

Making Decisions from Traffic Models Workshop

March 20-21, 2007
Sacramento, CA

Agenda

Projects Presented

- **Interstate 80 – New Jersey**
- **Pulaski Skyway – New Jersey**
- **Doyle Drive – San Francisco**
 - **Project still looking at IPA**
 - **Staging not at issue yet**

I-80 Construction Staging Impact Analysis



Introduction: I-80 Construction Staging

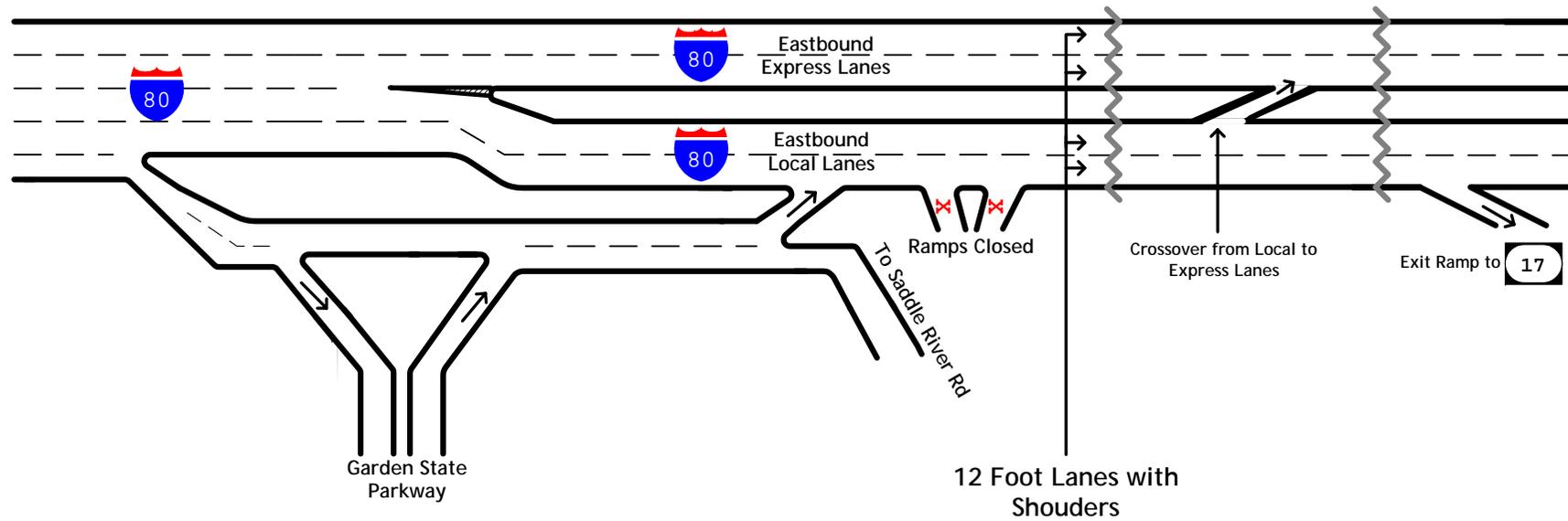
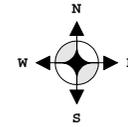
- PB developed construction staging plans
- Construction contractor proposal to change and combine stages
 - Cut construction time in half (from 6 to 3 months)
- NJDOT asked PB to evaluate congestion impact of contractor's proposal versus proposed staging
- Evaluation of impact of proposal using operational modeling techniques

Scenarios Examined: I-80 Construction Staging

- Existing Conditions
 - Two 12' Lanes with shoulders Local
 - Two 12' Lanes with shoulders Express
- PB Staging Alternative
 - Two 11' Lanes without shoulders Local
 - Two 12' Lanes with shoulders Express
- Contractors Staging Alternative
 - Close Local
 - Three 11' Lanes without shoulders Express

