North Jersey Regional Transportation Model- Enhanced

Training for Transportation Planners

May 20-22, 2008

Instructors

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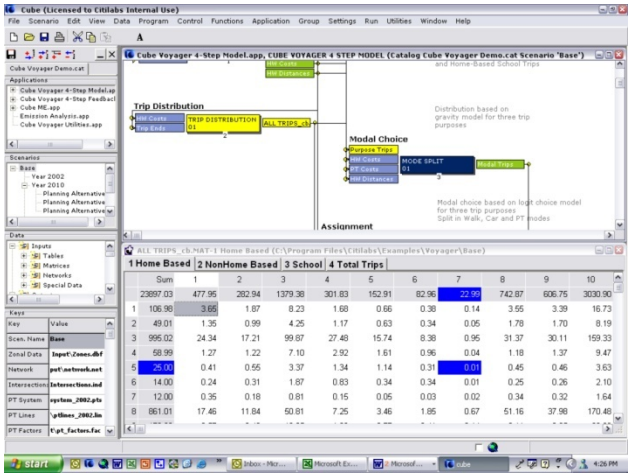
SOFTWARE FOR TRANSPORTATION PLANNING

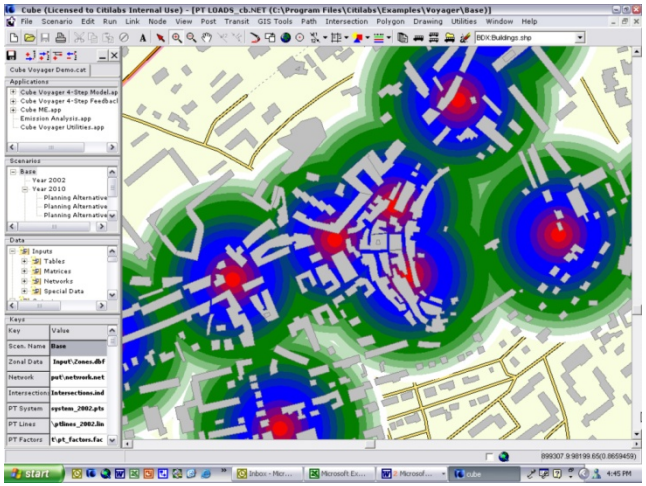
URS

Agenda

- Day 1
  - General Overview of Modeling
  - Typical Applications of Models
  - Using the Tool Appropriately
  - The Model as Part of a Toolbox
  - Data Behind the Model
  - Navigating the Model
- Day 2
  - Case Studies
    - Developing Alternatives
    - Data Sources to Support Alternative Development
- Day 3
  - Case Studies
    - Translating Model Outputs to Recommendations



Cube Base



Cube Base

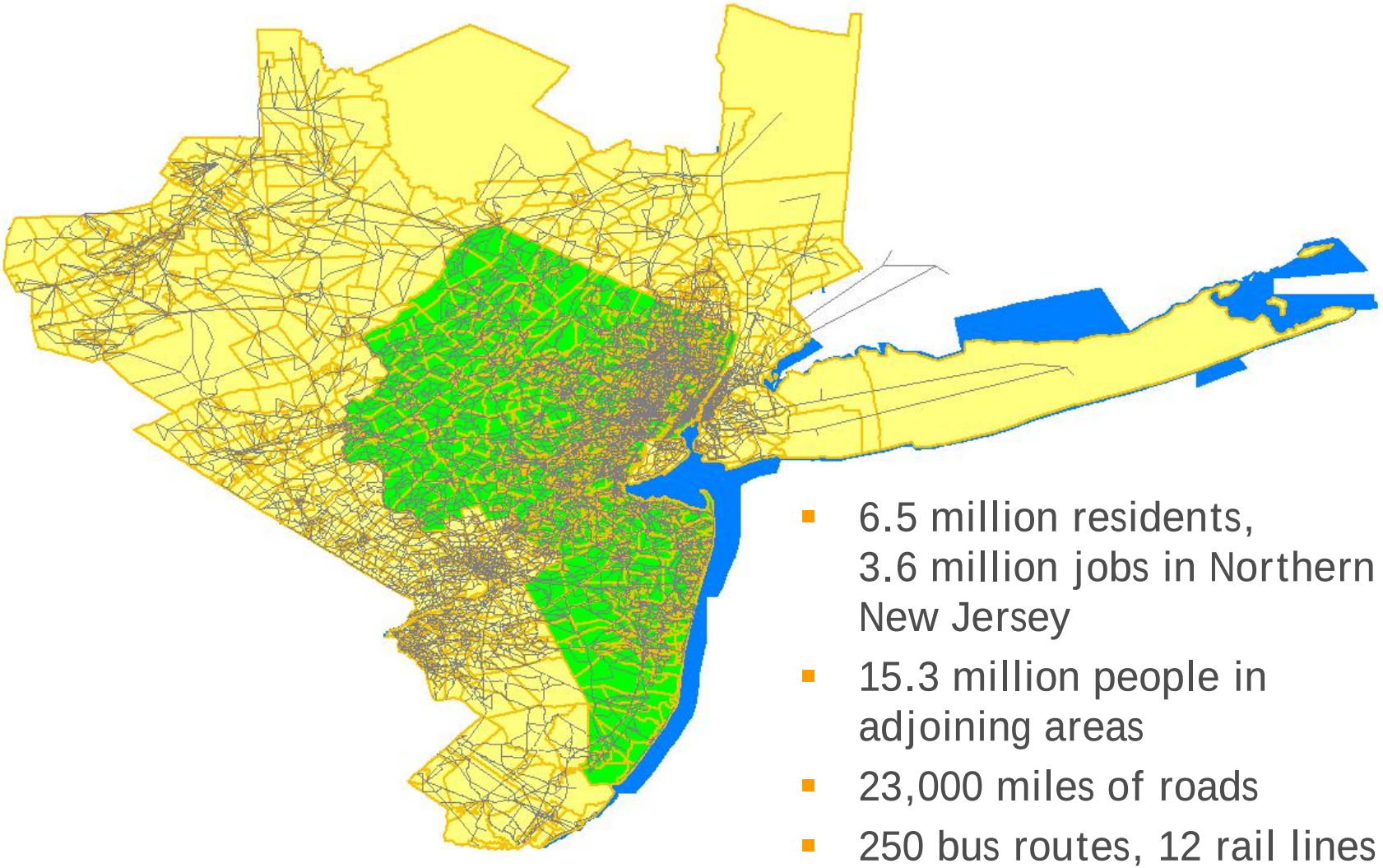
Day 1– Understanding the Model

"What's this thing all about?"

General Overview of Modeling

- Types of Models
  - Simple Trend
  - Macroscopic Models (such as the NJRTME)
  - Operational Models

NJTPA Region Study Area



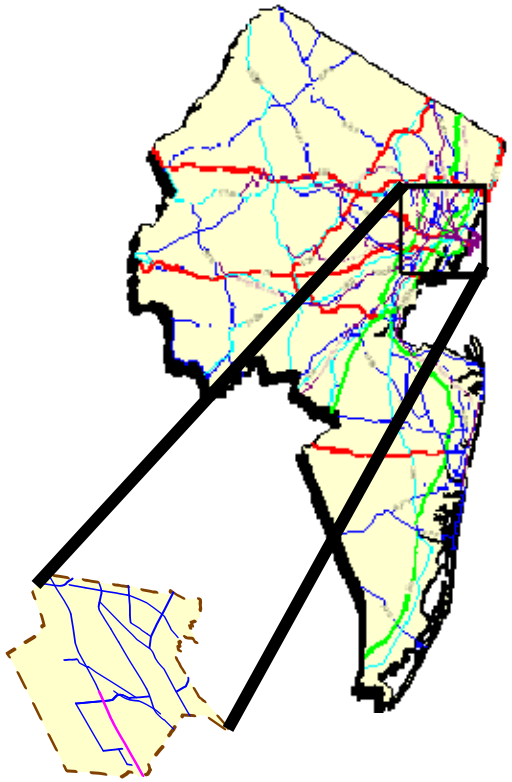
- 6.5 million residents, 3.6 million jobs in Northern New Jersey
- 15.3 million people in adjoining areas
- 23,000 miles of roads
- 250 bus routes, 12 rail lines

The Basics

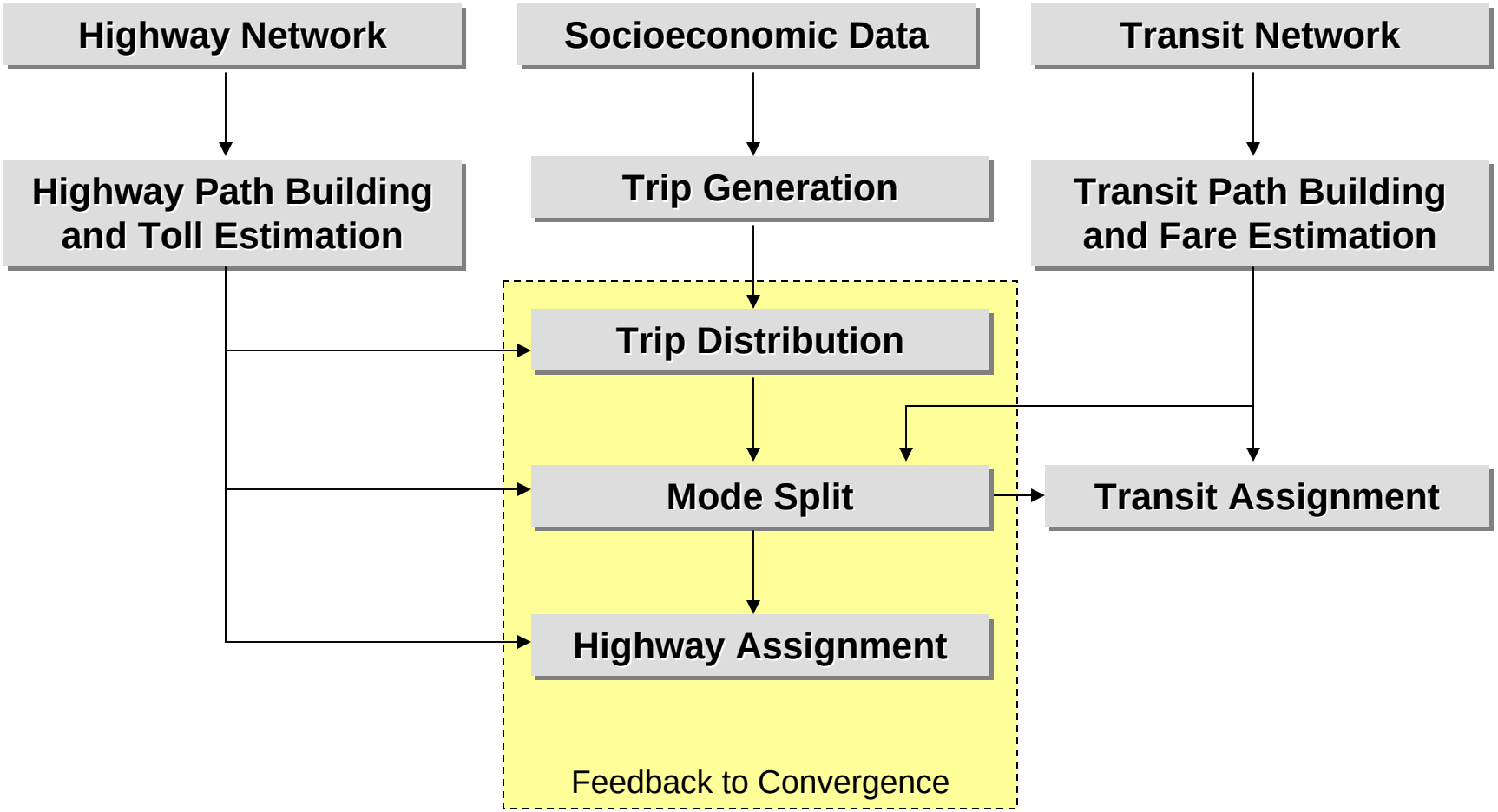
- Trip Generation- Who and Why Should I Go
  - Considers the location of people and destination potential
  - Households, employment, land use, activity centers
- Trip Distribution- Where to Go
  - Considers the choices available to travelers and why they go to one vs. another
  - Where is it and how much does it cost me to go to one vs. another?
- Mode Choice- By What Means to Go
  - Considers the relative attractiveness of choices for various types of trip making
  - To go from home to work, should I drive, walk, take the bus, take the train, etc
- Assignment- By What Route to Go
  - Considers the best and alternate routes between the selected origin location and destination location now that I've selected a mode

Traffic Analysis Zones

- A TAZ is a Unit of Geography Used to Forecast Trip Making
  - Should be consistent (nested inside) network boundaries
  - Should be consistent with model application
- Considerations
  - Fine Enough to Forecast Traffic
  - Course Enough to Get Data On
- Boundaries Typically Respect
  - Manmade Features (Roads, RR, etc)
  - Natural Features (Rivers, etc)
  - Political Features (census, city, county, state)



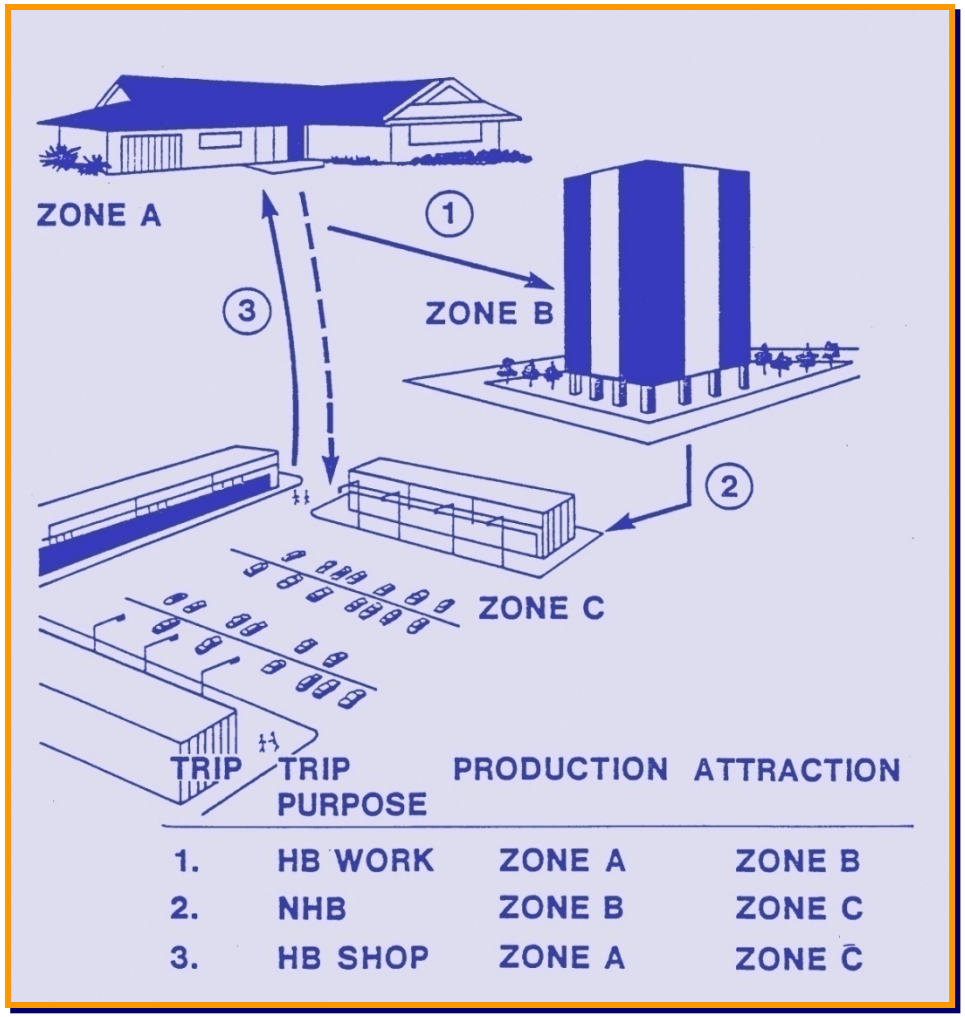
Standard Four-step Demand Forecasting Model



NJRTM-E Specific Examples

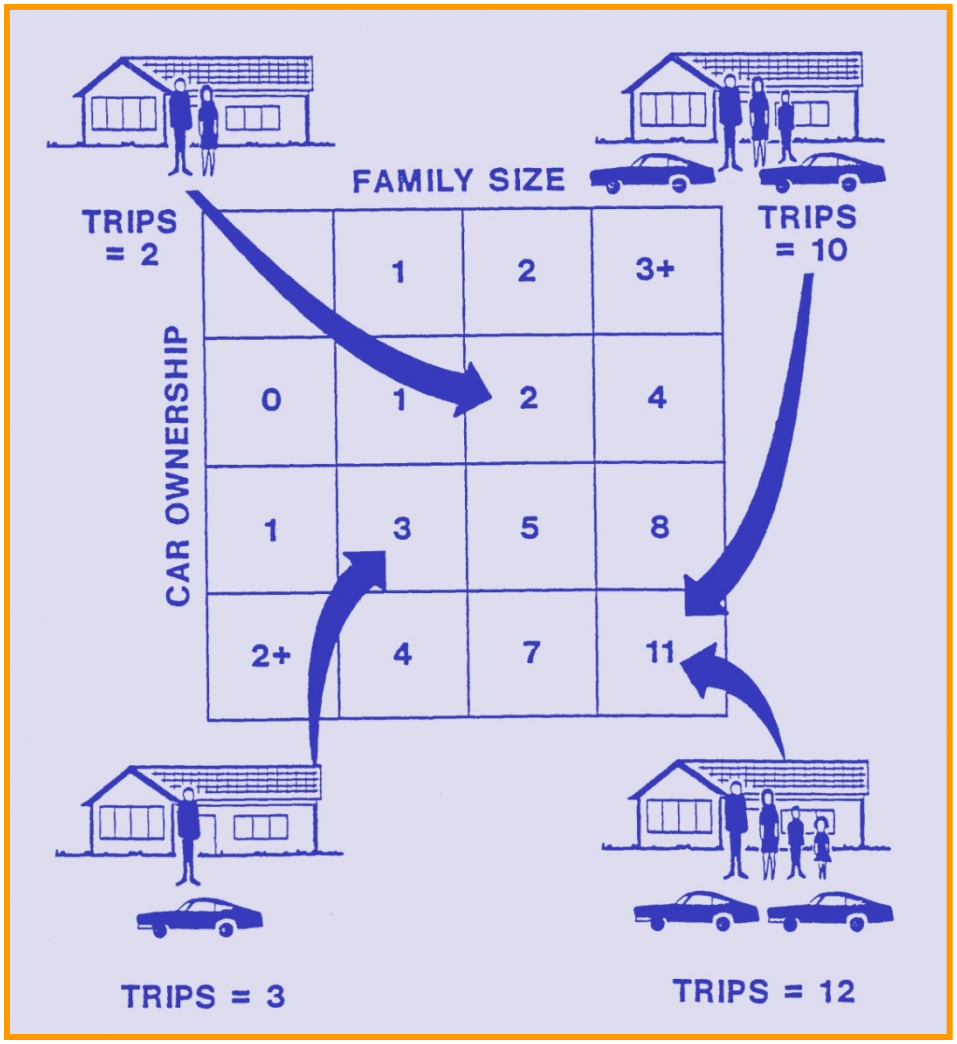
- Who & Where are They- Zonal Data
- Where to Go- Trip Ends, Travel Time and Cost Matrices
- By What Means to Travel- Mode Choice Model, Costs and Congestion, Roadway Network, Transit Network
- Which Route to Take- Traffic Assignment, Transit Assignment, Feedback Loop

Simple Trip Chain



TRIP	TRIP PURPOSE	PRODUCTION	ATTRACTION
1.	HB WORK	ZONE A	ZONE B
2.	NHB	ZONE B	ZONE C
3.	HB SHOP	ZONE A	ZONE C

Simple Cross-Classification Technique



NJRTM-E Trip Generation

- Cross-classification
  - Household Lifecycle Groups (3)
    - With Retirees (at least 1)
    - With Children
    - Without Retirees or Children
  - Household Income Groups (5)
    - 0-15K
    - 15-35K
    - 35-75K
    - 75-150K
    - 150k+
  - Workers Per Household (4)
    - 0 Worker
    - 1 Worker
    - 2 Workers
    - 3+Workers
  - Persons Per Household (6)
    - 1 to 6+ Persons

CODE	HBSH	HBO	HBU	NHNW
1	0.56	0.76	0.01	0.49
2	1.34	1.19	0.01	0.65
3	1.55	1.67	0.16	0.65
4	1.55	3.57	0.04	0.63
5	1.65	4.52	0.33	0.7
6	2.17	7.33	0.33	1.29
7	0.6	1.17	0.01	0.84
8	1.4	2.02	0.01	0.91
9	0.8	2.7	0.14	0.75
10	1.5	3.75	0.04	0.75
11	0.7	4.75	0.23	0.75
12	2.35	8	0.23	1.3
13	0.65	1.52	0.01	1.1

An example of NJRTM-E trip rates

NJRTM-E Trip Purposes

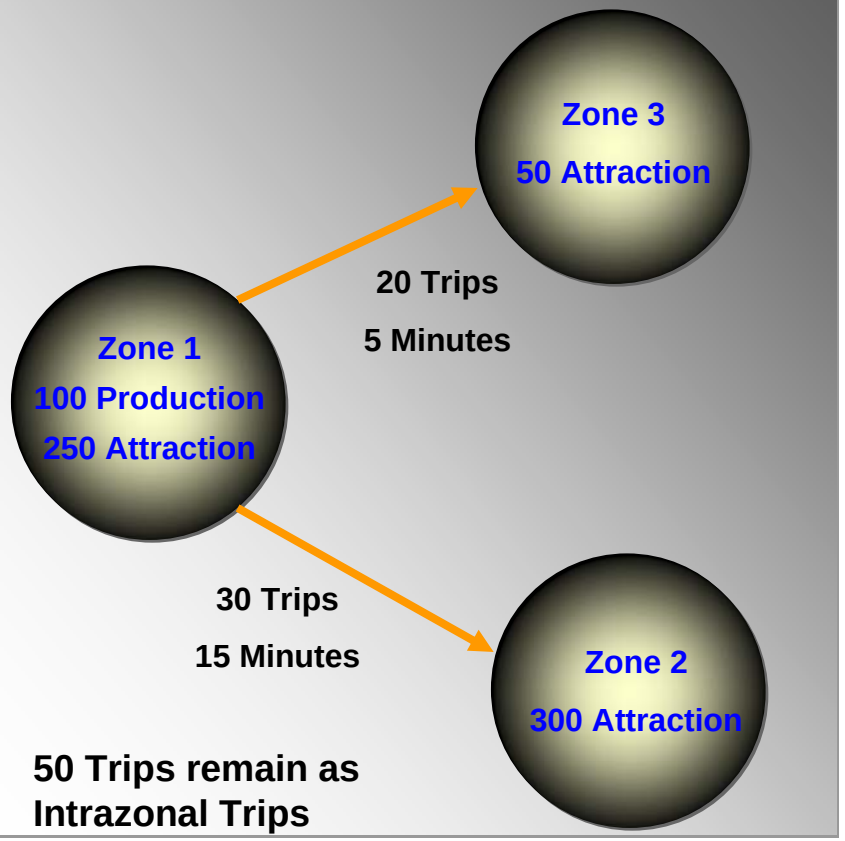
- Trips are Classified Based on Whether they are Oriented Toward **Home** or **Work:**
  - Home-Based **Work Direct** (from home to work)
  - Home-Based **Work Strategic** (e.g., drop off kids, pick up coffee on the way)
  - Home-Based **Shopping**
  - **Home-Based Other** (e.g., leisure, visit family)
  - Home-Based **University**
  - **Work-Based Other** (e.g., to lunch, shopping)
  - **Non-Home Non-Work** (all the rest - e.g., from a store to school)
  - **Trucks**

Trip Distribution Example

I. Trip Generation Estimates

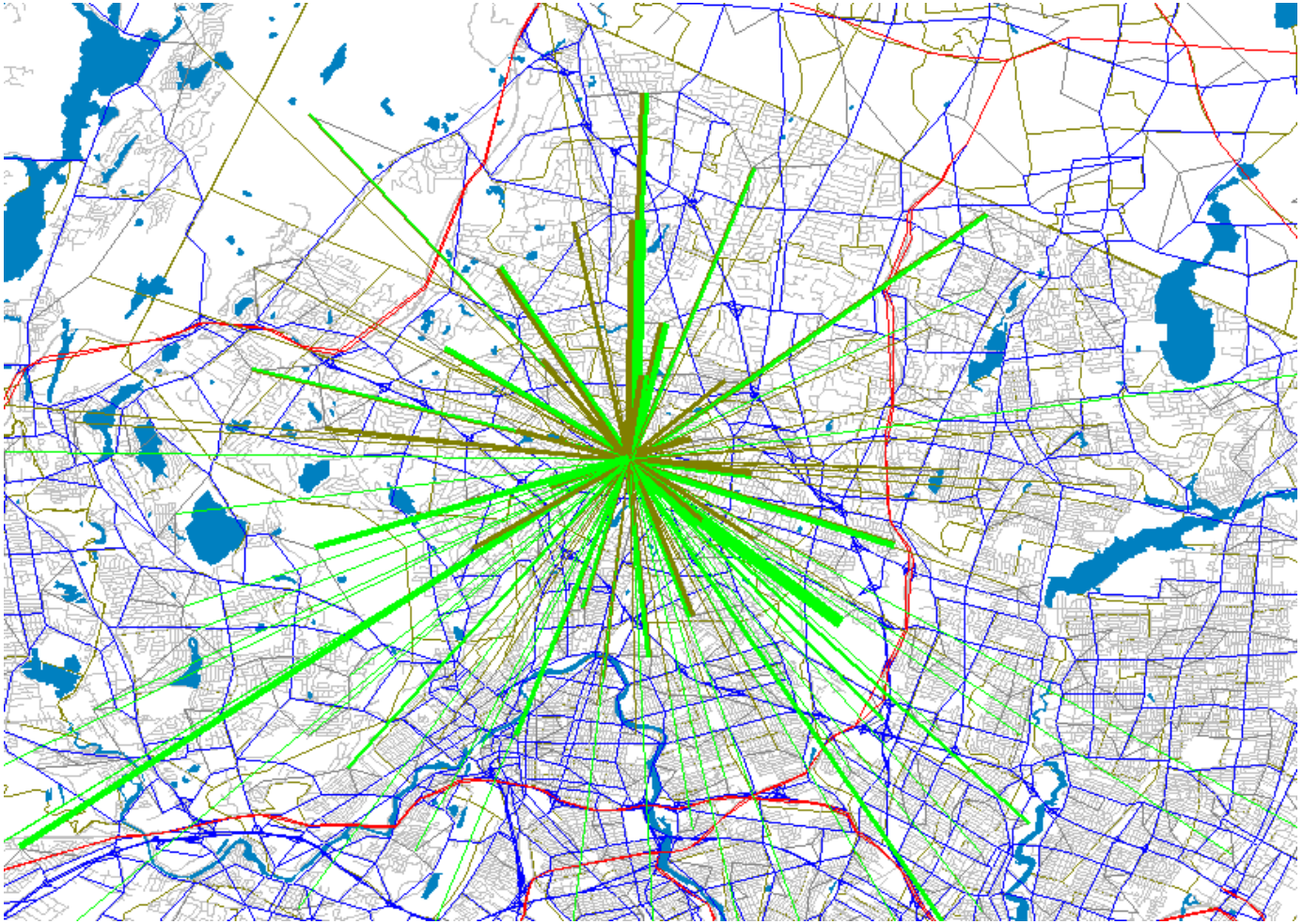
Zone	Production	Attraction
1	100	250
2	200	300
3	300	50
Total	**600**	**600**

