KDOT Northeast Kansas 5-County Regional Transportation Study

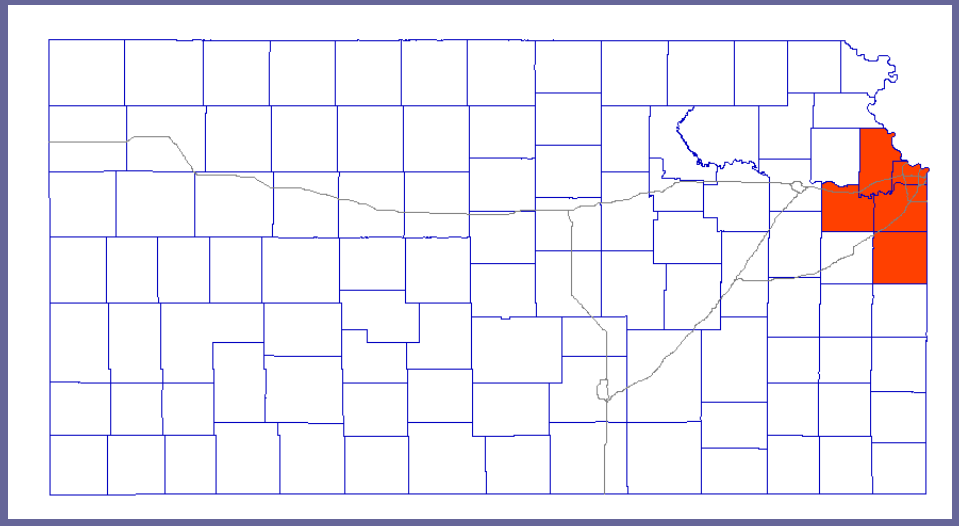
Travel Demand Model Development

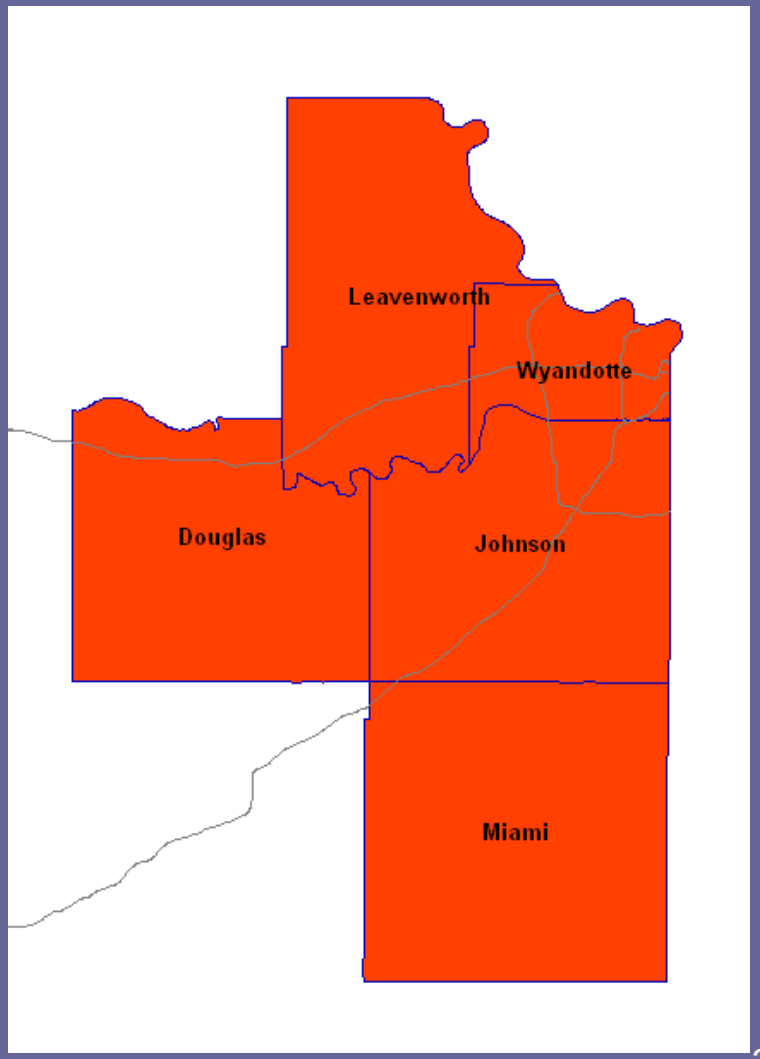
Outline

- Project Overview
- 5-County Model Description
- Challenges
- Approach
- Results

