

Multi-Point and Multi-Class User Equilibrium Assignment

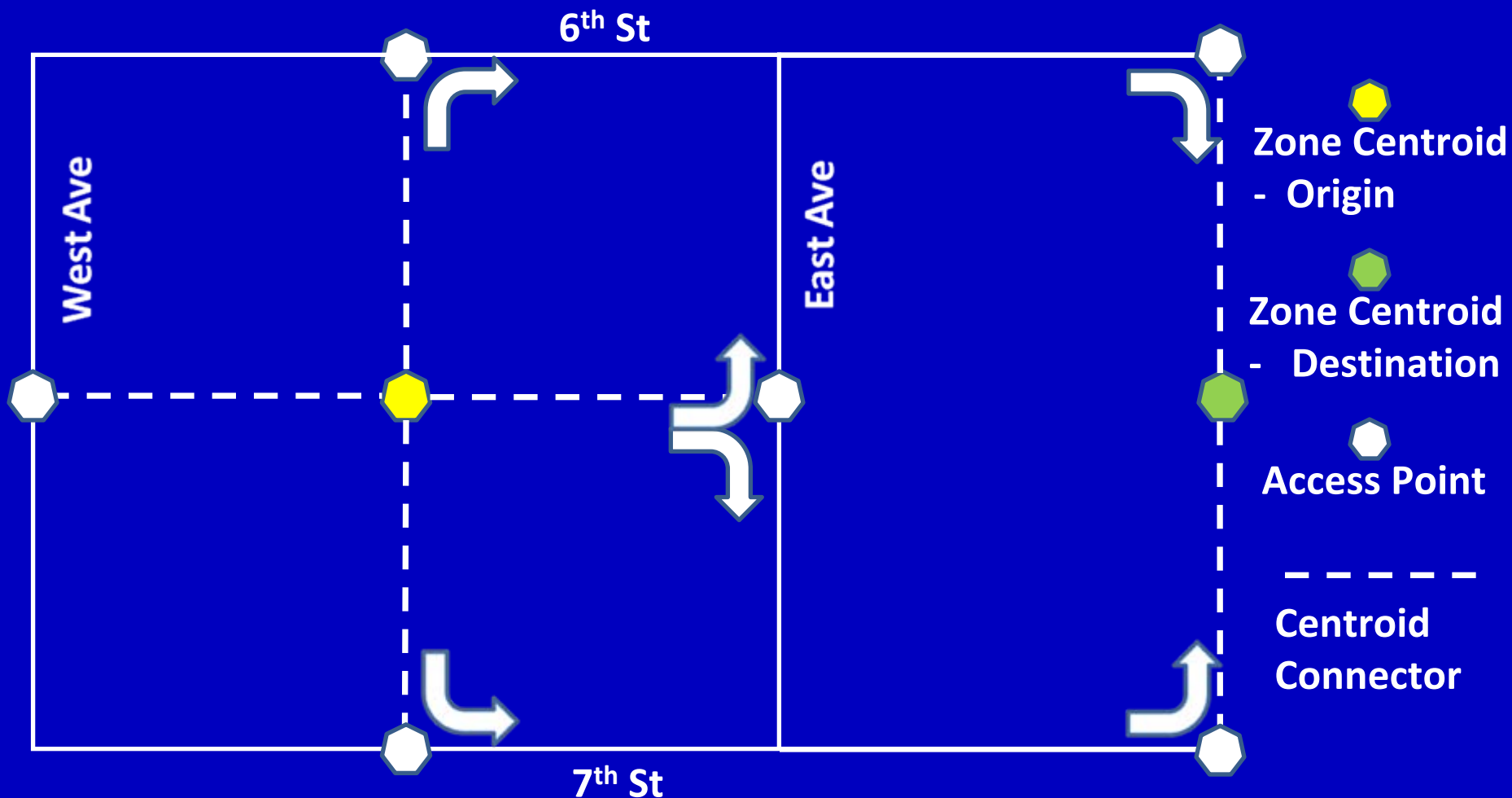
