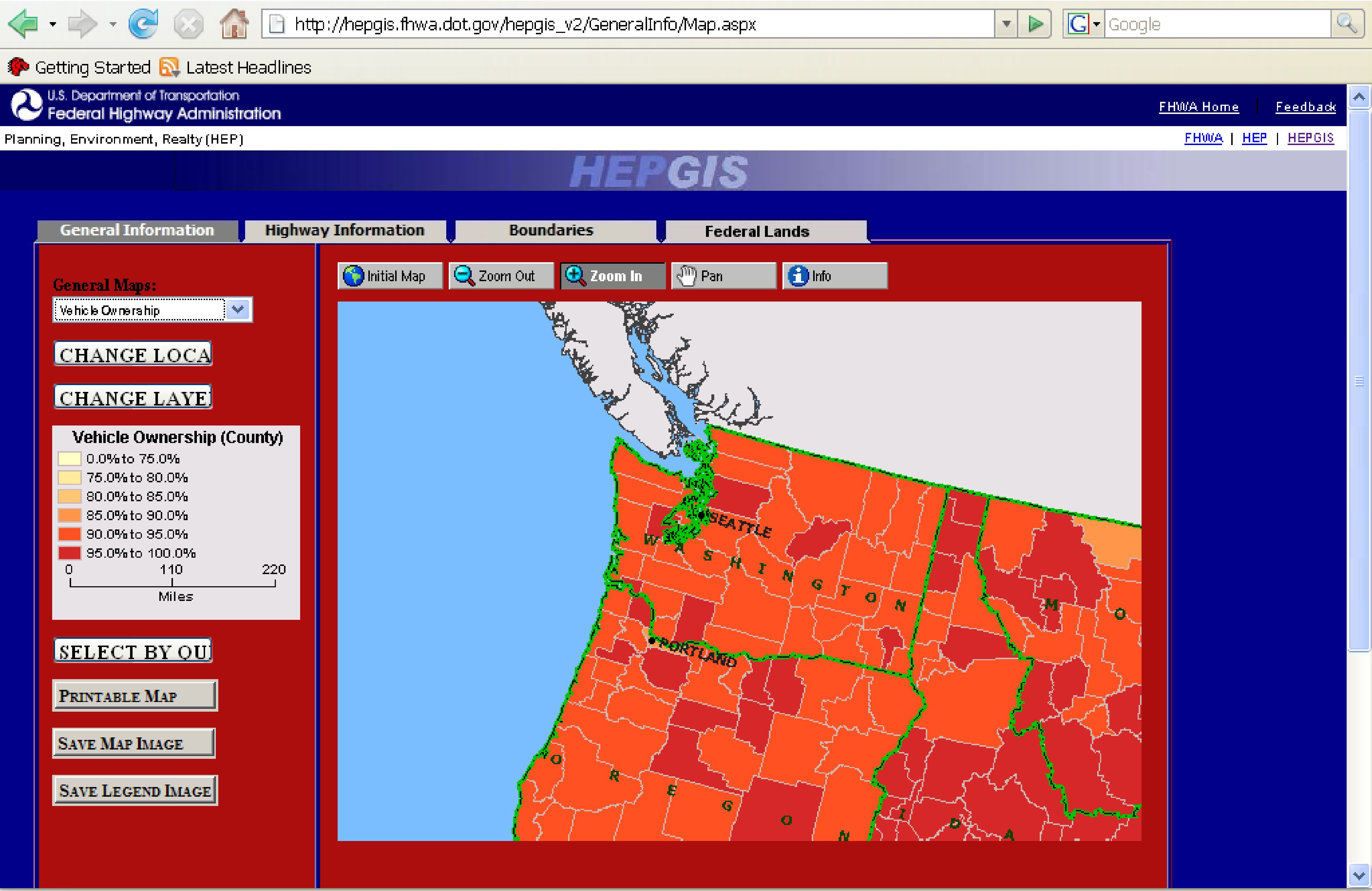
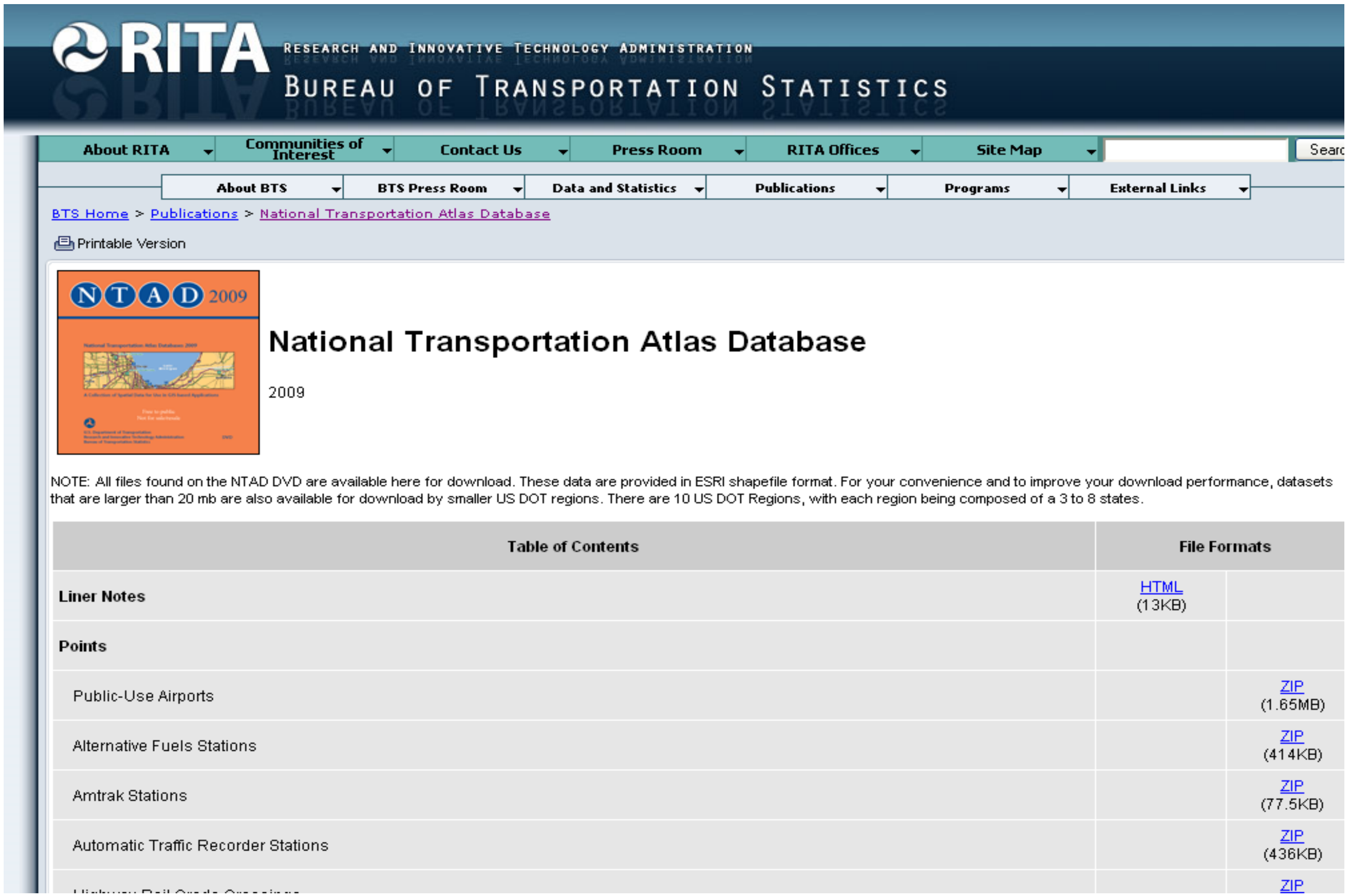
Projects
Data Catalog
Knowledge Base
Training
Data Format Primer
KCGIS Vector Data
KCGIS Raster Data
Orthophotography
Elevation
Landcover
Non-KCGIS Data
Other Site Features
Property Research
Parcel Viewer
iMAP
KCGIS Data Disks
GIS Training
Site Map
Site Search
Other KCGIS Sites
DDES
DNRP
More...
Contact Us...
Spatial Data Catalog
The Spatial Data Catalog (SDC) is the metadata resource for the King County enterprise GIS.
KCGIS Vector Data
Point, line, and polygon data in shapefile format.
See also: KCGIS Vector Data: Metadata Format.
KCGIS Raster Data
Cell-based data, including imagery, lidar-derived elevation data, and landcover themes.
Non-KCGIS Vector Data
Data acquired from non-King County agencies and organizations; for internal King County use only.
Not sure what you need or where to look?
Check out our Data Format Primer.
See also: What Is Metadata?
E-mailing county contact persons:
To e-mail an individual, use the King County address format: firstname.lastname@metrokc.gov
Transferring data from www.metrokc.gov...
Start
Cla...
My ...
Uni...
Cla...
GIS...
Cla...
582...