Project Overview

- Study Area



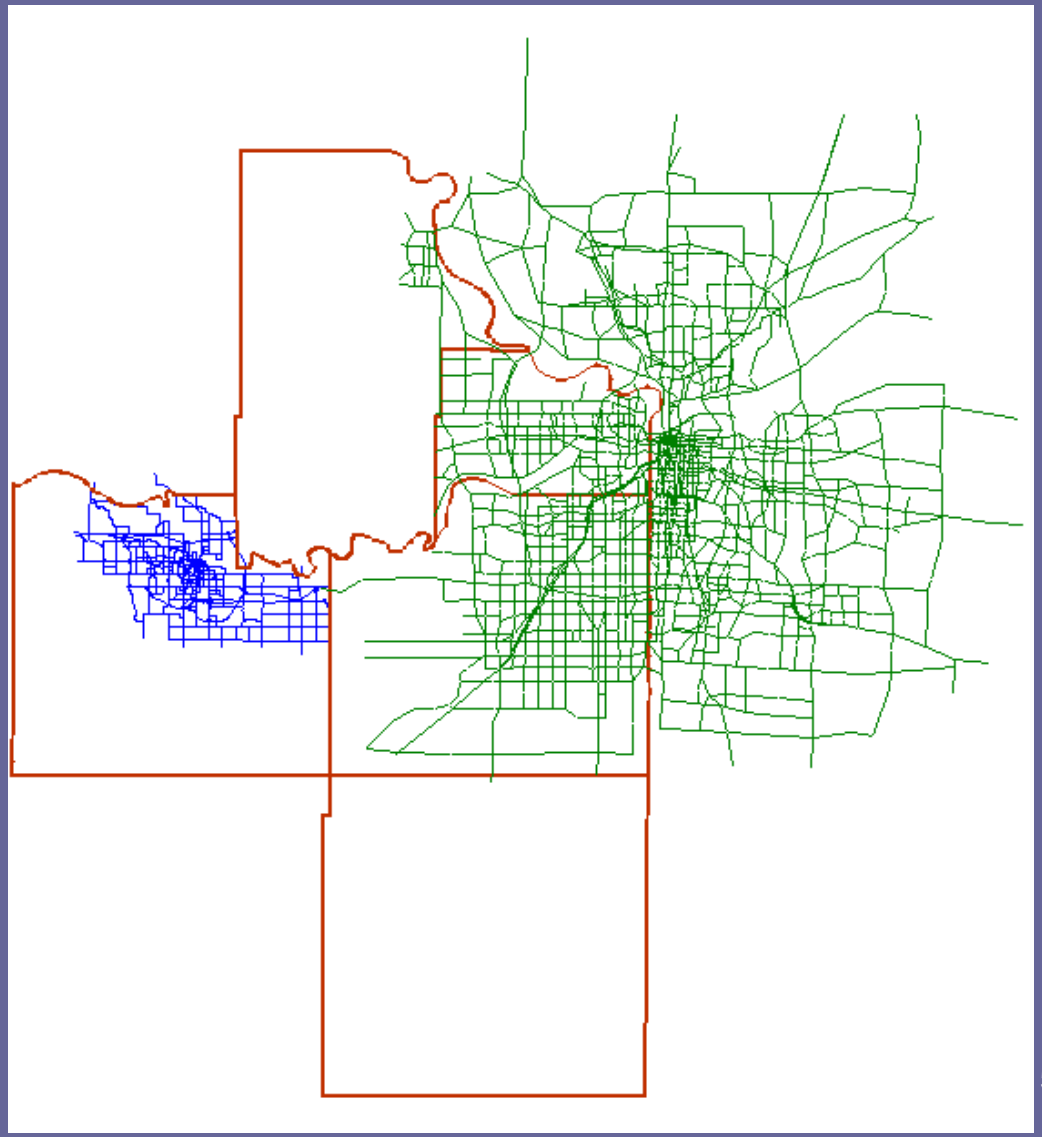


Project Overview