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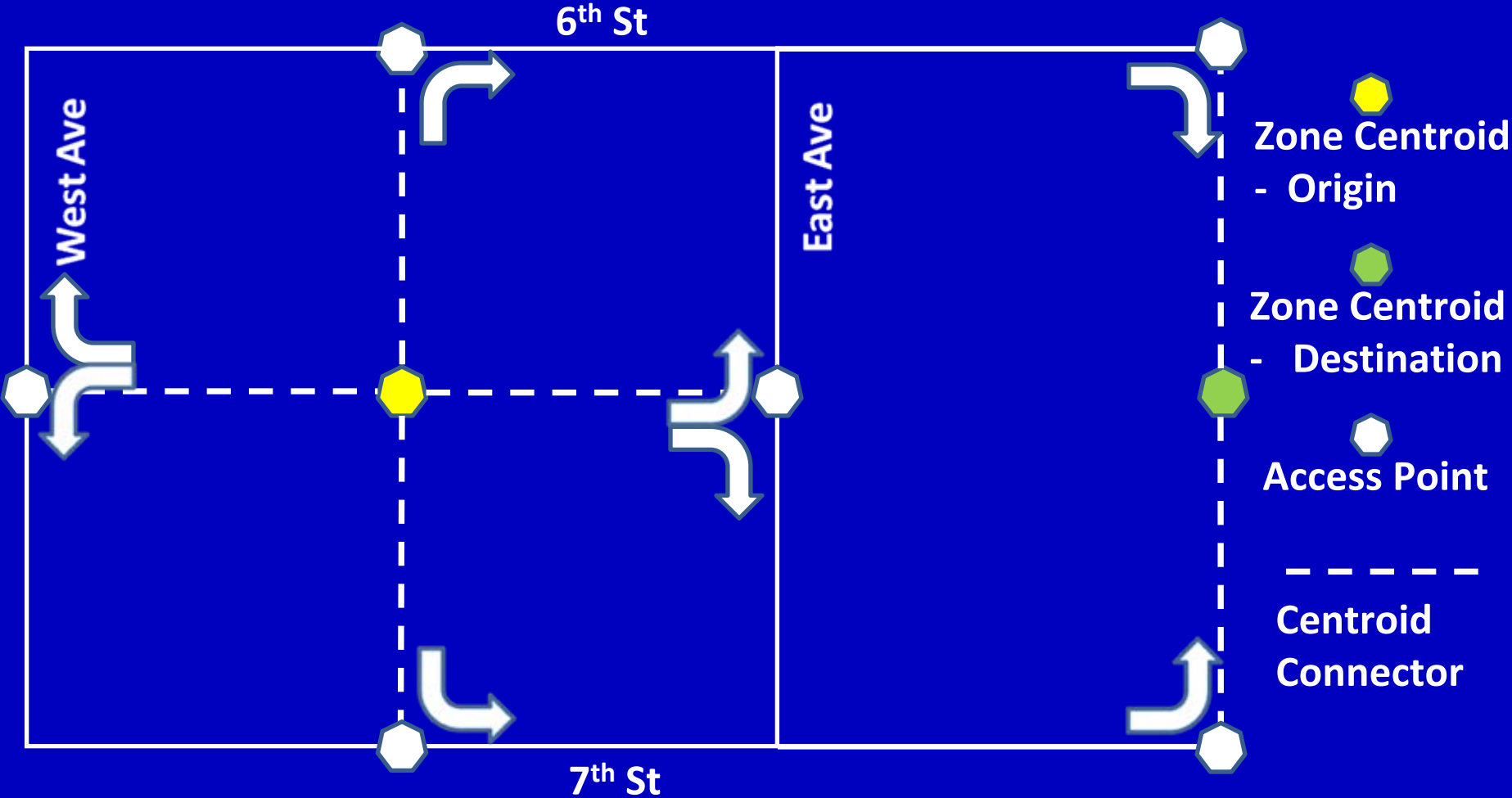
Multi-Point Assignment (MPA)