http://hepgis.fhwa.dot.gov/



http://www.bts.gov/publications/national_transportation_atlas_database/2009/



RITA Research and Innovative Technology Administration

Bureau of Transportation Statistics

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BTS Home > Publications > National Transportation Atlas Database

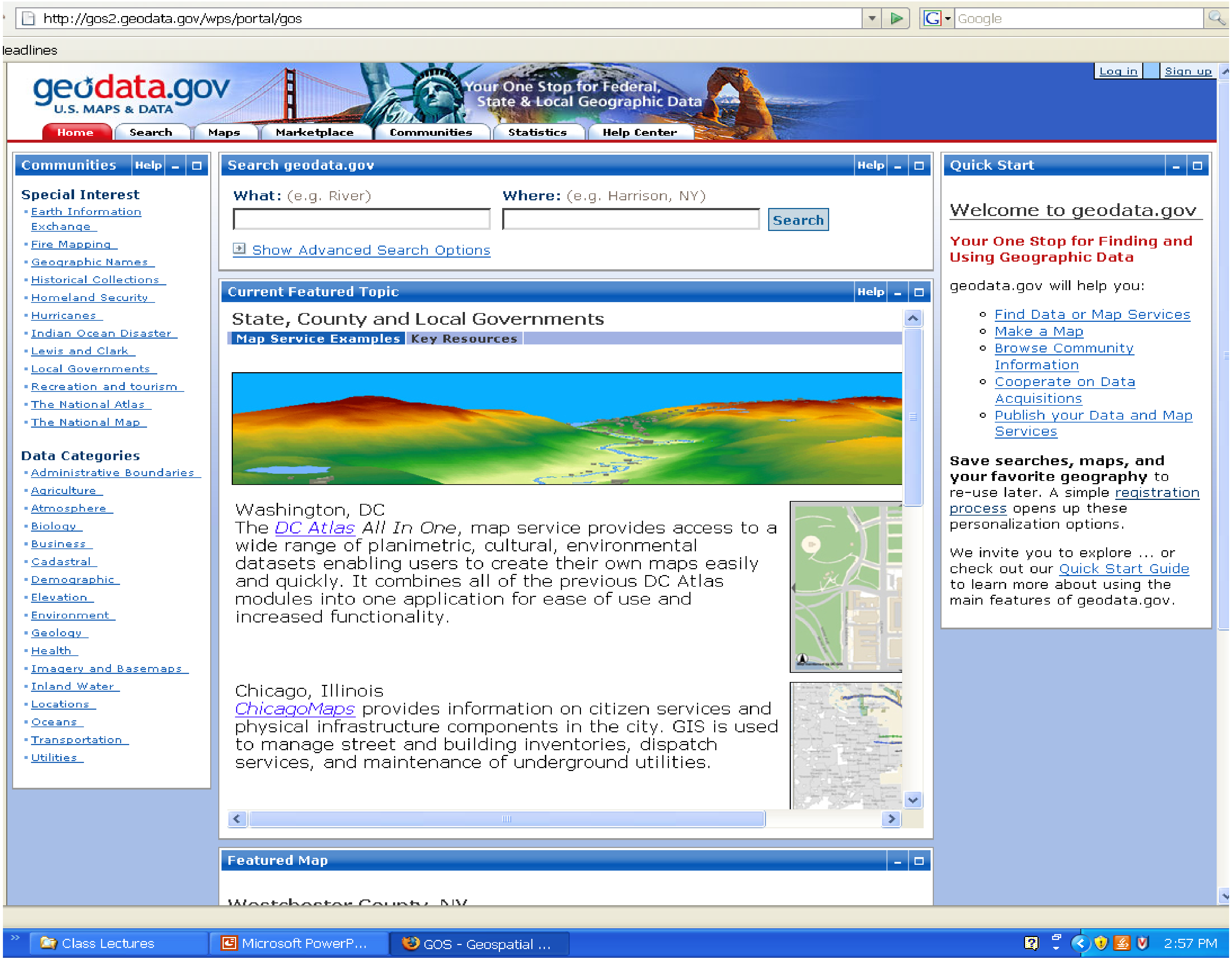
Printable Version

National Transportation Atlas Database

2009

NOTE: All files found on the NTAD DVD are available here for download. These data are provided in ESRI shapefile format. For your convenience and to improve your download performance, datasets that are larger than 20 mb are also available for download by smaller US DOT regions. There are 10 US DOT Regions, with each region being composed of a 3 to 8 states.

Table of Contents	File Formats	
Liner Notes	HTML (13KB)	
Points		
Public-Use Airports		ZIP (1.65MB)
Alternative Fuels Stations		ZIP (414KB)
Amtrak Stations		ZIP (77.5KB)
Automatic Traffic Recorder Stations		ZIP (436KB)
Highway-Rail Grade Crossings		ZIP


http://gos2.geodata.gov/wps/portal/gos
Google
leadlines
geodata.gov
U.S. MAPS & DATA
Your One Stop for Federal, State & Local Geographic Data
Log in
Sign up
Home
Search
Maps
Marketplace
Communities
Statistics
Help Center
Communities
Help
Special Interest
Earth Information Exchange
Fire Mapping
Geographic Names
Historical Collections
Homeland Security
Hurricanes
Indian Ocean Disaster
Lewis and Clark
Local Governments
Recreation and tourism
The National Atlas
The National Map
Data Categories
Administrative Boundaries
Agriculture
Atmosphere
Biology
Business
Cadastral
Demographic
Elevation
Environment
Geology
Health
Imagery and Basemaps
Inland Water
Locations
Oceans
Transportation
Utilities
Search geodata.gov
What: (e.g. River)
Where: (e.g. Harrison, NY)
Search
Show Advanced Search Options
Current Featured Topic
State, County and Local Governments
Map Service Examples
Key Resources
Washington, DC
The DC Atlas All In One, map service provides access to a wide range of planimetric, cultural, environmental datasets enabling users to create their own maps easily and quickly. It combines all of the previous DC Atlas modules into one application for ease of use and increased functionality.
Chicago, Illinois
ChicagoMaps provides information on citizen services and physical infrastructure components in the city. GIS is used to manage street and building inventories, dispatch services, and maintenance of underground utilities.
Featured Map
Quick Start
Welcome to geodata.gov
Your One Stop for Finding and Using Geographic Data
geodata.gov will help you:
Find Data or Map Services
Make a Map
Browse Community Information
Cooperate on Data Acquisitions
Publish your Data and Map Services
Save searches, maps, and your favorite geography to re-use later. A simple registration process opens up these personalization options.
We invite you to explore ... or check out our Quick Start Guide to learn more about using the main features of geodata.gov.
Class Lectures
Microsoft PowerP...
GOS - Geospatial ...
2:57 PM

Puget Sound Regional Council

Puget Sound Regional Council

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DATA

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  - Map Catalog
  - GIS Shapefiles
  - Equivalency Tables
  - Puget Sound LiDAR Consortium
  - WA-Trans
- Models & Tools
- Forecasts
- Research
- Regional Data Profile
- Puget Sound Trends
- Data Request Form
- Regional Technical Forum

GIS and Maps

Map Catalog

Catalog of PSRC map products.

GIS Shapefiles

Index of GIS shapefiles, including census geographies and PSRC forecasting zones.

Equivalency Tables

Equivalency tables for correlating various geographic boundary systems (e.g. census tracts to TAZ, FAZ to TAZ).

Puget Sound LiDAR Consortium

Devoted to developing public domain high-resolution LiDAR topography for the Puget Sound region

WA-Trans: Washington State Transportation Framework

WSDOT-sponsored interagency collaboration to build a statewide transportation spatial data structure.

USEFUL LINKS

- Geography
- Maps
- Aerial Photos

RELATED PSRC RESOURCES

- Census
- Forecasts

CONTACT

Andy Norton, 206-464-7527

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WSDOT GeoData Distribution Catalog

General Information

- WSDOT GeoData Distribution Catalog home page
- How to use the WSDOT GeoData Distribution Catalog
- Data download content and format information
- Links to other Washington State GIS data sites