I-80 Eastbound

Existing Conditions

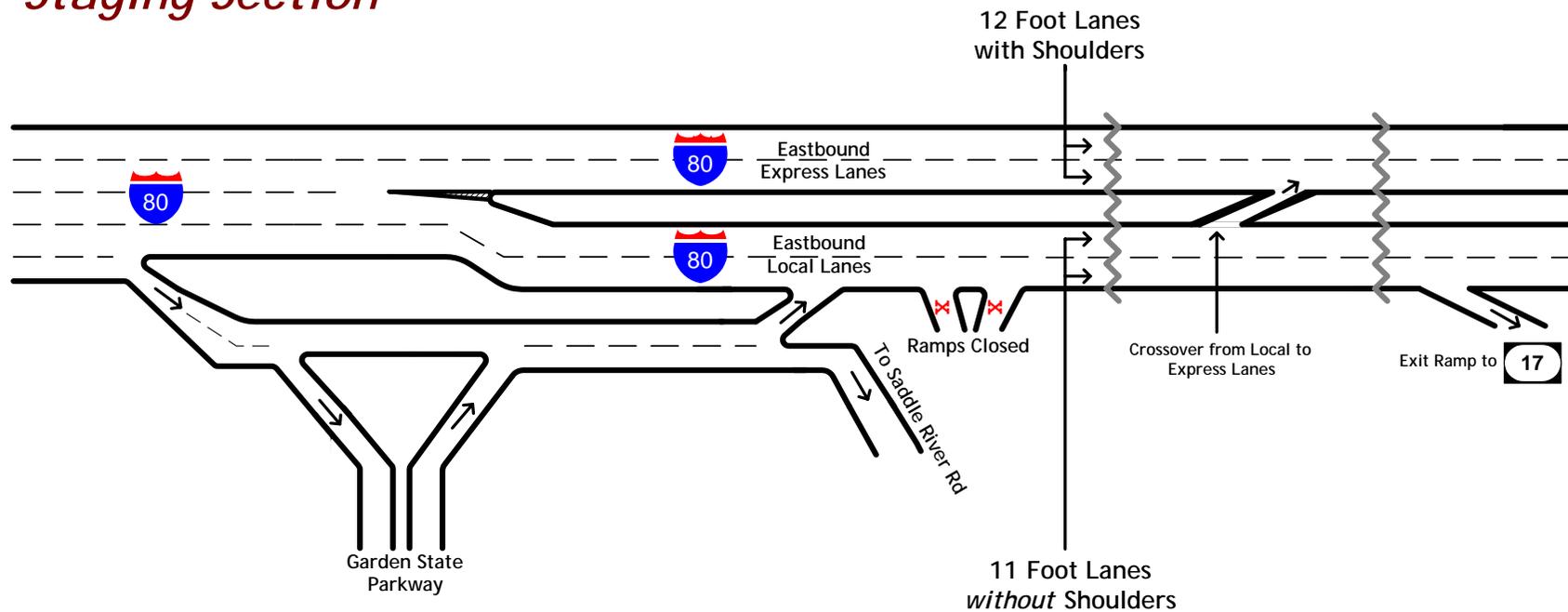
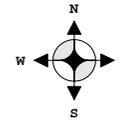


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I-80 Eastbound

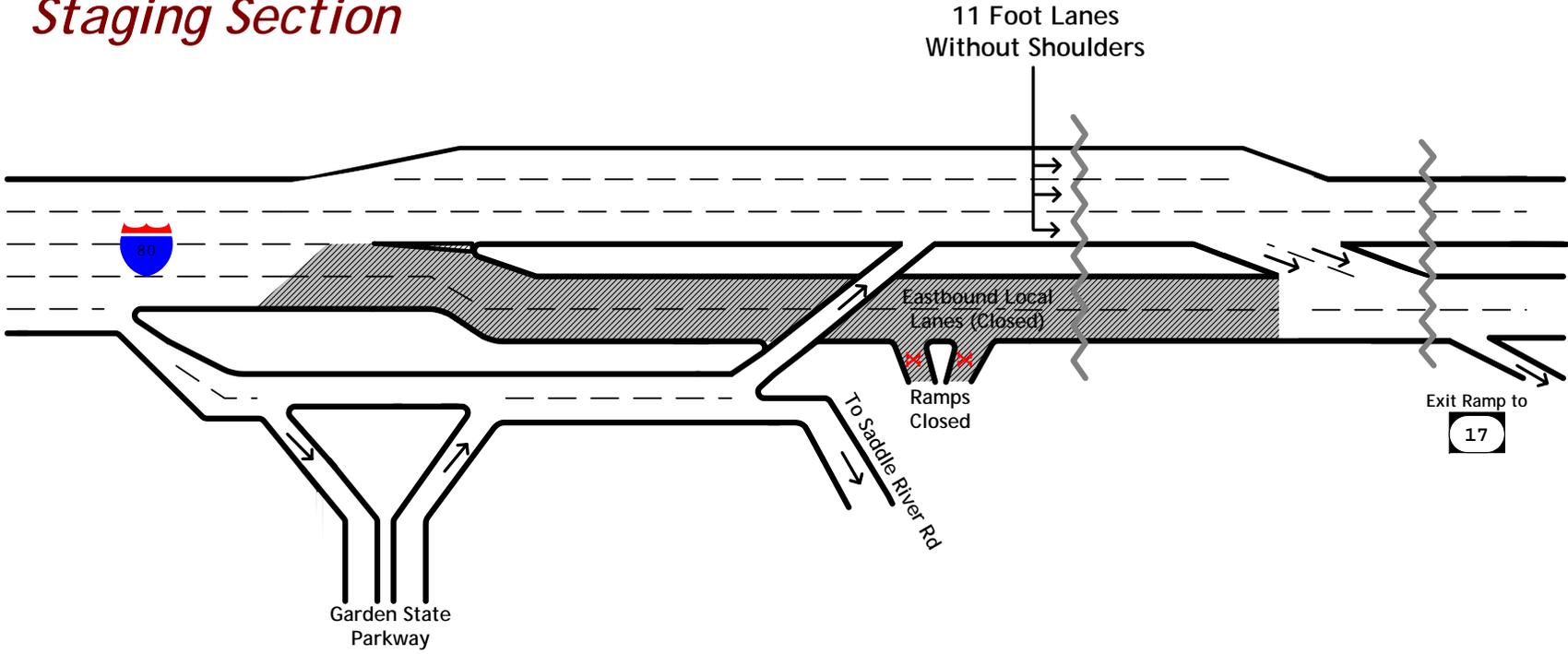
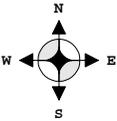
Parsons Brinckerhoff Construction