- Standard User Equilibrium (UE) Assignment
 - Using shortest time path between zone centroids
 - Weak control on trip local loading directions
- MPA
 - Strong control on trip local loading directions
 - Not a method to assign trips from origins to destinations
 - Used together with UE or other assignment methods

Standard User Equilibrium (UE) Assignment - Example



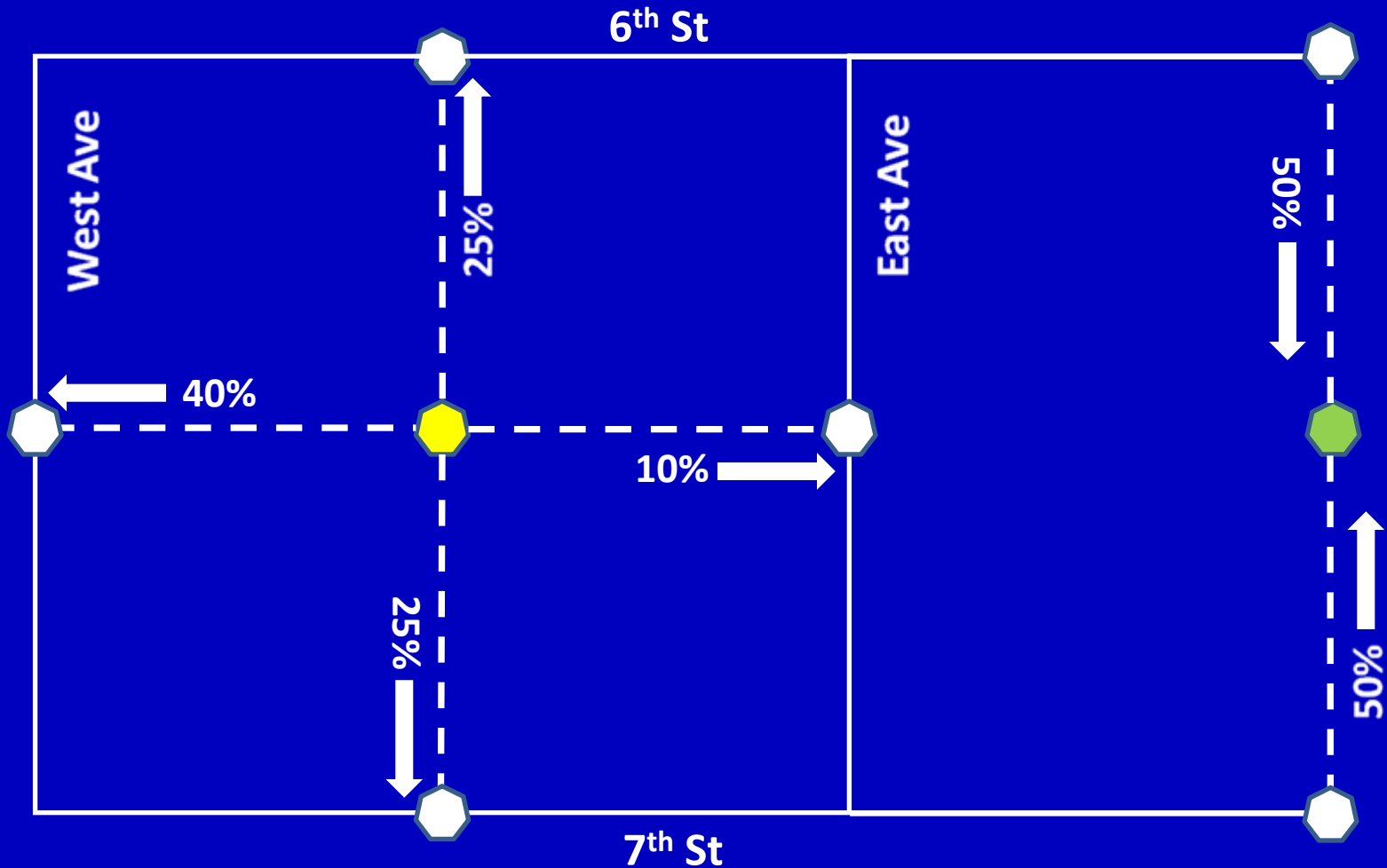
Multi-Point Assignment (MPA) - Example