Available Data

- Transportation Features
- Political and Administrative Features

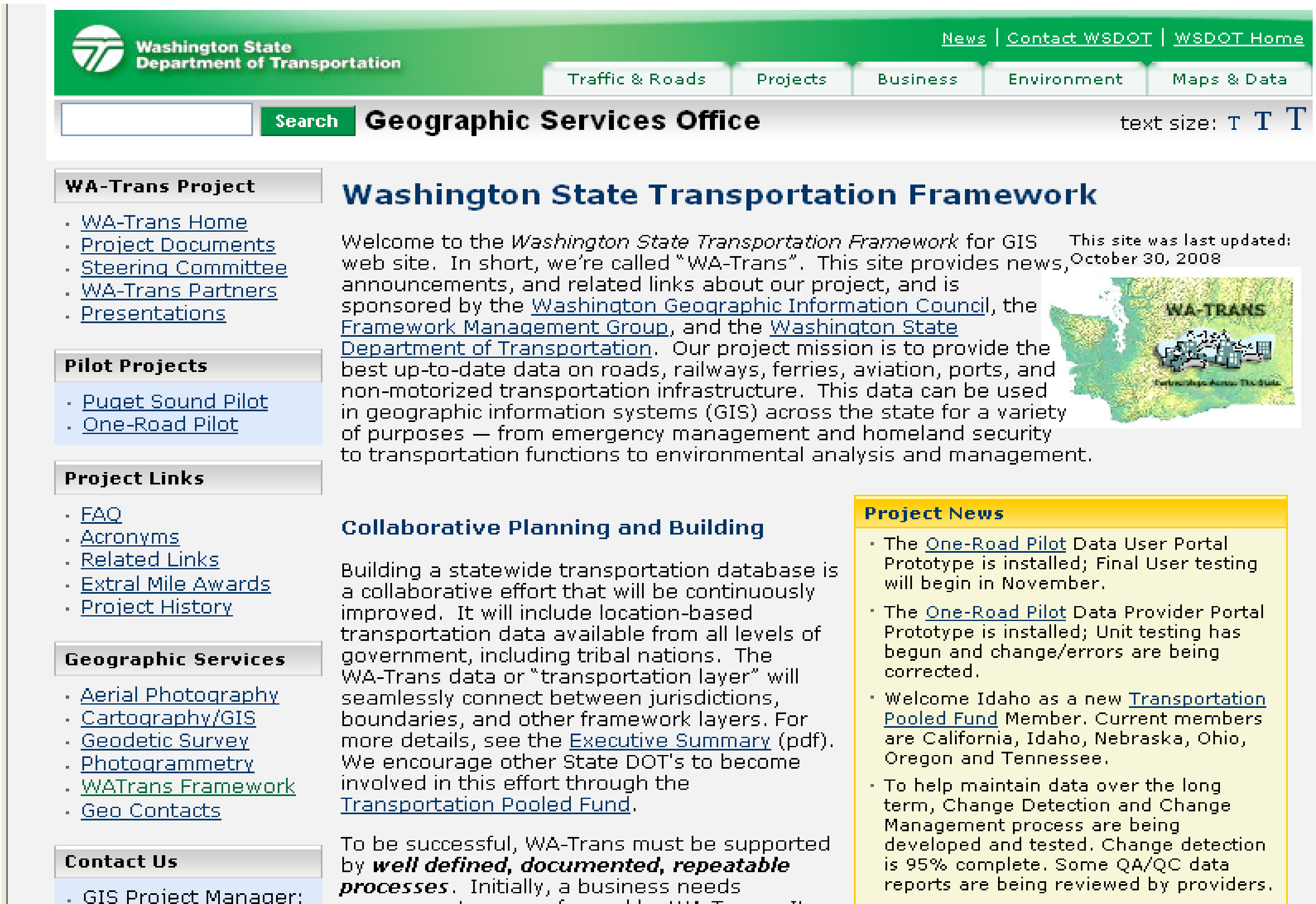
The WSDOT GeoData Distribution Catalog, maintained by the Office of Information Technology, is a centralized distribution site for geographic information system data produced at the Washington State Department of Transportation. Data provided here is used by WSDOT's transportation partners, government entities, schools, private businesses, and the general public. The WSDOT GIS Community actively promotes inter agency data exchange and resource sharing; therefore, data on this site is available for download free-of-charge. Our data is provided in ESRI shapefile, georeferenced .jpg, and Mr. SID formats. See the sidebar to the left for more details. If you do not have a GIS solution to view this data, you can download free of charge open source software for Windows, Macintosh, or Linux from Quantum GIS (Qgis) or Refractions Research (uDig).

Geospatial Data Available for Download

TRANSPORTATION FEATURES

Transportation Projects, 09-11	View	Download	4 MB
Transportation Projects, 2005 Partnership Package	View	Download	1.2 MB
Bridges	View	Download	334 KB
Ferry Routes	View	Download	52 KB
Ferry Terminals, Public and Private	View	Download	52 KB

Washington Transportation GIS Framework



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Search **Geographic Services Office** text size: T T T

WA-Trans Project

- WA-Trans Home
- Project Documents
- Steering Committee
- WA-Trans Partners
- Presentations

Pilot Projects

- Puget Sound Pilot
- One-Road Pilot

Project Links

- FAQ
- Acronyms
- Related Links
- Extral Mile Awards
- Project History

Geographic Services

- Aerial Photography
- Cartography/GIS
- Geodetic Survey
- Photogrammetry
- WATrans Framework
- Geo Contacts

Contact Us

- GIS Project Manager:

Washington State Transportation Framework

This site was last updated: October 30, 2008

Welcome to the *Washington State Transportation Framework* for GIS web site. In short, we're called "WA-Trans". This site provides news, announcements, and related links about our project, and is sponsored by the Washington Geographic Information Council, the Framework Management Group, and the Washington State Department of Transportation. Our project mission is to provide the best up-to-date data on roads, railways, ferries, aviation, ports, and non-motorized transportation infrastructure. This data can be used in geographic information systems (GIS) across the state for a variety of purposes — from emergency management and homeland security to transportation functions to environmental analysis and management.

Collaborative Planning and Building

Building a statewide transportation database is a collaborative effort that will be continuously improved. It will include location-based transportation data available from all levels of government, including tribal nations. The WA-Trans data or "transportation layer" will seamlessly connect between jurisdictions, boundaries, and other framework layers. For more details, see the Executive Summary (pdf). We encourage other State DOT's to become involved in this effort through the Transportation Pooled Fund.