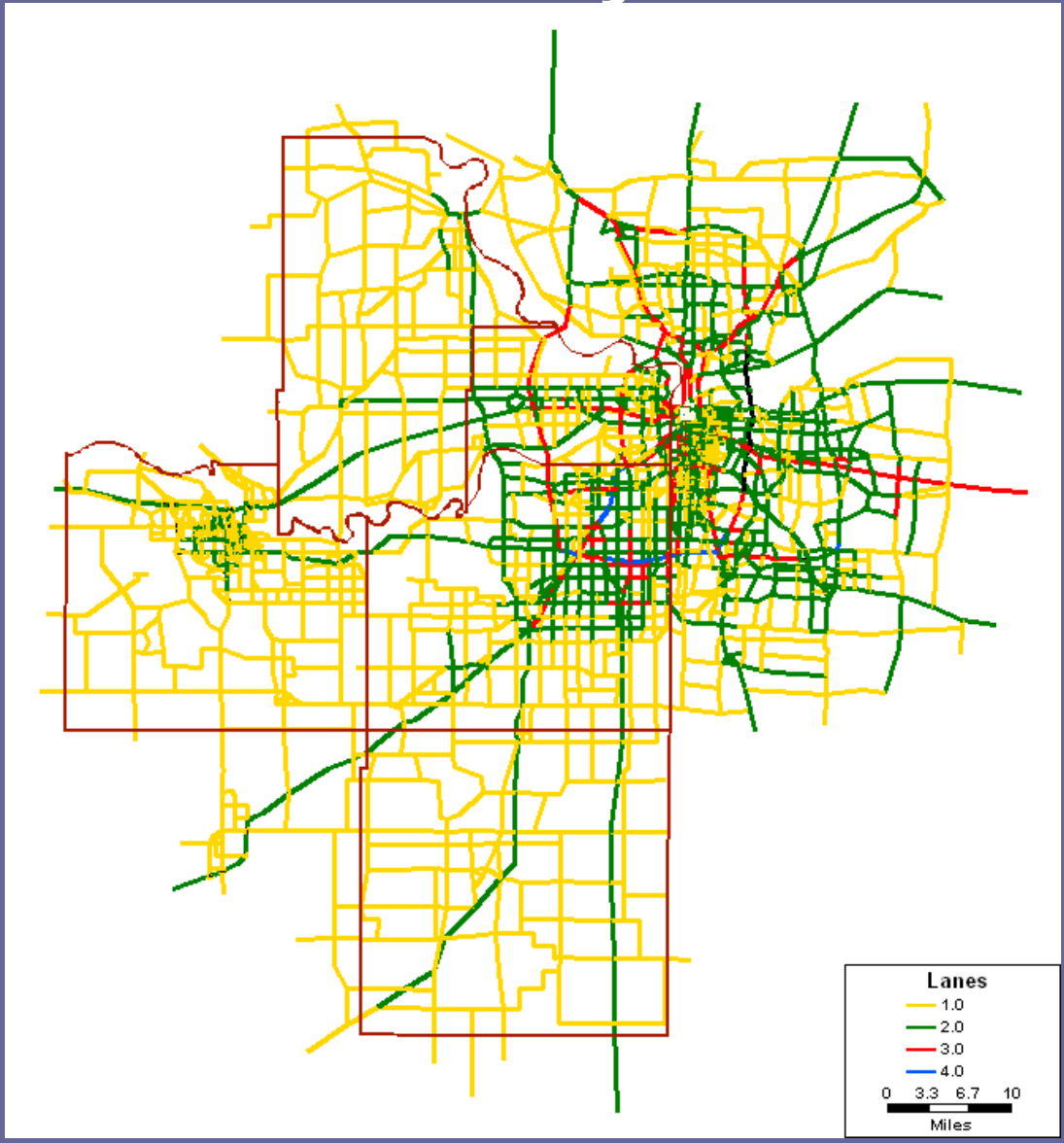
- Project Goals & Objectives
  - Assess Needs
  - Prioritize
  - Identify strategies