Staging Section



*Note:
Not Drawn to
Scale*

I-80 Eastbound Contractor Construction Staging Section



*Note:
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Operational “Tool”: I-80 Construction Staging

NJDOT Liked:

- Operational Analysis tool
- Applicable to freeway segments
- Accounts for capacity reductions on mainline and ramps due to geometric changes during construction
- Capable of evaluating staging
- Addresses lane closures/crossovers
- Produces numerous measures of effectiveness

Results Summary

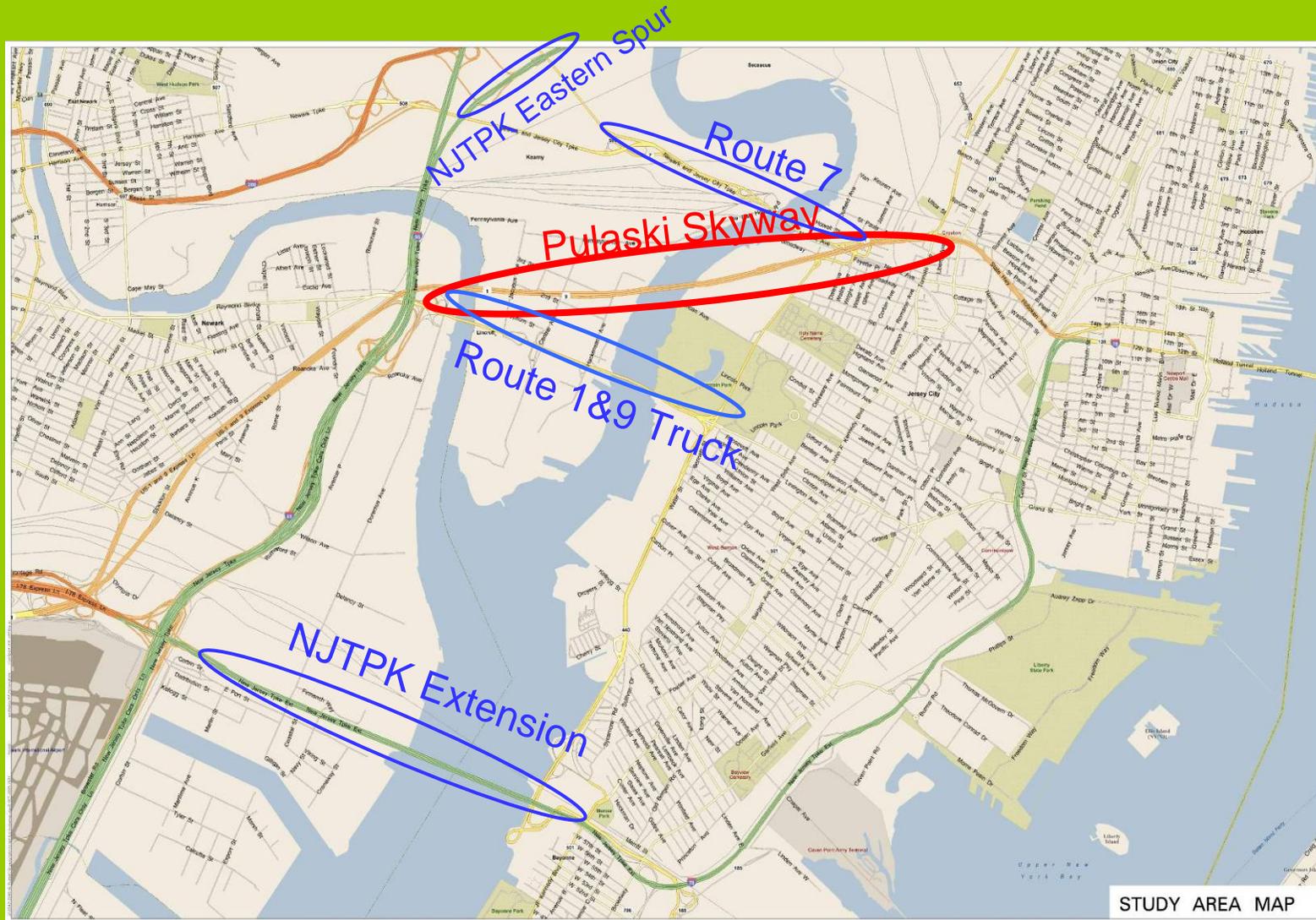
- Existing Conditions
 - Average speed 36 mph
 - Average trip time 10 minutes
 - Total throughput to I-80 and Route 17 – 5440 vph
- PB Staging Alternative
 - Average speed 33 mph
 - Average trip time 11 minutes
 - Total throughput to I-80 and Route 17 – 5380 vph
- Contractors Staging Alternative
 - Average speed 16 mph
 - Average trip time 23 minutes
 - Total throughput to I-80 and Route 17 – 4300 vph