To be successful, WA-Trans must be supported by ***well defined, documented, repeatable processes***. Initially, a business needs

Project News

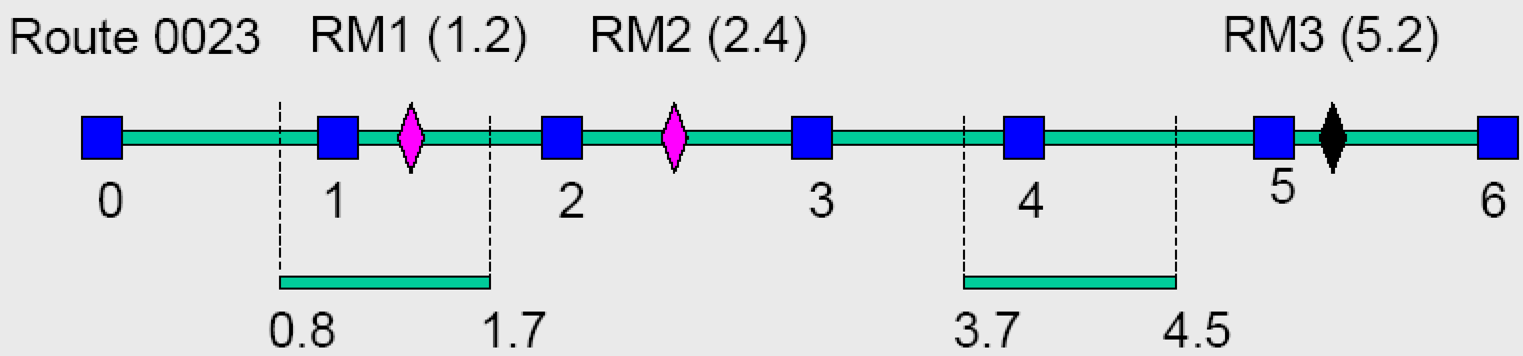
- The One-Road Pilot Data User Portal Prototype is installed; Final User testing will begin in November.
- The One-Road Pilot Data Provider Portal Prototype is installed; Unit testing has begun and change/errors are being corrected.
- Welcome Idaho as a new Transportation Pooled Fund Member. Current members are California, Idaho, Nebraska, Ohio, Oregon and Tennessee.
- To help maintain data over the long term, Change Detection and Change Management process are being developed and tested. Change detection is 95% complete. Some QA/QC data reports are being reviewed by providers.

Questions?

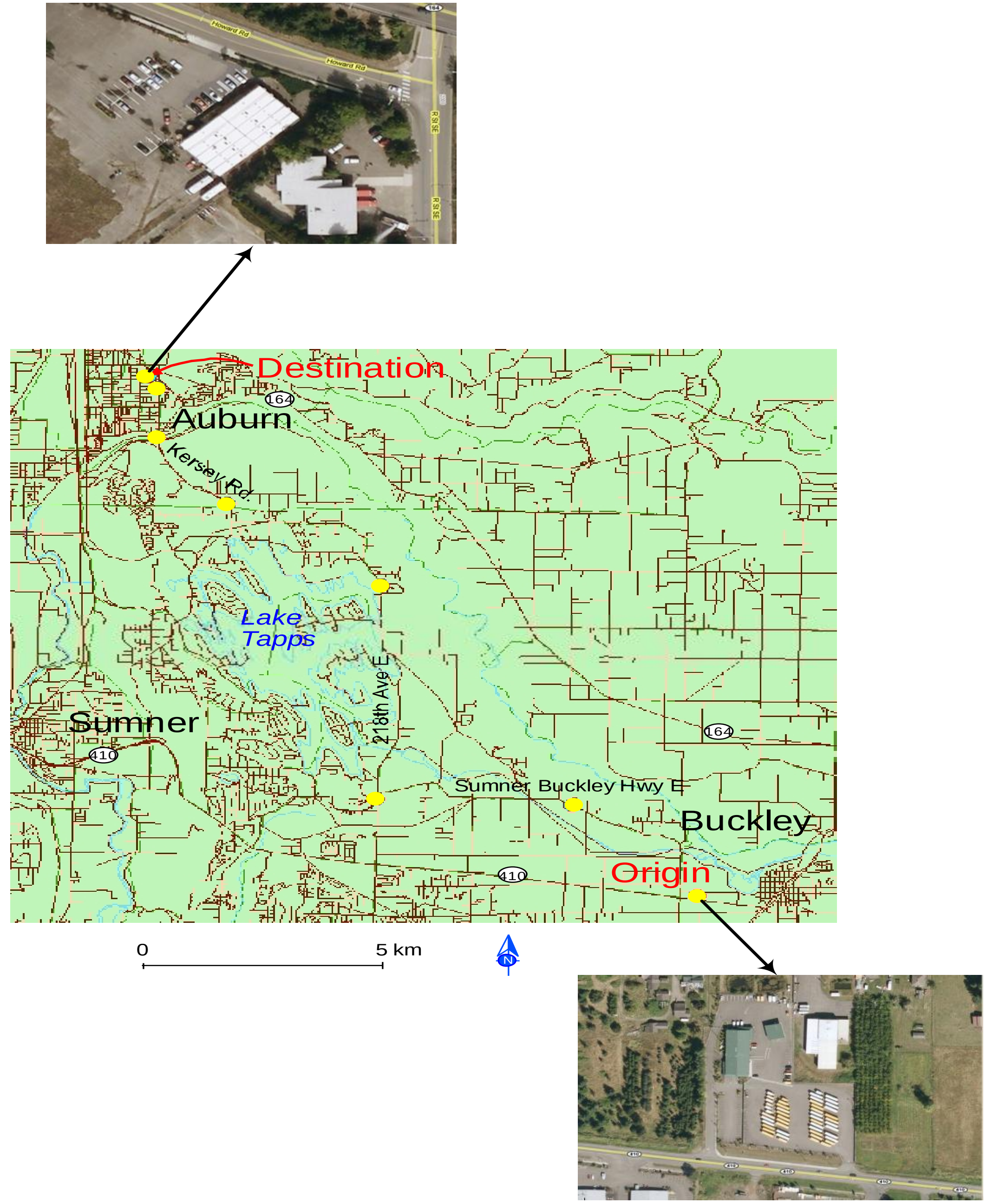
Ed McCormack
Civil and Environmental Engineering
Washington State Transportation Center
(206) 543-3348
edm@u.washington.edu

[Linear Referencing Methods]

Example LRM - Reference Marker Offsets



ROUTE_ID	BEGIN_MARKER	BEGIN_OFFSET	BEGIN_SECID	END MARKER	END_OFFSET	END_SECID	ATTRIBUTES
0023	RM1	-0.4		RM1	0.5		...
0023	RM2	1.3		RM3	-0.7		...