II. Trip Distribution (Zones)

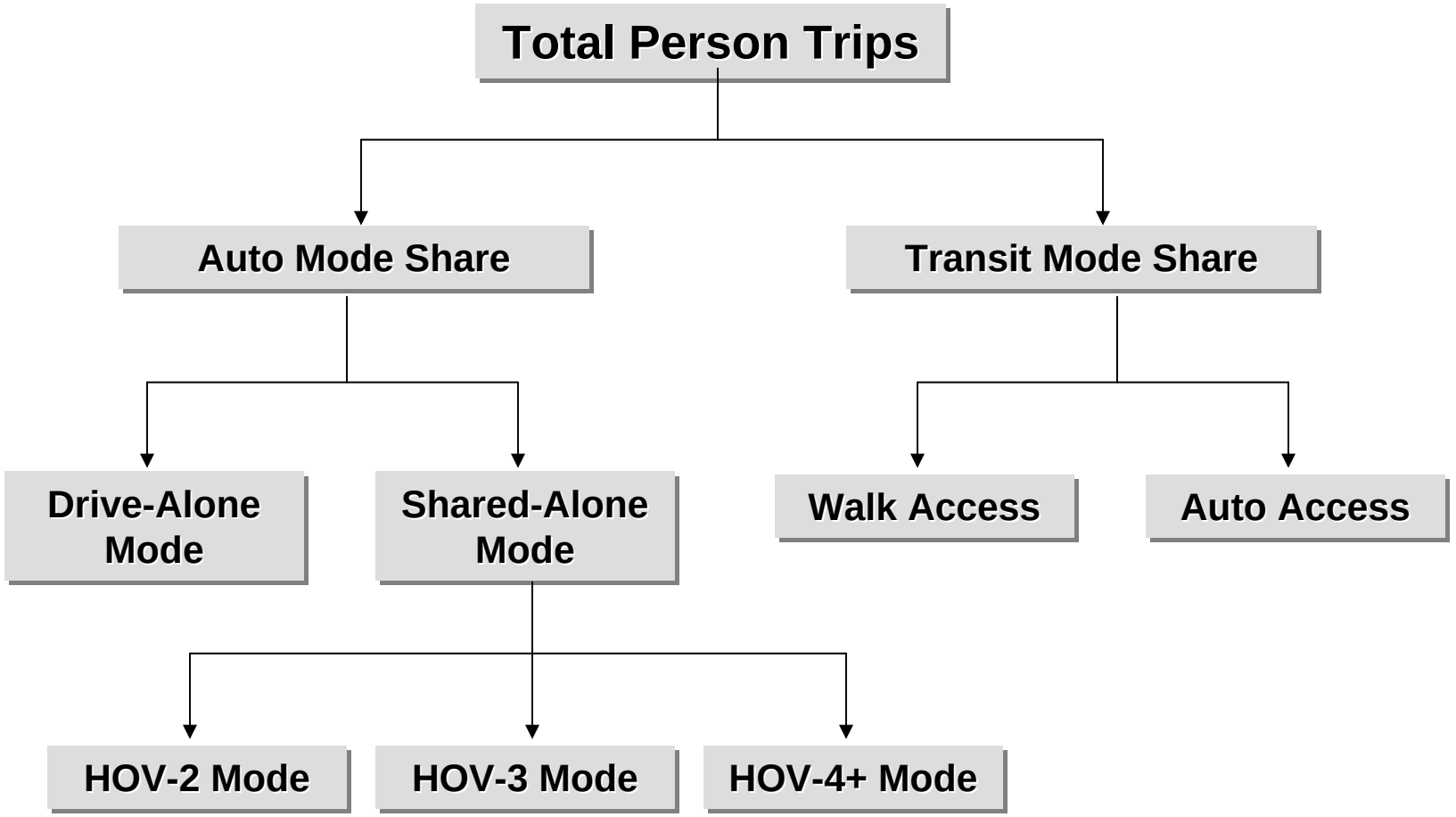


NJRTM-E Distribution

- Direction and Magnitude of Travel



Modes and Choices in NJRTM-E



Assignment

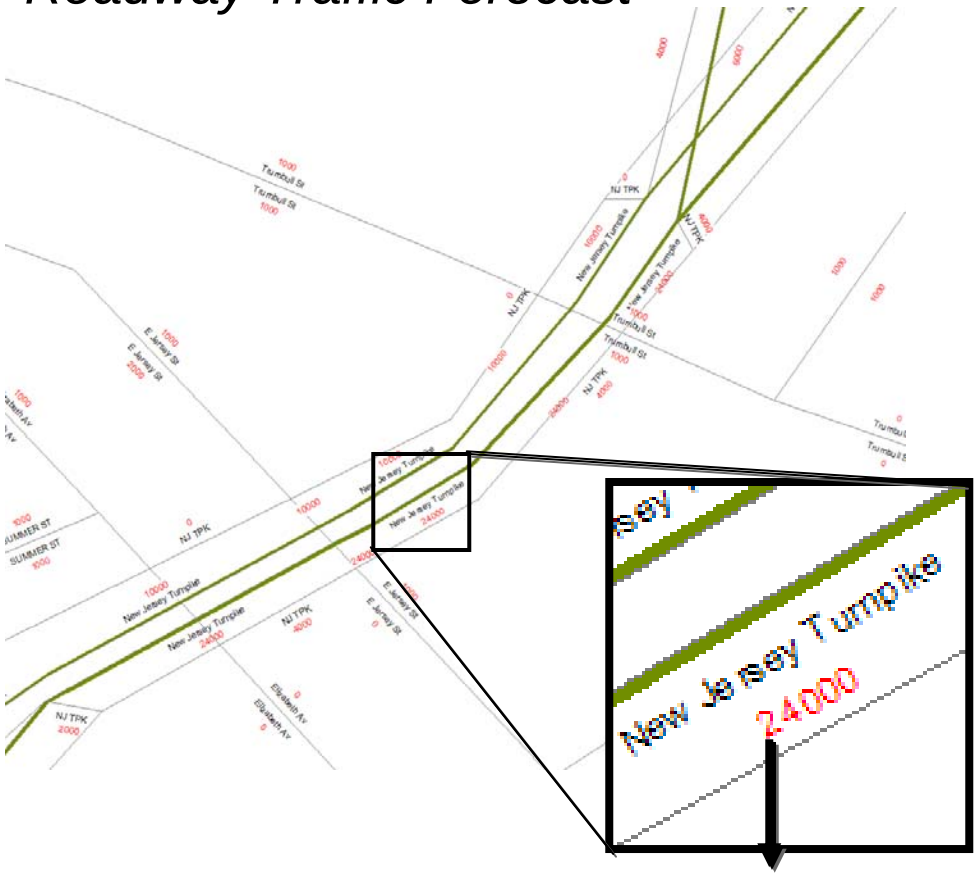
- Given the Number of Trips by Mode have been Calculated, Assignment Puts those trips on Specific Routes (road, transit)
- Transit Assignment is a Function of the Best Choice
- Highway Assignment is a Function of the Best Choice
  - Travel Time
  - Toll Cost
  - Congestion

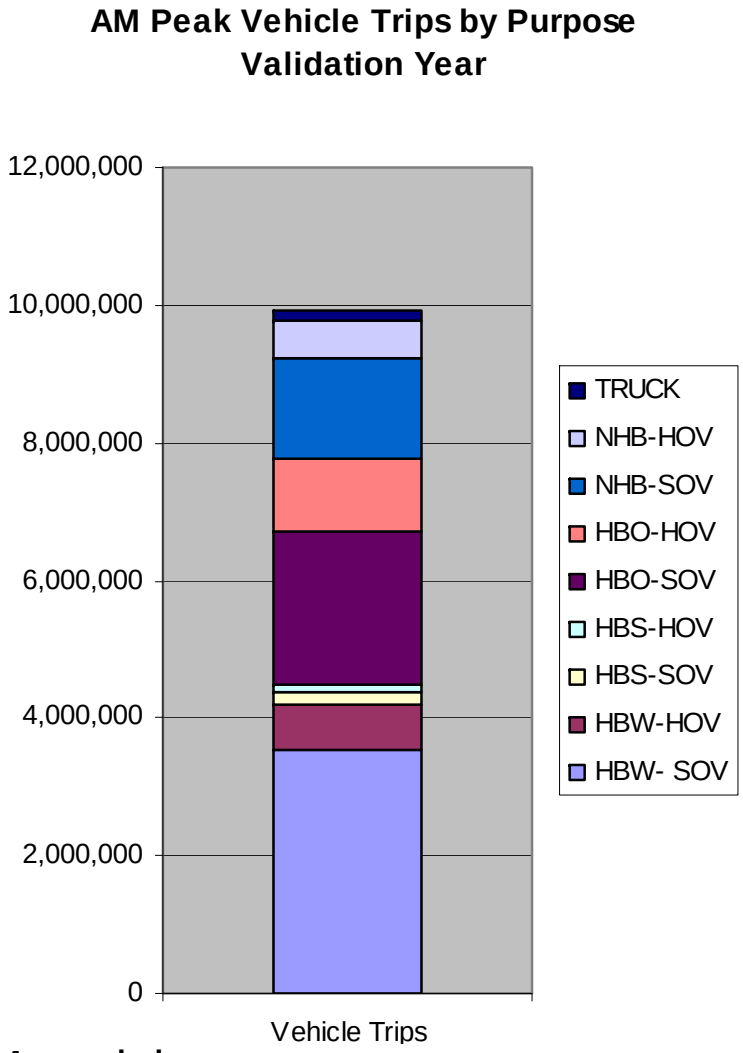
NJRTM-E Assignment

- Highway Assignment
  - Four Periods (AM/PM Peak Periods, Midday, Night)
  - Route Choice Assigns Nine Vehicle Type/Path Conditions:
    - SOV, HOV, Truck
    - NonToll, Cash Toll, ETC Toll
    - Sensitive to Directional Toll biases
  - Assignment Options:
    - Standard BPR
    - 2000 HCM & Simple Queuing
    - Akcelik Method
    - Detailed HCM Method

NJRTM-E Assignment

Roadway Traffic Forecast





24,000 vehicles in AM peak hour

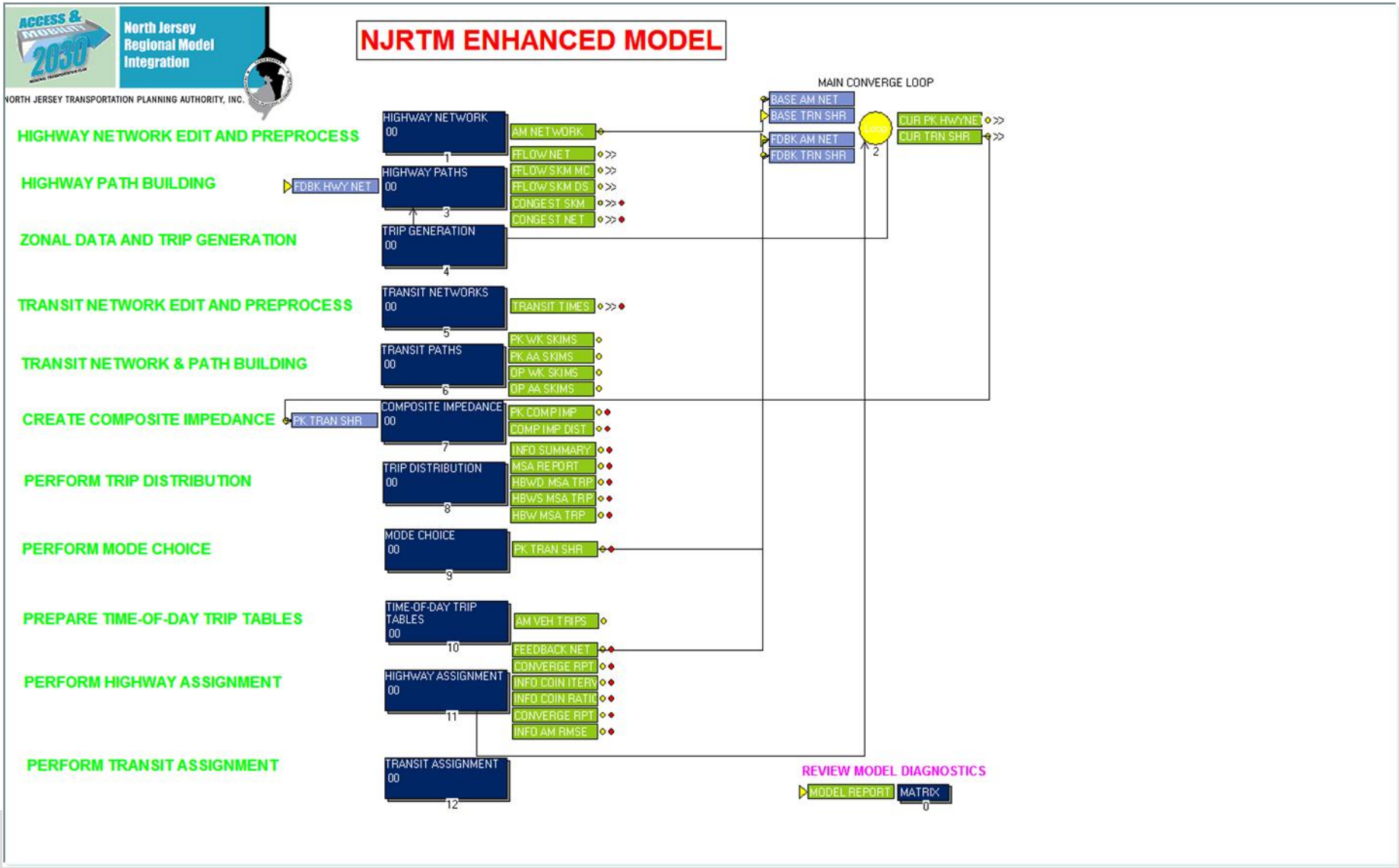
NJRTM-E Transit Assignment

- Results for Modes, Lines or Stops
- Information Available About
  - Ridership
  - Revenues
  - Passenger Miles of Travel
  - Vehicle Fleet Requirements

Train Ridership Comparison

	Base	Scenario 3A	Ratio
Bay Head	885	889	1.00
Pt Pleasant Beach	2,376	2,372	1.00
Manasquan	1,811	1,814	1.00
Spring Lake	1,867	1,872	1.00
Belmar	1,083	1,086	1.00
Bradley Beach	1,799	1,804	1.00
Asbury Park	1,784	1,786	1.00
Allenhurst	294	294	1.00
Elberon	1,246	1,245	1.00
SUBTOTAL	13,145	13,162	1.00
Long Branch	4,592	4,598	1.00
Little Silver	4,615	4,603	1.00
Red Bank	4,340	4,337	1.00
Middletown	6,953	6,967	1.00
Hazlet	4,661	4,696	1.01
Matawan	16,378	17,047	1.04
South Amboy	4,914	5,813	1.18
Perth Amboy	3,123	3,125	1.00
Woodbridge	3,550	3,556	1.00
Avenal	486	489	1.01
SUBTOTAL	53,612	55,231	1.03
GRAND TOTAL	66,757	68,393	1.02

NJTRM-E "FLOWCHART"



New Model Features & Capabilities

- Incorporation of NJ Transit Mode Choice Model
  - Nested Logit Structure
    - 6 Line-haul Modes / 2 access modes
    - Geographic Market Segmentation
      - Area / Density Related
    - Mode Choice by Purpose segmented into Peak and Off-Peak

NJRTM-E Airport Submodel

- Focused on Predicting Trips to Newark International Airport
- Four Purposes:
  - Business Trip from Residents
  - Business Trip from Non-Residents
  - Non-Business Trip from Residents
  - Non-Business Trip from Non-Residents
- Model Estimated using NJT trip tables derived from Survey Data
- Structured as linear equation trips using the following variables:
  - Population and Employment
  - Income
  - Distance to Newark Airport
  - Distance to nearest competing Airport (JFK, Laguardia, Philadelphia, Lehigh Valley)
- R^2 Ranges between 0.75 and 0.84

Types of Demand Models

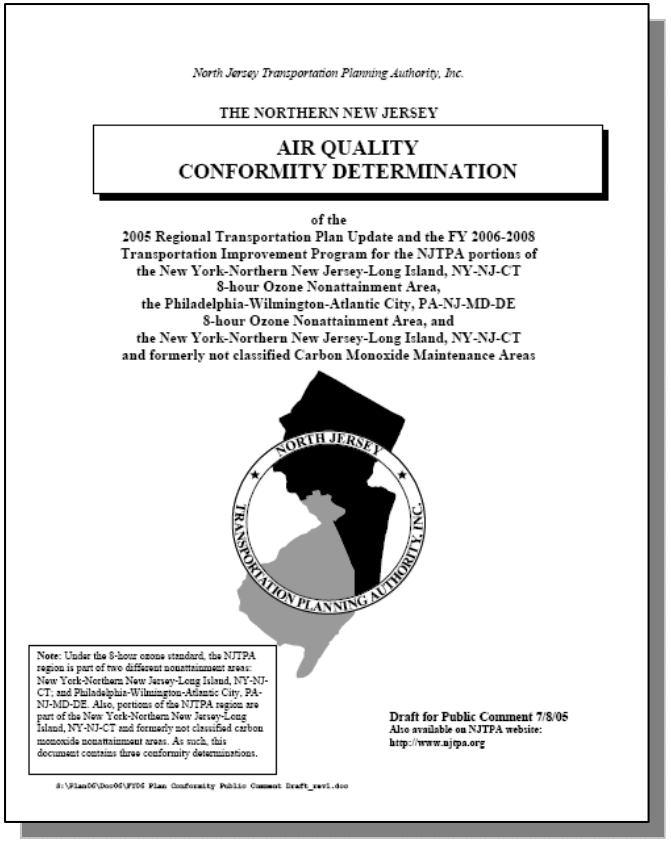
- Gaming/Visioning
- Direct Demand
- Simple Four-step
- Complex Four-step
- Complex Four-step with Feedback (NJRTME)
- Activity-based
- Integrated Transport/Land Use Models

TMIP

Travel Model Improvement Program

Typical Applications of Models

- Long-Range Transportation Plans
- Air Quality Analysis
- Impact Analysis
- Local Traffic Studies
- AA/EIS



North Jersey Transportation Planning Authority, Inc.

THE NORTHERN NEW JERSEY

AIR QUALITY CONFORMITY DETERMINATION

of the
2005 Regional Transportation Plan Update and the FY 2006-2008 Transportation Improvement Program for the NJTPA portions of the New York-Northern New Jersey-Long Island, NY-NJ-CT 8-hour Ozone Nonattainment Area, the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE 8-hour Ozone Nonattainment Area, and the New York-Northern New Jersey-Long Island, NY-NJ-CT and formerly not classified Carbon Monoxide Maintenance Areas

NORTH JERSEY TRANSPORTATION PLANNING AUTHORITY, INC.

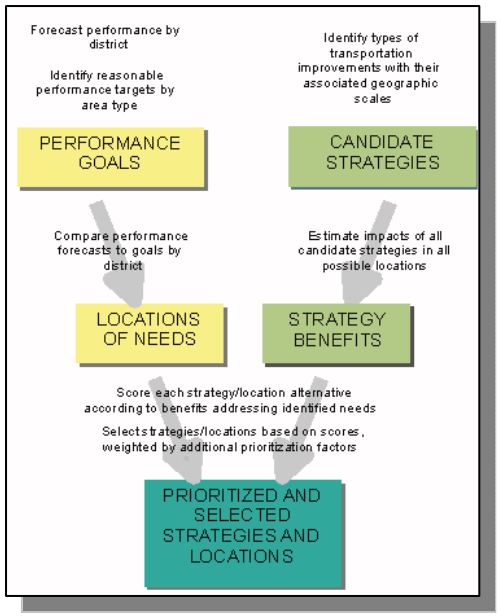
Note: Under the 8-hour ozone standard, the NJTPA region is part of two different nonattainment areas: New York-Northern New Jersey-Long Island, NY-NJ-CT; and Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE. Also, portions of the NJTPA region are part of the New York-Northern New Jersey-Long Island, NY-NJ-CT and formerly not classified carbon monoxide nonattainment areas. As such, this document contains three conformity determinations.

Draft for Public Comment 7/8/05
Also available on NJTPA website: http://www.njtpa.org

S:\Plan06\Doc06\FY06 Plan Conformity Public Comment Draft_rev1.doc

Using the Tool Appropriately

- Understanding the Character of a Macroscopic Model
- Understanding the Limitations of Each Type of Model
  - Trend
  - Macroscopic/Demand
  - Microscopic/Operational
- Understanding the Causes of Model "Error"
  - Averages
  - Error Terms
- Compensating for Errors and Unknowns



The NJRTM-E as Part of a Toolbox

- Finding the Most Appropriate Tool to Answer the Question
- Typical "Short-range" Planning Tools
- Typical "Long-range" Planning Tools

Caveats

- The NJRTM-E Model Is A Tool
  - Based on Average Human Behavioral Characteristics and Responses and the Transport System's Characteristics
  - Remember, the AVERAGE family has 2.5 kids (none do)
  - For Every Average (mean), there is a standard deviation
  - The NJRTM-E is Built Upon the Most Recent AVAILABLE Data (some data are dated and some data are not available locally)
- Detailed Studies (FTA New Starts, Corridor Studies, Impact Assessment, etc) Should ALWAYS review the Model Data, Assumptions and Results and TAILOR the Tool to Fit the Conditions/Needs of the Study
- The NJRTM-E is now being reviewed by NJ Transit and has not yet been approved for use with project-level planning studies in the high-density urbanized areas.

Data Behind the NJRTM-E

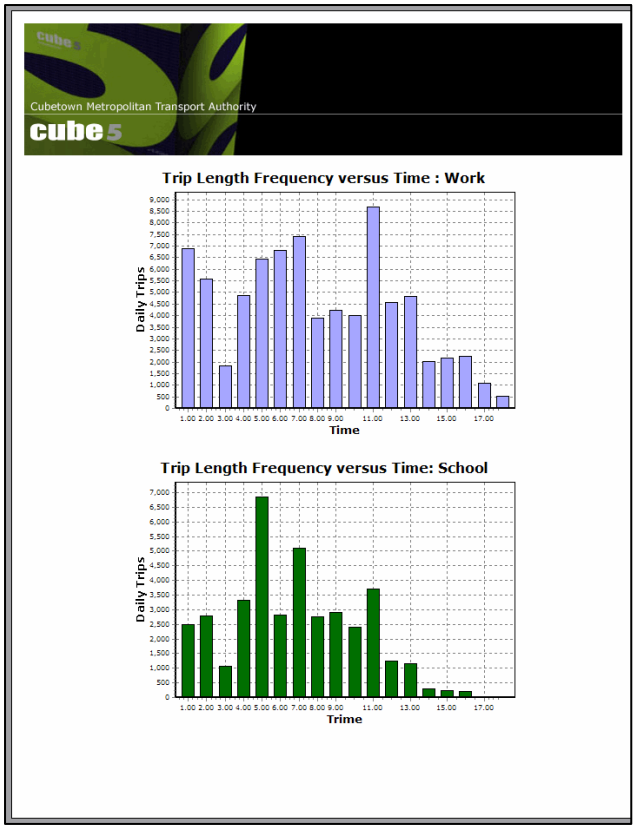
- Socio-economic
  - Households by Lifestyle, Income and Persons
  - Employment by Type
  - Truck Terminals
  - University Enrollment
  - Special Generators
  - Etc.
- Network
  - Facility Type
  - Lanes
  - Transit Services
  - Etc.
- Behavioral
  - Parameters, rates, coefficients, etc.

Navigating the NJRTM-E

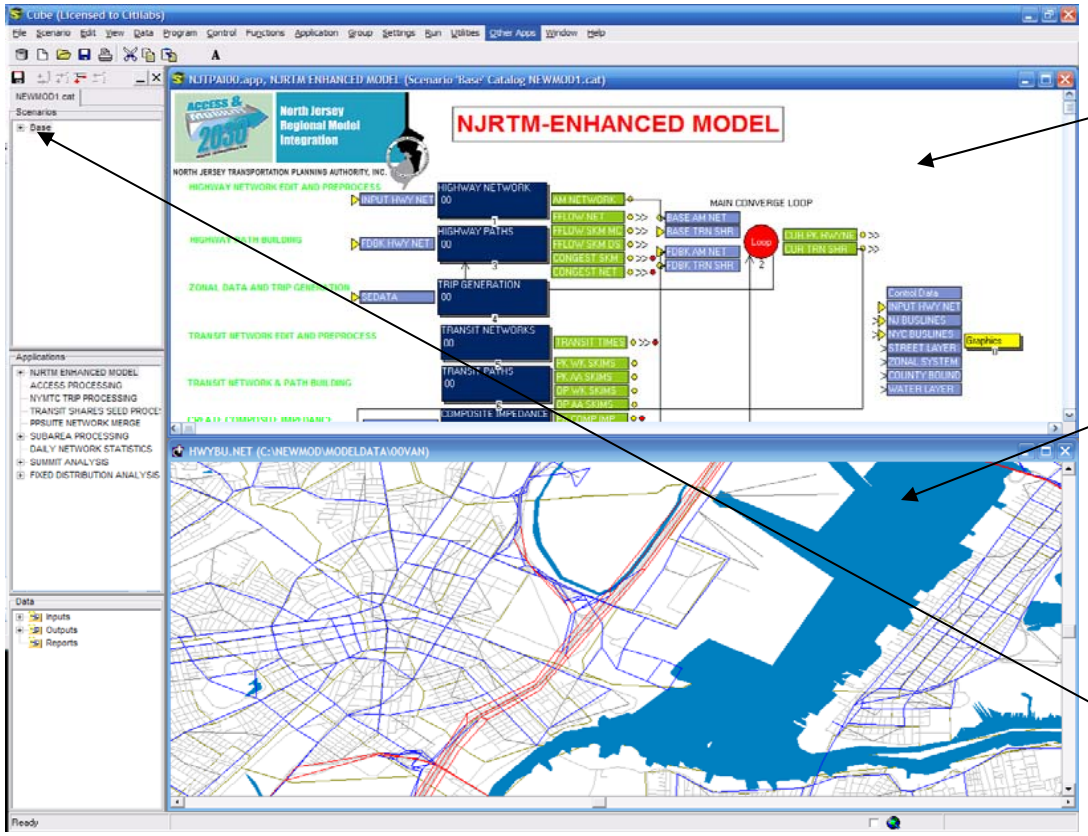
- Starting Up Cube
- Basic Navigation of the Desktop
- Running the Model
- Finding Results

Translating Model Outputs to Recommendations

- Understanding Model Results
  - Land Use / Trip Generation
  - Distribution
  - Mode Choice
  - Highway Assignment
  - Transit Assignment
- Taking Raw Model Outputs to Final Numbers
  - Smoothing Techniques
  - Level of Service
- Presenting Model Results
  - Tabular Summaries
  - Charts, Figures and Graphical Summaries
  - Mapping Summaries



Cube Base: build, edit, run, present



A common user interface for all Citilabs libraries. Learn this once and you can use all existing and future libraries

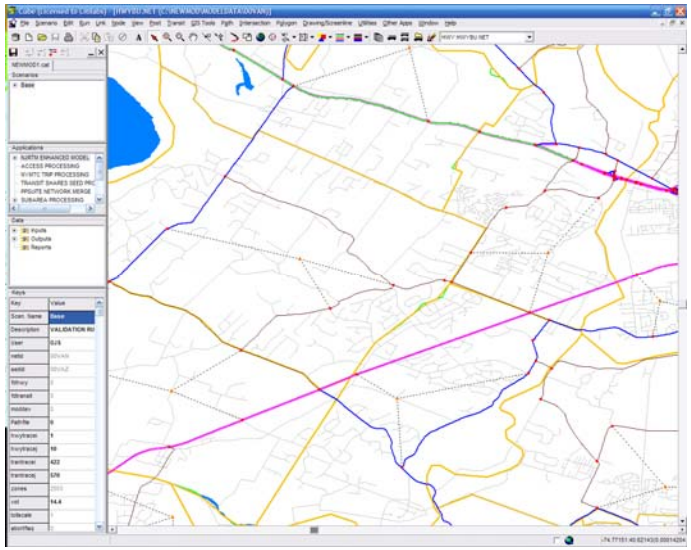
Application Manager- Flowchart provides extremely easy to use model interface for building, running and documentation

Cube Graphics- Provides unlimited layering, signing, intersection coding and analysis, network editing and analysis, charting, links to digital media

Scenario Manager- Makes creating, managing and running scenarios very easy to do

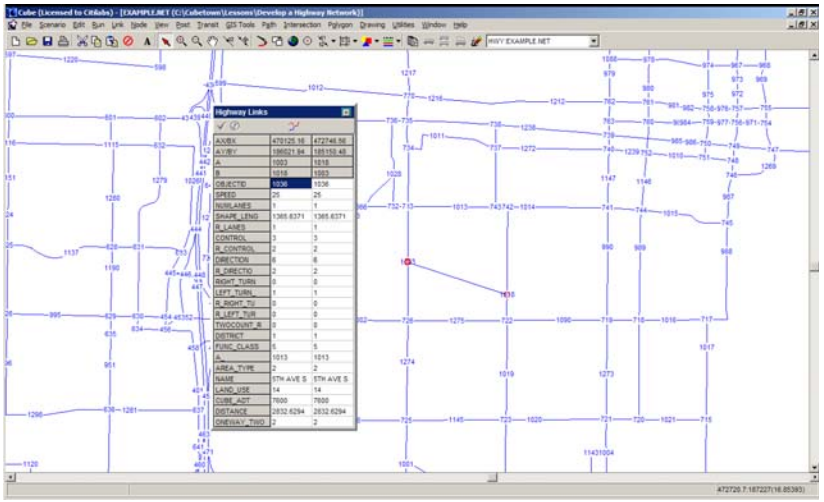
Network Editing: Add Links

- Browse and open a network
- View Center on Node 8482 with Scale ~0.15
- Select Post, All Nodes from Main Menu
- Select Link, Add Two-Way from Main Menu
- Position cross-hair over node, click then drag to the node 7304
- Hit the ESC key and select the new link to view/edit its attributes