Multi-Point Assignment (MPA) and Loading Strategy

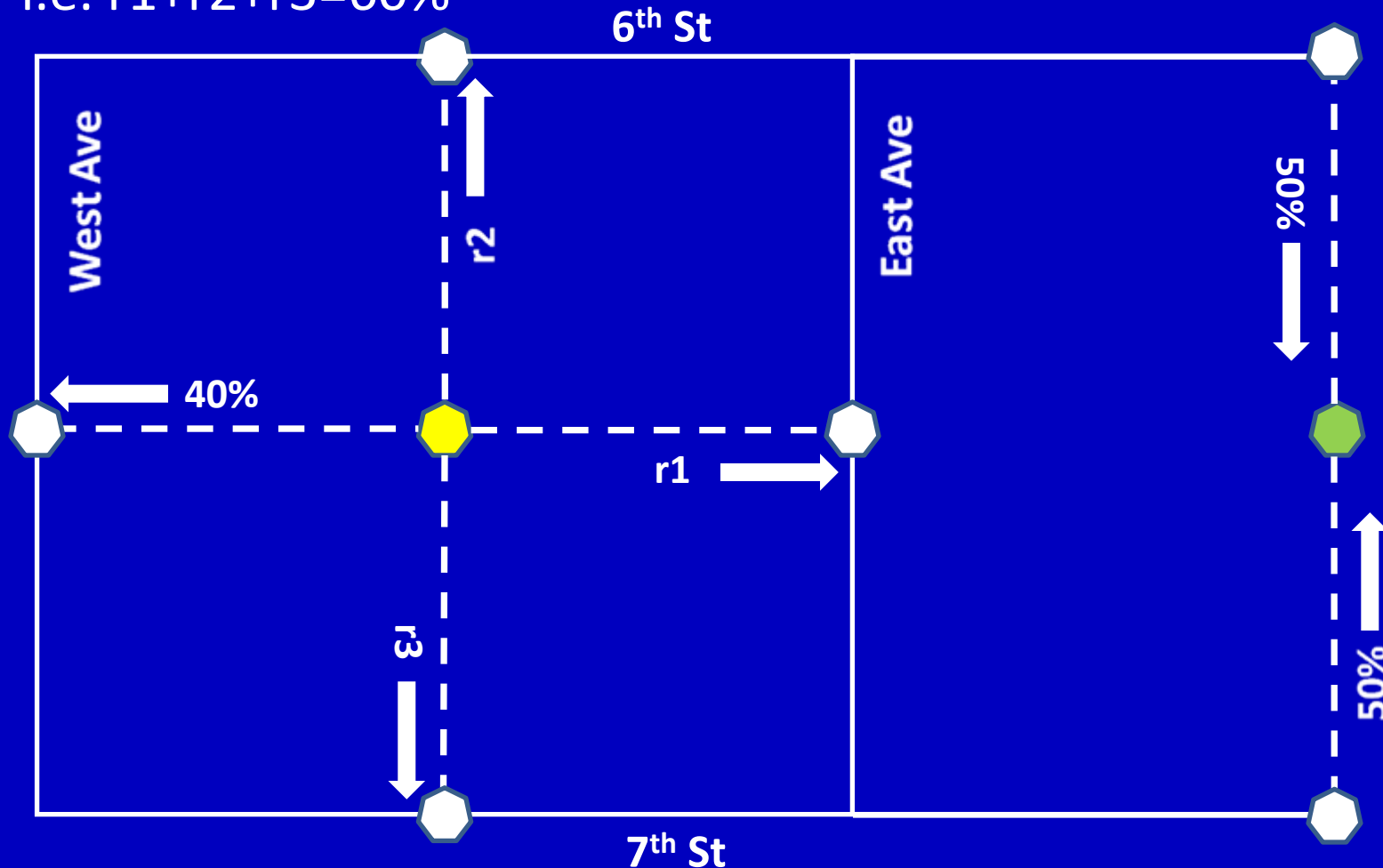
- Fixed Rate Strategy, Robert Shull 1999 (implemented in TModel2)
- Mixed Strategy 1
 - Some centroid connectors got fixed loading rates
 - Other centroid connectors got the variable rates determined by UE assignment
- Mixed Strategy 2
 - Part of Origin-Destination (O-D) trips follows the fixed rate strategy
 - Other O-D trips follows the UE assignment rules