Destination
164
Auburn
Kersey Rd.
Lake Tapps
218th Ave E
Sumner
410
164
Sumner Buckley Hwy E
Buckley
Origin
410
0
5 km
N

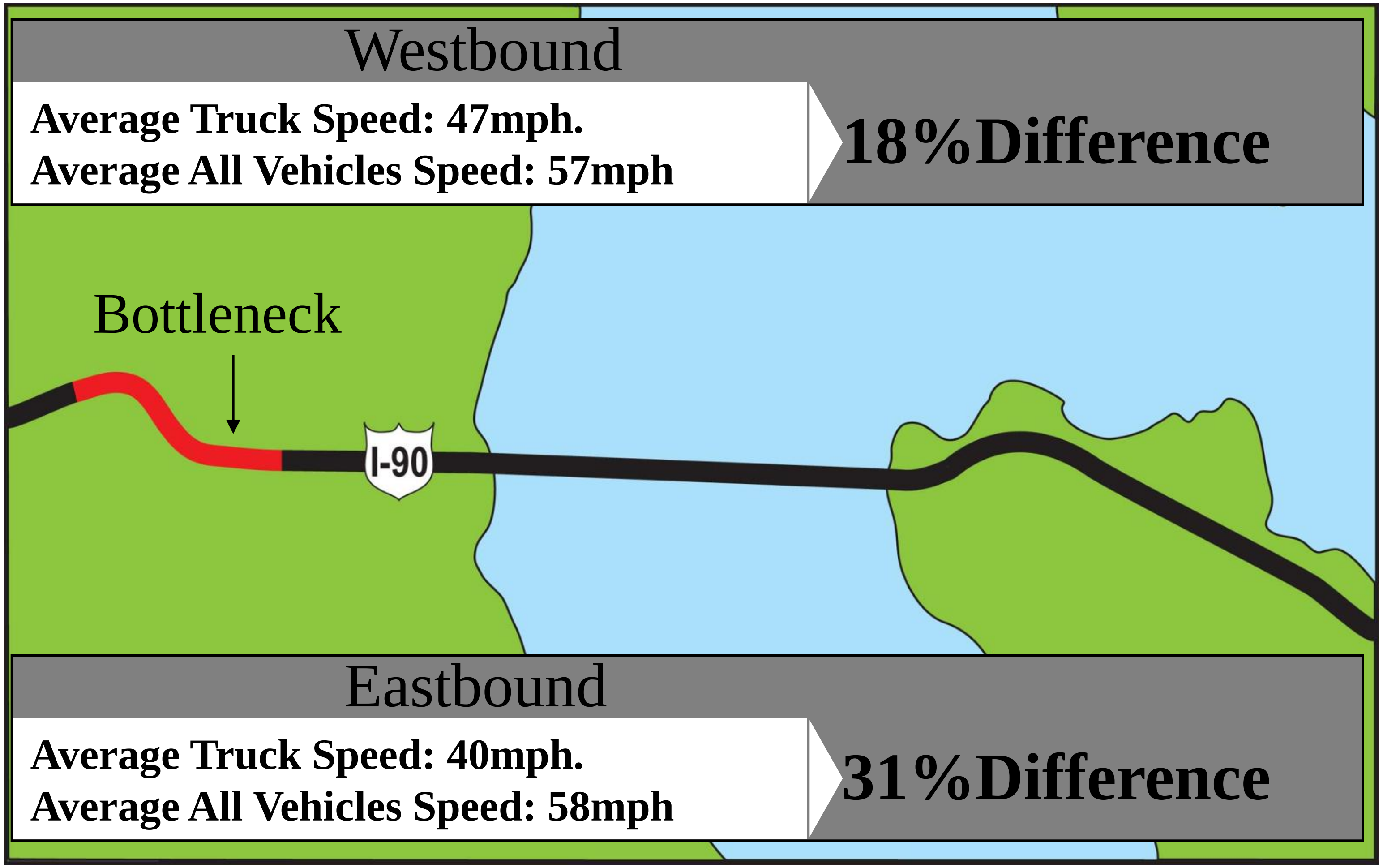
Truck Data vs. Car Data

GPS Speeds (Trucks) vs. Freeway Loop Speeds (Cars)