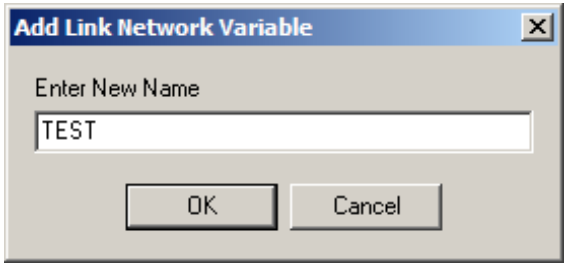
Network Editing: Add Links

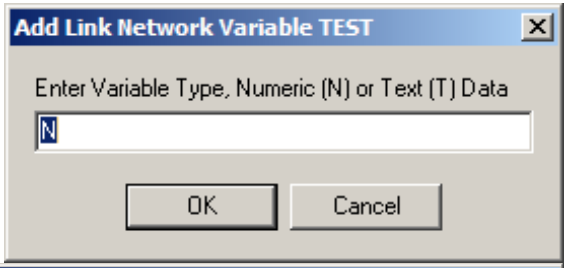
- Right click on link 8482-7304 and select delete
- Add link 8482-7304 again using Copy and Paste
- Copy from link 26961-8482
- When you select Paste the cross-hair will appear.
- Position cross-hair over node 8482. Click, drag and release over node 7304. New Link is Pasted.
- Hit the ESC key and select the new link to view/edit its attributes

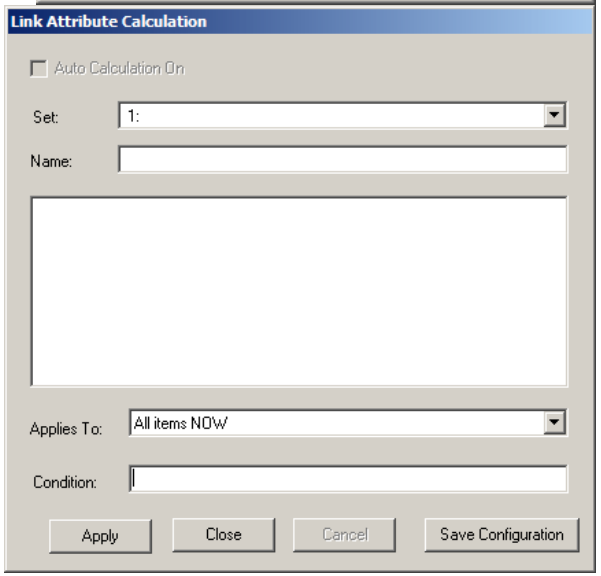


Network Editing: Adding Attributes and Calculations

- Select Link, Attribute, Add from the Main Menu
- Add a link attribute called: TEST
- Type is Numeric
- Select Link, Compute from Main Menu

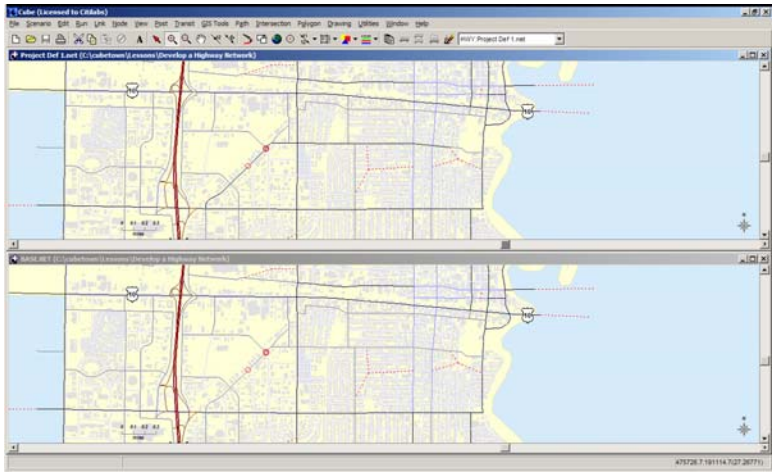




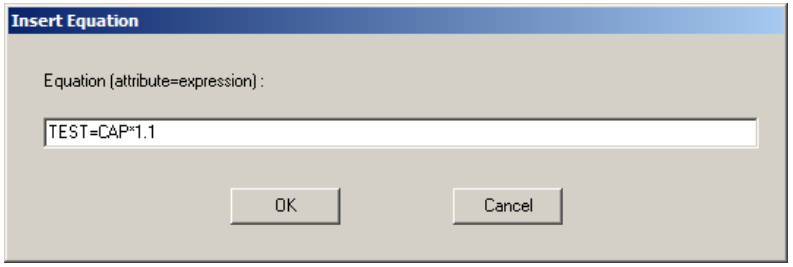


Visual Comparisons

- Saving a common View
- Restore a common view across multiple networks

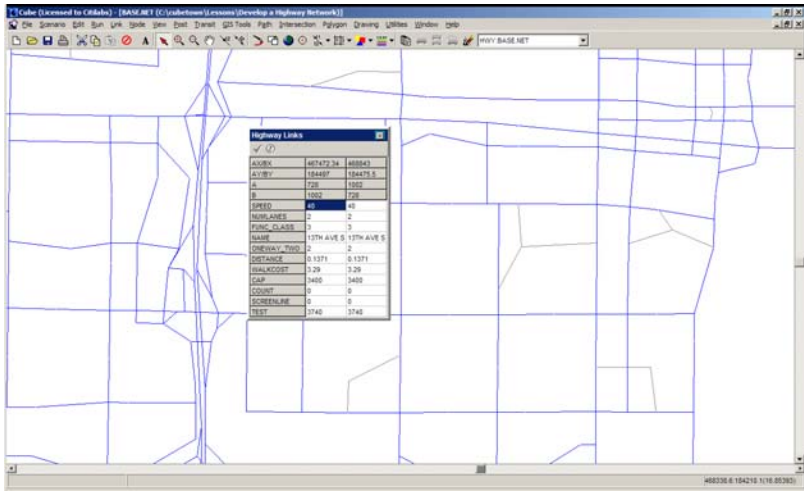


Network Editing: Adding Attributes and Calculations



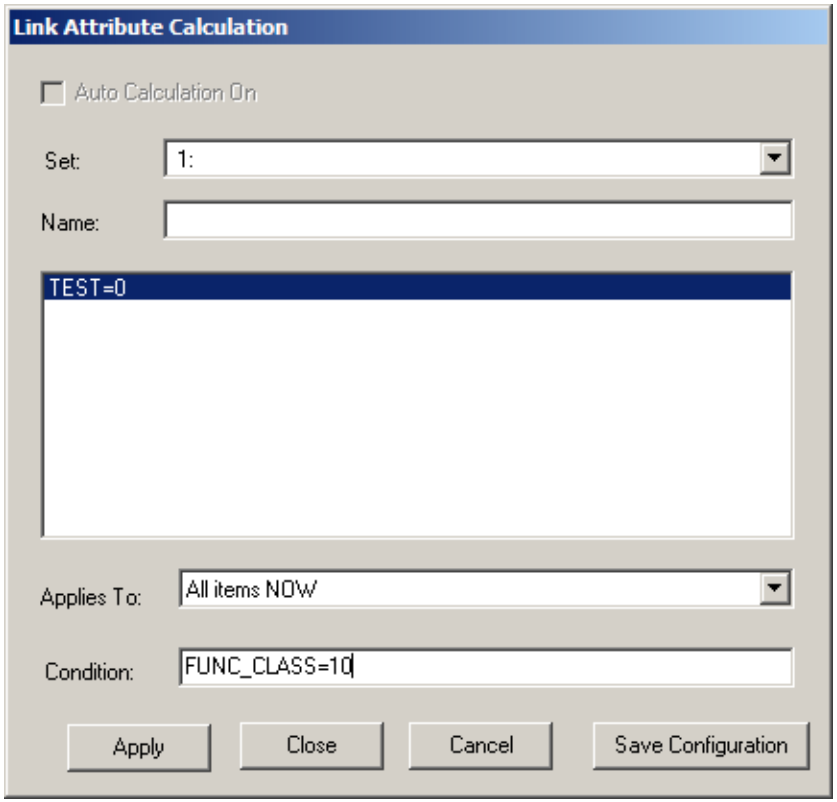
- In computation area Right Click and select Insert
- Enter equation TEST=CAPACITY*1.1 and select OK
- Accept other defaults and select Apply
- Browse link attributes to verify computations

- Computation Sets

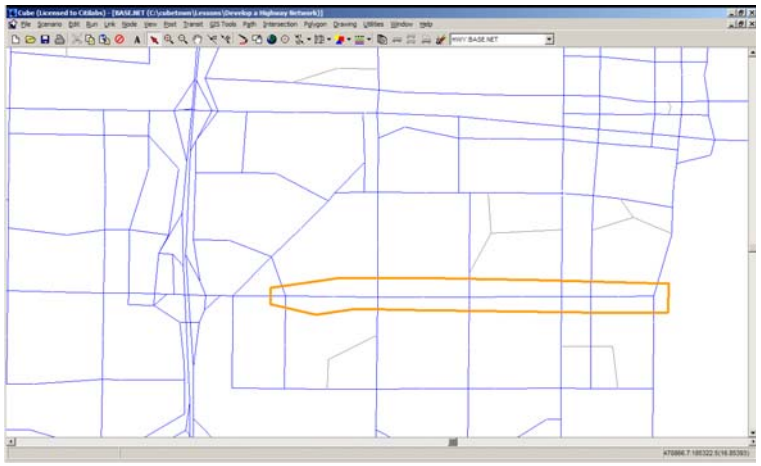


Network Editing: Adding Attributes and Calculations

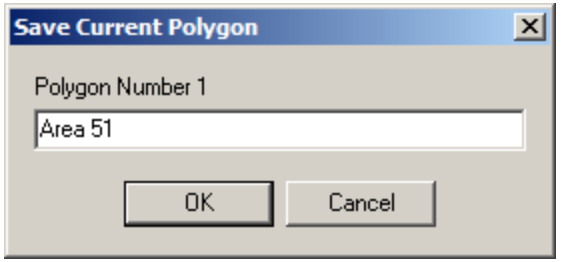
- Using Conditions with Calculations
- Select Link, Compute again
- Double click your equation to edit and set TEST=0
- Right click in the blank Condition box and set up a condition to apply the calculation only for Centroids (_CENTROID=1)
- Select Apply
- Browse link attributes to verify computations



Network Editing: Polygons

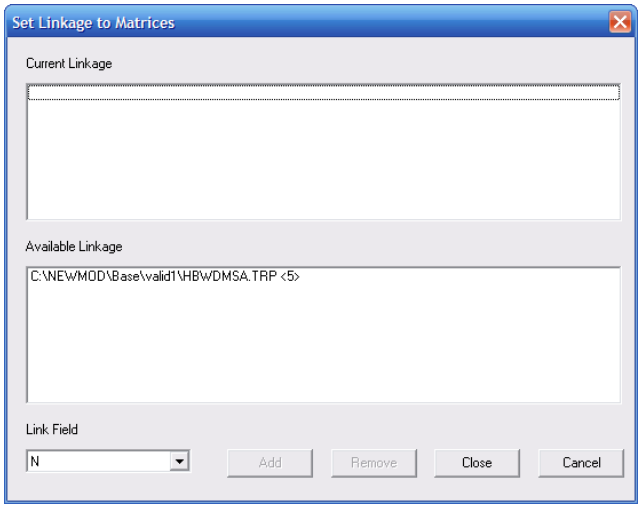


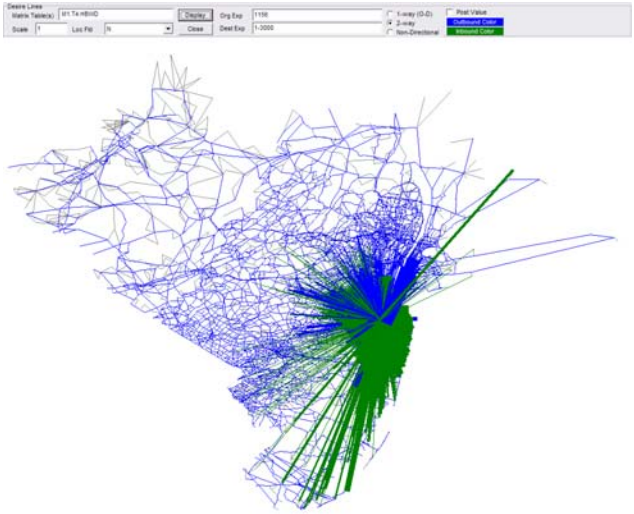
- Select Polygon, New from the Main Menu and draw a Polygon by point-and-click.
- Select Polygon, Save, 1= from the Menu and name this Polygon ‘Area 51’
- Add link attributes ORIGCAP and DIFF
- Compute ORIGCAP=CAPACITY
- Subtract 700 from CAPACITY for all links within the polygon
- Check and validate that it has worked:
- Compute DIFF=CAPACITY-ORIGCAP
- Post DIFF



Desire Lines

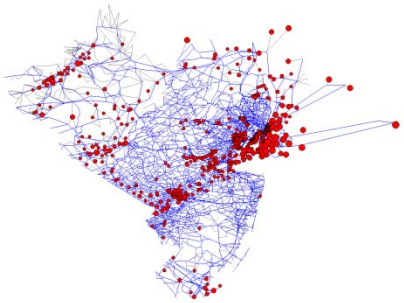
- Close all open files. Open c:\newmod\newmod1.cat
- Double click on the NJRTM Enhanced Model in the Applications area
- Double click on the HBWDMSA Trip Table
- Window back to the application and Double Click on the HW Intersections
- Select Node, Link to Matrix and add the matrix from the Available to Current Linkage
- Select Post, Desire lines. Display trips from Table 4, Zone 1156 to all other zones (1-2553)





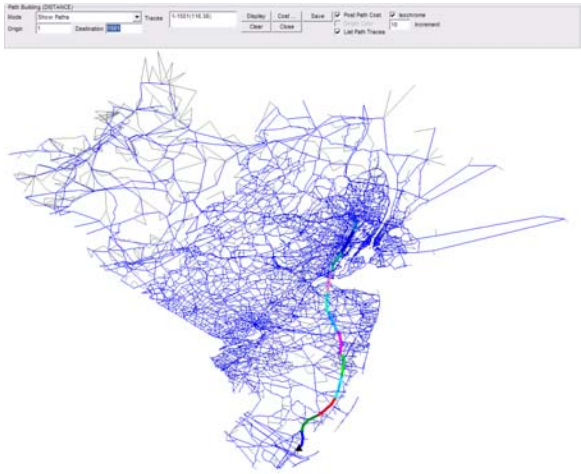
Node Charts

- Select Post, Clear All Postings
- Select Post, Node/Point Chart and Node Chart dialog settings as show on the next page
- Select Ok to view.
- Select View, Legend to see the Link and Node Legend




Highway Layer Node Chart Settings
Set:
1:HBW1
Name:
HBW1
Chart Type:
Radius Expression
LN(M1.T1.P_SUM.HBWD)
Attributes
Color Settings
divisor
Value Range
M1.T1.P_SUM.HBWD
Node Color
Fix Color
Dynamic Color
Color
1
Selection Criteria:
Copy Scale
M1.T1.P_SUM.HBWD>100
Scale Range to Show Posting
0
to
0
Key Value
Key Min. Width
Key1
Key2
Key3
Key4
Key +
Key -
OK
Cancel
Save Configuration

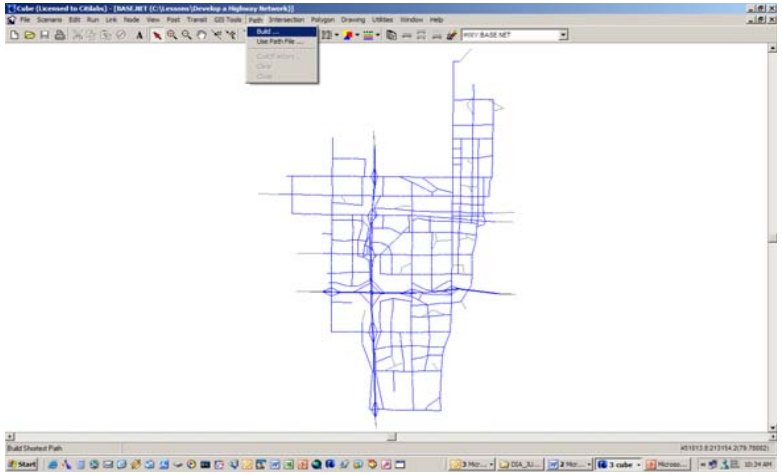
Path Building, Display & Analysis

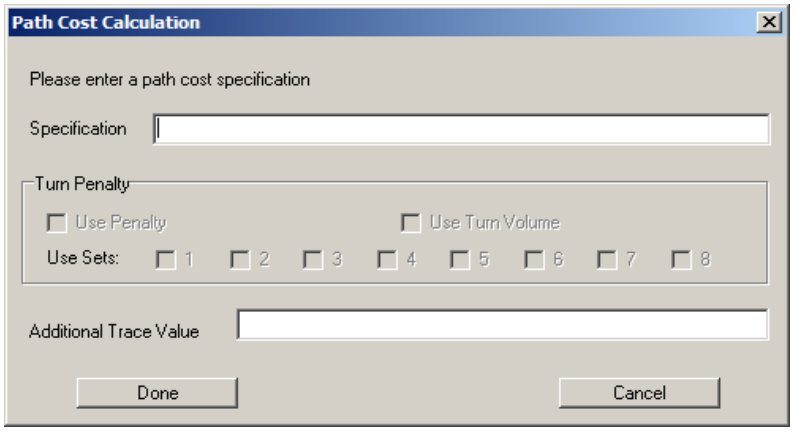


- Opening the Path from Assignment
- Selected Zone Display
- Selected Link Display
- Multi-stop routing Display and Analysis
- On screen path building and display
- Isochrone display

On Screen Paths

- Select Path, Build from the Main menu to open the Path Cost Calculation dialog box



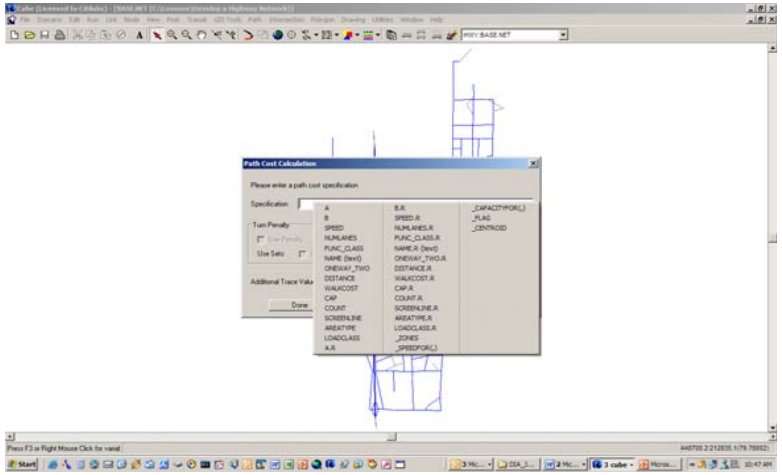


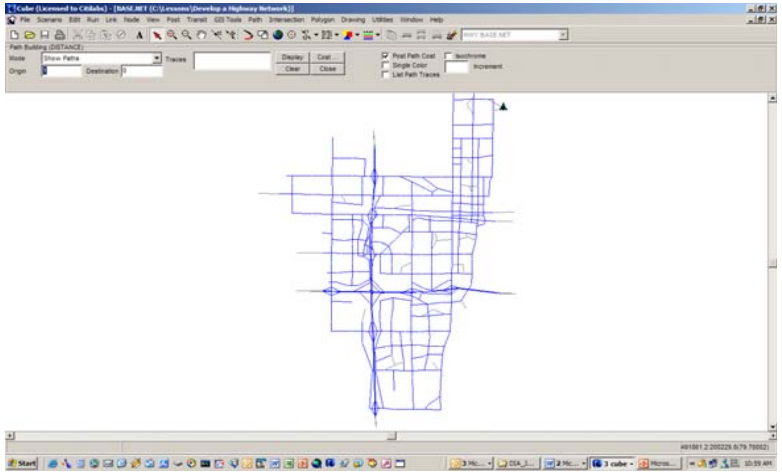
On Screen Paths

- COST - Measure of any attribute along the path between the origin and destination.
- Cube finds the least “COST” path
- Attributes can be functions of or combinations of link attributes
  - Distance
  - Time
  - Impacted Population
- Penalties, Prohibitions and other Restrictions are considered

On Screen Paths

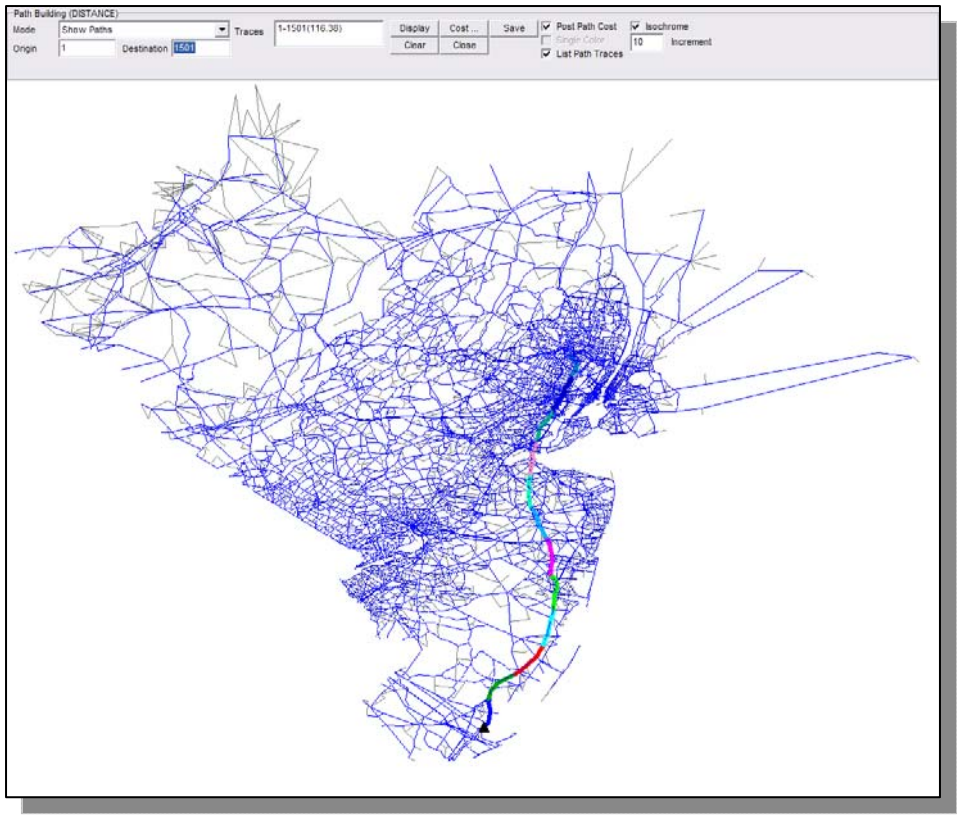
- Cube allows for interactive path building and display with user defined cost specifications
- Cost specifications can be built using available network attributes, Turning restrictions or penalties, and incremental cost values
- Right click in the blank Specifications area and select Distance
- Path Building dialog opens with zone one pre-selected





On Screen Paths

- Set Origin to 1 and Destination to 1501, minimum distance path is built and displayed
- Check List Path Traces and click Display
- Continue to click additional destinations for multiple paths
- Select Clear and Close

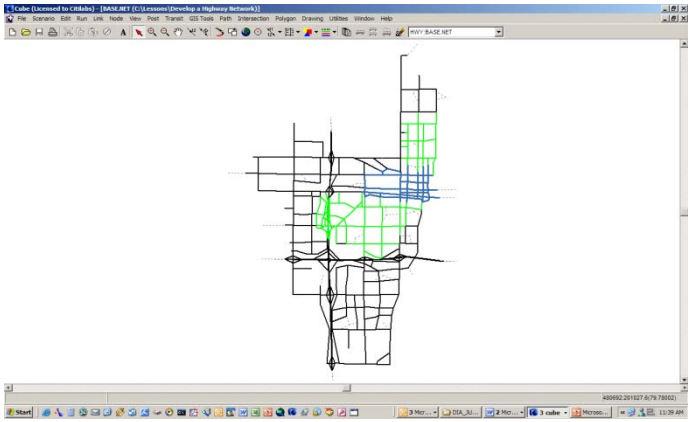


On Screen Paths:
Example-Minimum Population Exposure

- Example: Minimum Population Exposure
- Set up a link color set to display the link attribute AreaType
  - Make sure the centroids can be identified
- Add a new link attribute: POPULATION
- Compute a value for POPULATION based on Area type
  - 1=10000 persons per mile
  - 2=1000 persons per mile
  - 3=100 persons per mile
- POPULATION=DISTANCE*100 (for AreaType=3)

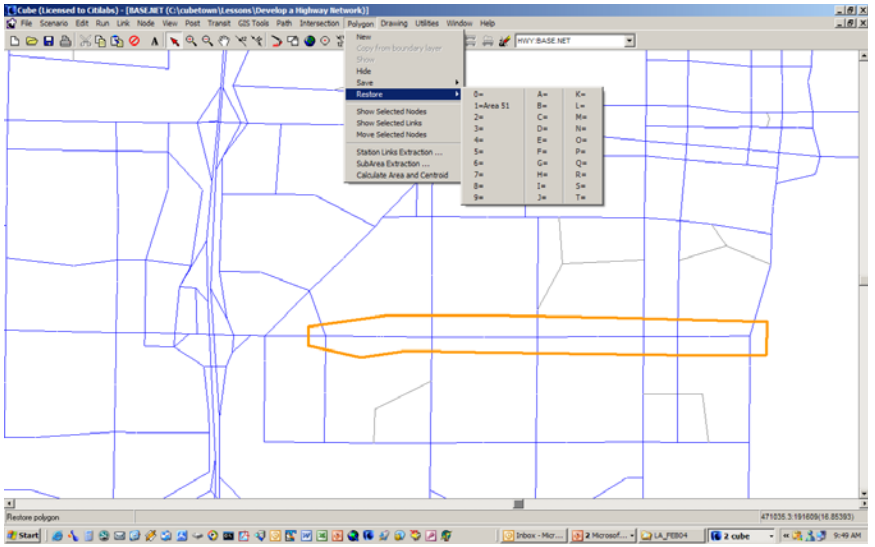
On Screen Paths:
Example-Minimum Population Exposure

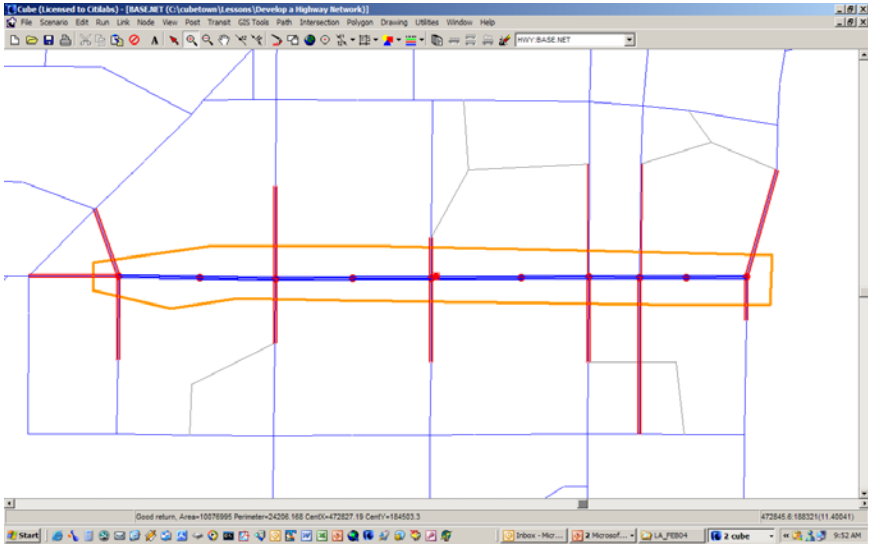
- Now build Minimum Population Paths with Distance as the additional Trace attribute
- Select Origin as 1 and Destination as 17
- Select List Path Traces and Display
- The path that minimizes exposure to population is displayed along with the total population and distance on the path
- Close Path Building dialog



Network Editing: Polygons

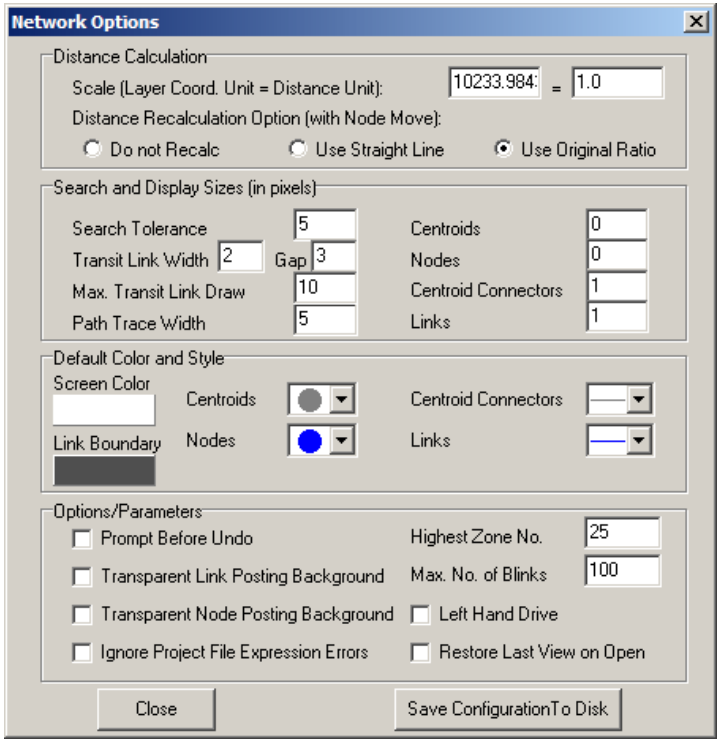
- Save and Restore
- Show selected Nodes/Links
- SubArea Extraction
- Calculate Area and Centroid
- Copy from Boundary Layer
- Export to CubeDyansim