Pulaski Skyway Emergency Repairs Construction Staging Support



Study Area - Pulaski Skyway Construction Support



STUDY AREA MAP

Objective - Pulaski Skyway Construction Support

To perform rehabilitation on the Pulaski Skyway while **minimizing or mitigating delays** due to congestion to commuters in the **corridor** and **region**

Concerns - Pulaski Skyway Construction Support

- **Maintaining vital linkages to/from Jersey City and New York City**
- **Peak period disruptions (congestion, detours, lane closures or reductions)**
- **Disruptions to local residents and businesses**
- **Safety on local and regional roadways**
- **Adjacent Construction projects (simultaneous critical staging)**

Toolbox - Pulaski Skyway Construction Support

- 1. Existing Traffic Counts**
- 2. Regional Travel Demand Model**
- 3. Regional Construction Projects Tracking Tool**
- 4. Highway Capacity Software**
- 5. Operational Model**

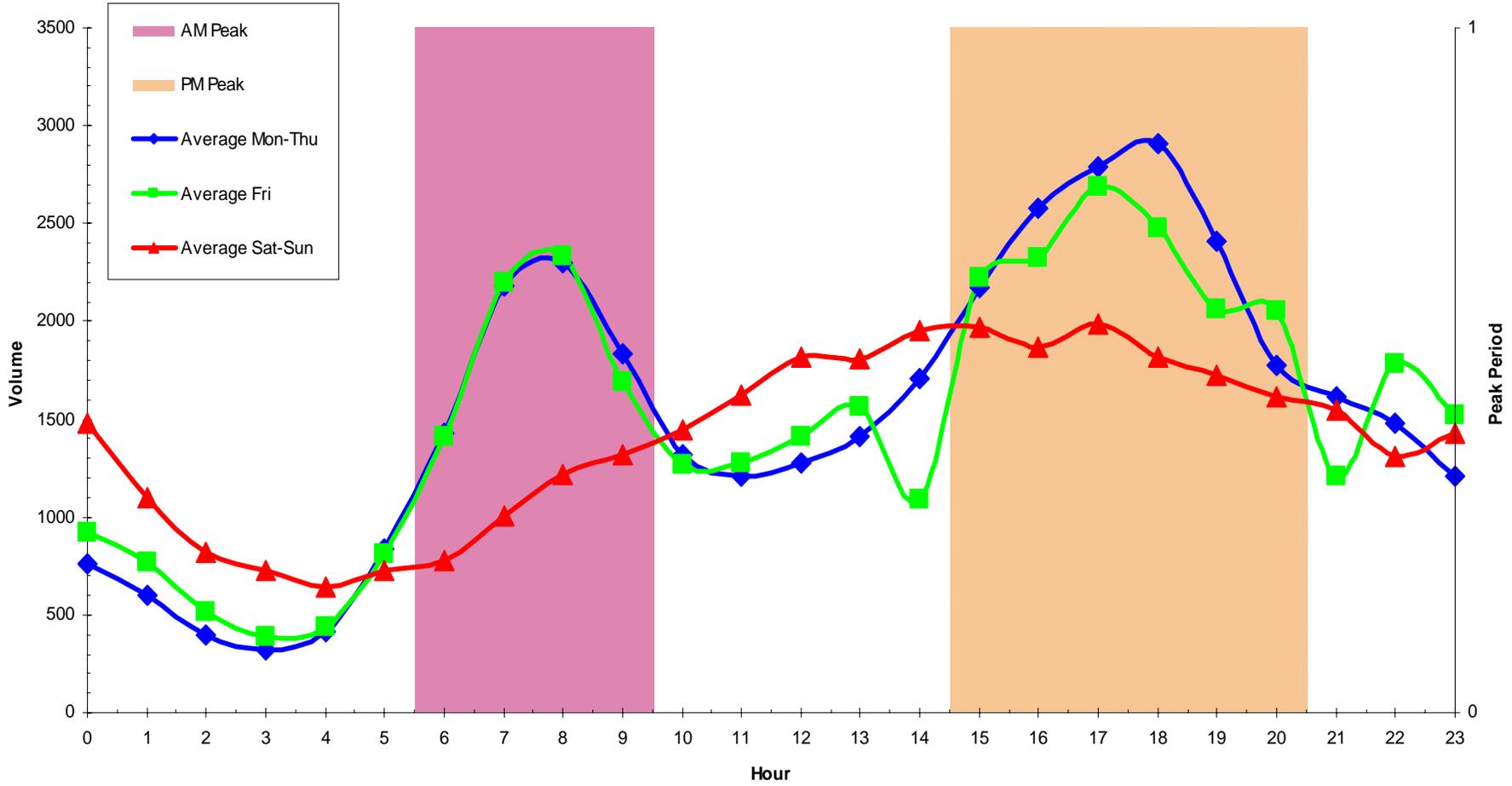
Toolbox - Pulaski Skyway Construction Support