Project Overview

- Existing Modeled Areas
  - MARC
  - LDMPO



5-County Model



5-County Model

- Trip Generation
  - Based on Recent MARC Home Interview Survey
  - Calibrated for MARC Region
  - Model Structure
    - Sub Models:
      - Household size Allocation
      - Income Allocation
      - Auto ownership
  - Generates person-trips for all modes (including Non-Motorized)
  - Purposes include HBW, HBSR, HBSHOP, HBO, NHBW, NHBO, Truck

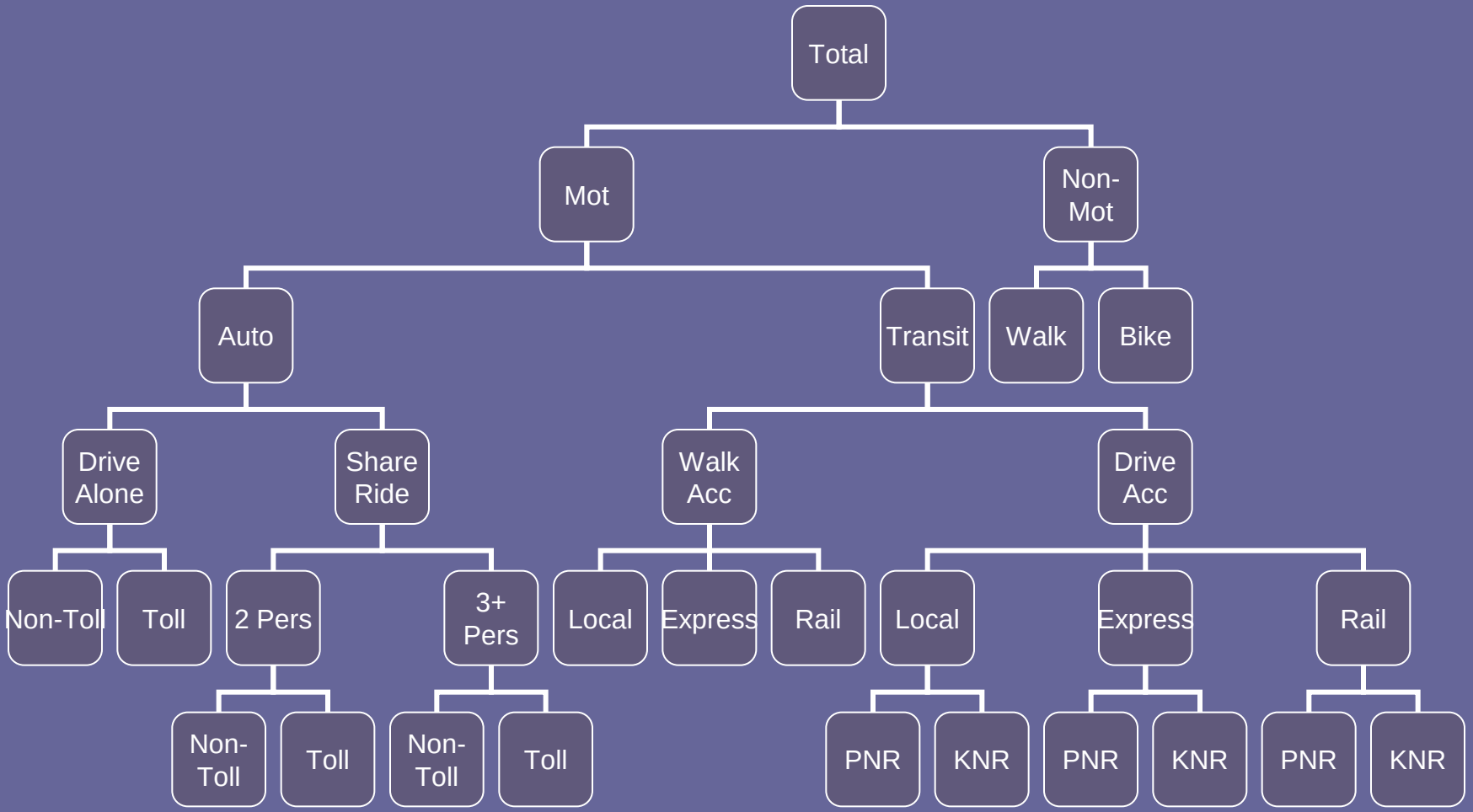
5-County Model

- Trip Distribution
  - Gravity model formulation
  - Use of composite travel time + β*distance for impedance
    - β is based on Mode Choice Auto Op cost and Value of time
  - Trips normalized to production totals