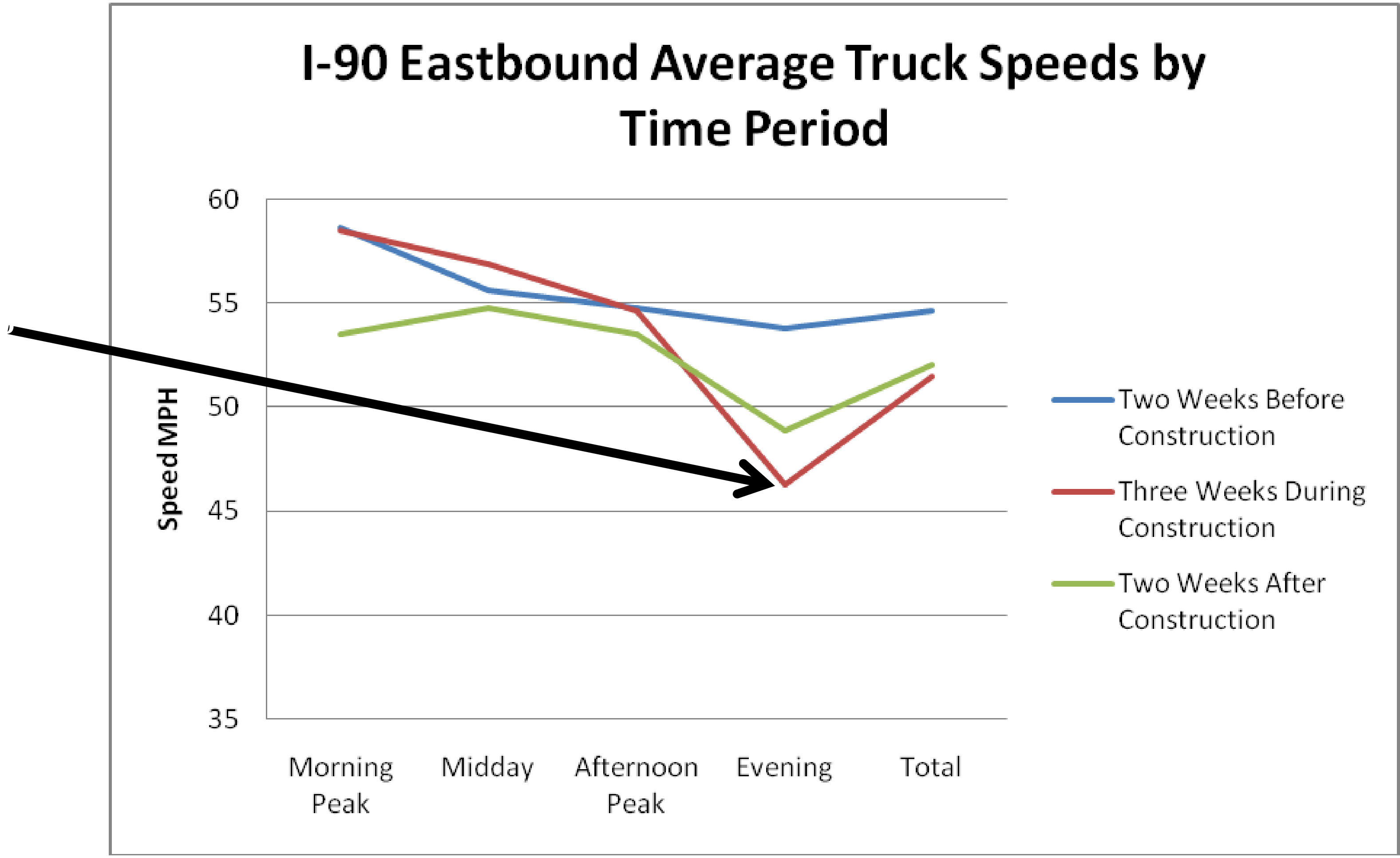
Road	Mile Post	Time	GPS Speed	5-Minute Loop Data	20-Second Loop Data
I-405	8.00	14:34	15.3	59	26
I-405	8.06	14:35	14.5	60	
I-405	8.47	14:36	37.8	60	
I-405	9.19	14:38	23.9	60	45

- Which is right?
- It turns out trucks have different travel patterns and speeds than cars