1. Existing Traffic Counts

- ✓ **Time of Day**
 - **Morning, Evening, Overnight**
- ✓ **Day of Week**
 - **Weekday**
 - **Friday**
 - **Saturday**
 - **Sunday**

Toolbox - Pulaski Skyway Construction Support

US 1/9 South (MP: 51.2) at Ramps to Pulaski Skyway NB (3P6D502) (Average)



Toolbox - Pulaski Skyway Construction Support

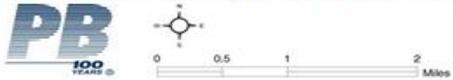
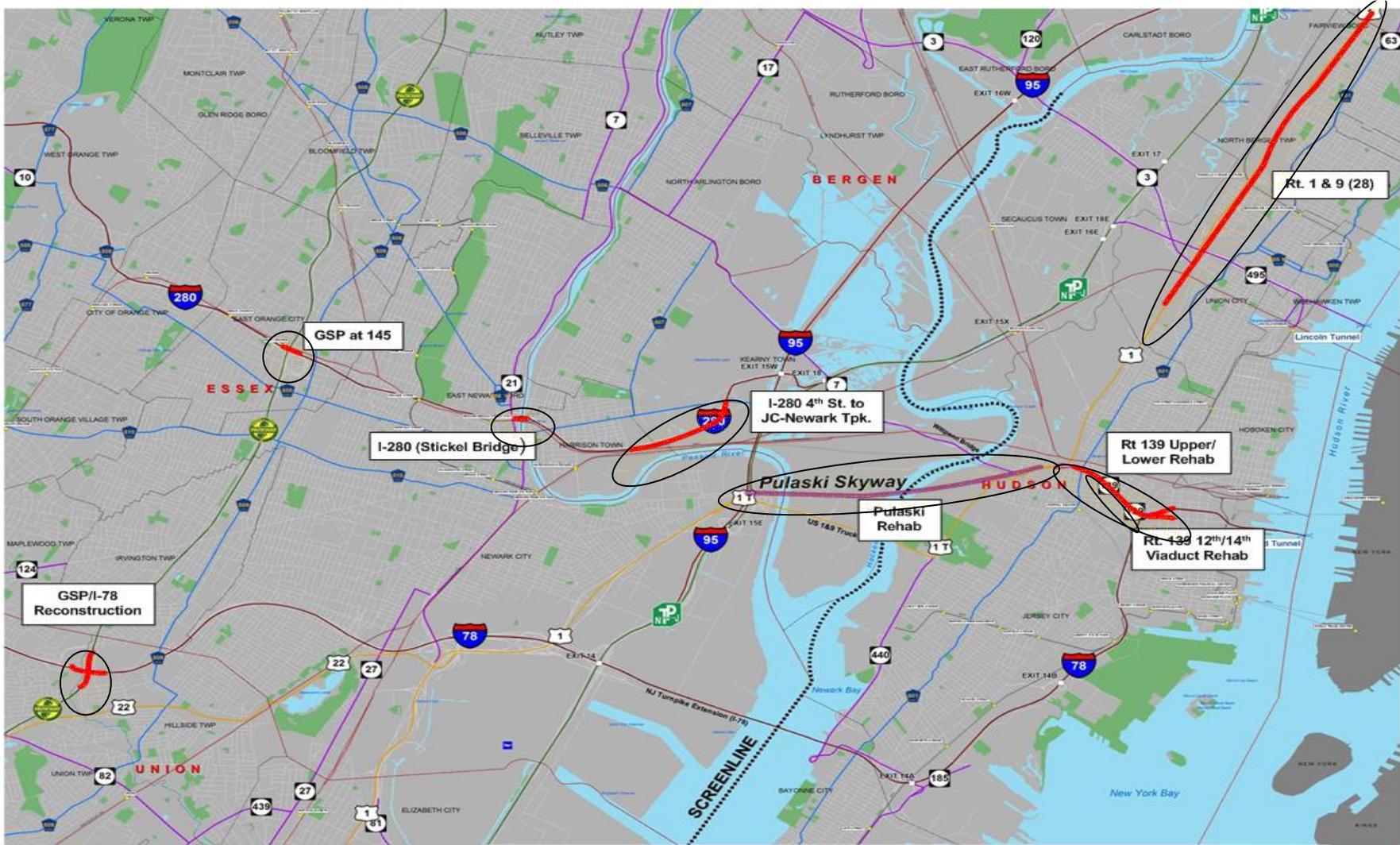
2. Regional Travel Demand Model