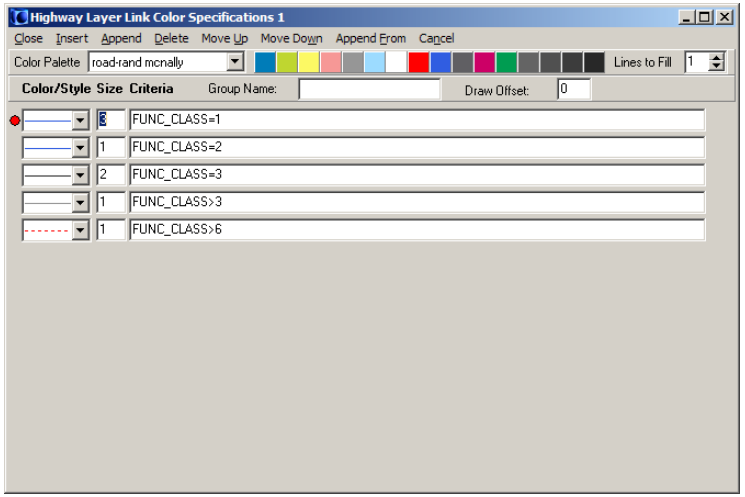
Network Editing: Viewing Data

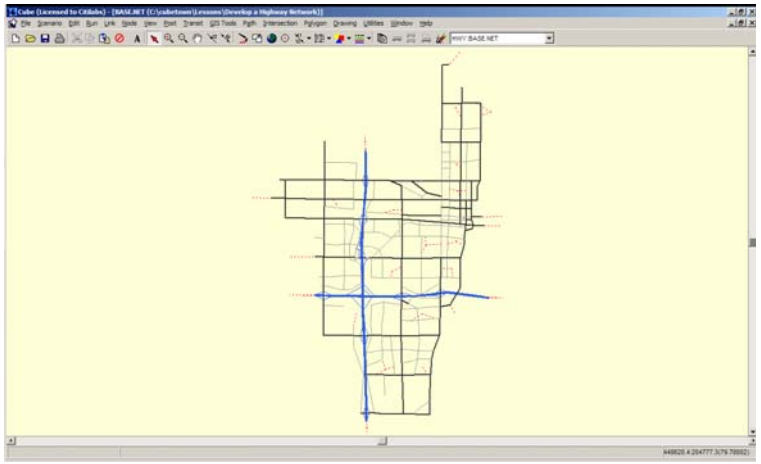
- Customized Data Views simplify editing
- From Edit Menu select Options
- Adjust display size settings and view
- Adjust Default colors and styles and view
- Adjust Parameters and view



Network Editing: Viewing Data

- Define Color Specification for the Highway Layer
- Select the Link/Line Color Icon
- On the Specification Dialog menu click on Insert 5 times
- Select the Color Palette: road-rand mcnally
- Use the Color/Style, Size and Criteria settings to display links by FUNC_CLASS

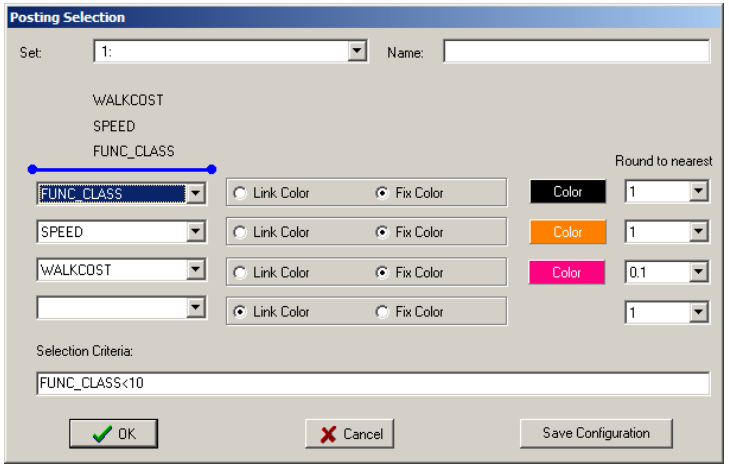


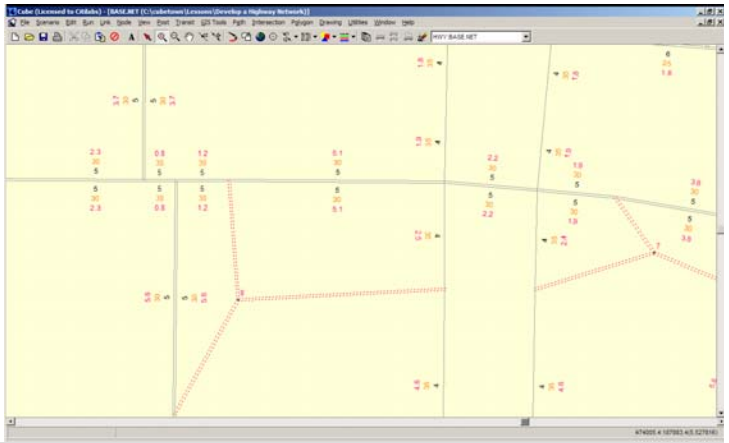


Network Editing: Viewing Data

- Posting Values and Saving Posting Sets

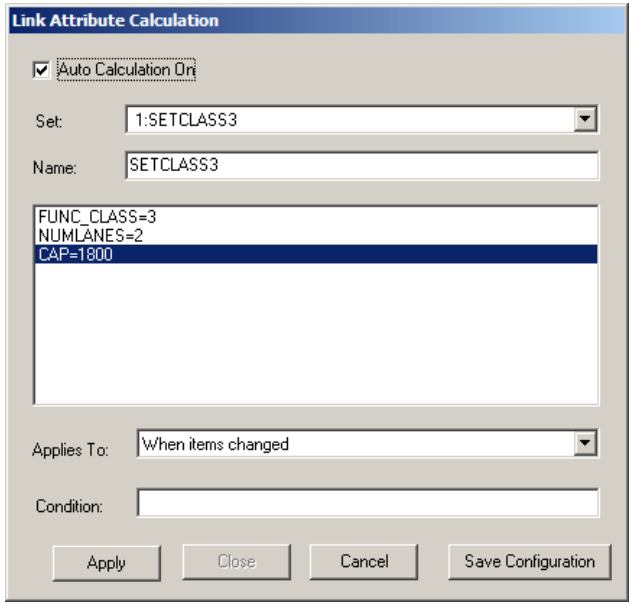
- Post zone numbers on the screen
- Post FUNC_CLASS, SPEED and WALKCOST on all links except zone centroid connectors
- Select Fix Color for each Posting and set rounding for WALKCOST to 0.1
- Name the Posting Set CLASS
- Zoom to view project area

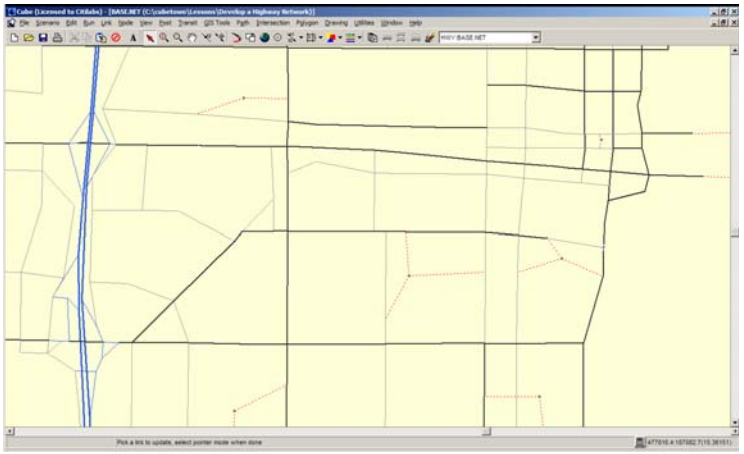




Network Editing: Link Updating

- Automatic link attribute updating with point-and-click
- Select Link, Compute
- Select an unused Set Number
- NAME=SETCLASS3
- Insert 3 expressions: FUNC_CLASS=3, NUMLANES=2, CAP=1800
- Applies To = When items changed
- Check Auto Calculation On and Apply
- Select Link Update
- Update a CLASS 5 corridor to CLASS 3 by point & click with the Update pointer
- Save file as Project Def 1.net





Day 2- How to Build Alternatives

“What do I do before I even turn on the computer?”

Objectives

- When to Use a Model
- Preparing for the Use of the Model
- Applying the Model
- Evaluating the Results
- Summarizing / Communicating Findings

Model Utilization Criteria

- Governed by Several Conditions
  - Level of Analysis
    - Appropriate Tool for Analysis Scale?
    - Adequate Resources / Schedule?
  - Model Structure
    - Sensitive to Policy Issues
    - Calibration Status
    - “Forecast-able” Variables?
  - Number of Alternatives
    - Efficiency vs. Cost
  - Regulatory Requirements

Preparing to Use the Model

- Does the Model Adequately Reflect Existing Travel Patterns?
- How Will the Model Reflect the Proposed Scenario?
  - Network parameters
  - Socio-economic data
  - Behavioral Assumptions (unlikely but possible)
- What Horizon Year is Appropriate?
- What are the Model's Data/Conditions for that Year?
- What Plans or Specifications are Available?
  - Specific development plans
  - Committed Infrastructure Improvements
- What Agencies Have Jurisdiction?

Applying the Model

- Does the scenario explore immediate or long-term impacts?
  - Immediate Impacts – Use "Fixed Distribution" Option
  - Long Term Impacts – Use Full Feedback Model
- Fixed Distribution Process
  - Holds Trip Distribution Patterns Constants
  - Permits variation in Mode Choice
  - Permits variation in Highway/Transit Assignments
- Full Feedback Model
  - Assumes that trip distribution can change in response to network/service modifications

Evaluating Results

- Was the model reaction expected?
  - Reasonable Sensitivity
  - Reasonable Influence Area
- Investigation of Counterintuitive Results
  - What is the model trying to indicate?
  - First Order/ Second Order impacts?
  - Minor / Acceptable Variation?
- Model Adjustments / Further Analysis
  - Applying Constraints
  - Other Refinements

Summarizing Results

- Characteristics of Target Audience
  - Public Officials / Stakeholders?
  - Detailed Technical Review?
- Proper Mix of Graphical and Numerical Summaries
- Documentation Formats
  - Internal Summaries
    - Project Team (Client / Consultants)
    - Controlled Release
  - Public Documents
    - Client and Public
    - Unrestricted Release

Case Study Design

- Step 1 – Project Description / Analysis Issues
- Step 2- Edit and Execute Model
- Step 3- Evaluate / Summarize Outputs

Case Study Criteria

- Hypothetical Examples
  - Similar to Potential Projects
- Relevant to NJTPA Region
  - Consistent with typical assignments
    - Development / Redevelopment Situations
    - Transportation Network
    - Refinements/Optimization
    - Not Large Infrastructure Scenarios
- Provide Variety of Editing Tasks
  - Both Network and Socioeconomic Data
  - Variety of Adjustments

Data Sources to Support Alternative Development

- Local
  - Local Land Use Plans
  - Traffic Studies
  - Traffic Counts
- Regional
  - Traffic Counts / Trends
  - Transit Ridership
- State
  - Highway and Transit Plans
  - Traffic Counts
- National
  - Institute of Transportation Engineers (ITE) Trip Generation Handbook
  - Highway Capacity Manual (HCM)

Case Study #1- “Smart Growth”

- Approach to Alternative Development- Discussion
- Implementation

Scenario General Description

- Location- JFK Blvd in Bayonne
- Nature of Proposed Development
  - Redevelopment
  - Change from Residential Only to Mixed Land Use
  - Increase in Density
  - Proposed Infrastructure Changes
    - Increase Transit Services
    - Pedestrian “Friendly” Design
    - Lanes Reduction on JFK Boulevard
    - On-street Parking
- Goal of Project is Economic Redevelopment and a “Green” community

Considerations

- Does the MPO model reflect this development already?
- What is planned precisely? How much development?
- What types of households and businesses will be in the development?
- When is this proposed to be built? Is there staging?
- What model year data sets are available? Interpolation?
- If this area gets new households and jobs, where might they be coming from? Will they add to the regional total or reallocate it?
- What transit services are already available in the area?
- What parking policies are reflected in the MPO model? On the ground?
- How does this proposed development fit into the current plans for the area- city, county, MPO, DOT, NJT, etc.?
- Are there other such developments in NJ that can be examined for data, results?

Potential Data Sources

- Existing Conditions
  - Existing Traffic Counts (Car, Pedestrian, Transit)
  - Current Land Use Inventory- Property Appraiser
  - Field Review
- Plans
  - Developers' Plans
  - TIP/LRTP
  - County Master Plans
- Comparisons
  - NJRTM-E Model Data
  - ITE Trip Generation
  - New Jersey Office and Planning and Growth
  - ULI
  - HCM
  - Other Local/State Case Studies/Examples of Similar Development

Model Inputs- Technical Specs

- Demographics
  - Zone 644
    - Households=1000
      - Average Income of $100,000
      - 50% No Children, 40% Retirees, 10% Working w/Children
    - Population 2112
    - 2500 Employees- All retail
  - Zone 646
    - Households=3500
      - Average Income of $80,000
      - 45% No Children, 25% Retirees, 30% Working w/Children
    - Population- 8,000
    - 800 Employees- All Office

Model Inputs- Technical Specs (continued)

- Demographics
  - Zone 649
    - Households=500
      - Average Income of $50,000
      - 100% Retirees
    - Population- 700
    - 500 Employees- All Medical
  - Zone 654
    - Households=500
      - Average Income of $150,000
      - 25% WNC, 50% Retirees, 25% WWC
    - Population- 1172
    - 800 Employees- 50% Retail, 50% Government

Model Inputs- Technical Specs (continued)

- Infrastructure Changes
  - Roadway Changes JFK Blvd from the Turnpike Extension to NJ440
    - Subtract a lane (Change LANESAM, LANESPM, LANESOP Variable to 1)
    - Permit Parking (Change PARK Variable on Network to 1)
    - Change Facility Type (Change FT Variable on Network to 7)
  - Transit Changes- Revise Headway on JFK Routes
    - Route 99A1- Frequency[1]=5, Frequency[2]=10
    - Route 33A1- Frequency[1]=10, Frequency[2]=20
    - Route SAP12- No Changes
  - Pedestrian Changes- None for this test

How to Implement

- Model Inputs Effected
  - NJSEVA00.DBF
  - HWYBU.NET
  - BUSLINES.DAT
- Interactive Exercises to Update Model Inputs
- Start Cube
- Click “Cancel” On Intro Screen
- Click “FILE/OPEN”, change the type to Catalog *.CAT
- Browse to and Open c:\newmod\NEWMOD1.CAT

How to Implement (continued)

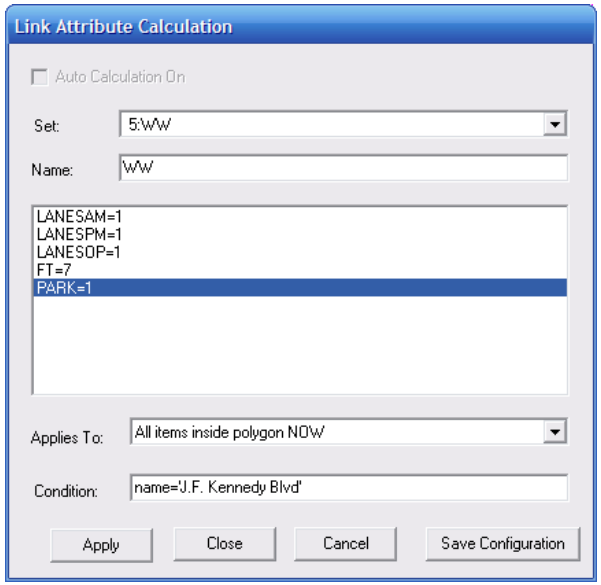
- Copy c:\newmod\modeldata\20VAN directory to c:\newmode\modeldata\20SMARTN
- Copy c:\newmod\modeldata\20VAZ directory to c:\newmode\modeldata\20SMARTZ
- Create “SMART20” scenario in Scenario Manager under “BASE”
- Select the Network (N) and Zonal Data (Z) directories for the smart growth scenario in the Scenario Manager dialog box
- Now it is time to edit the inputs!!!

Editing Zonal Data Attributes

- Double-click on the NJRTM Enhanced Model Application in the "Applications" Pane
- Drill down through TRIP GENERATION and SOCIOECONOMIC data
- Double-click on the SE DATA input to box 2
- Make Changes
- Double-click on the LKUP LIFECYCLE input to box 2
- Make Changes

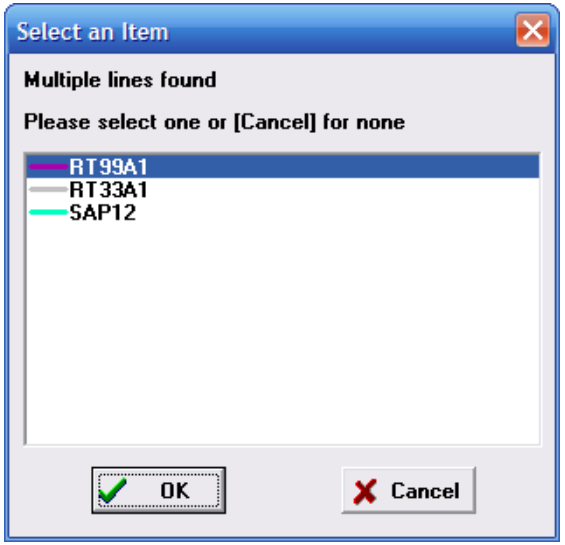
Editing Highway Network Attributes

- Double-click on the HIGHWAY NETWORK box
- Double-click on the GRAPHICS box
- Click Center on Node (Icon or Node Menu)
  - Enter 644
  - Enter 0.07 for scale
- Post NAME and LANESAM
  - Update J.F. Kennedy Blvd attributes from node 9890 to 9891
    - FT
    - LANESAM
    - LANESPM
    - LANESOP
    - PARK



Editing Transit Network Attributes

- Make the TRANSIT LAYER the working (top most) layer
- Click anywhere inside the polygon on Kennedy Blvd and select RT99A1
- Update Headways
- Repeat for RT33A1 and SAP12
- Go to TRANSIT/TRANSIT LINE MANAGER in menu and save edits back to file



Running the Model

- Normally you would click on the Scenario Manager pane, select the scenario and then run it.
- We're going to do a TV version of cooking and look at the results tomorrow

Case Study #2- Impact Assessment

- Approach to Alternative Development- Discussion
- Implementation

Scenario General Description

- Location- Far Hills Shopping and Office Complex
- Nature of Proposed Development
  - New Development
  - Shopping Complex and Office Park
  - Proposed Infrastructure Changes
    - Integrated Transit Services w/ PnR and Access to Rail Service
    - Reroute Express Busses to PnR
    - Add New Rail Line
    - Changes in Roadway Access
  - Developer to Pay “Fair Share” of Necessary Improvements

Additional Considerations from Previous Case Study

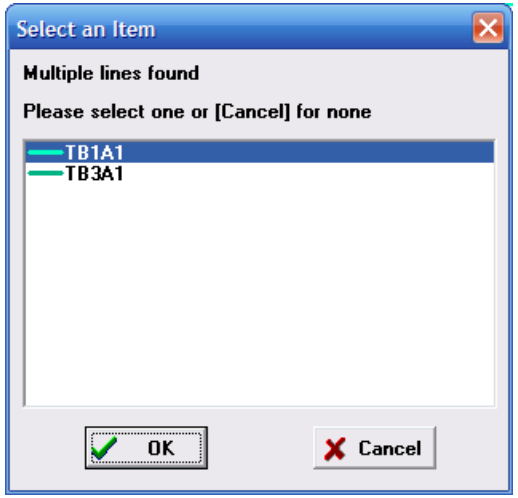
- What types of businesses and number of employees will be in the development?
- What local access/site circulation plan has been proposed by the developer?
- What additional local access/network coding is needed to best meet the needs of this development?
- What other facilities will the traffic from this development impact? How can these be mitigated?
- How should transit services be realigned to service this area?
- What are the characteristics of the PnR to be added?
- How do we assess the cost to the developer?

Potential Data Sources

- Existing Conditions
  - Existing Traffic Counts (Car, Pedestrian, Transit)
  - Current LOS/CMS
  - Current Land Use Inventory
  - Field Review
- Plans
  - Developers' Plans
  - TIP/LRTP
  - County Master Plans
- Comparisons
  - NJRTM-E Model Data
  - ITE Trip Generation
  - HCM

Model Inputs- Technical Specs

- Demographics
  - Zone 1610, Add 300 Retail Jobs and 1000 Office Employees
- Infrastructure Changes
  - Roadway- local widenings
    - Add 1 lane to Peapack to nearest intersections
    - Add 1 lane to Mine Brook/Main to nearest intersections
  - Transit
    - Add New “Far Hills” Rail Line- Copy from GLD01 but truncate at node 20248 with a frequency of 15/30
    - Reroute Express Bus TB1A1 and TB3A1 to stop in the expanded PnR lot
    - Update Park and Ride Lot with 500 new spaces and define catchment area
  - Pedestrian- no changes



Case Study #3a- Major Infrastructure Changes

- Approach to Alternative Development- Discussion
- Implementation

Scenario General Description

- Location- Raritan River Bridge Reconstruction
- Nature of Proposed Project
  - Reduce Lanes on Garden State Parkway to Reflect Reconstruction of Bridge Spanning the Raritan River
  - Use NJ35 and US9 as Relief Routes
  - Optimize Transit Service During Peak Periods
  - Consider TDM Strategies- Toll Increases

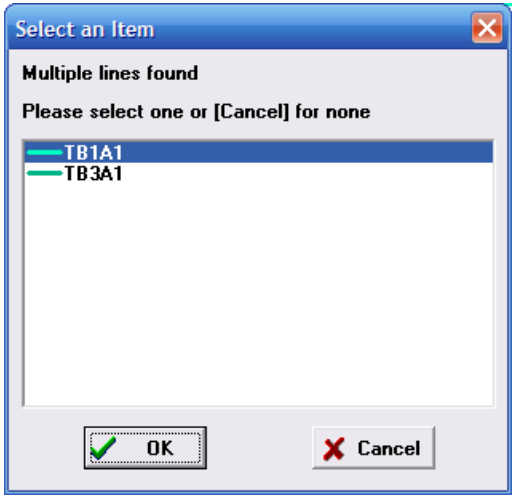
Additional Considerations from Previous Case Study

- Peak Period Traffic Flows (k/d)
- Reliever Routes
- Traffic Diversion
- Number of Lanes and Lane Width Alternatives
- Transit can Provide some Relief via Increased Service Frequency
- TDM Possibilities- HOV Options, Toll Options

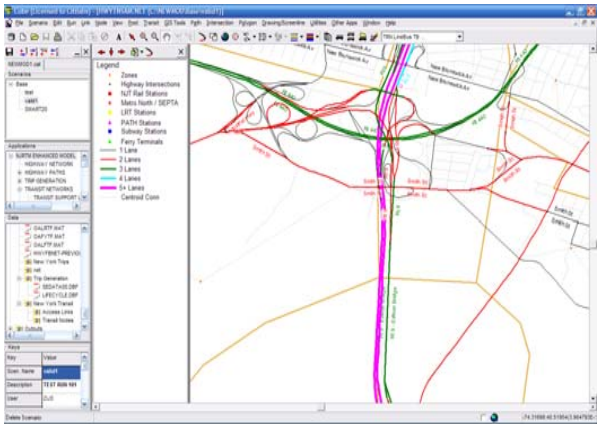
Potential Data Sources

- Existing Conditions
  - Existing Traffic Counts by 15 minute increment
  - Transit Capacity Utilization
  - Current LOS/CMS
  - Speed Study
  - Toll Data
  - Field Review
  - Roadway Geometrics
- Plans
  - MoTP
  - Design Plans
  - Signal Timing Plans

Model Inputs- Technical Specs



- Demographics
  - None
- Infrastructure Changes
  - Roadway- Northbound
    - 5223-26446, ADD 1 TO LANEAM, SUBTRACT 1 from LANEPM and LANEOP
    - Lane Width reduces to 10', shoulder becomes substandard (0)
  - Roadway- Southbound
    - 26492-5224, SUBTRACT 1 FROM LANEAM AND LANEOP, ADD 1TO LANEPM
    - Lane Width reduces to 10', shoulder becomes substandard (0)
  - Transit
    - Decrease AM Headway on Route 131A1 to 10 Minutes
    - Decrease MD Headway on Route 137C2 to 20 Minutes
  - Pedestrian- no changes



Case Study #3b- Minor Infrastructure Changes

- Approach to Alternative Development- Discussion
- Implementation

Scenario General Description

- Location- Princeton
- Nature of Proposed Project
  - Build the “little dig”- bury US206 through Princeton Borough, 6 lane controlled access
  - Project limits are from US1 to North of CR518
  - Remove Local Access Points, only arterial connections
  - Brand New Shiny Green Space for the Lovely Coeds to throw Frisbees on during the Warm Summer Months

Additional Considerations from Previous Case Study

- Development will be green space- no new business/households allowed
- New facility will likely carry more traffic than current facility but should operate at a better LOS
- Coeds must play frisbee at least twice a week during commuting hours

Potential Data Sources

- Existing Conditions
  - Existing Traffic Counts (Car, Pedestrian, Transit)
  - Current LOS/CMS
  - Current Land Use Inventory
  - Field Review
- Plans
  - TIP/LRTP
  - County Master Plans
- Comparisons
  - This is a whole new one baby- fantasy project!

