

Planning Process

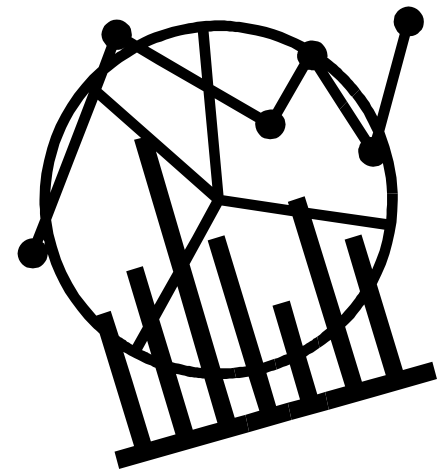
Types of Studies

- ☑ Trend Line
- ☑ Allocation Model
- ☑ Small Urban
- ☑ MPO
- ☑ Regional



Trend Line Study

- ⌘ Very small urban areas or counties
- ⌘ Little growth anticipated
- ⌘ No new thoroughfares expected
- ⌘ Trend line projections of past traffic counts



Travel Allocation Model

- ⌘ Population < 5,000
- ⌘ Growth anticipated
- ⌘ New facilities anticipated
- ⌘ Allocation approach



Small Urban Study



- ⌘ Population between 5,000 and 50,000
- ⌘ Area that has anticipated growth
- ⌘ Area has current TIP project
- ⌘ Perceived need for new location facilities
- ⌘ "Sketch" travel model

MPO Study



- ⌘ Need to answer more policy related questions
- ⌘ Growth communities
- ⌘ Multiple transportation alternatives
- ⌘ Need to perform air quality analysis
- ⌘ Travel Demand Model

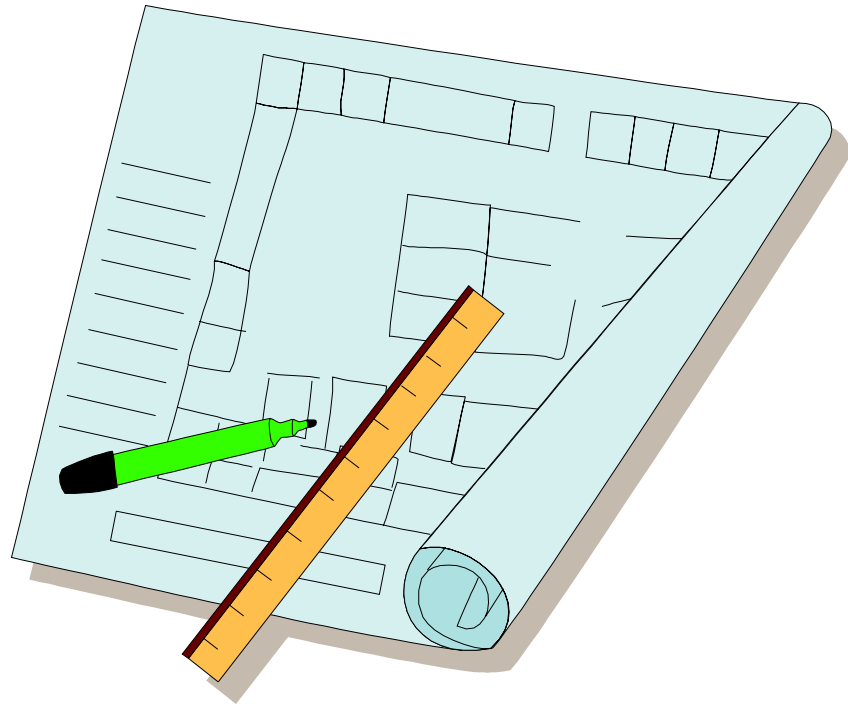
Regional Study



- ⌘ Complex, cross jurisdictional policy issues
- ⌘ Large multi-modal investments
- ⌘ Regional travel flows and facilities
- ⌘ Non-traditional travel models - state of the practice

Planning Process

Travel Allocation Models as a Tool



Why an Allocation Model?