- ✓ Comparison of screenline volumes
- ✓ LOS on screenline crossings

3. Regional Construction Projects Tracking Tool

- ✓ Cooperation with Traffic Operations and Project Managers
- ✓ Track other regional projects
- ✓ Look at critical staging on other projects
- ✓ Measure impact on Pulaski Construction Staging

Toolbox - Pulaski Skyway Construction Support



2008 Construction Projects with Traffic Implications

Pulaski Skyway Preliminary Investigation
February 22, 2006



Toolbox - Pulaski Skyway Construction Support

Regional Demand Model used to frame big picture issues and patterns

- **Scenarios**

- **Closure of Pulaski during peak periods**
- **Closure of Pulaski during night-time**
- **Closure of Pulaski over weekends**
- **Closure of eastern end and use of Broadway ramps for detoured traffic**
- **Close Kearny entrance ramp and detour to Fish House and Route 7**
- **Overnight Southbound closure until next Evening Peak Period**
- **Closure of one lane and reduce width of remaining travel lane**

Toolbox - Pulaski Skyway Construction Support

Highway Capacity Software

- ✓ Analysis at ramps and key intersections due to detours

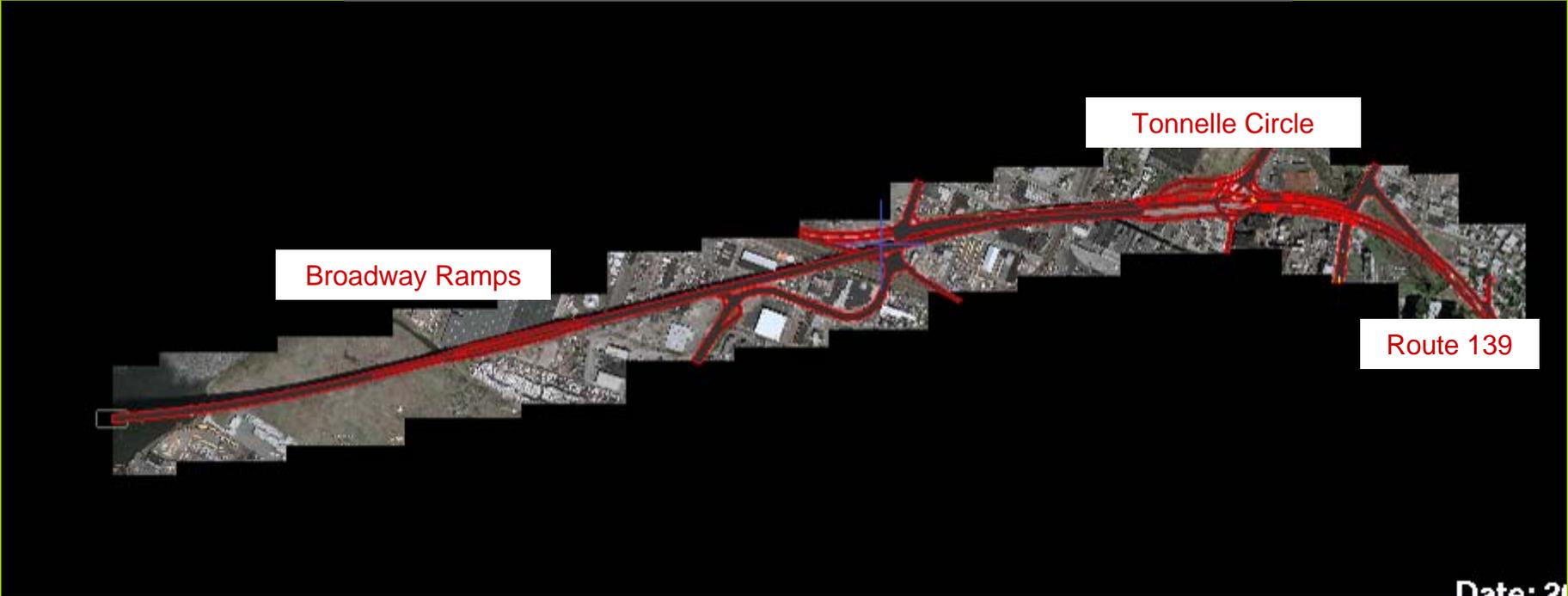
Toolbox - Pulaski Skyway Construction Support