Model Inputs- Technical Specs

- Demographics
  - None
- Infrastructure Changes
  - Roadway- facility upgrade and intersection removal
    - Add a new Facility Type 2 within project limits= node 8109 southern terminus, node 8069 northern terminus, 6 lanes
    - Downgrade existing RT206 within project limits to transit only- TCODEAM=9, TCODEOP=9- only busses can use those abandoned facilities
  - Transit
    - No changes except the highway coding
  - Pedestrian- no changes

Day 3- Hands-on Case Studies

“Let’s see what happened”

Analysis, Findings and Recommendations

- Case Study 1- Smart Growth
- Case Study 2- Impact Assessment
- Case Study 3- Infrastructure Rehabilitation

Case Studies

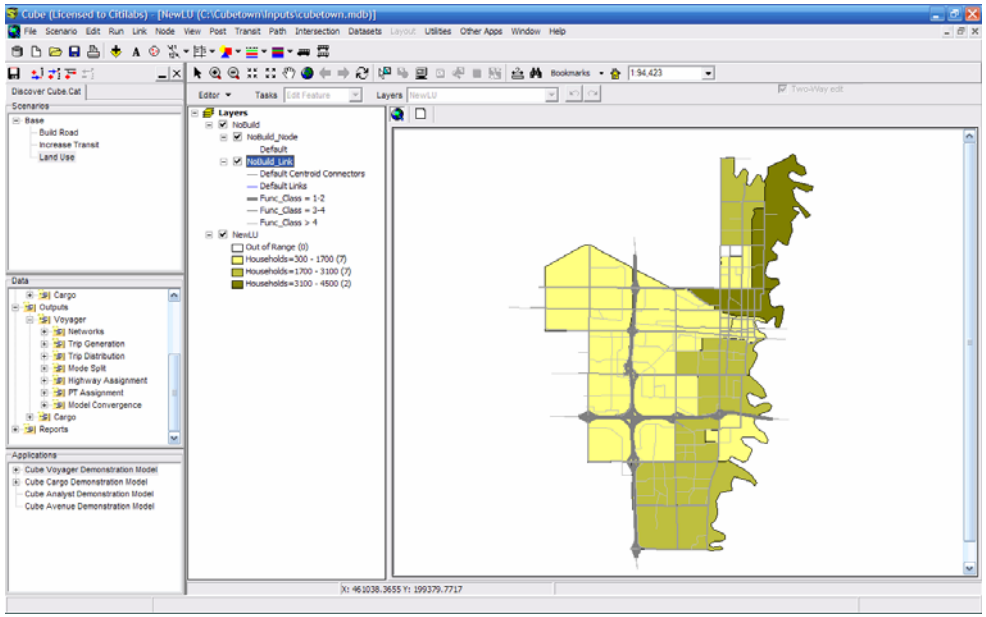
- Objective- Understanding Model-Based Planning Analysis
- Development- Utilizing the Model as part of the Analysis
- Application- Summarizing and Evaluating Model Results

Types and Varieties of Outputs

- Translating Model Outputs to Meaningful Decision Making Results
- Summaries
  - Tabular
  - Graphical
  - Map

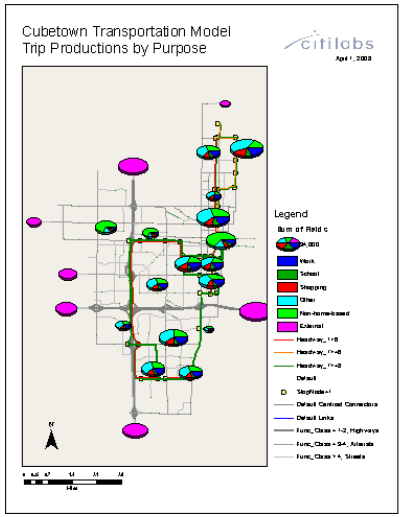
Summarizing Land Use Input/Outputs

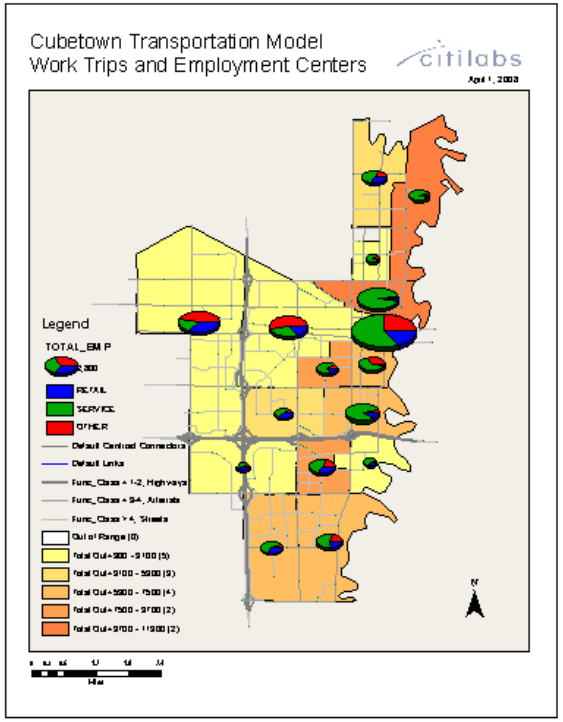
- Thematic Maps
  - Tell a story with pictures and colors
  - Commonly produced using GIS data



Summarizing Land Use Inputs/Outputs

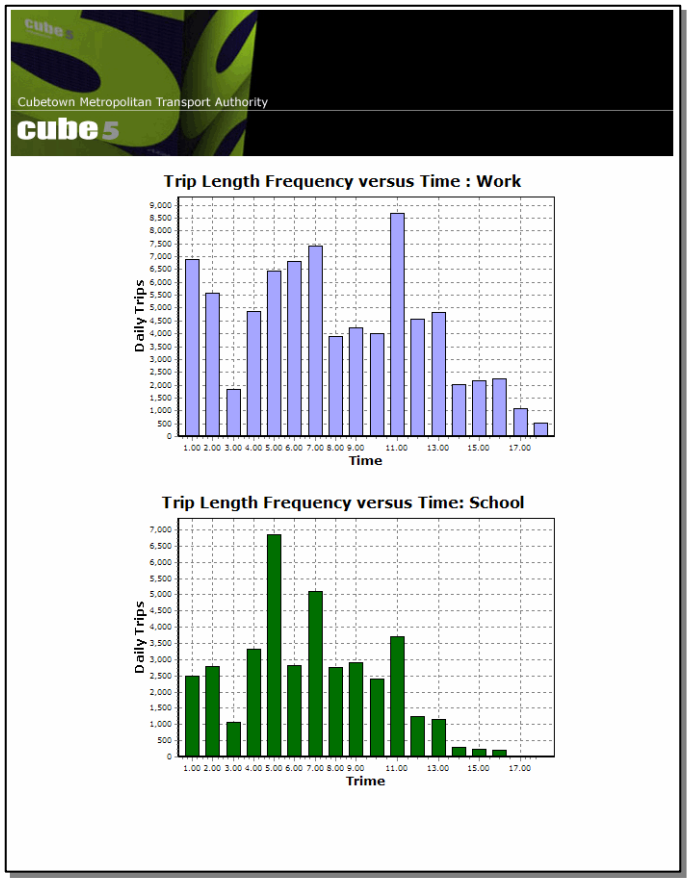
- Pie Charts
  - Typically show things as shares
  - Can be scaled based on the size of the whole





Summarizing Land Use Inputs/Outputs

- Histograms
  - Great for showing side by side comparisons of magnitude
  - Commonly used for trip length



Summarizing Land Use Inputs/Outputs

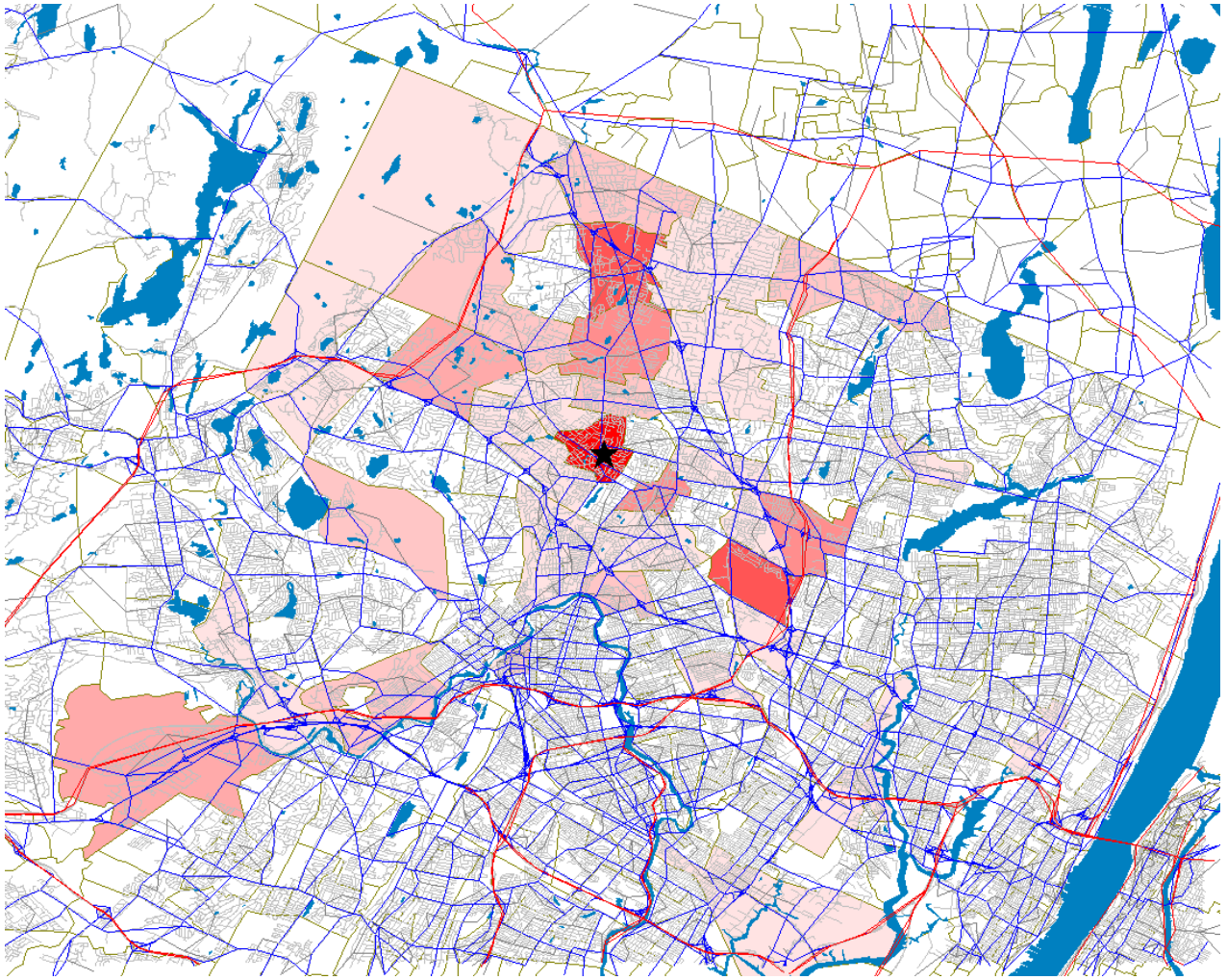
- Tables
  - Convey Details with Rows/Columns of Data
  - Useful for absolute magnitudes

Transit Ridership Summary

Rail/Ferry Services	Observed	Estimated	Diff	% Diff
Main/Bergen/Port Jervis Line	22,380	26,192	3,812	17.0%
Pascack Valley Line	7,018	3,352	-3,666	-52.2%
Boonton Line	9,824	14,620	4,796	48.8%
Morris/Essex Line	40,250	30,904	-9,346	-23.2%
Raritan Valley Line	18,070	16,556	-1,514	-8.4%
North Jersey Coastline/Northeast Corridor Line	106,052	94,154	-11,898	-11.2%
Metro North Trips from West of Hudson Locations	5,248	3,224	-2,024	-38.6%
Total Rail Service	208,842	189,002	-19,840	-9.5%
PATH	500,532	519,082	18,550	3.7%
Newark City Subway Line	36,232	30,385	-5,847	-16.1%
Hudson-Bergen LRT	22,000	31,838	17,580	123.3%
NJ Ferry Service	23,097	14,838	-8,259	-35.8%
Total	790,703	785,145	-5,558	-0.7%

Presenting Trip Distribution Results

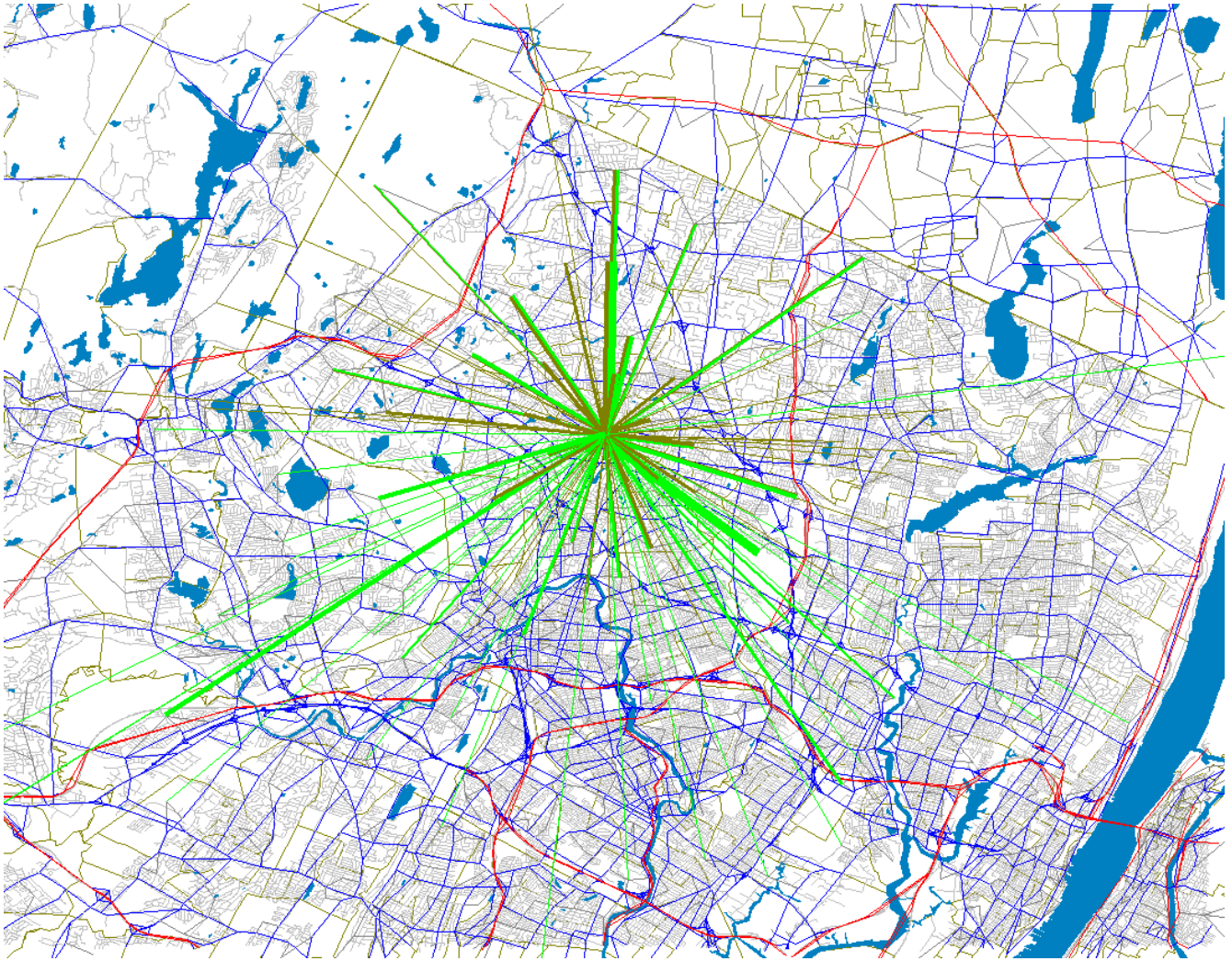
- Thematic Map
  - Useful for One Origin/Destination to Many
  - Color Ranges Should Make Sense / Have a Logic
    - Magnitudes
    - Standard Deviations
    - Outliers
  - Great for QA/QC



Destinations, Color by Trips Attracted from a Zone

Presenting Trip Distribution Results

- Desire Lines
  - Useful for One Origin/Destination to Many
  - Show Directionality and Magnitude
  - Great for QA/QC



Destinations, Trips Attracted to/from a Zone

Presenting Trip Distribution Results

- District-to-district Tables
  - Provide Technical Detail in an Understandable Format
  - Useful for Area-to-area Flows

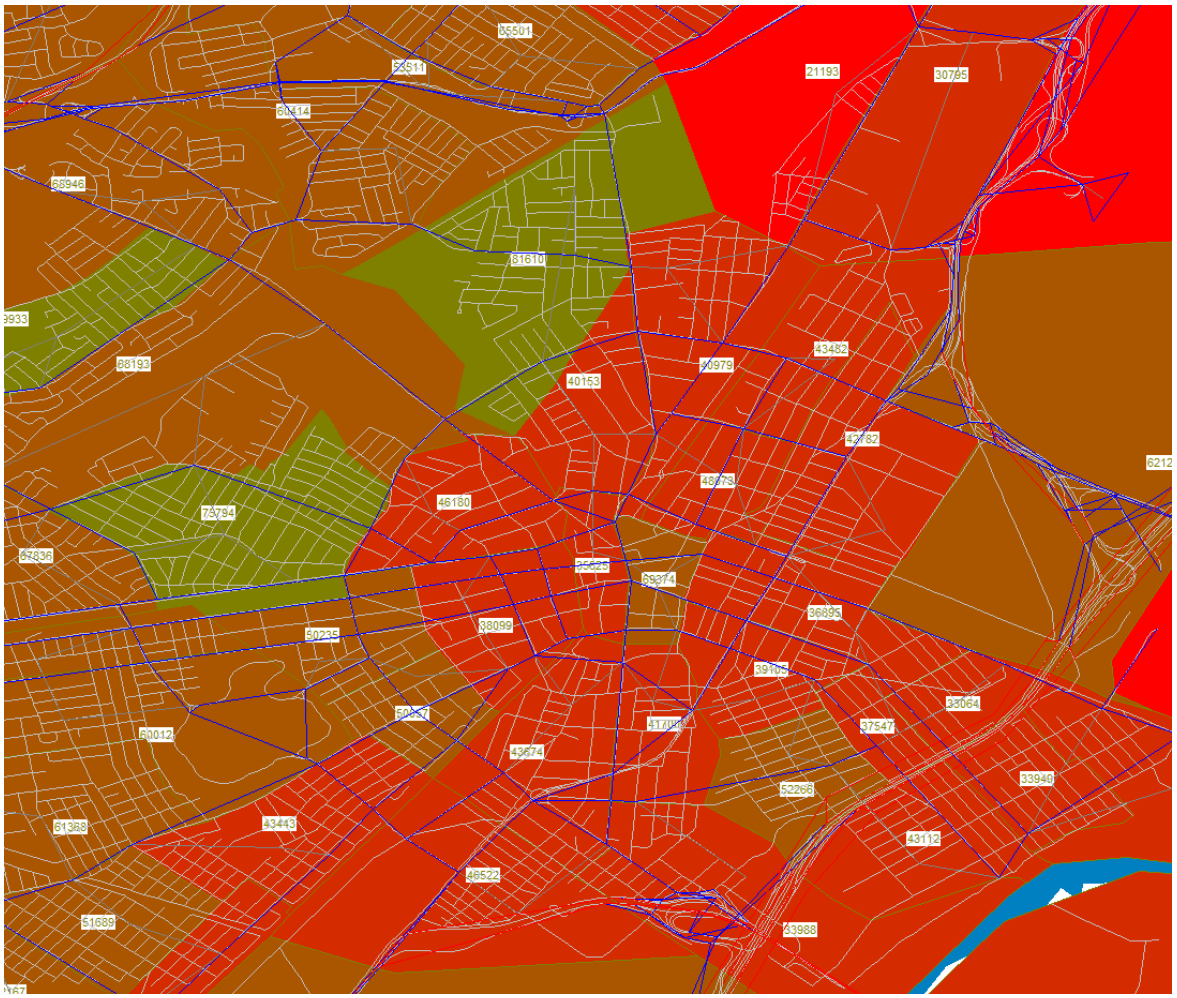
NJRTM-E Trip Distribution Results

Home-Based Work Trips

State	New Jersey	New York
New Jersey	1,000,000	250,000
New York	100,000	100,000

Understanding Mode Choice Results

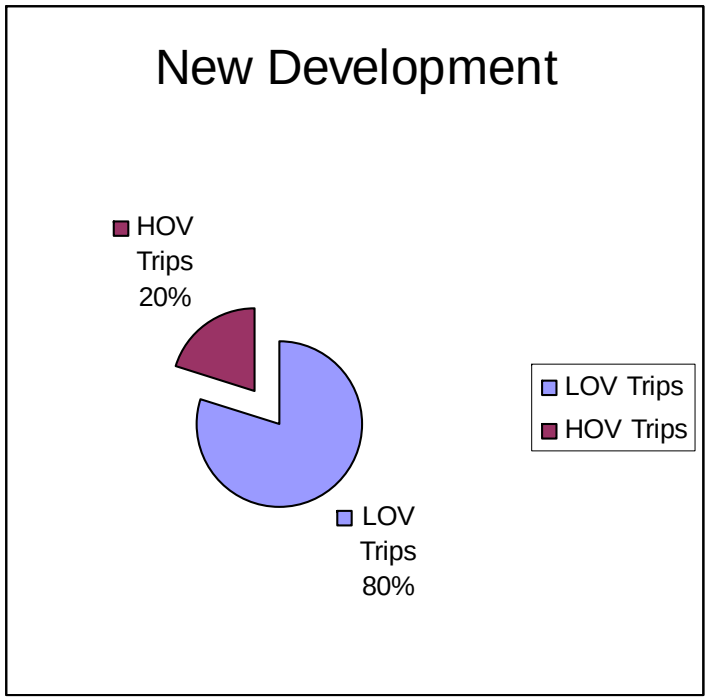
- Thematic Map of Low Income HH
- Map of Transit Trip Ends

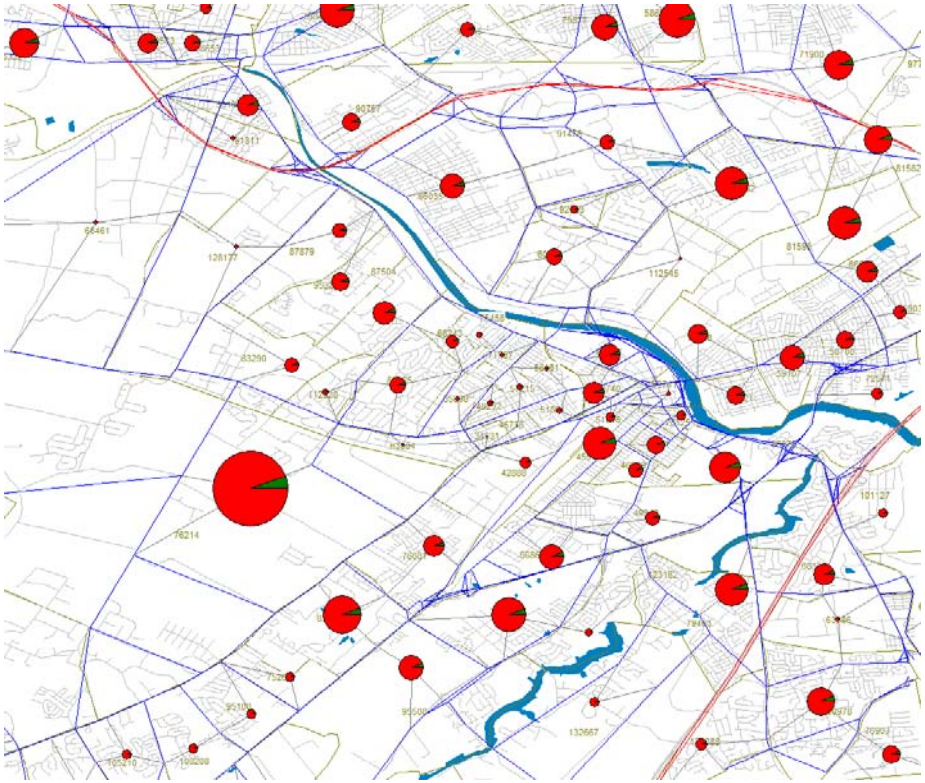


Low-income Transit Population Centers

Understanding Mode Choice Results

- Pie Charts and Histograms
  - Use Cube or ARCGIS for Spatial Placement
  - Use Cube Reports or Excel for Single Chart





Number of Trip Productions- Size
Share by Mode- Red=LOV, Green=HOV

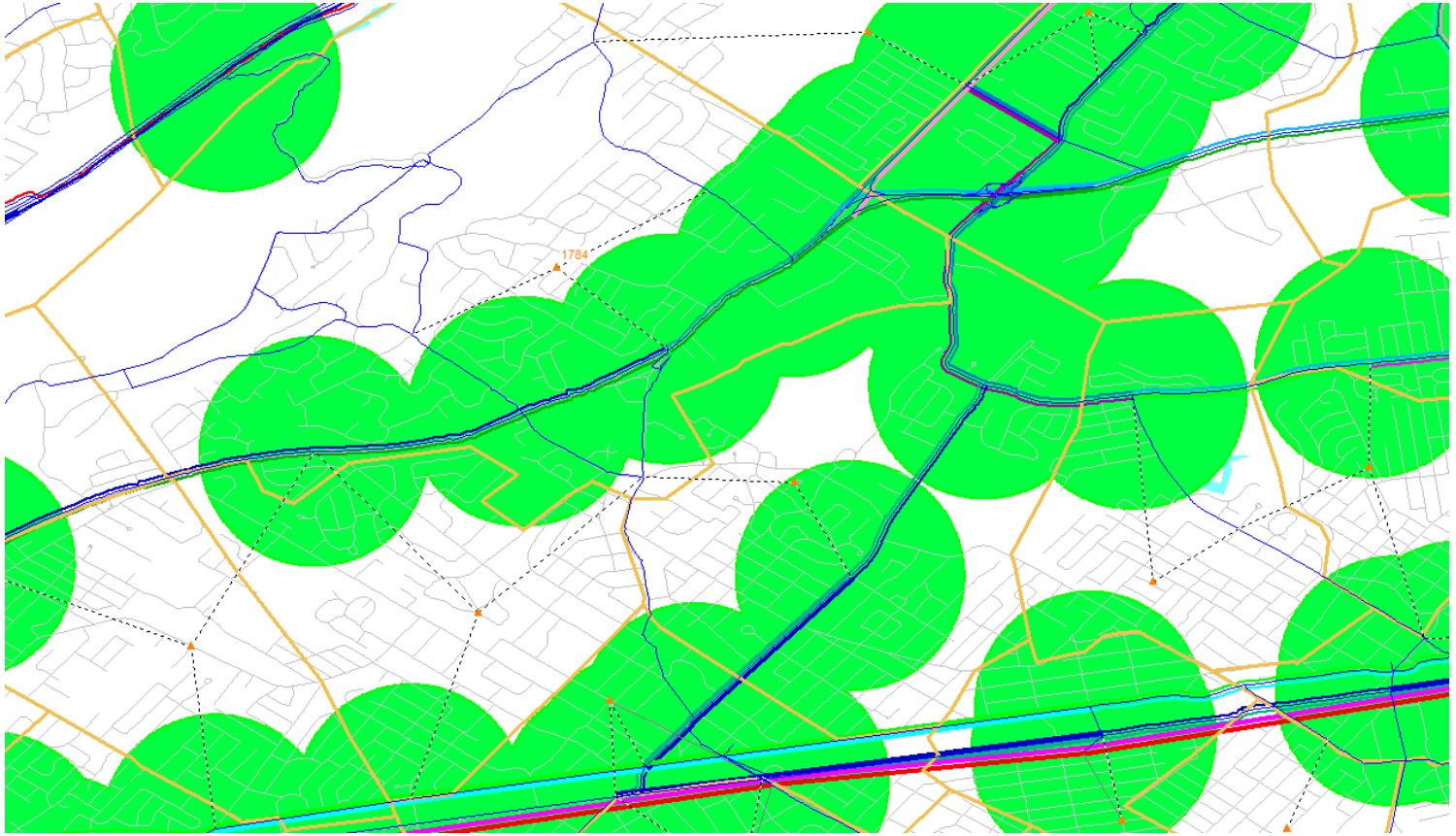
Understanding Mode Choice Results

- District-to-district Tables by Mode

HBWSOV	1	2	3	4	5
1	72.95	771.07	8.38	5.46	6.37
2	198.31	7582.2	260.38	5.99	7.75
3	33.88	1773.96	123.5	3.01	3.23
4	18.68	77.56	6.73	303.91	107.3
5	38.29	150.6	13.22	197.49	299.17
HBWHOV	1	2	3	4	5
1	3.21	36.58	0.39	0.33	0.36
2	9.44	328.74	11.95	0.38	0.46
3	1.59	80.64	5.52	0.2	0.2
4	1.13	4.88	0.45	13.52	4.82
5	2.19	8.93	0.83	8.86	13.11

Understanding Mode Choice Results

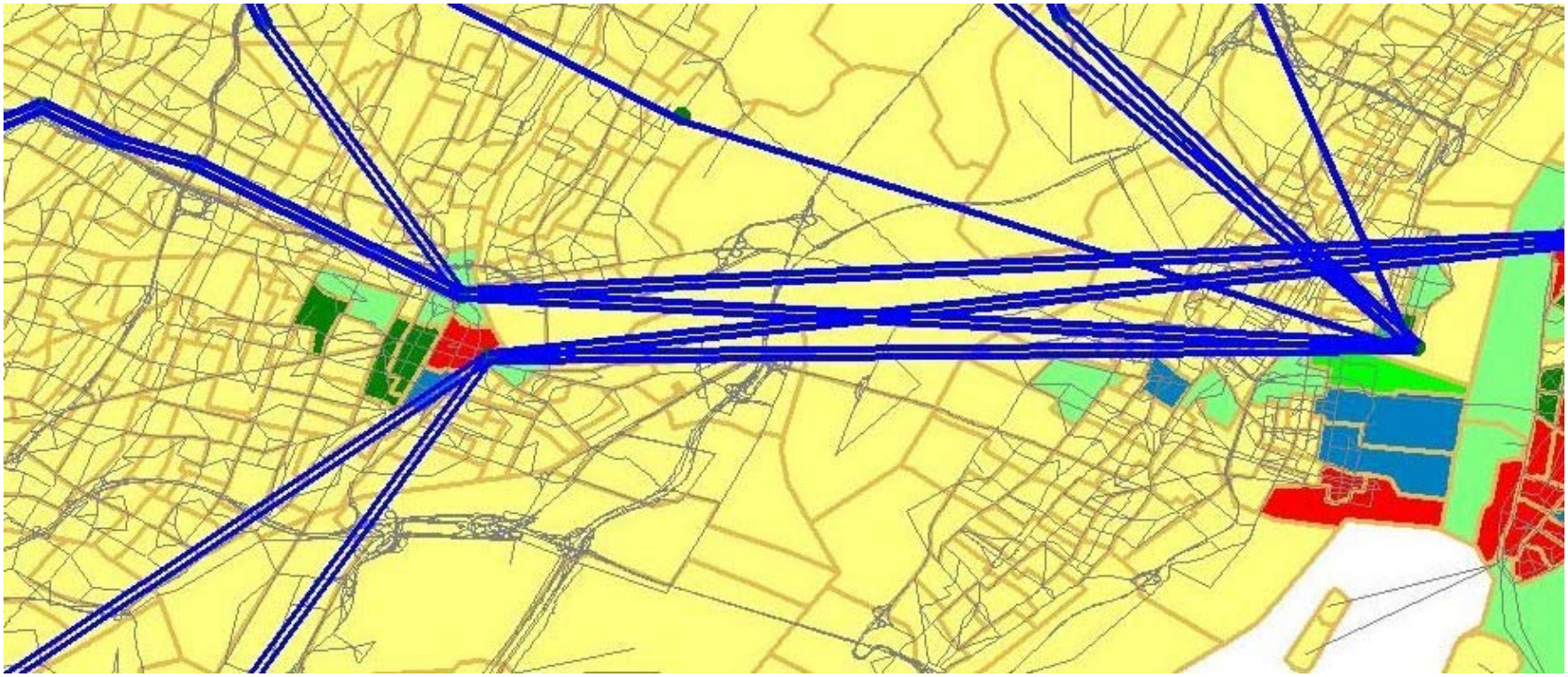
- Percent Walk Access Tables/Maps



Mountainside Twp.
(Zone 1784)