Fixed Rate Strategy for Loading/Receiving



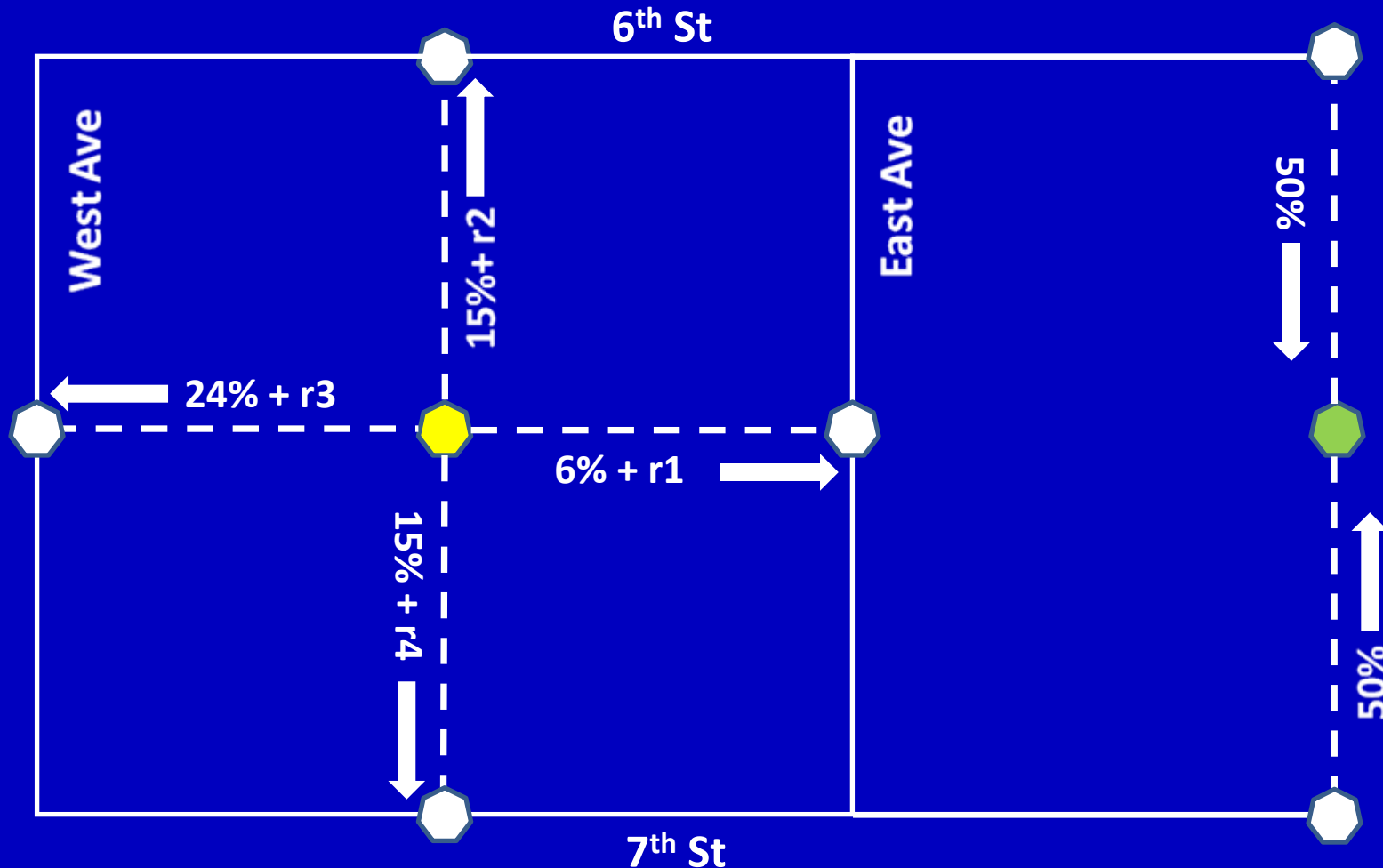
Mixed Strategy 1 - Example

- 40% O-D Trips Loaded onto West Ave
- 60% O-D Trips follow UE assignment to other 3 directions, i.e. $r_1+r_2+r_3=60\%$



Mixed Strategy 2 - Example

- 60% O-Ds follows the fixed rates
- 40% O-Ds follows the UE assignment rule, $r_1+r_1+r_3+r_4=40\%$



What MPA can be used for

- Large Special Zone, e.g. Airport, University Campus, Shopping mall, ...
 - with large amount employment
 - with multiple loading directions
 - with socio-economic data that cannot be split into smaller zones
- Zone with Off-Site Loading, e.g. Office with off-site parking garage
- Zones with multiple vehicle class loading and different loading directions for each vehicle class
- Special Event Model, Stadium, Theater, ...