5-County Model

- Mode Split
  - Latest calibrated MARC Mode Choice model (at the time of the project)
  - Incorporates recent MARC HIS data
  - Includes auto, transit and non-motorized modes

Mode Choice Nest Structure



5-County Model

- Assignment
  - Volume-Delay functions: BPR formulation
  - 24 hourly assignments
  - Summed to daily

Challenges

- Lack of Data
  - No Home-Interview Survey
  - No External Station Survey
  - No Truck Survey

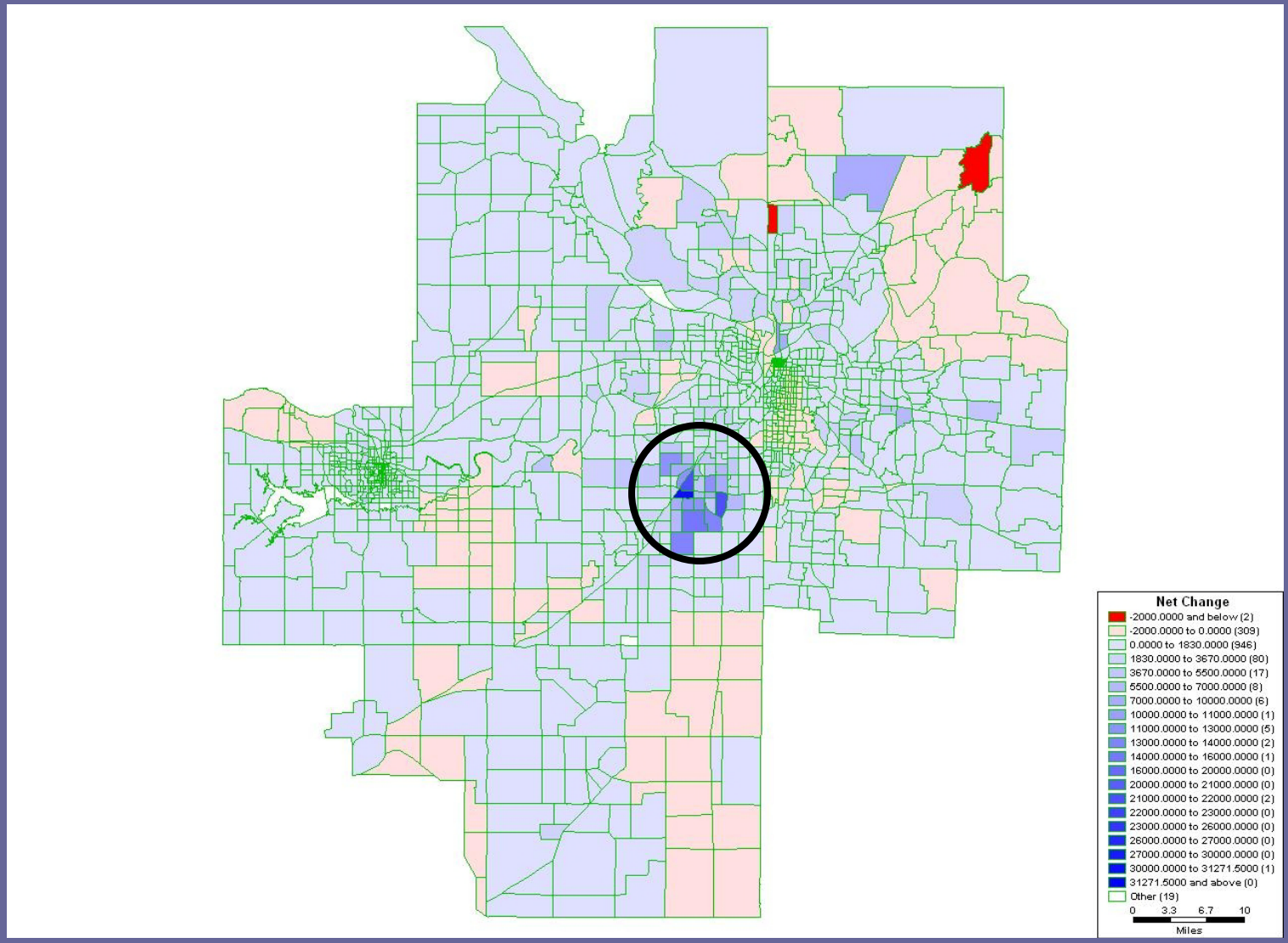
Approach

- Trip Generation
  - Special Generators
  - SME Analysis
  - External Stations
    - Use of existing model external data
    - Counts used elsewhere

Synthetic Matrix Estimation

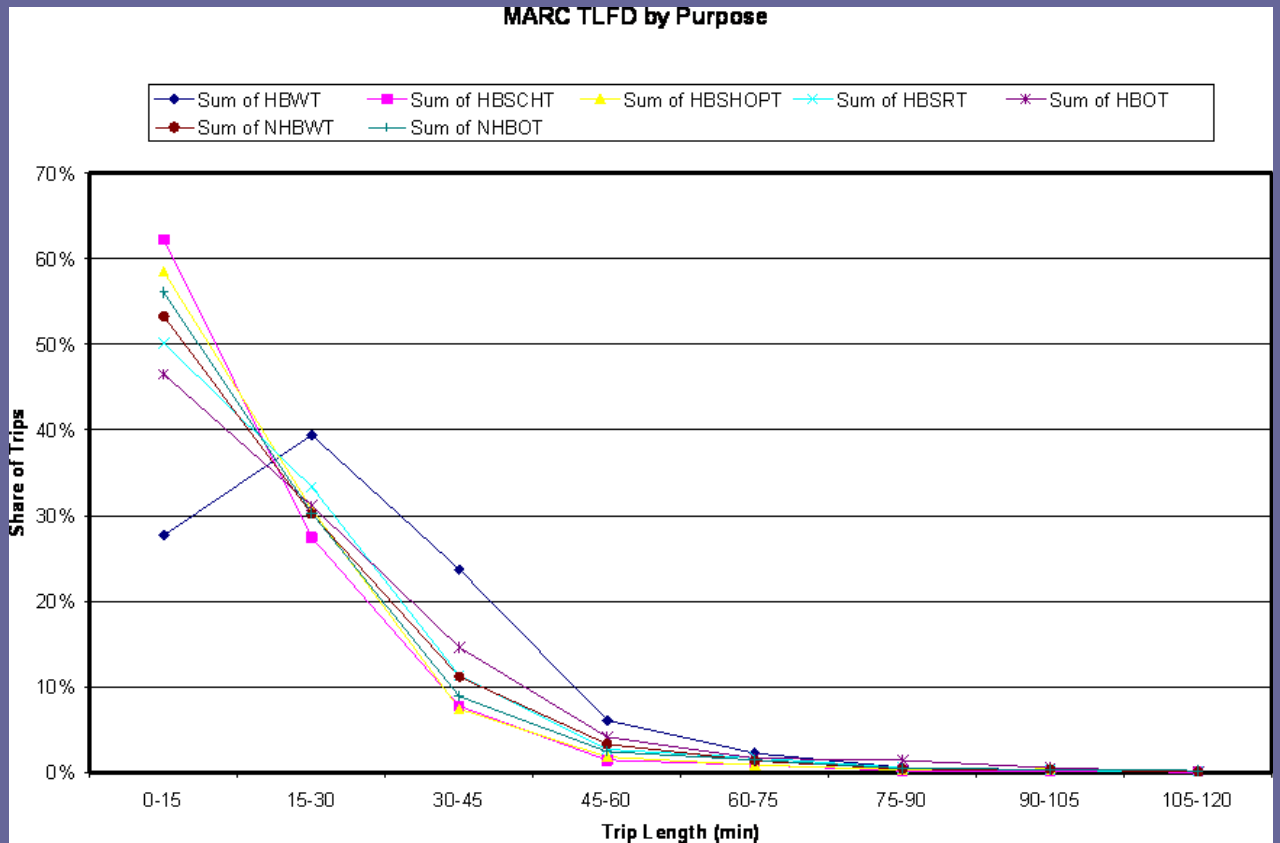
- Used to QC our counts data
- Used to improve model performance
- Addition of Mid-Day trips in Johnson County
- Resulted in Improved RMSE