5. Operational Model

- ✓ Analyze staging specifics on the Skyway
- ✓ Bottleneck analysis at touch down points
- ✓ Queues – how much more time spent in congestion?
- ✓ Communication through visualization as well as analytical outputs

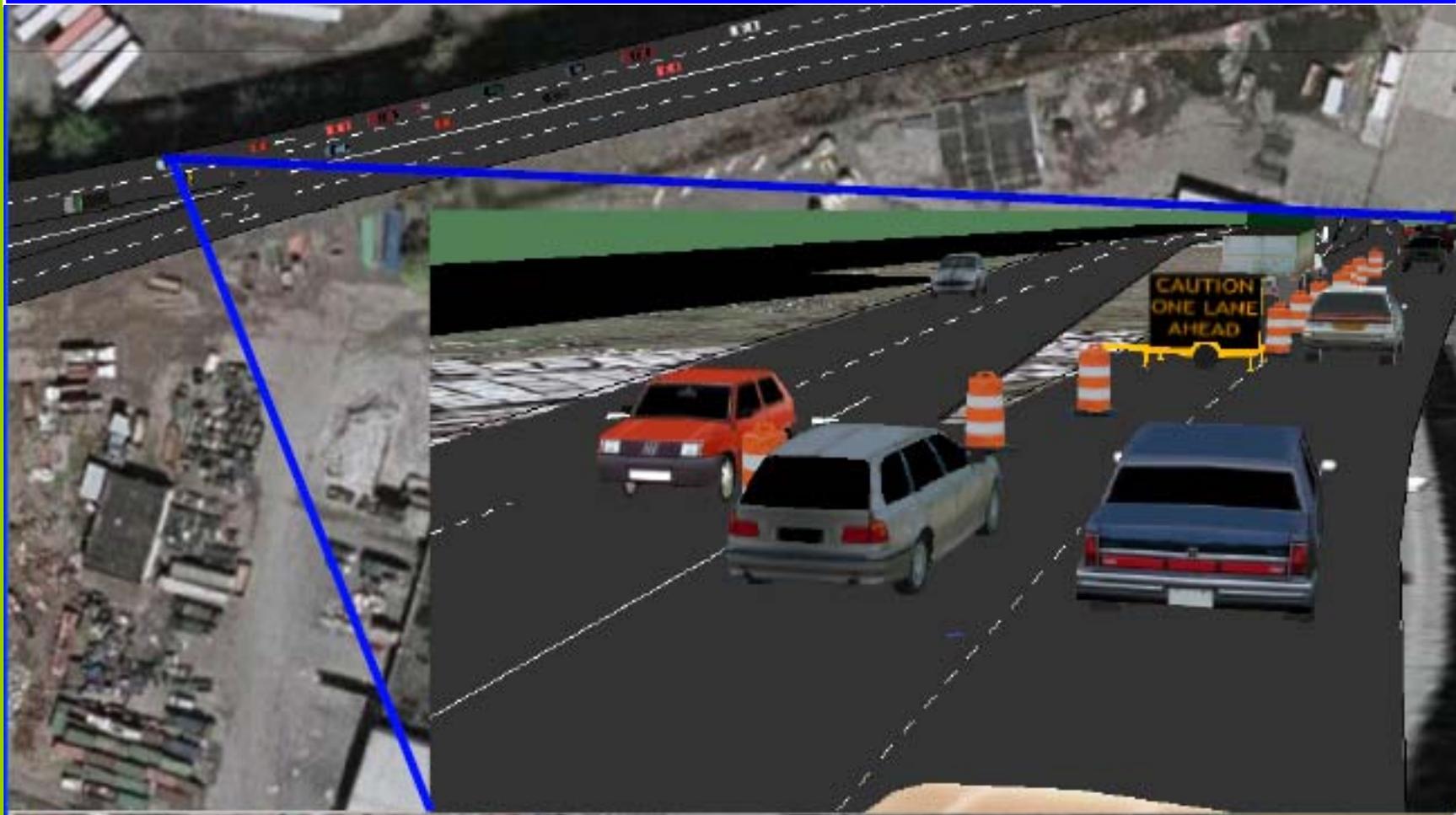
Toolbox - Pulaski Skyway Construction Support