Example – Special Zone-RDU Airport



TRM v4 2005
PM Peak Period
(3:30-7:30)

Example – Zone with Off-Site Loading



MPA Tool

- Coded in GISDK for use in TransCAD

Assignment

About MMPA v1.1 | Select Inputs

Modeling Directory
C:\TRM50_v4\2005 Browse

O-D Matrices
TOTPM_OD.mtx Browse

Network Layer
Network Roads

Configuration
Class1-OD: SOV
Class2-OD: HOV
Class3-OD: CV
Class4-OD:
Class5-OD:
Rel Gap: 0.01 Max Iteration: 50
Run MPA

Close

MPA Application

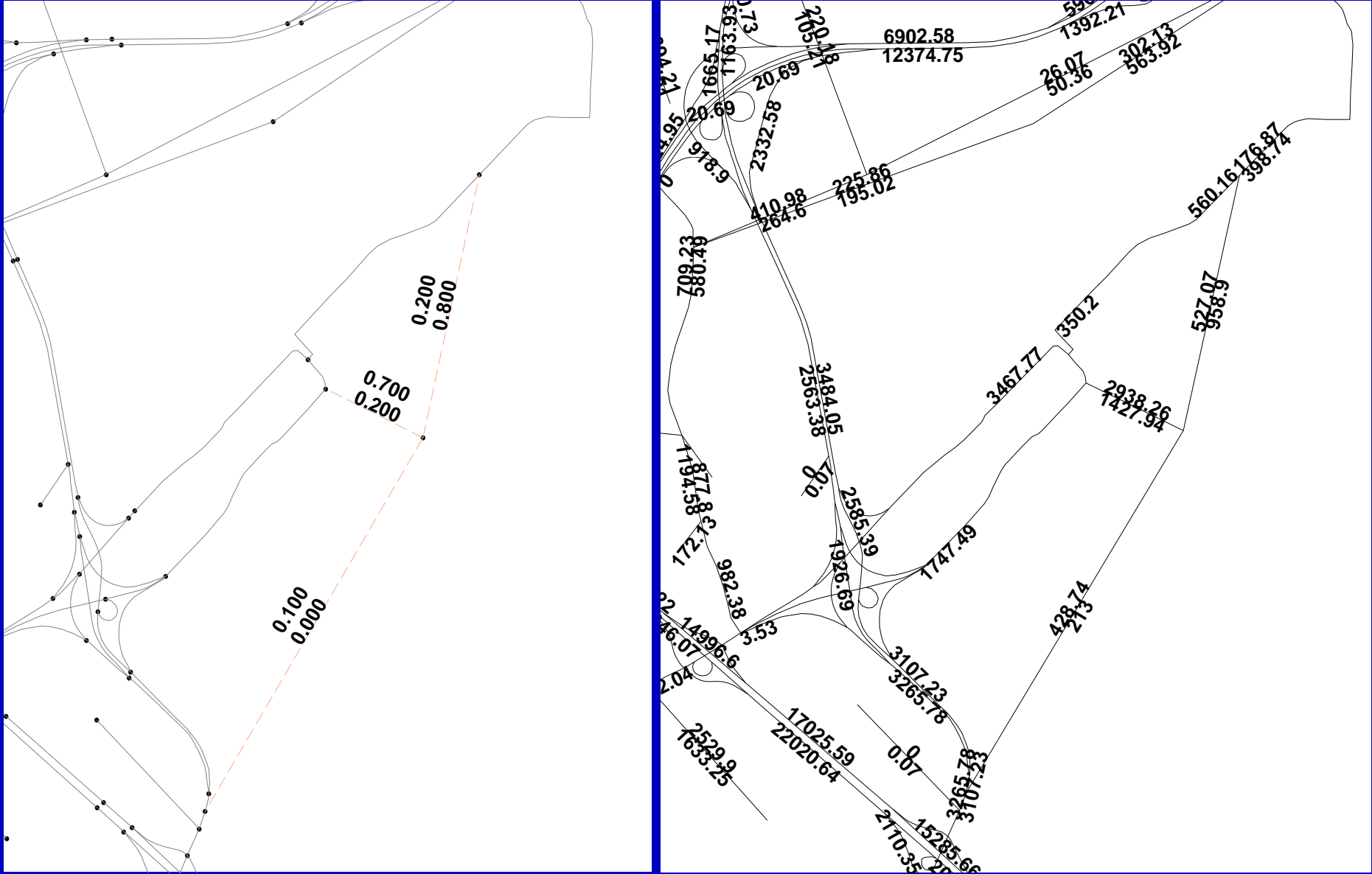
- Kansas City Metro Area, including the Kansas City Model, 2005-2006
- Special Event Traffic Study for the New Stadium, Scottsdale, AZ, 2009