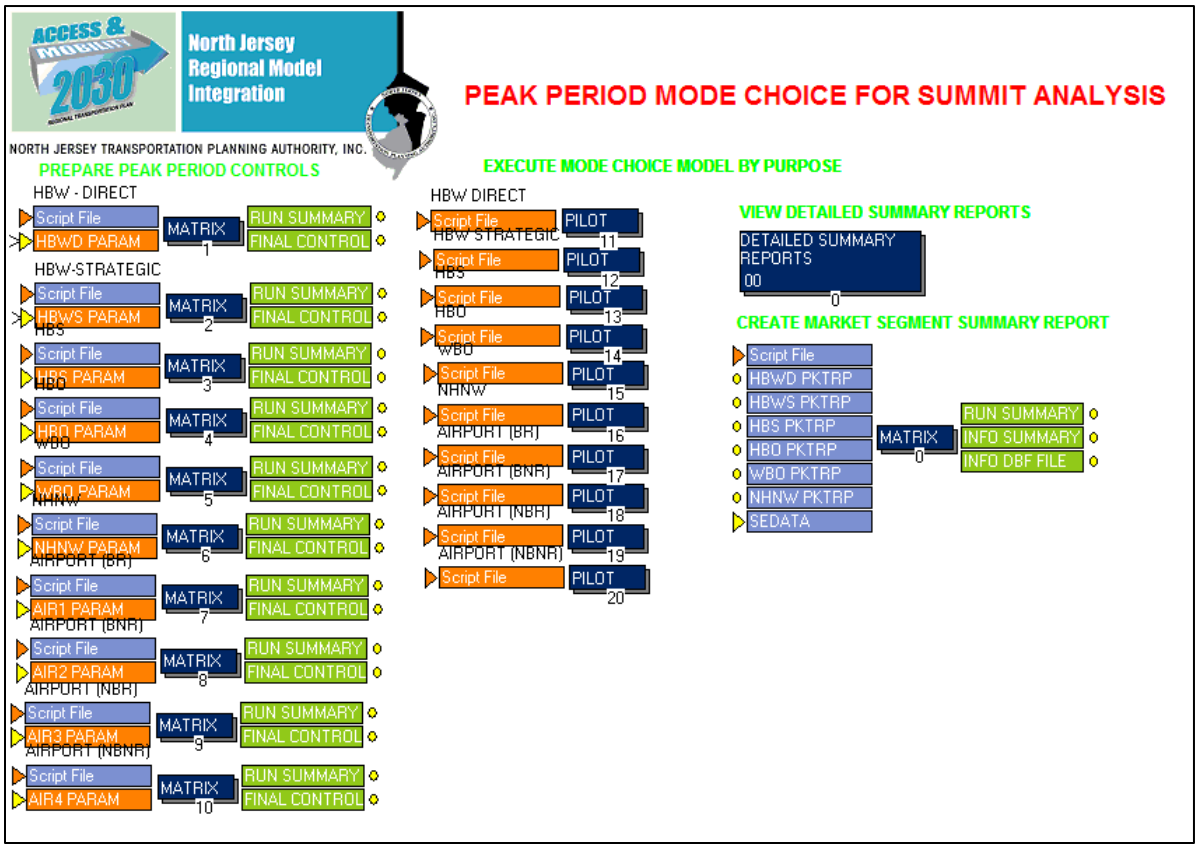
Understanding Mode Choice Results

- Thematic Map of Trip Ends Served by Transit



Understanding Mode Choice Results

- FTA SUMMIT Application
  - Convert Model Outputs to Summit-ready Inputs
  - Executes Fixed Trip Table Mode Choice for Work and Non-work Trips
  - Allows Mode Results to be Sent to SUMMIT Program for FTA Project Funding Requests



Presenting Transit Assignment

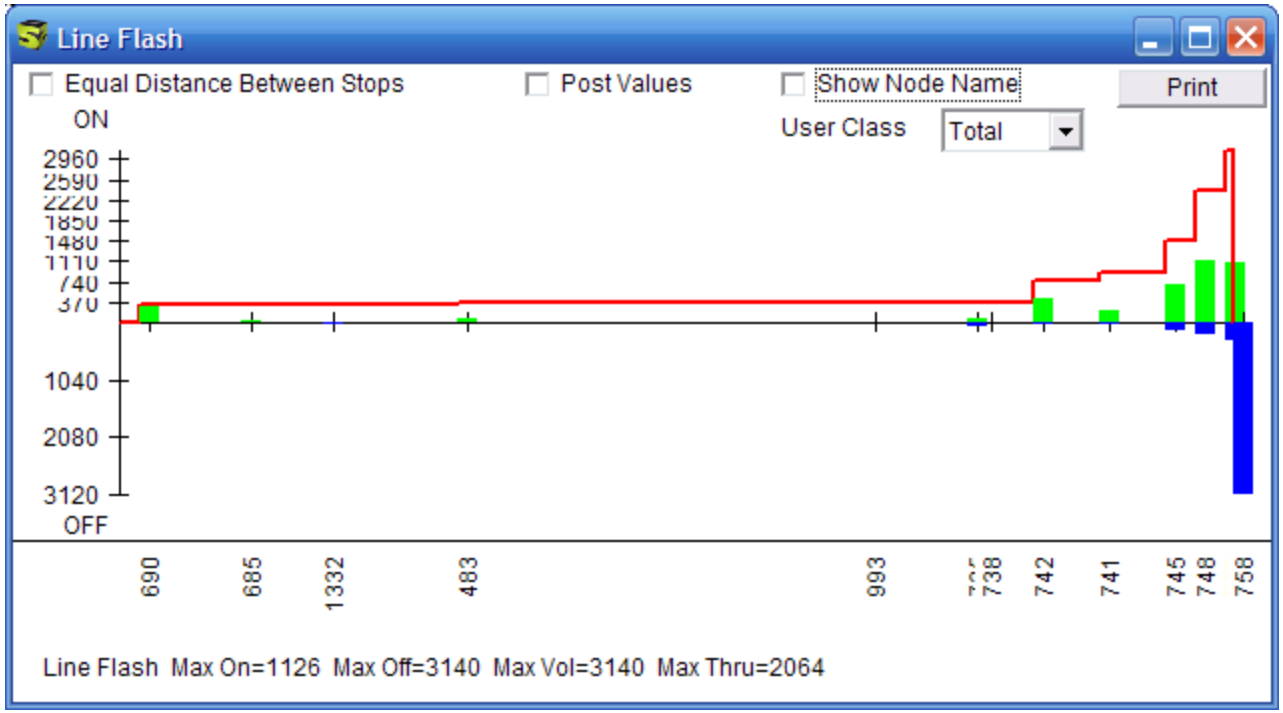
- Simple Tables of Boardings, Passenger Miles and other statistics by line/mode/operator

Train Ridership Comparison (Section of Northeast Corridor)

Station Name	Base	Scenario 3B	Ratio
Trenton	13,127	13,130	1.00
Hamiton	8,779	8,822	1.00
Princeton Junction	16,716	17,165	1.03
Jersey Ave	5,343	5,307	0.99
New Brunswick	13,059	12,845	0.98
Edison	6,369	6,391	1.00
Metuchen	4,802	4,779	1.00
Metropark	12,369	12,427	1.00
TOTAL	80,564	80,866	1.00

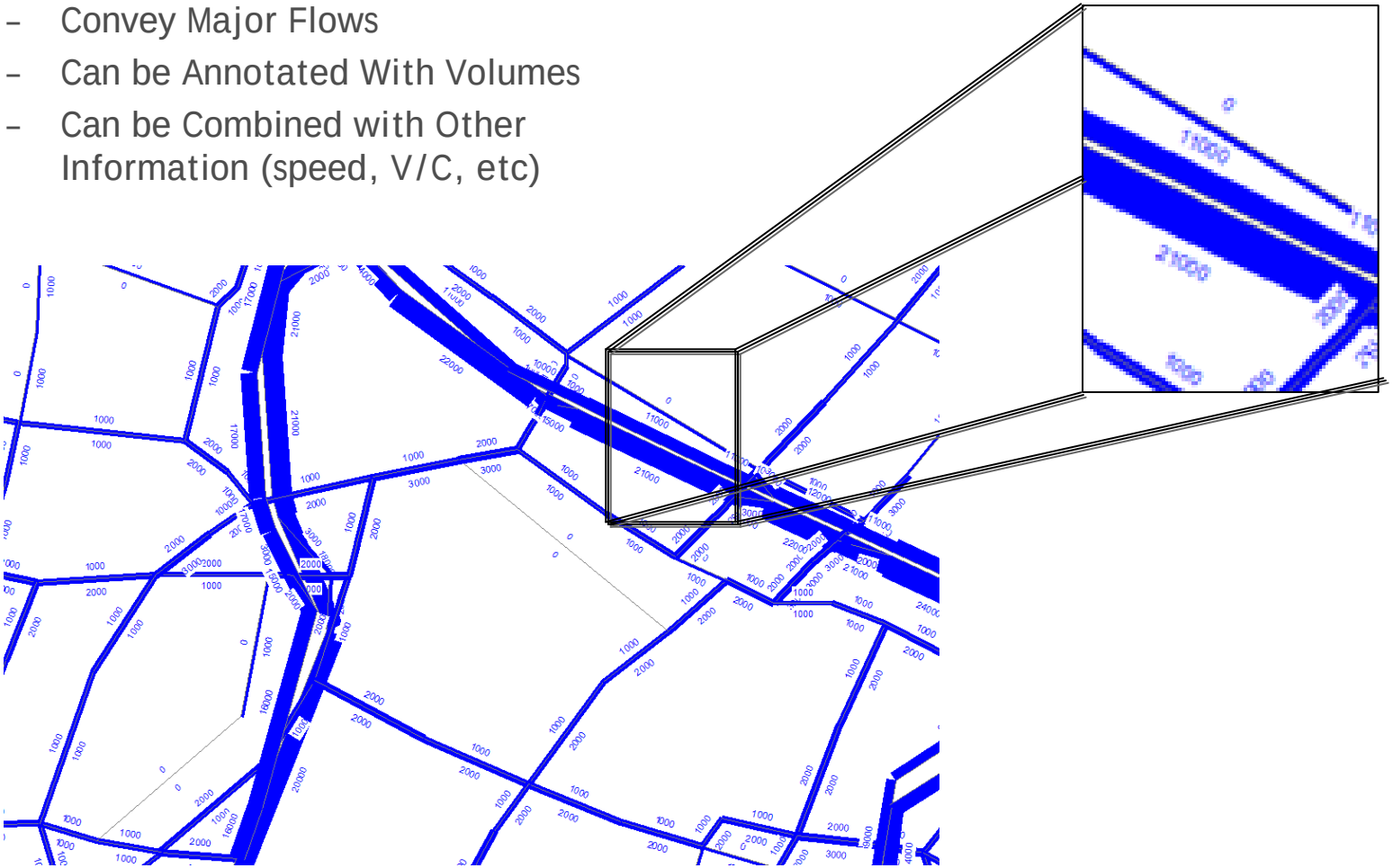
Presenting Transit Assignment

- Boardings and Alightings



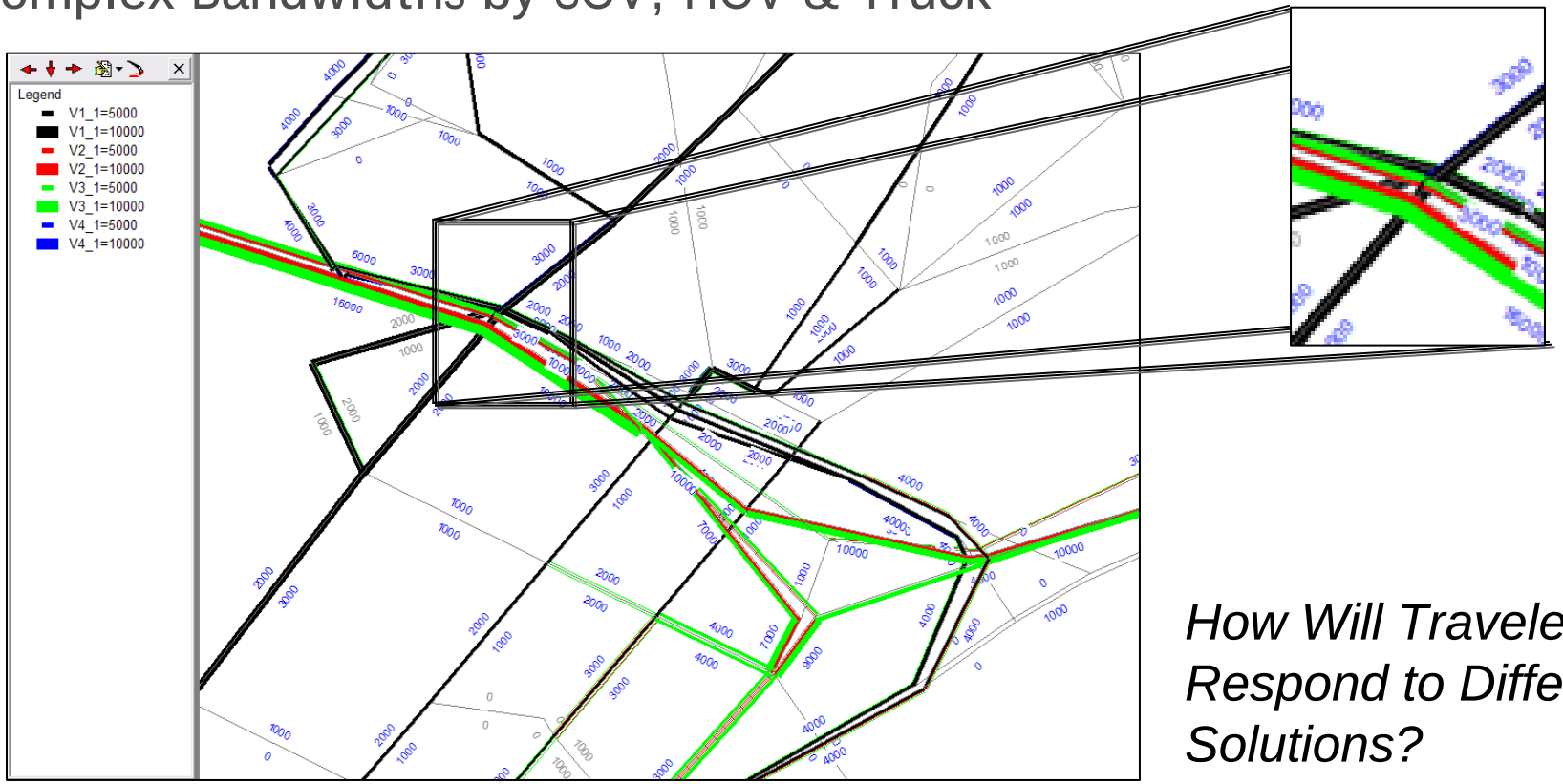
Presenting Highway Assignment

- Simple Bandwidths of volume
  - Convey Major Flows
  - Can be Annotated With Volumes
  - Can be Combined with Other Information (speed, V/C, etc)



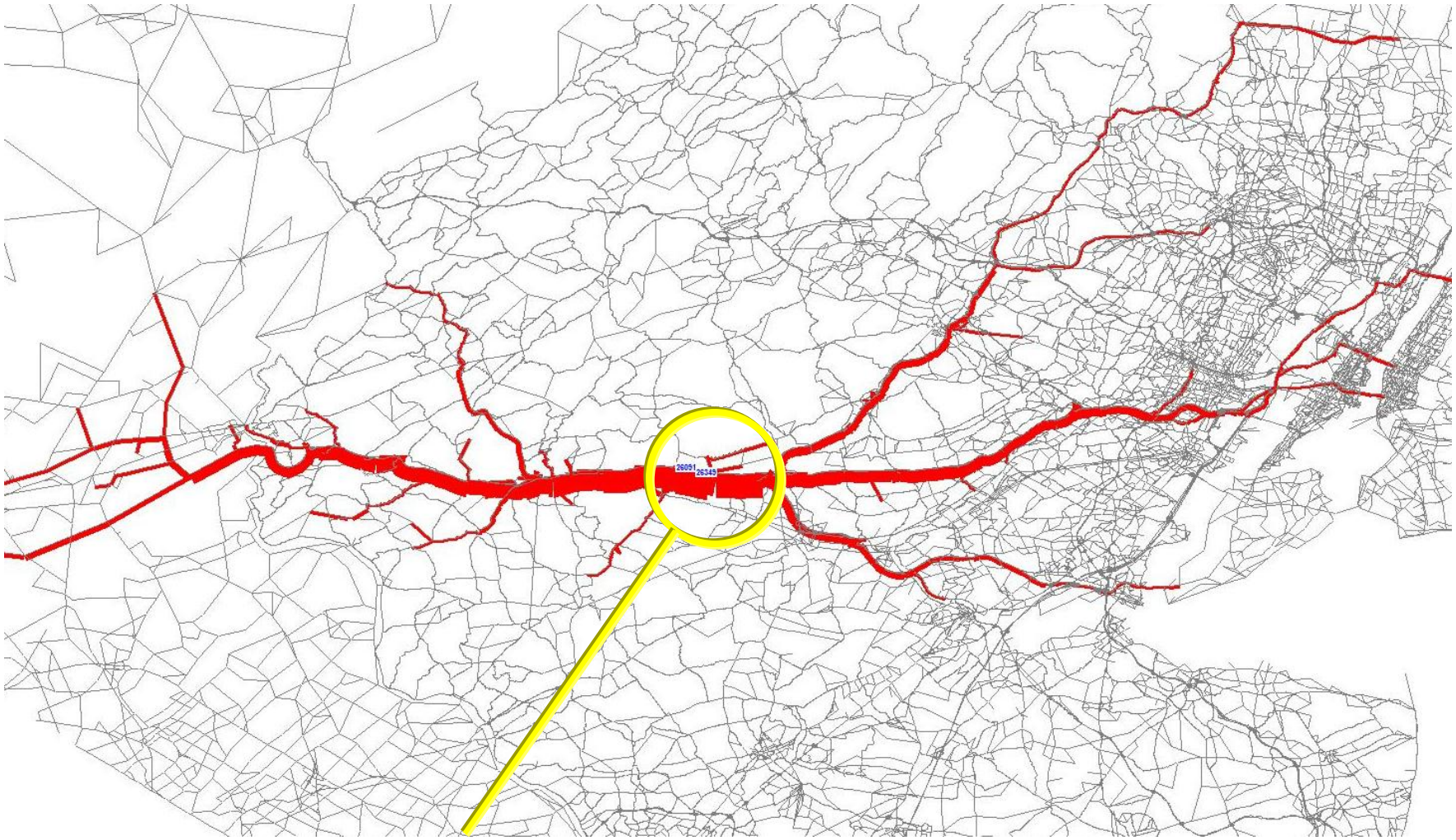
Presenting Highway Assignment

- Complex Bandwidths by SOV, HOV & Truck



How Will Travelers Respond to Different Solutions?

Presenting Highway Assignment



Select-Link for I-78 Just West of I-287

Presenting Highway Assignment

- Simple Systemwide Indicator Tables
  - VMT
  - VHT
  - Hours of Delay
  - Lane Miles by FT, Congestion, Travel Speed, etc

Other Output Display Options

- Beyond the Graphical Display Features in CUBE 5.0, users can:
  - Use of CUBE “Reports” Component to Summarize Data
  - Convert Networks to Shape Files for Display in ARC Software
  - Export Tabular Summary Data to EXCEL

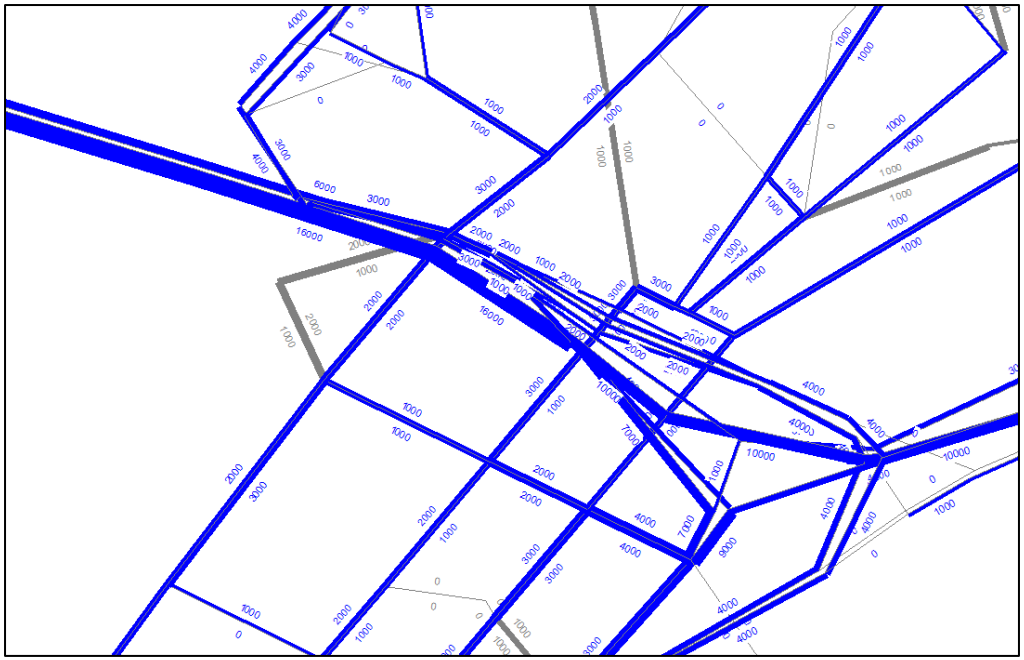
Scenario 1 Summary Tables

		Existing Development	Redevelopment Plan
		Year 2020 Base	Scenario 1
Total Productions		46,659	82,189
Non-Motorized	Trips	7,820	17,860
	%	16.8%	21.7%
Motorized	Productions	38,857	64,139
	Attractions	33,317	104,884
Intra-Zonal(All Modes)	Trips	12,186	28,662
	%	26.1%	34.9%
Avg Trip Length (prod)	Peak Skim	5.43	5.60
	Off-Peak Skim	5.25	5.44
Avg Trip Length (attr)	Peak Skim	11.11	13.00
	Off-Peak Skim	10.45	12.29
Transit	**Production**	7,986	11,598
	%	17.1%	14.1%
	Attraction	1,712	6,839
	%	3.7%	8.3%
Ridership	33A1	326	4,711
	99A1	3,113	13,058
	SAP12	14,752	14,329
	Total	18,191	32,098

Note: Route SAP12 has no change to schedule.

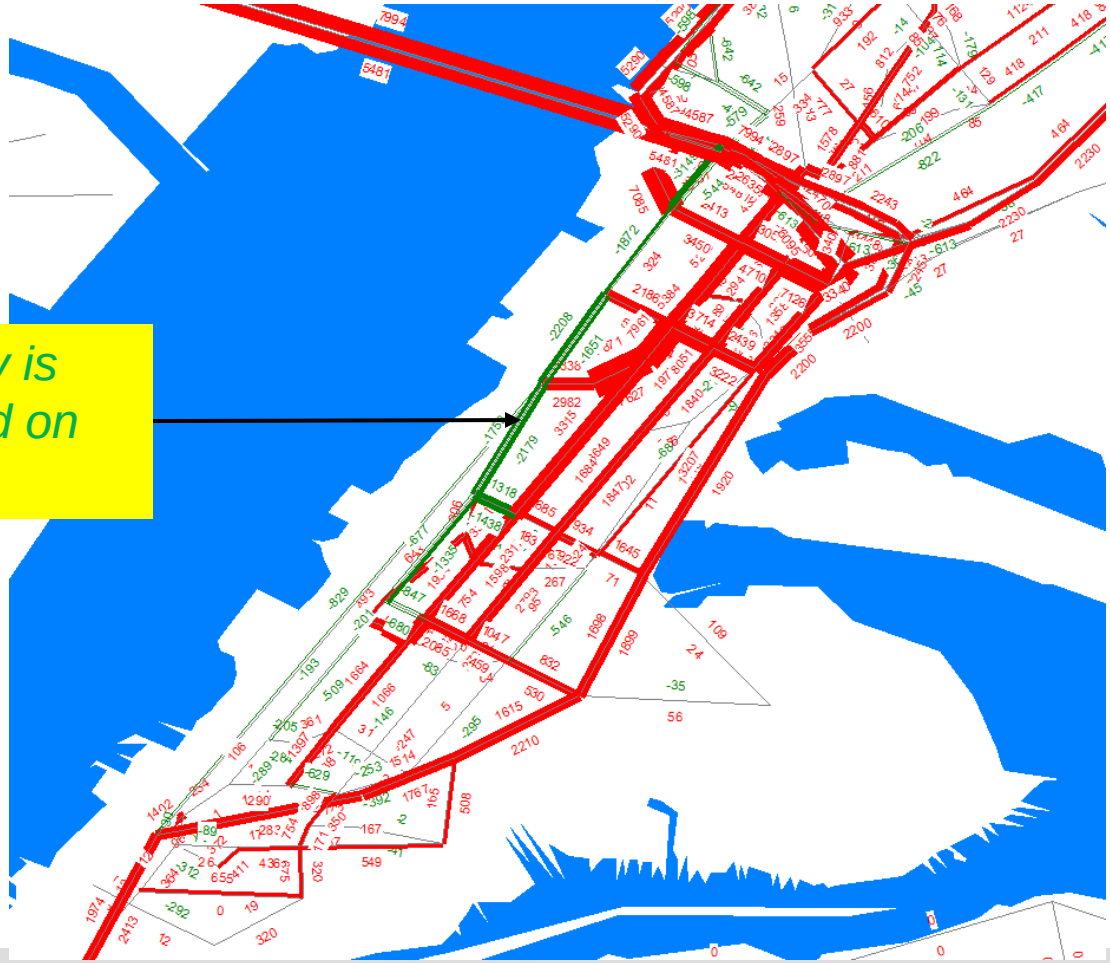
Presenting Highway Assignment

- Raw Model Volumes Map



Scenario 1- Change in Traffic

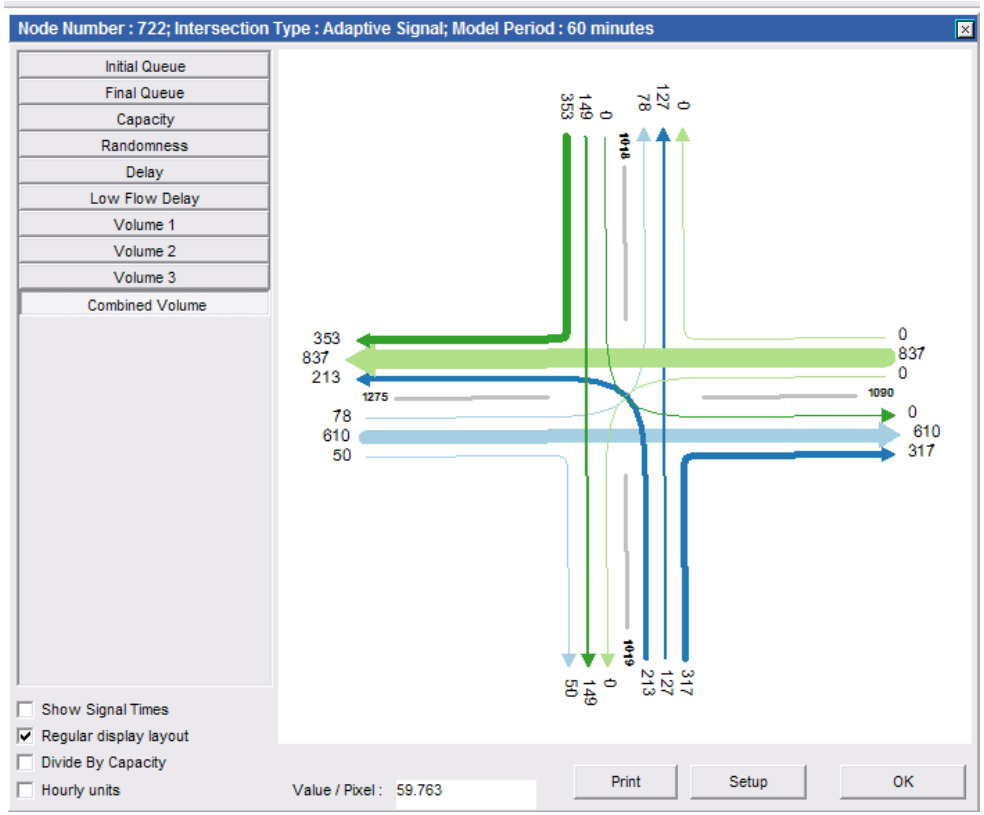
Question Why is traffic reduced on JFK Blvd. ?