- ⌘ New transportation facilities are anticipated
- ⌘ Base and future travel patterns needed to:
 - ☑ assist in location decisions
 - ☑ determine design requirements
 - ☑ evaluate user benefits of proposed improvements

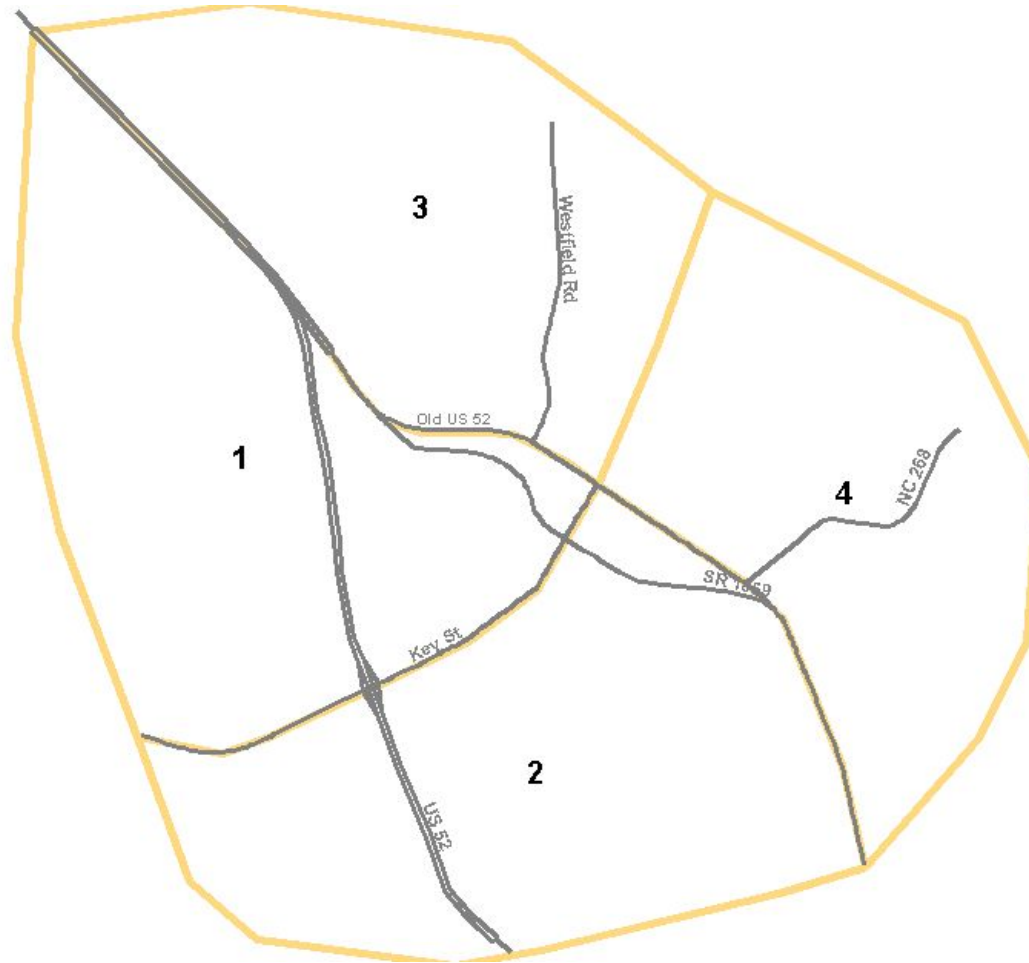
Benefits of an Allocation Model



Can produce estimates of existing and future travel patterns in a fast, low cost, and easy to apply manner.

Teaches the general concepts of transportation planning and travel modeling.

Step 1: Define Planning Area and Traffic Zones



Step 2: Estimate existing and future population

⌘ Step down approach:

☑ county

☑ township

☑ planning area

⌘ Use OSBM or projection from past trends for future year totals

$$POP_{PA} = (POP_{township}) \times (est_{PA_{TS}})$$

Step 3: Estimate external and through trips for external stations

- ⌘ Average daily traffic
- ⌘ Use local knowledge or OD survey to estimate percent through trips

$$IX_{trips} = ADT - THRU$$

$$where : IX_{trips} = IE_{trips} + EI_{trips}$$

Step 3: Example

Station	Total ADT	ThruTrips	Externals
1	2900	1000	1900
2	9500	2800	6700
3	4000	900	3100
4	2000	700	1300
5	6200	2500	3700
6	700	0	700
Total	25300	7900	17400