Trip Generation Comparison Using SME Results



Approach

- Trip Distribution
  - CTPP
  - MARC HIS relative TLFD

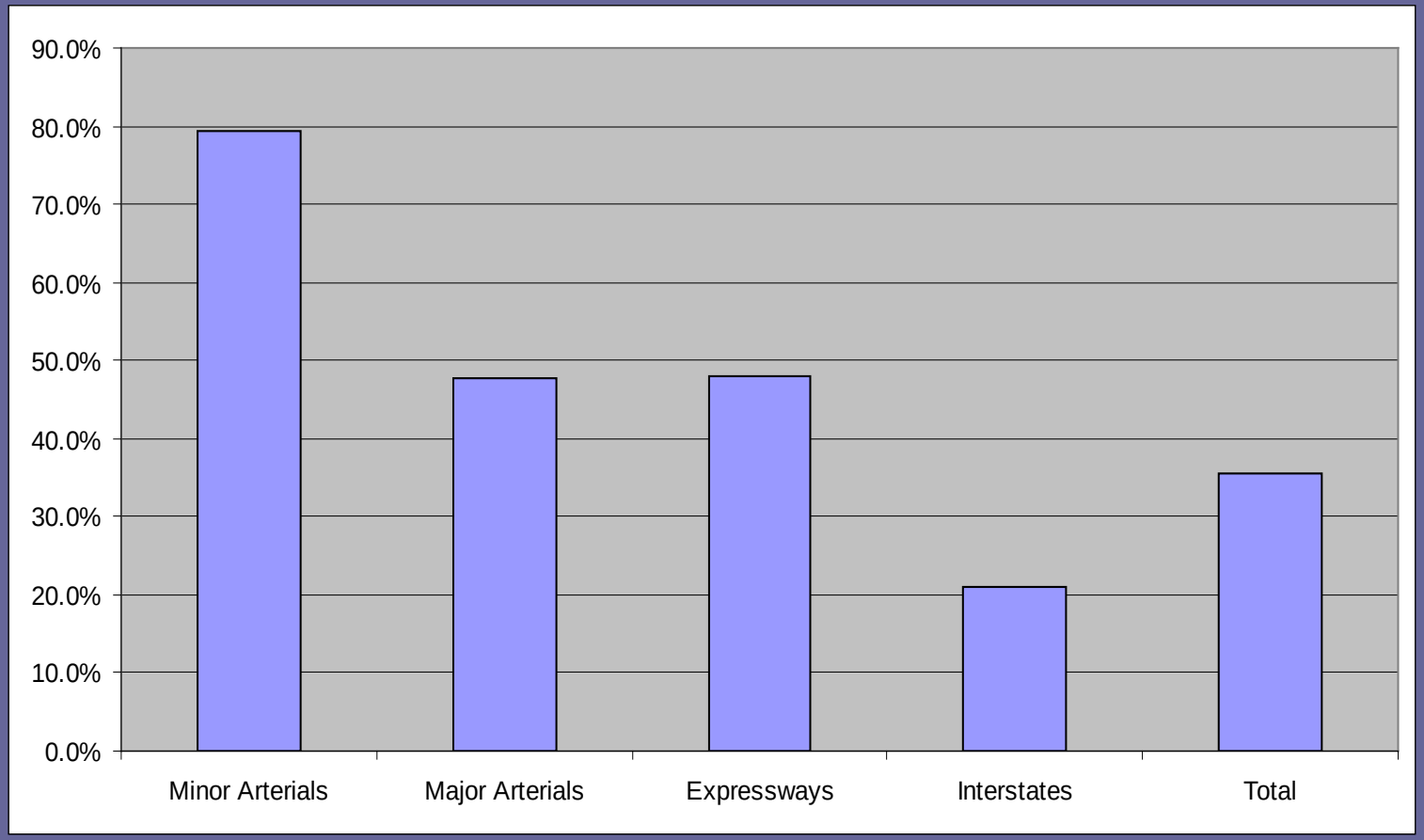


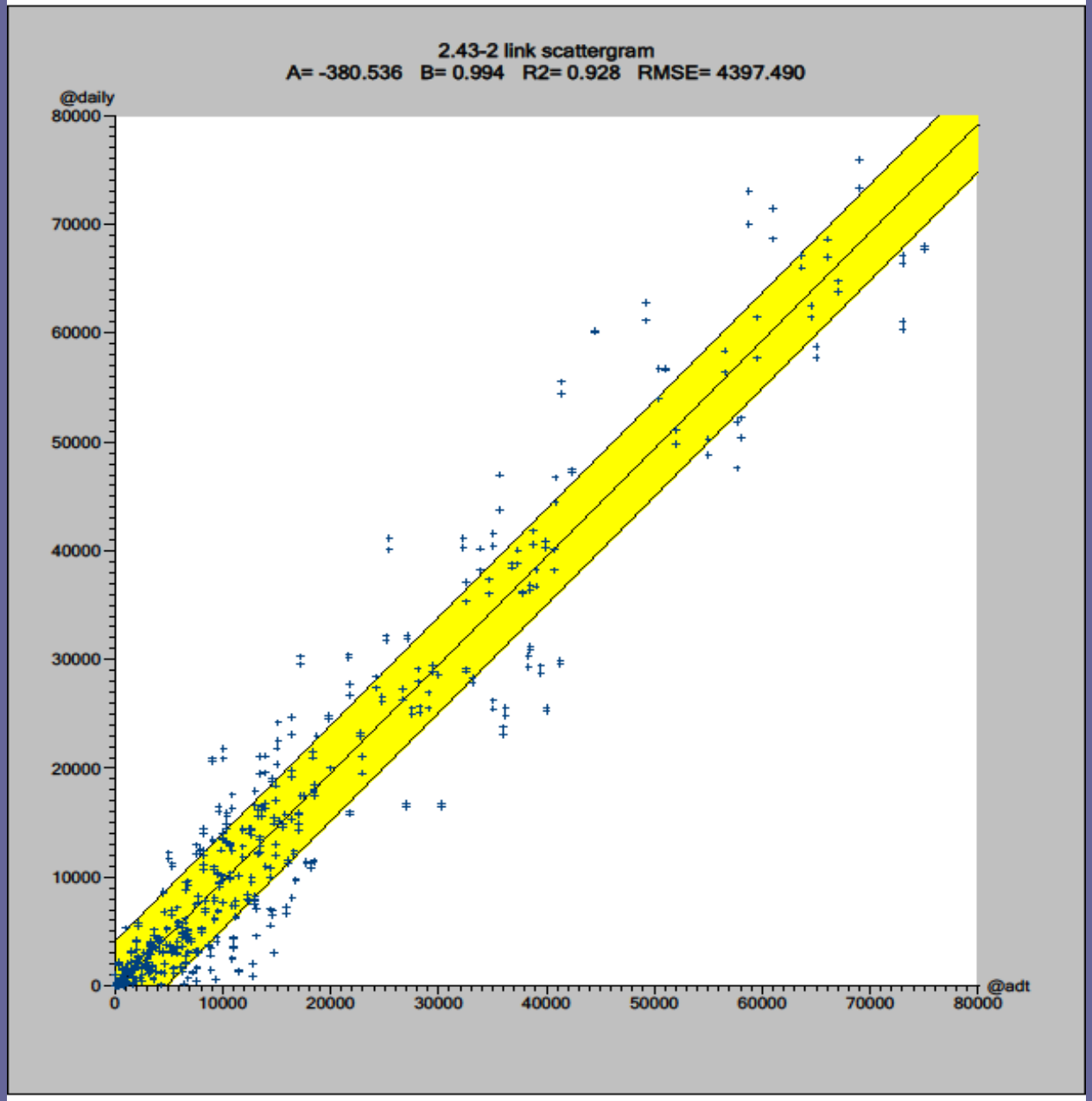
Approach

- Assignment
  - Multi-class
    - Auto
    - Truck

Results

- PRMSE




2.43-2 link scattergram
A= -380.536 B= 0.994 R2= 0.928 RMSE= 4397.490
@daily
@adt
0
10000
20000
30000
40000
50000
60000
70000
80000