We Can Quantify Network Problems



We Can Evaluate Construction Impacts



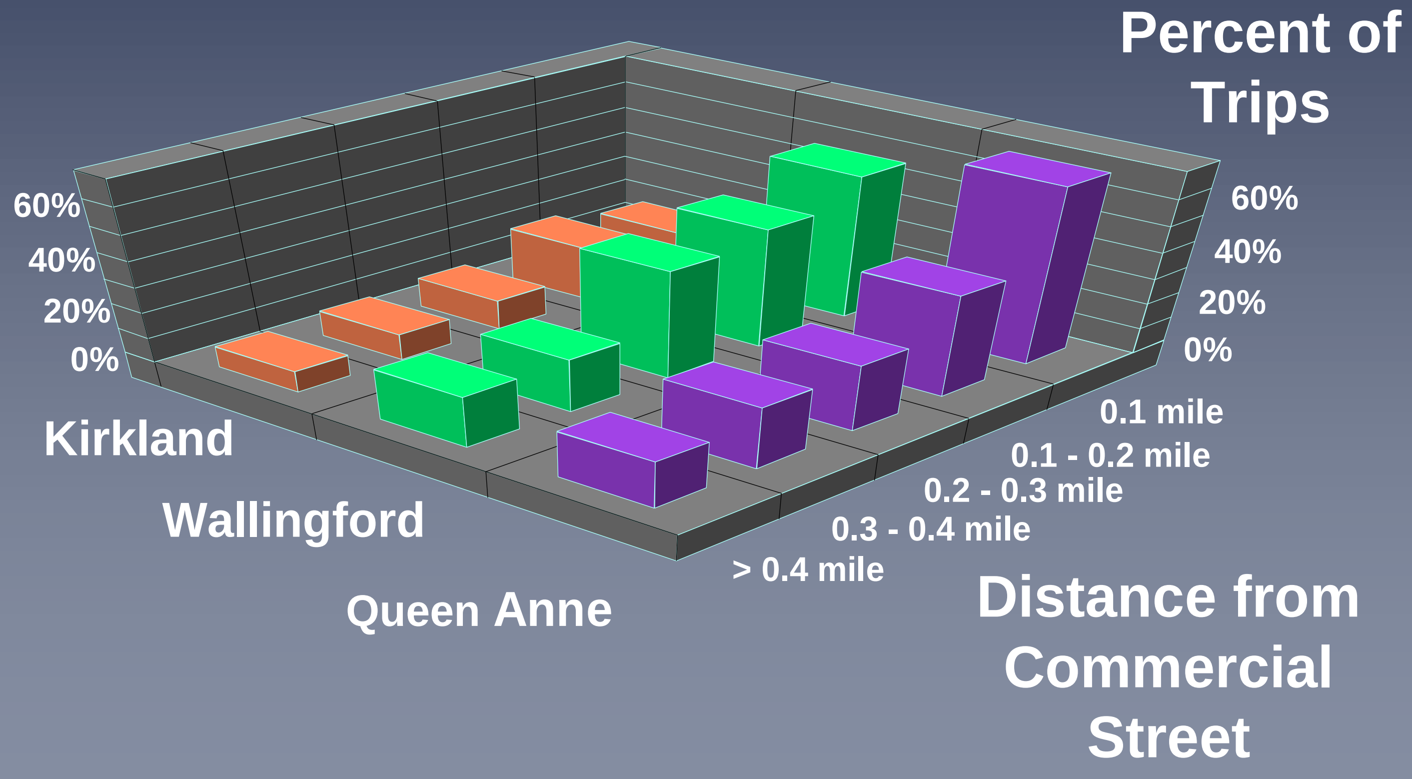
Wireless GPS Data

Geocoding Results

Table 3: Geocoding Results

Addresses	
Total	12,631
% Computer Matched	72.8%
Intersections	
Total	3,882
% Computer Matched	57.3%
Places	
Total	825
% Computer Matched	0%
All Data	
Matched by Computer or Manually	97.0%

Shopping by Walk Trips



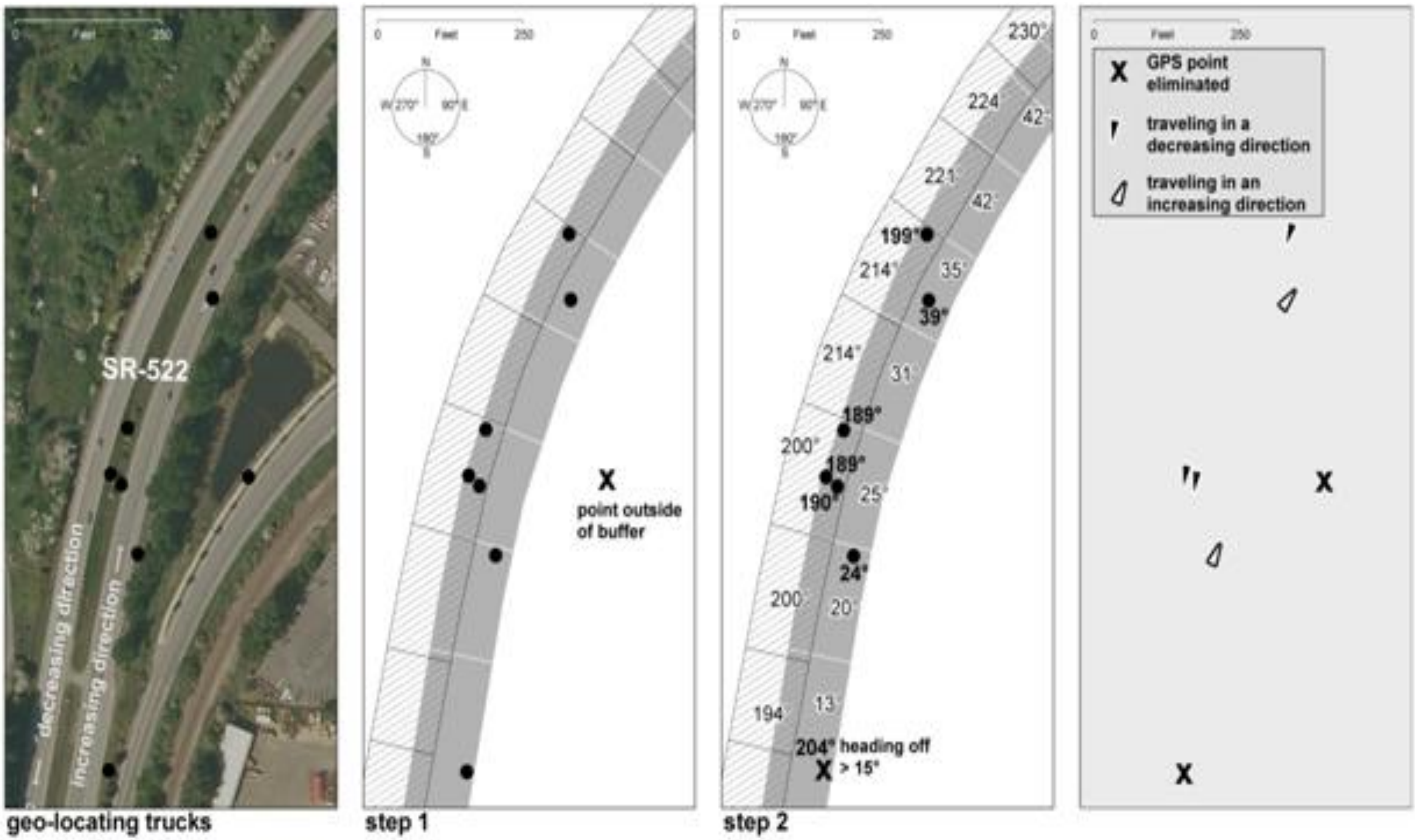
Truck Data

- Truck ID
- Latitude and Longitude
- Time/ Date Stamp
- Ping at engine start/stop and every ½ to 15 minutes
- Privacy protected

GPS data from trucks

GPS Vendors	Average Total Daily Records	Total Trucks	Frequency of reads (minutes)	Data type
Vendor A	94,000	Approx 2,500 per day	5-15	In-vehicle GPS with a cellular connection
Vendor B	12,000	25	0.5	In-vehicle GPS with a cellular connection
Vendor C	3,000	60	1-5	GPS cell Phone

Geocoding


SR-522
decreasing direction
increasing direction
geo-locating trucks
step 1
X
point outside of buffer
step 2
230°
224
42°
221
42°
199°
214°
35°
39°
214°
31
189°
200°
189°
190°
25°
24°
200
20°
194
13
204° heading off
X > 15°
GPS point eliminated
traveling in a decreasing direction
traveling in an increasing direction

Average Daily Travel by Mode