Scenario 1- Change in Peak Transit Trips

Presenting Highway Assignment

- Turning Movement Diagrams
  - Show Total Volumes (Raw)
  - Show Volumes by Mode



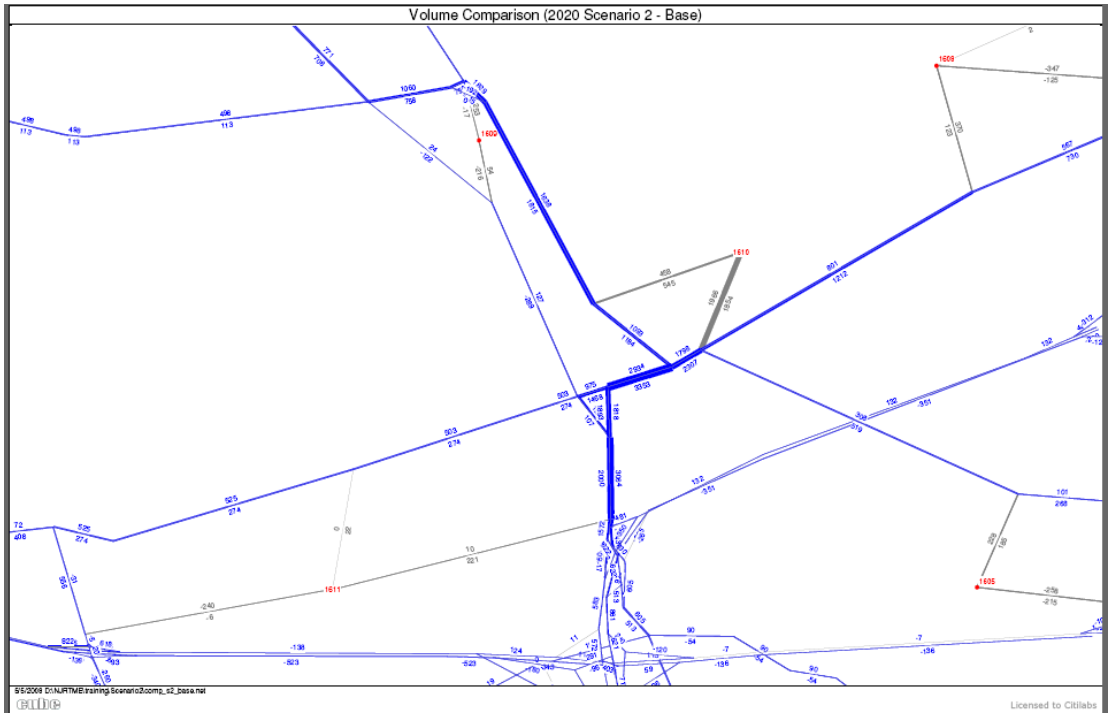
Scenario 2 Summary Tables

Transit Ridership Comparison

	Base	Scenario 2	Ratio
TB1A1	290	221	0.76
TB3A1	374	286	0.76
Train Stations			
Gladstone	1,675	1,462	0.87
Peapack	208	164	0.79
Far Hills	1,054	1,267	1.20
Bernardsville	953	1,194	1.25
Basking Ridge	483	562	1.16
Lyons	1,083	1,321	1.22
Millington	398	911	2.29
Stirling	439	554	1.26
Gilette	536	652	1.22
Berkeley Heights	1,774	2,206	1.24
Murray Hill	855	1,050	1.23
New Providence	1,736	2,066	1.19
TOTAL	11,858	13,916	1.17

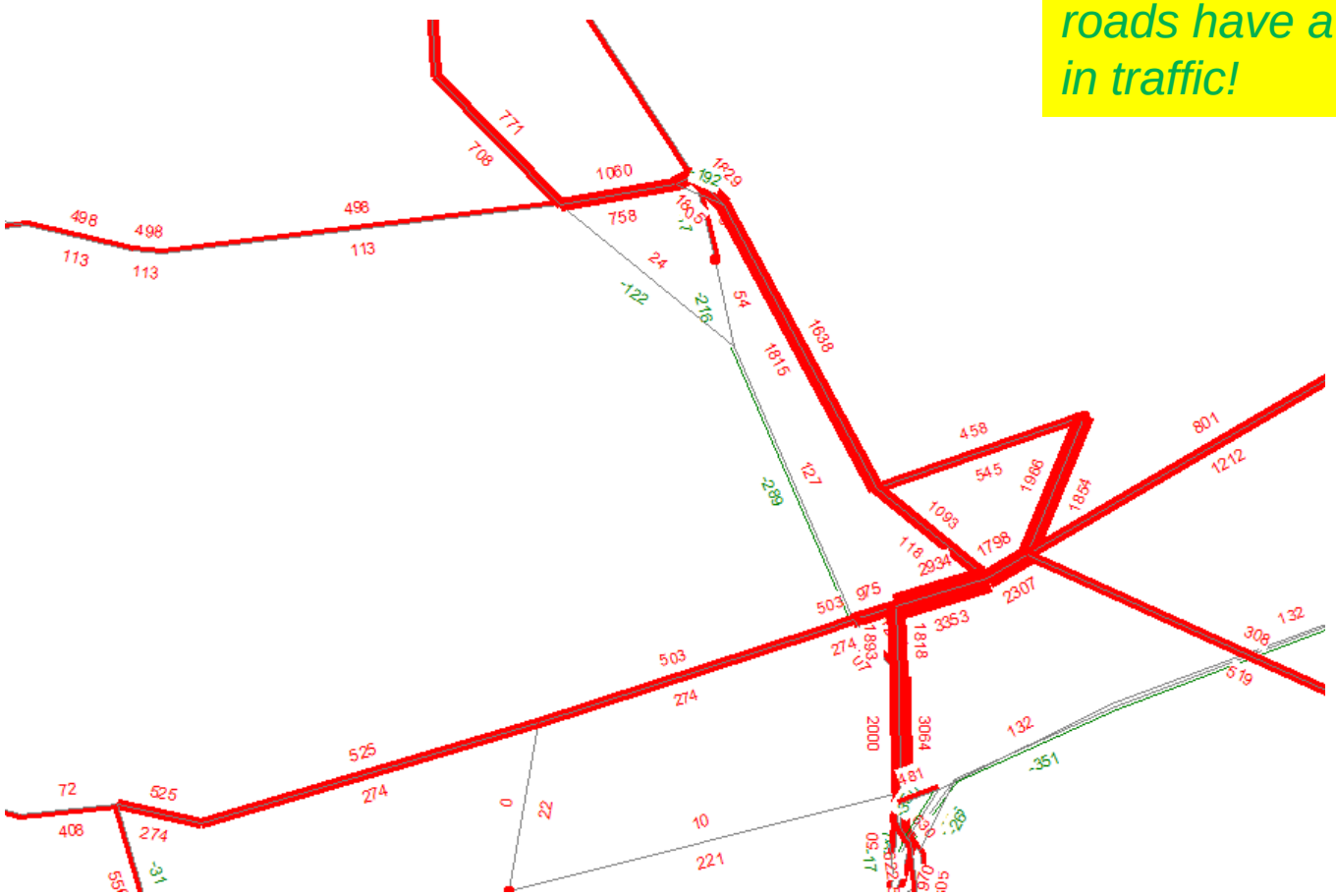
Presenting Highway Assignment

- Raw Model Volumes Map

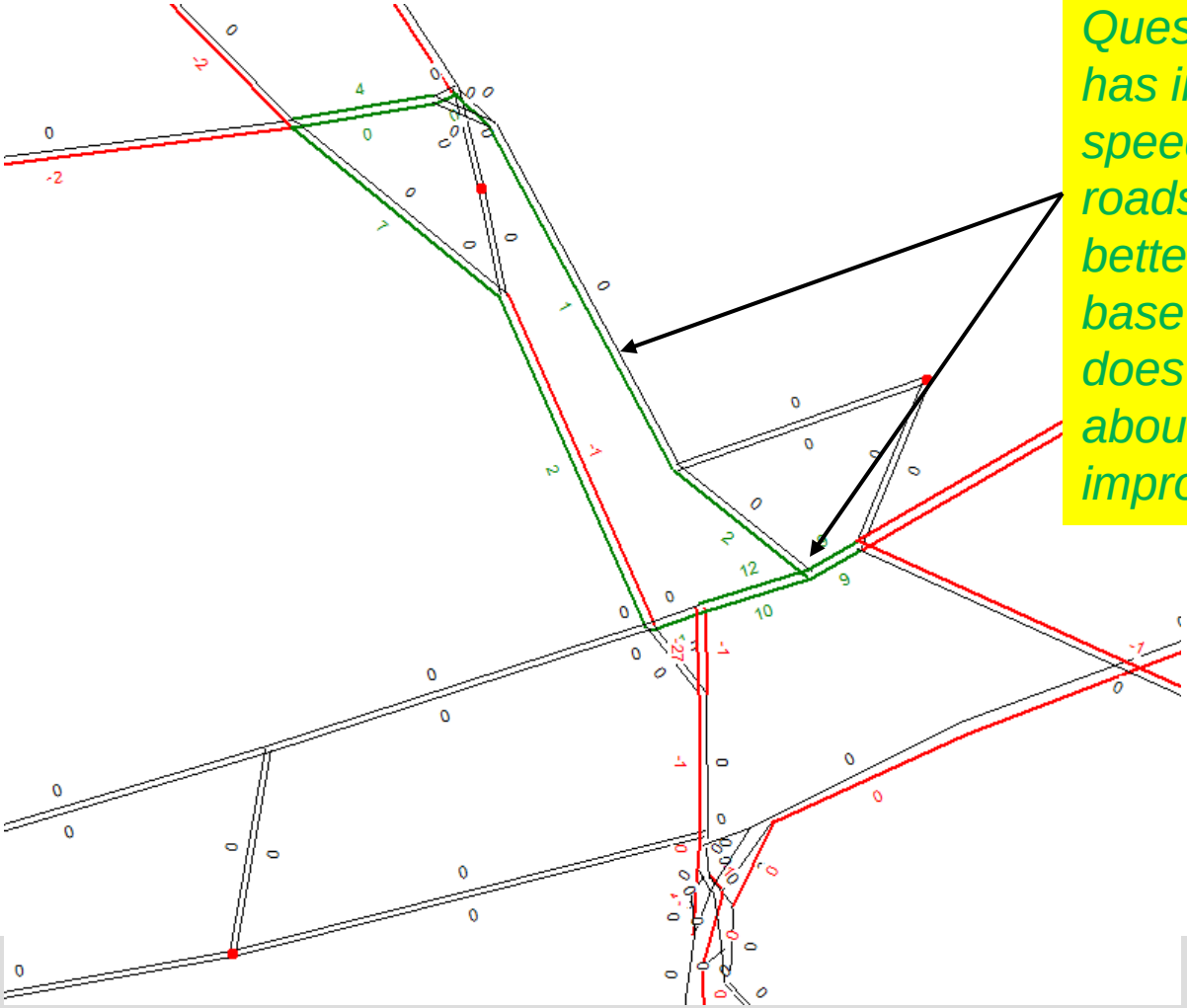


Scenario 2- Change in Traffic

Note that most roads have a gain in traffic!

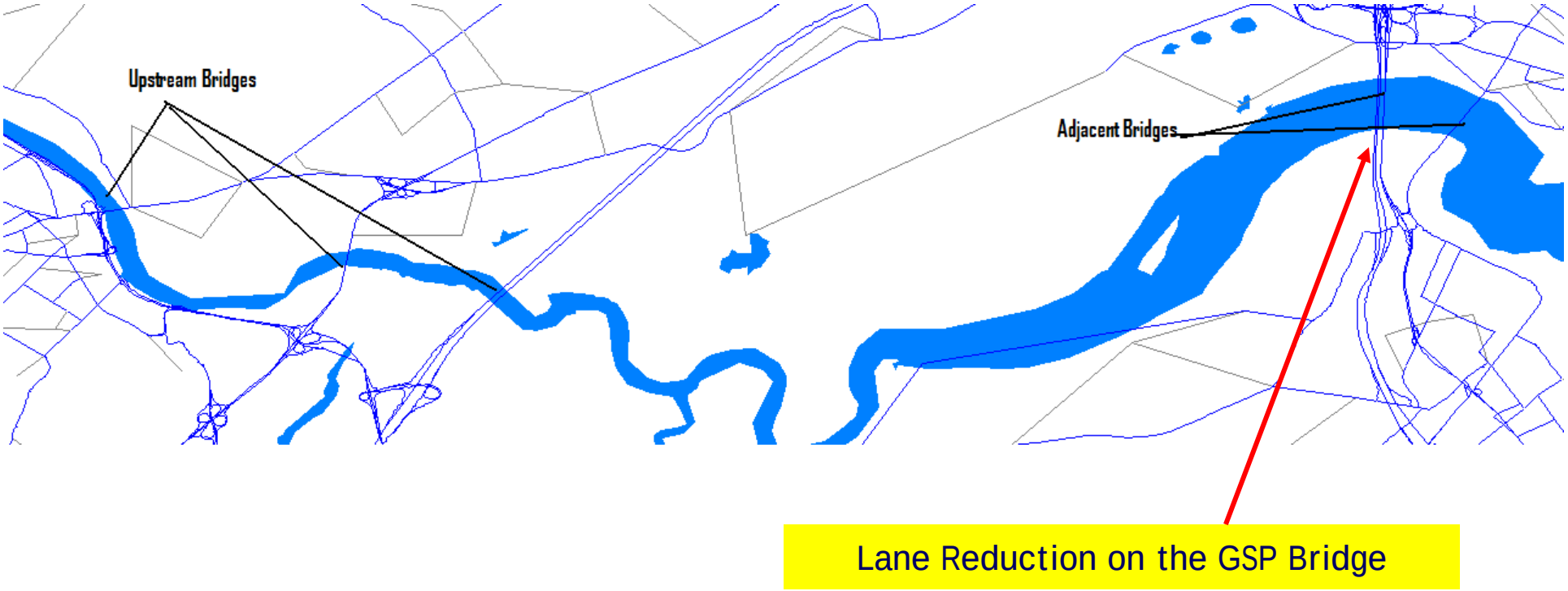


Scenario 2- Change in AM Peak Speed



Question: If traffic has increased and speeds on adjacent roads are similar or better than the base case, what does that indicate about the proposed improvements?

Scenario 3A- Raritan River Screenline



Scenario 3A- Change in Traffic (Adjacent Bridges)

GSP

	SOV			HOV			HOV/SOV	
SOV	Base	Scenario 3A	Ratio	Base	Scenario 3A	Ratio	Base	Scenario 3A
AM	52,691	50,336	0.96	13,099	12,635	0.96	24.9%	25.1%
PM	56,683	54,765	0.97	16,072	15,552	0.97	28.4%	28.4%
OP	108,549	108,611	1.00	38,661	38,619	1.00	35.6%	35.6%
TOTAL	217,923	213,713	0.98	67,833	66,807	0.98	31.1%	31.3%

US 9

	SOV			HOV			HOV/SOV	
SOV	Base	Scenario 3A	Ratio	Base	Scenario 3A	Ratio	Base	Scenario 3A
AM	22,761	24,556	1.08	5,524	5,814	1.05	24.3%	23.7%
PM	23,256	24,472	1.05	5,922	6,312	1.07	25.5%	25.8%
OP	25,486	25,472	1.00	9,048	9,044	1.00	35.5%	35.5%
TOTAL	71,502	74,500	1.04	20,494	21,170	1.03	28.7%	28.4%

NJ-35

	SOV			HOV			HOV/SOV	
SOV	Base	Scenario 3A	Ratio	Base	Scenario 3A	Ratio	Base	Scenario 3A
AM	5,667	5,790	1.02	1,455	1,487	1.02	25.7%	25.7%
PM	8,366	8,629	1.03	2,378	2,340	0.98	28.4%	27.1%
OP	3,320	3,319	1.00	867	867	1.00	26.1%	26.1%
TOTAL	17,353	17,739	1.02	4,700	4,694	1.00	27.1%	26.5%

Question: What can we say about lack of diversion to NJ 35 Bridge?

Scenario 3A- Change in Traffic (Up Stream Bridges)

NJTPK

	SOV			HOV			HOV/SOV	
SOV	Base	Scenario 3A	Ratio	Base	Scenario 3A	Ratio	Base	Scenario 3A
AM	38,092	38,221	1.00	11,208	11,261	1.00	29.4%	29.5%
PM	43,918	44,411	1.01	13,198	13,313	1.01	30.1%	30.0%
OP	64,178	64,178	1.00	23,167	23,166	1.00	36.1%	36.1%
TOTAL	146,188	146,809	1.00	47,573	47,740	1.00	32.5%	32.5%

US-1

	SOV			HOV			HOV/SOV	
SOV	Base	Scenario 3A	Ratio	Base	Scenario 3A	Ratio	Base	Scenario 3A
AM	20,958	21,083	1.01	3,537	3,568	1.01	16.9%	16.9%
PM	24,412	24,177	0.99	4,688	4,679	1.00	19.2%	19.4%
OP	35,343	35,344	1.00	8,668	8,667	1.00	24.5%	24.5%
TOTAL	80,712	80,604	1.00	16,893	16,914	1.00	20.9%	21.0%

NJ-27

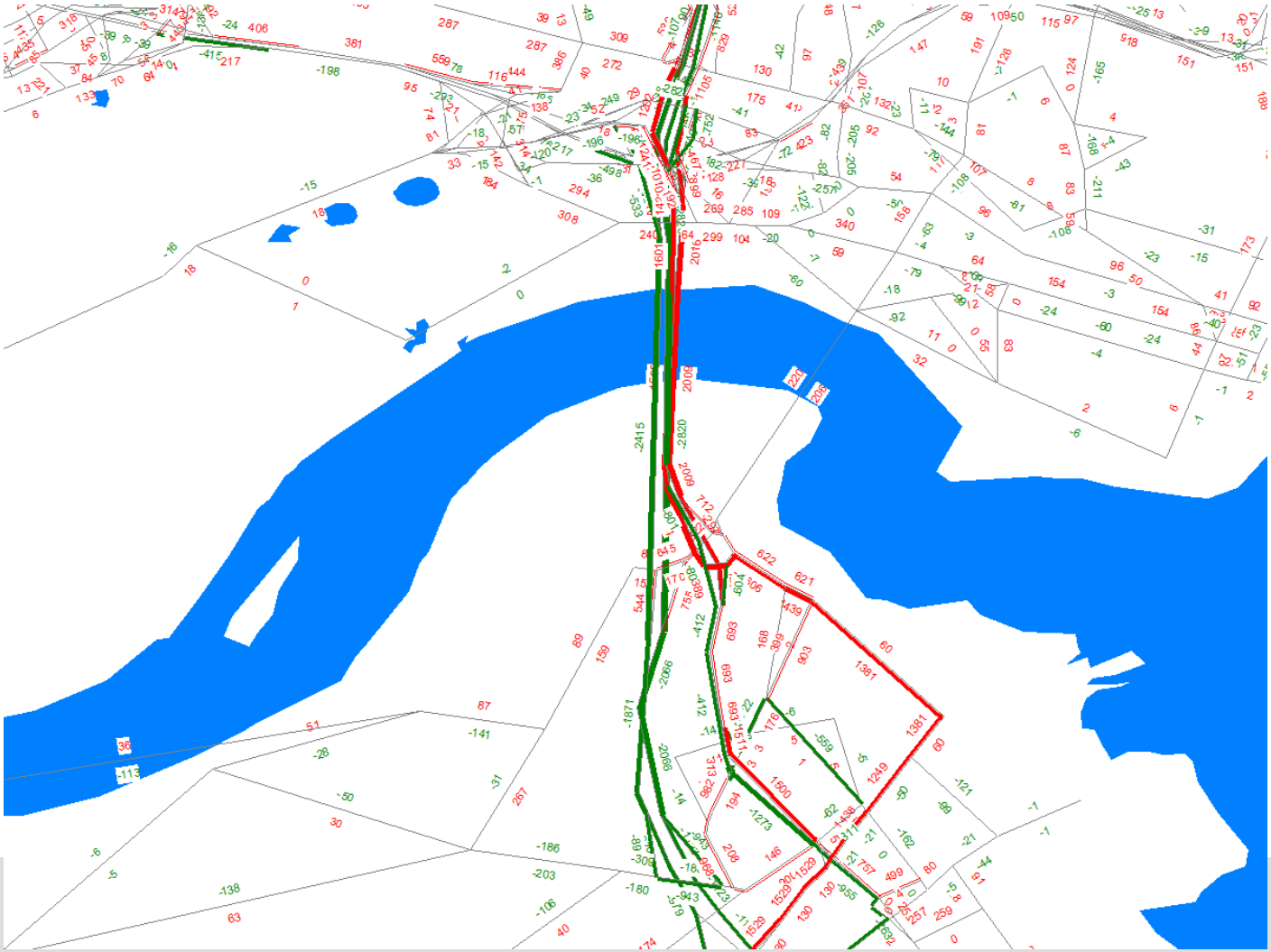
	SOV			HOV			HOV/SOV	
SOV	Base	Scenario 3A	Ratio	Base	Scenario 3A	Ratio	Base	Scenario 3A
AM	7,645	7,611	1.00	1,385	1,390	1.00	18.1%	18.3%
PM	8,301	8,304	1.00	1,843	1,847	1.00	22.2%	22.2%
OP	16,497	16,494	1.00	4,564	4,564	1.00	27.7%	27.7%
TOTAL	32,443	32,409	1.00	7,793	7,801	1.00	24.0%	24.1%

Total

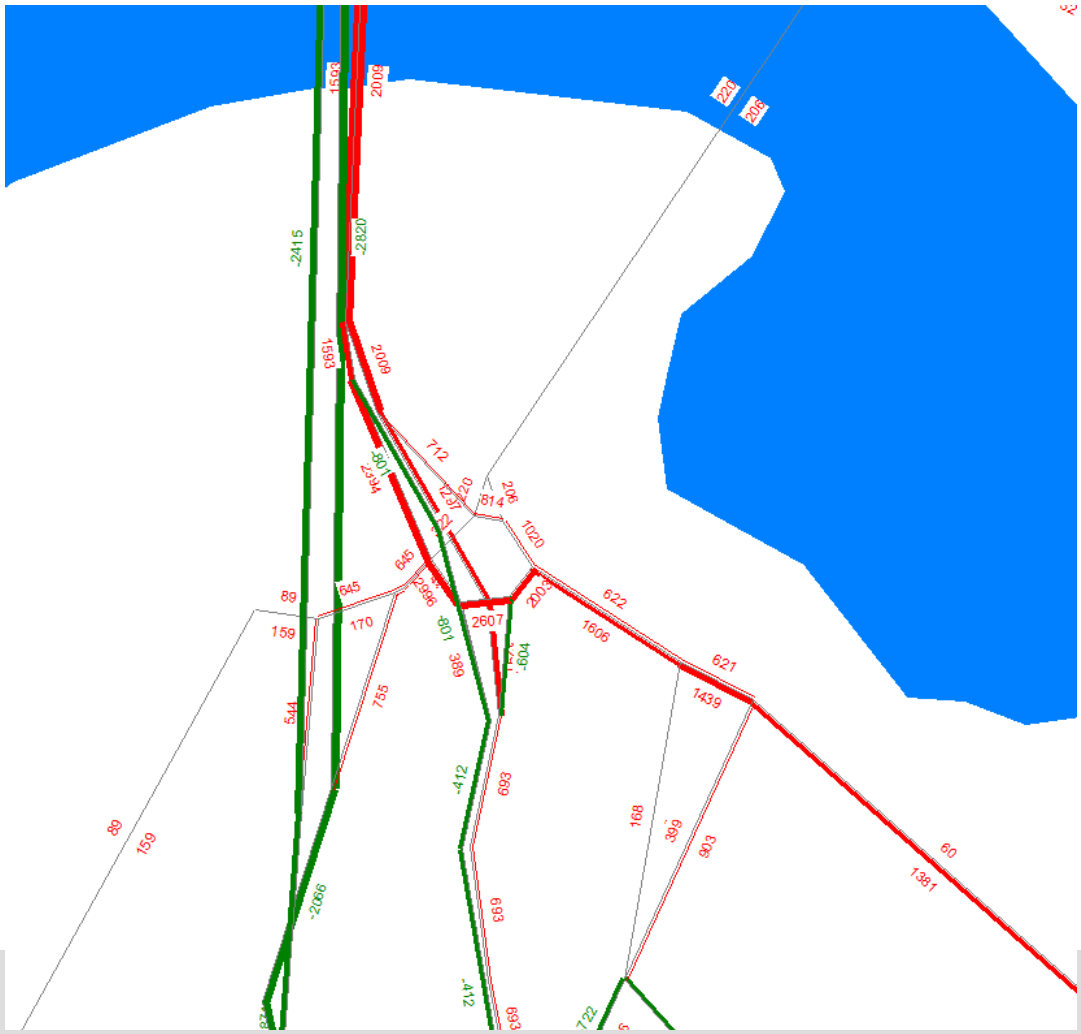
	SOV			HOV			HOV/SOV	
SOV	Base	Scenario 3A	Ratio	Base	Scenario 3A	Ratio	Base	Scenario 3A
AM	147,813	147,598	1.00	36,209	36,155	1.00	24.5%	24.5%
PM	164,935	164,759	1.00	44,101	44,043	1.00	26.7%	26.7%
OP	253,372	253,418	1.00	84,975	84,928	1.00	33.5%	33.5%
TOTAL	566,120	565,775	1.00	165,285	165,127	1.00	29.2%	29.2%

Question: Did we expect any changes on the bridges?

Case Study #3A- Change in Traffic



Scenario 3A- Change in Traffic (Inset)



Scenario 3A- Change in AM Peak Speed

Note:

AM peak speed reduced by 11 MPH for link with lane reduction.