Step 4: Estimate trips generated by population and development

- ⌘ Estimate persons per dwelling
- ⌘ Estimate trip generation rate
- ⌘ Estimate commercial vehicle trips as a percent of dwellings

$$DU_{trips} = (POP / PPDU) \times (triprate)$$

$$CV_{trips} = (pctcv) \times (DU_{trips})$$

Step 4: Example

$$DU_{trips} = (POP / PPDU) \times (triprate)$$

$$CV_{trips} = (pctcv) \times (DU_{trips})$$

$$DU_{trips} = \left(\frac{7200 p}{2.5 ppdu} \right) * 8.0 \frac{trips}{du} = 23040$$

$$CV_{trips} = (0.125) \times (23040) = 2880$$

Total = 25920

Step 5: Account for trips made by residents leaving the area

- ⌘ Based on knowledge of planning area and surrounding area determine the number of residents and CVs that will have destinations external to the planning area

$$I - I_{trips} = (DU_{trips} + CV_{trips}) \times (pct_{I-I})$$

$$IE_{trips} = (DU_{trips} + CV_{trips}) - (I - I_{trips})$$

Step 5: Example



$$I - I_{trips} = (25920) \times (.80)$$

$$I - I_{trips} = 20736$$

$$IE_{trips} = (25920) - (20736) = 5184$$

Step 6: Account for non-home based trips made by non-residents

- ⌘ Non-residents with destinations in the planning area often make additional trips while in the area
- ⌘ Percentage based on knowledge of area or old survey data