MPA Application

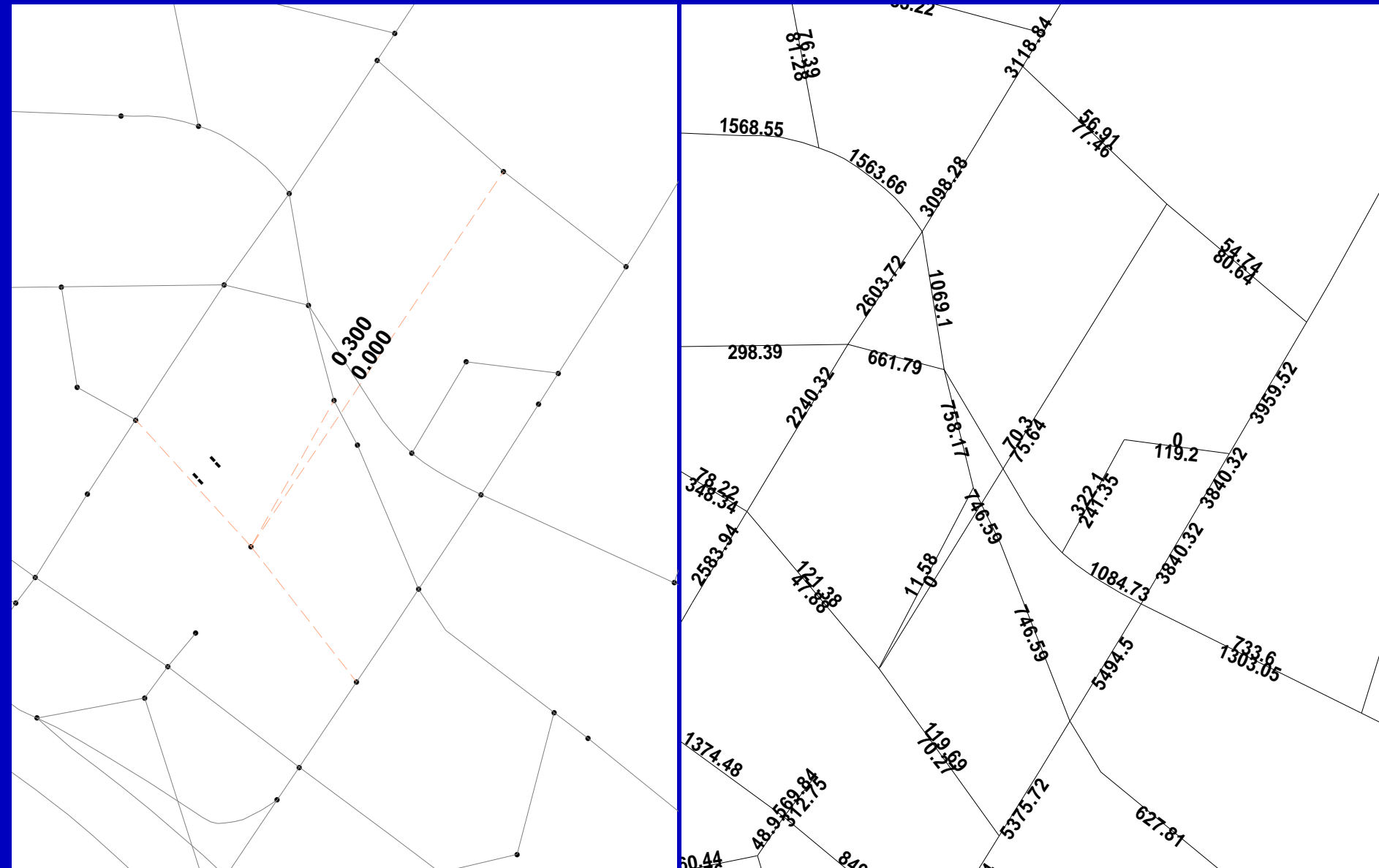
- 2005 PM Peak Hour, Kansas City North Shopping Mall



MPA Test in TRM



MPA Test in TRM



Suggestions

- System-wide use of MPA in the regional travel demand – NOT Suggest at this time
- Use of MPA for a limited number of key zones in the regional model – Strongly Suggest
- Use of MPA for corridor or small area studies – Strongly Recommend
- Use of MPA for obtaining better assignment results – No comment