PULASKI SKYWAY OPERATIONAL MODEL



Date: 2/

Construction Staging



Pulaski Skyway Construction Support – Operational Model

Method

- Created operational model of Pulaski Skyway
- Used existing counts to estimate Skyway (ultimate) throughput during peak periods
- Modeled existing conditions using “on-the-ground” throughput
- Closed 1-travel lane and reduced the width of the remaining travel lane
- Modeled existing demand on reduced cross-section
- Model outputs reduced throughput on new scheme
- Unmet demand becomes backup queue

Pulaski Skyway Construction Support – Toolbox WILL GO TO LIVE DEMONSTRATION AT THIS POINT

PULASKI SKYWAY STAGING TEST



Pulaski Skyway Construction Support - Recommendations

Period	Time of Week	Time of Day	Recommendations
AM and PM Peak Periods	Weekday	6am to 9am 4pm to 7pm	<u>Not recommended</u> for construction during weekday peak periods; detoured traffic causes failures all along the corridor screenline crossings in the eastbound direction in the morning and westbound direction in the evening
Overnight Period	Weekday	9pm to 5am	<u>OK for construction</u> ; worst volume at setup time 9pm but trails off until about 5am; reduced volume on all screenline crossings means that detoured traffic should not cause significant delays
Night-Time Friday to Monday Morning	Weekend	9pm Friday to 5am Monday	<u>OK for construction</u> ; the biggest block of time (56 hours) amongst alternatives; worst volume during PM hours on weekends but volumes are well below weekday peaks; reduced volume on all screenline crossings means that detoured traffic should not cause significant delays

pb

Pulaski Skyway Construction Support - Recommendations

Period	Time of Week	Time of Day	Recommendations
Off Peak Night to Next Afternoon	Weekday	9pm to 4pm	<u>Not recommended</u> for construction; even off-peak direction volumes are high enough to cause failures along the corridor screenline crossings
Close EB Kearny entrance ramp and detour traffic onto Fish House Road	All Periods	All Times	<u>OK for construction</u> ; detour accounts for only 30 vehicles in the AM and about 80 vehicles in the PM on weekdays; should not add any significant delays on Fish House Road; No delays seen on weekends
One-Lane Closure with Reduced width on remaining travel lane	All Periods	All Times	<u>Not recommended</u> for construction; operational analysis indicates a "best case" queue of 2 1/2 to 3 miles in two lanes for the worst peak periods
Close eastern end of Skyway and Reroute Traffic to Broadway Ramps	Weekday	6am to 9am 4pm to 7pm	<u>Not recommended</u> for construction; detoured traffic causes failure and long queues on ramps in AM and along Route 1&9T southbound in the PM pb

Limitations/Shortcuts Next Steps

- Project done in a limited time frame
- Recognize that we have limited traffic count data for all time periods
- Recognize that the travel demand model is limited to **weekday commuter travel** so weekend forecasts need to be considered with care
- Analysis done only on facility (no detour routes)

Limitations/Shortcuts Next Steps

- Concept Development and Feasibility Assessment stages longer duration (2.5 years)
- Connection of other area operational models to increase area wide coverage
- Increased coverage will enable analysis of local **detour** routes
 - Identify capacity issues of detour **area** (e.g. available capacity; time of day)
 - Identify undesirable local road detours (e.g. neighborhood streets)

Pros/Cons of Larger Network

Further Benefits

- Increased geographical coverage
- More system performance measures
- Ability to test **detour** routes

Issues

- Increased data required for calibration/validation
- Increase in time required for calibration/validation

Future Developments

- NJDOT developing a Statewide Weekend Model Framework
- Models that can address ITS
- Real Time Traveler Information