Scenario 3A Summary Tables

Person Trips By Mode

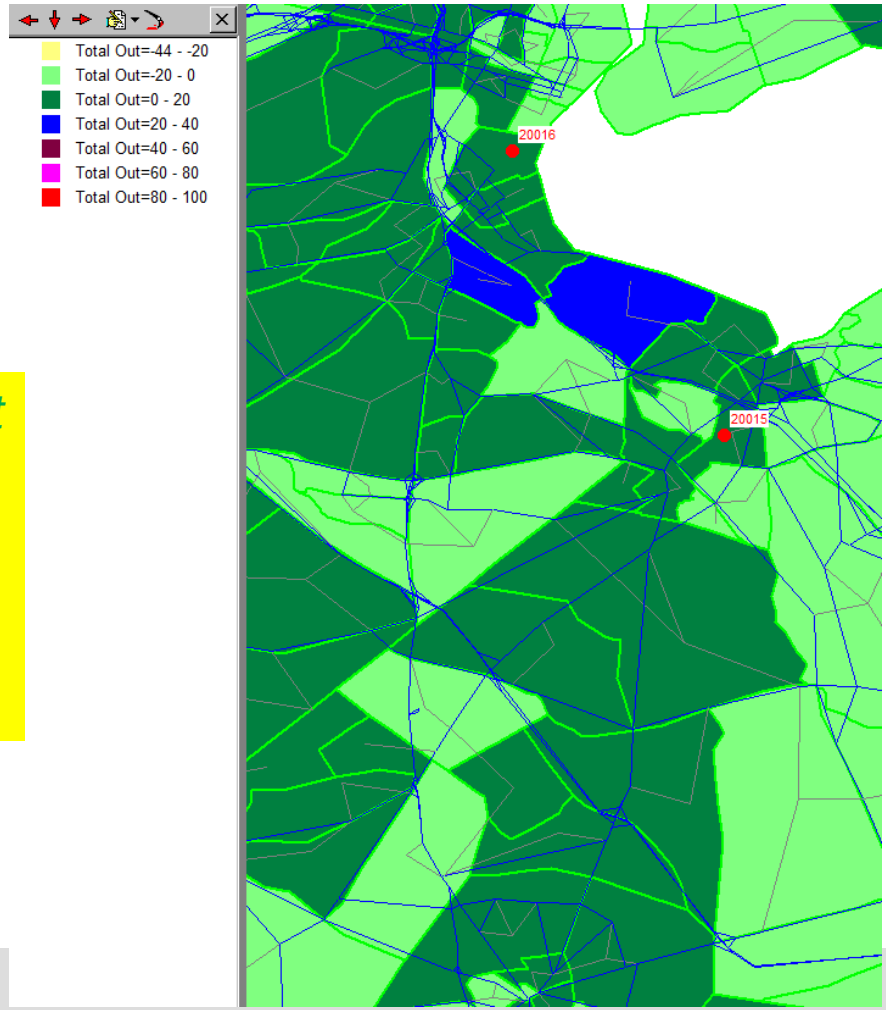
Mode	Daily			Peak			Off-Peak		
	Base	**Scenario 3A**	**Ratio**	**Base**	**Scenario 3A**	**Ratio**	**Base**	**Scenario 3A**	**Ratio**
SOV	18,447,056	18,447,402	100.0%	10,344,930	10,345,288	100.0%	8,102,126	8,102,113	100.0%
HOV2	7,932,813	7,932,767	100.0%	4,330,825	4,330,785	100.0%	3,601,987	3,601,982	100.0%
HOV3	2,784,673	2,784,604	100.0%	1,441,021	1,440,954	100.0%	1,343,653	1,343,649	100.0%
HOV4	2,190,333	2,190,220	100.0%	1,438,478	1,438,366	100.0%	751,855	751,854	100.0%
Auto	31,354,875	31,354,992	100.0%	17,555,255	17,555,393	100.0%	13,799,620	13,799,599	100.0%
Wk-Rail	106,765	106,755	100.0%	77,420	77,409	100.0%	29,345	29,345	100.0%
Wk-PATH	217,315	217,136	99.9%	152,677	152,501	99.9%	64,638	64,635	100.0%
Wk-Bus	544,446	544,478	100.0%	350,686	350,693	100.0%	193,760	193,785	100.0%
Wk-Ferry	157,872	157,877	100.0%	99,807	99,813	100.0%	58,065	58,065	100.0%
Wk-LRT	22,327	22,106	99.0%	16,954	16,733	98.7%	5,373	5,373	100.0%
Wk-Long Ferry	154	154	100.0%	154	154	100.0%	0	0	NA
Dr-Rail	260,320	260,974	100.3%	226,104	226,758	100.3%	34,216	34,216	100.0%
Dr-PATH	56,436	56,474	100.1%	33,533	33,570	100.1%	22,903	22,903	100.0%
Dr-Bus	112,527	112,131	99.6%	73,064	72,668	99.5%	39,462	39,462	100.0%
Dr-Ferry	44,446	44,388	99.9%	28,392	28,334	99.8%	16,054	16,054	100.0%
Dr-LRT	5,480	5,491	100.2%	4,320	4,331	100.3%	1,160	1,160	100.0%
Dr-Long Ferry	2,896	2,904	100.3%	2,896	2,904	100.3%	0	0	NA
Transit	1,530,985	1,530,868	100.0%	1,066,007	1,065,869	100.0%	464,977	464,999	100.0%
TOTAL	32,885,860	32,885,860	100.0%	18,621,262	18,621,262	100.0%	14,264,598	14,264,598	100.0%

Scenario 3A Summary Tables

Train Ridership Comparison

	Base	Scenario 3A	Ratio
Bay Head	885	889	1.00
Pt Pleasant Beach	2,376	2,372	1.00
Manasquan	1,811	1,814	1.00
Spring Lake	1,867	1,872	1.00
Belmar	1,083	1,086	1.00
Bradley Beach	1,799	1,804	1.00
Asbury Park	1,784	1,786	1.00
Allenhurst	294	294	1.00
Elberon	1,246	1,245	1.00
SUBTOTAL	13,145	13,162	1.00
Long Branch	4,592	4,598	1.00
Little Silver	4,615	4,603	1.00
Red Bank	4,340	4,337	1.00
Middletown	6,953	6,967	1.00
Hazlet	4,661	4,696	1.01
Matawan	16,378	17,047	1.04
South Amboy	4,914	5,813	1.18
Perth Amboy	3,123	3,125	1.00
Woodbridge	3,550	3,556	1.00
Avenal	486	489	1.01
SUBTOTAL	53,612	55,231	1.03
GRAND TOTAL	66,757	68,393	1.02

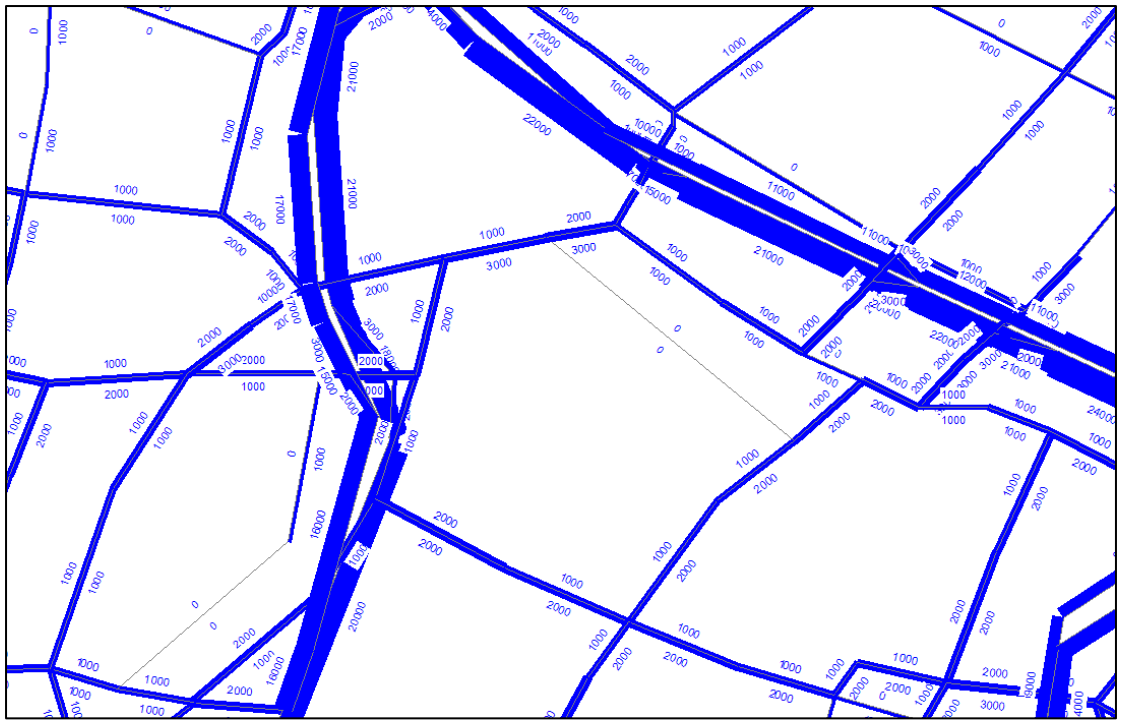
Scenario 3A- Change in Peak Transit Trips (Out)



Note gains in transit trip ends south of the Raritan River and served by NJT Coastline and Bus Routes.

Presenting Highway Assignment

- Raw Model Volumes Map



Scenario 3B Summary Tables

Transit Ridership Comparison (Princeton Related)			
	Base	Scenario 3B	Ratio
605A12R	55	51	0.93
605A12	51	43	0.84
SUX8AK1	2,389	2,391	1.00
SUX8AK2	270	282	1.04
606A12	1,921	1,999	1.04
606B12	723	742	1.03
606A12R	1,016	980	0.96
606B12R	509	512	1.01
SU4B1	220	224	1.02
SU4D2	183	181	0.99
SUPTD2	904	902	1.00
SUPTD1	1,047	1,045	1.00
SUPTA1	335	336	1.00
Total	9,623	9,688	1.01

Scenario 3B Summary Tables

Train Ridership Comparison (Section of Northeast Corridor)

Station Name	Base	Scenario 3B	Ratio
Trenton	13,127	13,130	1.00
Hamiton	8,779	8,822	1.00
Princeton Junction	16,716	17,165	1.03
Jersey Ave	5,343	5,307	0.99
New Brunswick	13,059	12,845	0.98
Edison	6,369	6,391	1.00
Metuchen	4,802	4,779	1.00
Metropark	12,369	12,427	1.00
TOTAL	80,564	80,866	1.00

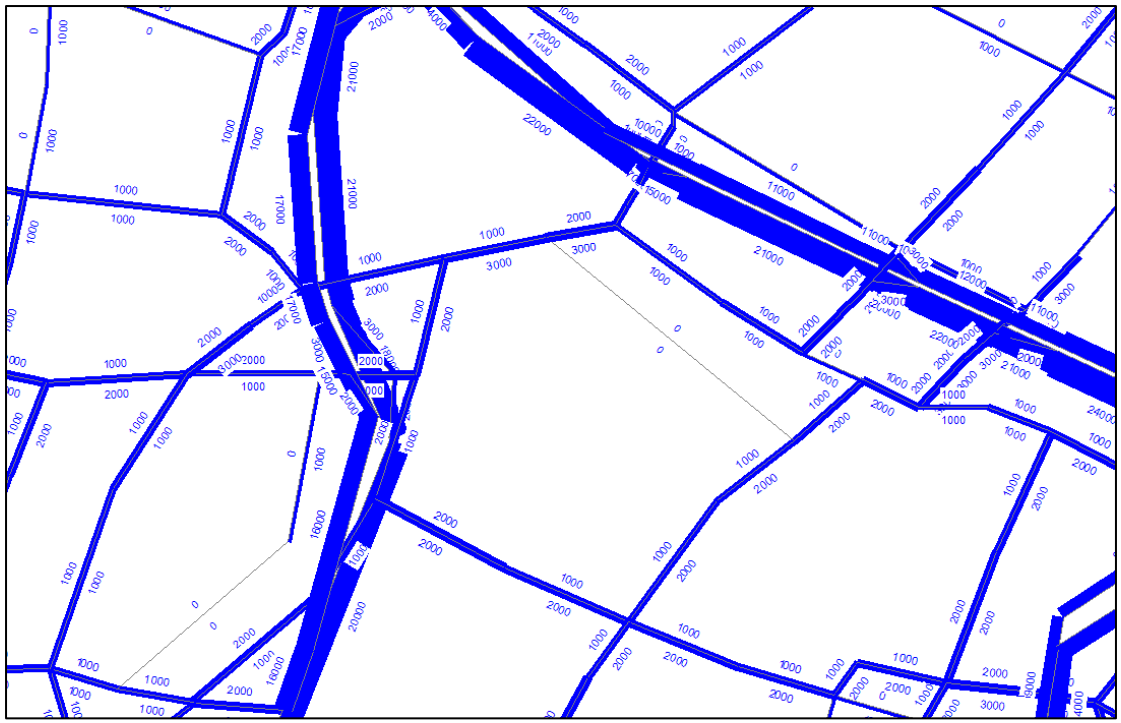
Scenario 3B Summary Tables

Person Trips By Mode

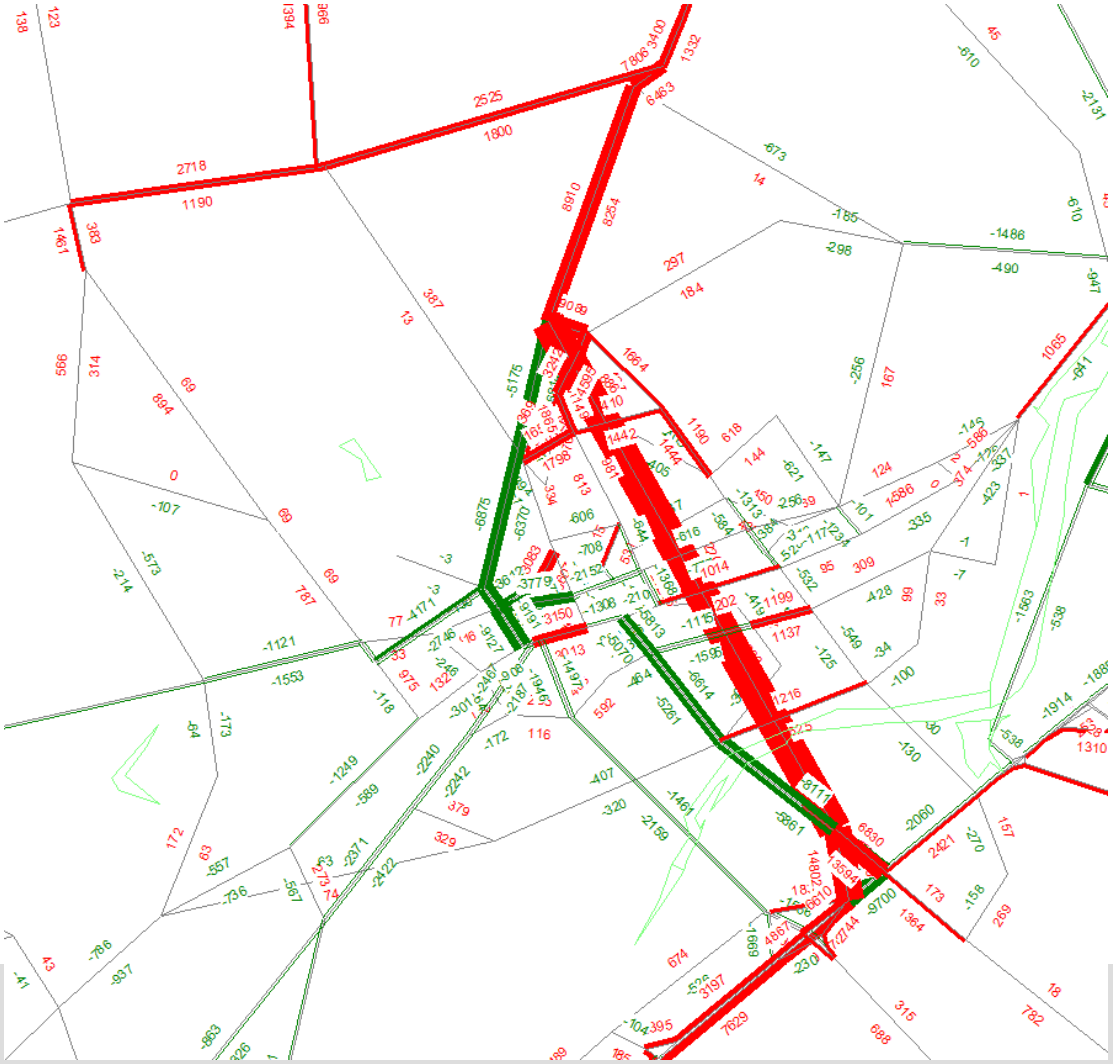
	Daily			Peak			Off-Peak		
Mode	Base	Scenario 3B	Ratio	Base	Scenario 3B	Ratio	Base	Scenario 3B	Ratio
SOV	18,447,056	18,446,151	100.0%	10,344,930	10,344,062	100.0%	8,102,126	8,102,089	100.0%
HOV2	7,932,813	7,932,308	100.0%	4,330,825	4,330,356	100.0%	3,601,987	3,601,952	100.0%
HOV3	2,784,673	2,785,080	100.0%	1,441,021	1,441,440	100.0%	1,343,653	1,343,640	100.0%
HOV4	2,190,333	2,190,633	100.0%	1,438,478	1,438,789	100.0%	751,855	751,844	100.0%
Auto	31,354,875	31,354,172	100.0%	17,555,255	17,554,647	100.0%	13,799,620	13,799,525	100.0%
Wk-Rail	106,765	107,060	100.3%	77,420	77,708	100.4%	29,345	29,352	100.0%
Wk-PATH	217,315	217,817	100.2%	152,677	153,179	100.3%	64,638	64,638	100.0%
Wk-Bus	544,446	543,322	99.8%	350,686	349,564	99.7%	193,760	193,758	100.0%
Wk-Ferry	157,872	158,115	100.2%	99,807	100,051	100.2%	58,065	58,065	100.0%
Wk-LRT	22,327	22,971	102.9%	16,954	17,598	103.8%	5,373	5,373	100.0%
Wk-Long Ferry	154	154	100.0%	154	154	100.0%	0	0	NA
Dr-Rail	260,320	261,535	100.5%	226,104	227,211	100.5%	34,216	34,324	100.3%
Dr-PATH	56,436	54,909	97.3%	33,533	32,022	95.5%	22,903	22,886	99.9%
Dr-Bus	112,527	112,975	100.4%	73,064	73,513	100.6%	39,462	39,462	100.0%
Dr-Ferry	44,446	44,488	100.1%	28,392	28,434	100.1%	16,054	16,054	100.0%
Dr-LRT	5,480	5,443	99.3%	4,320	4,283	99.2%	1,160	1,160	100.0%
Dr-Long Ferry	2,896	2,898	100.1%	2,896	2,898	100.1%	0	0	NA
Transit	1,530,985	1,531,688	100.0%	1,066,007	1,066,615	100.1%	464,977	465,073	100.0%
TOTAL	32,885,860	32,885,860	100.0%	18,621,262	18,621,262	100.0%	14,264,598	14,264,598	100.0%

Presenting Highway Assignment

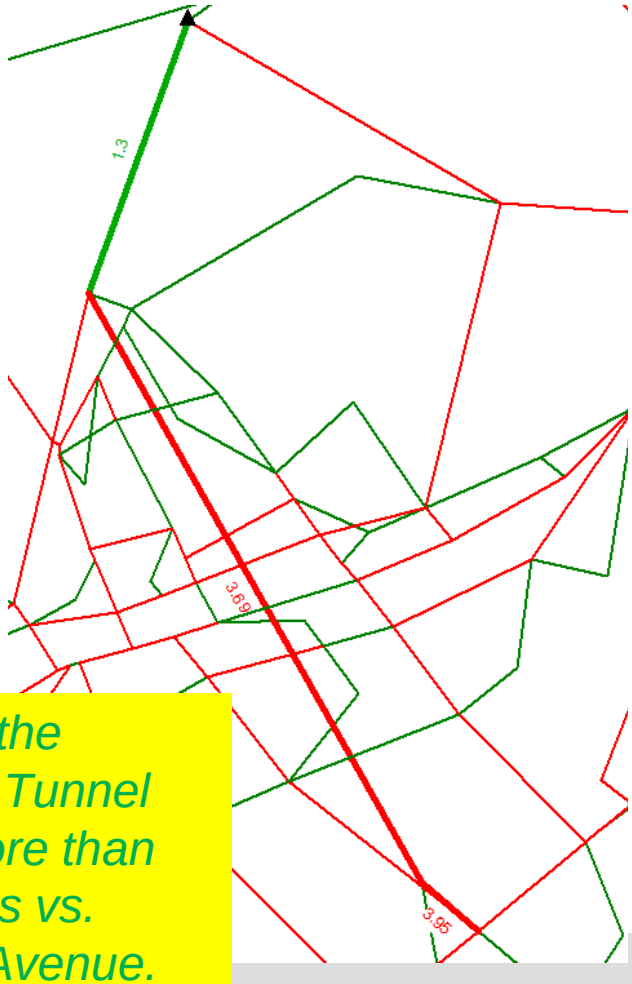
- Raw Model Volumes Map

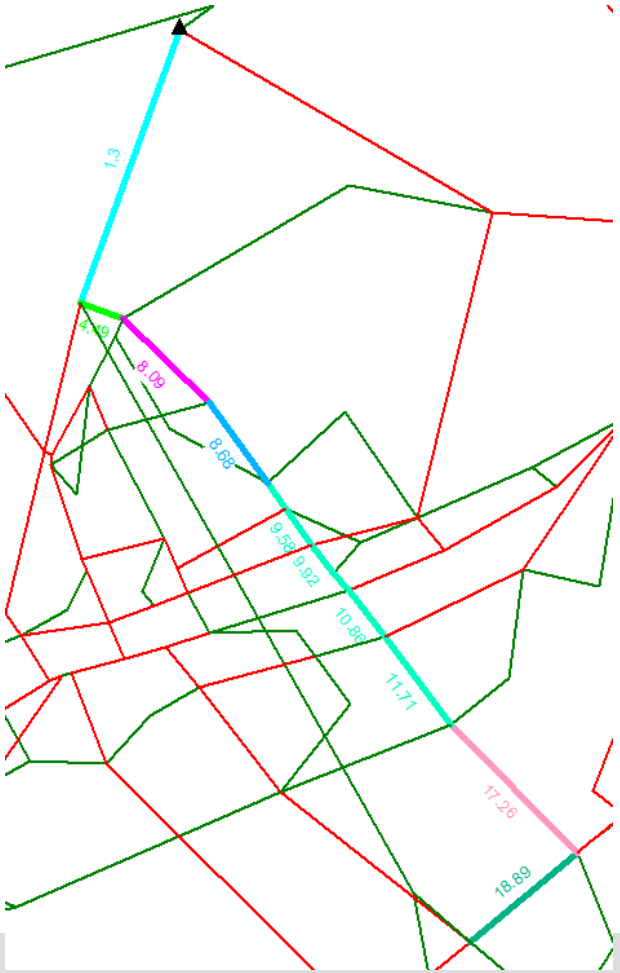


Scenario 3B- Change in Traffic



Scenario 3B- Difference In Travel Time



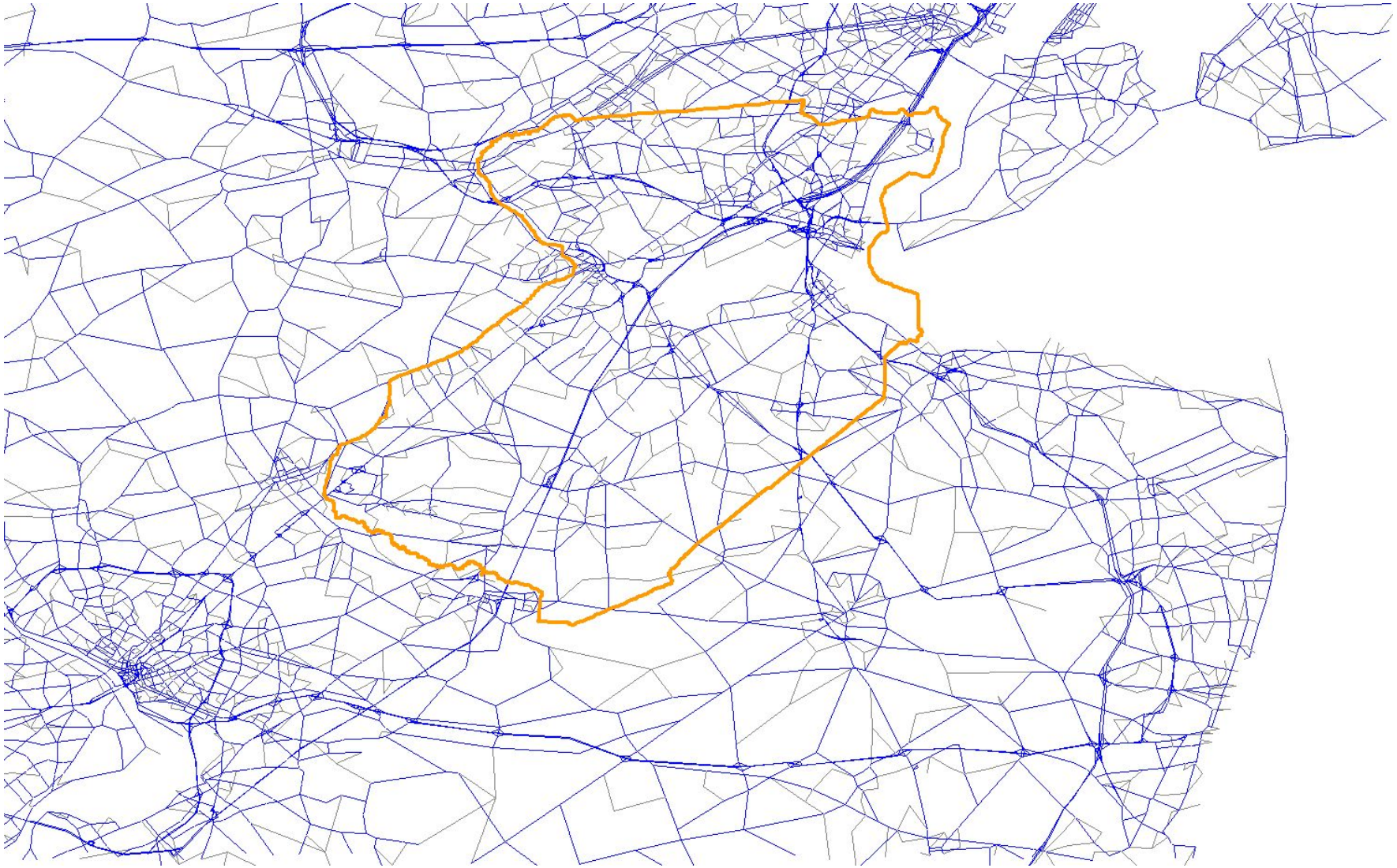


Note that the Princeton Tunnel saves more than 10 minutes vs. Harrison Avenue.

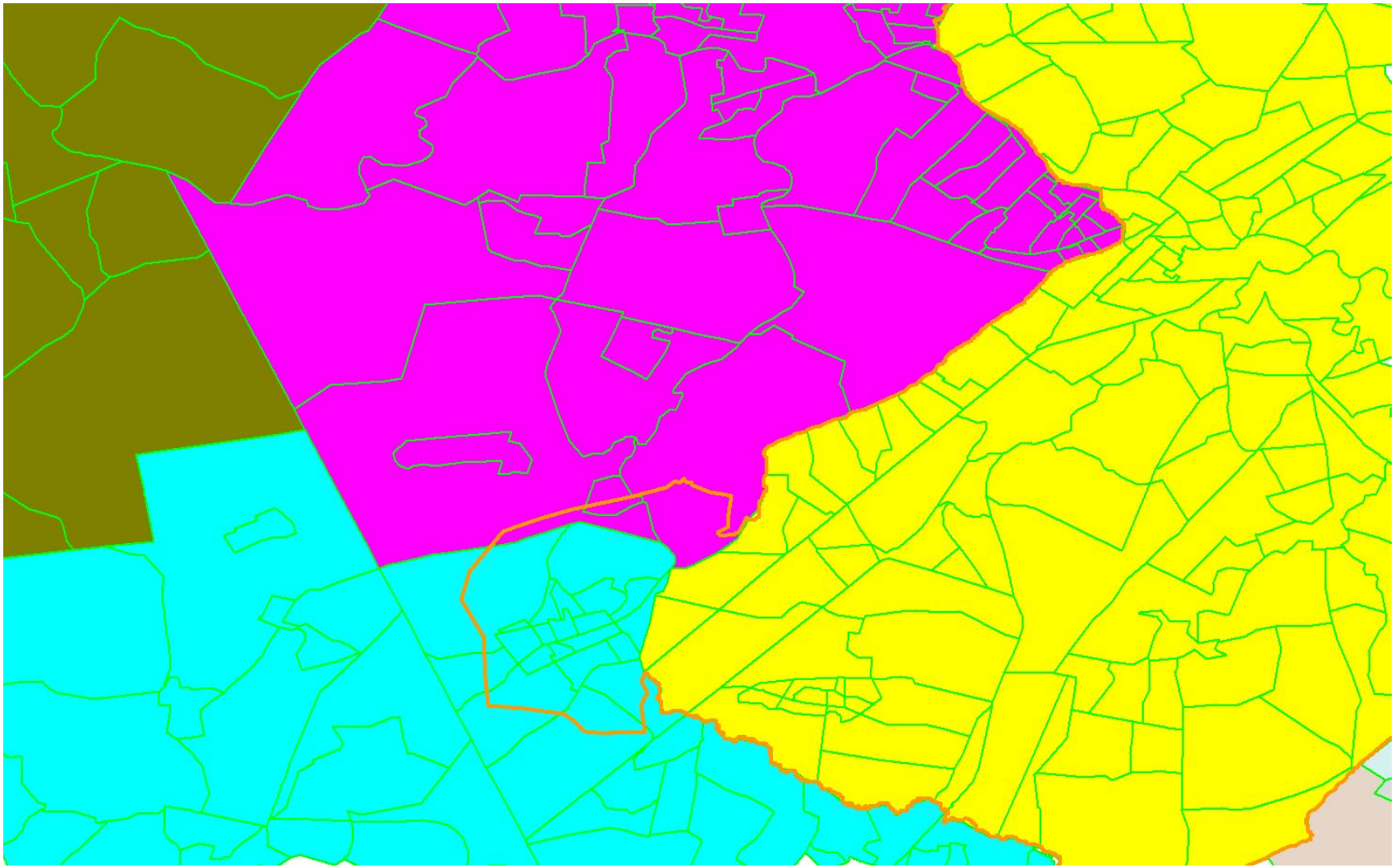
Further Analysis

- Creating Subarea For Extraction
  - Standard Support Application with Pre-defined Boundary Polygons by NJTPA Subregion
- Need to Add Area from Adjacent County
- Execute Assignment Procedures to Create Subarea Trip Tables

Standard Polygon for Middlesex County



Extended Polygon to Include Princeton



Group Discussion/Exercise

- How Can We Present this Information Differently
  - Scenario 1
  - Scenario 2
  - Scenario 3A
  - Scenario 3B
- Think About All of The Ways We Have Learned
  - What About Pie Charts?
  - What About Histograms?
  - What About Stacked Bars?
  - What About Thematic Maps?
  - Etc.

Access to Documentation

- Users Guide is now on the NJTPA Website which accessed via the following link:

  http://www.njtpa.org/DataMap/Perf/Model/default.aspx

- Model Development Report will be posted on the website when it is finalized.

Now it is Time for Q&A