$$EI_{trips} = (ADT - Thru) - (IE_{trips})$$

17 - 40%

$$NHB_{NR} = (EI_{trips}) \times (pct_{NHB})$$

$$TotIntTrips = (I - I_{Trips}) + (NHB_{NR})$$

Step 6: Example

$$EI_{trips} = (25300 - 7900) - (5184)$$

$$EI_{trips} = 12216$$

$$BY \cdot NHB_{trips} = 12216 * 0.20$$

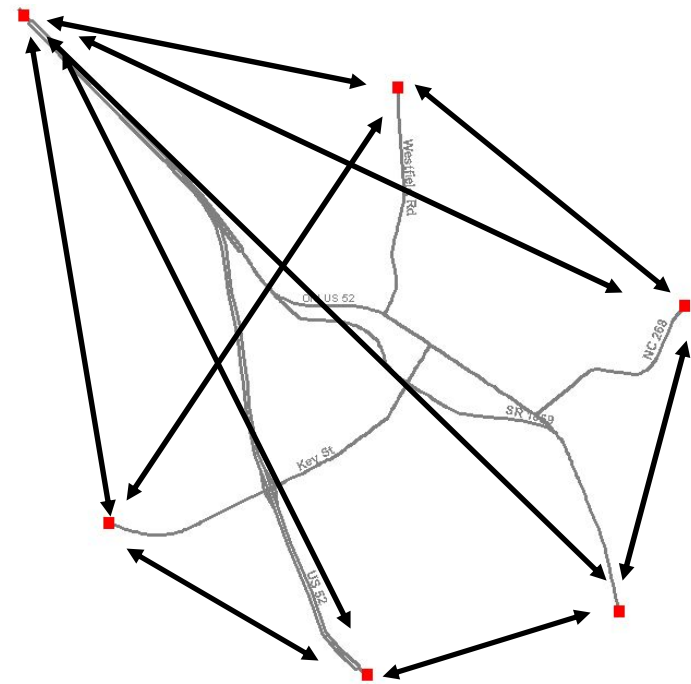
$$BY \cdot NHB_{trips} = 2443$$

$$BY \cdot TotIntTrips = 20736 + 2443$$

$$BY \cdot TotIntTrips = 23179$$

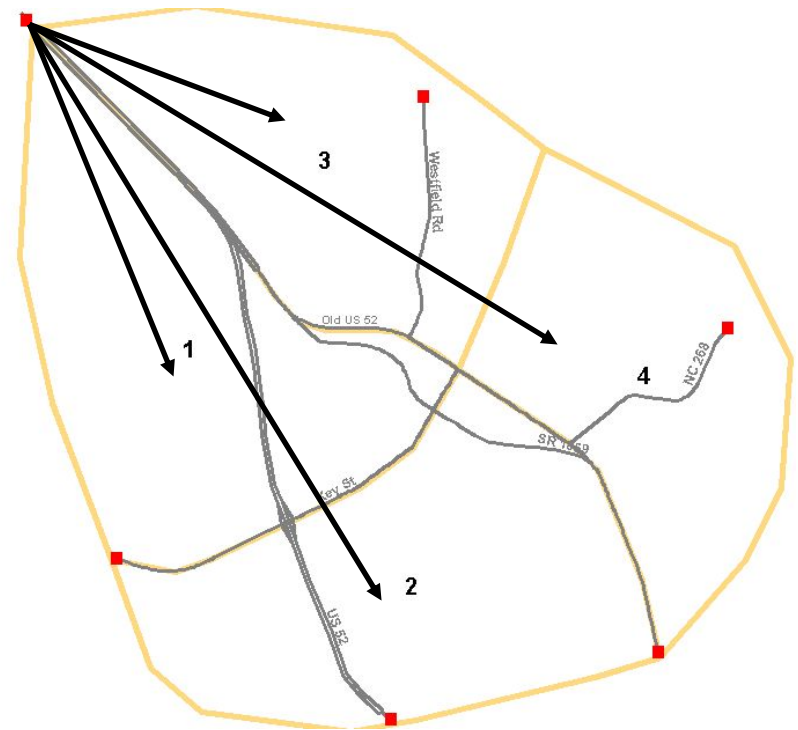
Step 7a: Develop trip tables

- ⌘ Through trips - NCHRP 365 or old survey data
- ⌘ A stick line sketch will help with estimation



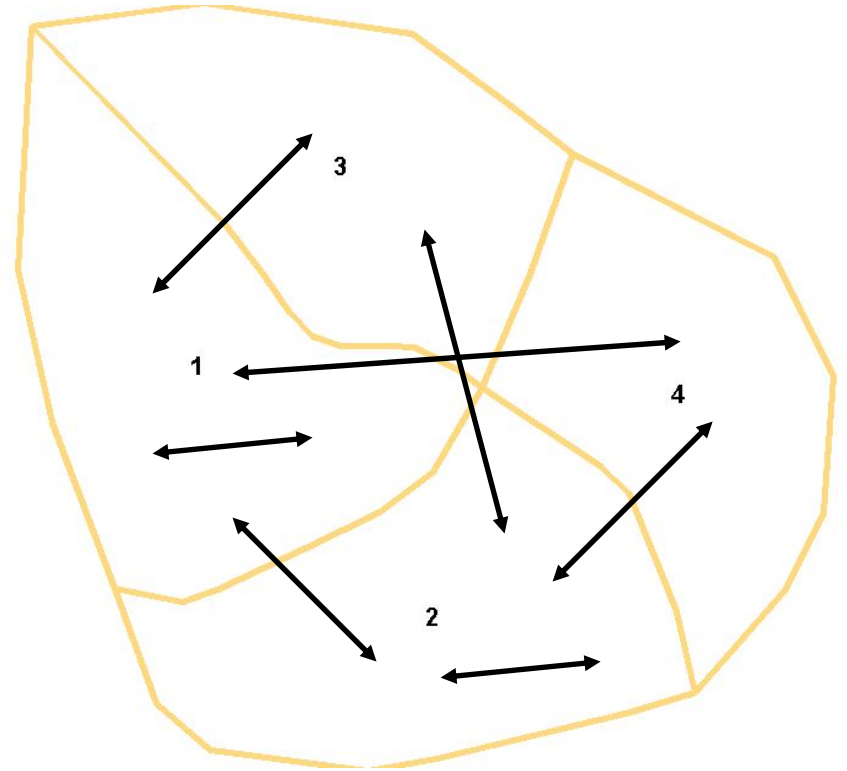
Step 7b: Develop trip tables

⌘ EI trips allocated to internal zones based on relative trip attractiveness judged by knowledge of land uses in zones



Step 7c: Develop trip tables

- ⌘ Internal trips are also distributed based on relative attractiveness
- ⌘ Zone-to-zone distribution and intra-zonal distribution



Step 8: Assign base year trips and check against ground counts



- ⌘ Manually assign trips to the major street system and validate against traffic counts
- ⌘ This process will provide analyst with a systematic understanding of the traffic flows
- ⌘ Using different colors for the different trip types is useful

Step 9: Assign future year trips and evaluate alternatives



- ⌘ An understanding of traffic flows from base year allocation will lead the analyst to a clearer understanding of future year deficiencies

Questions?

