Topic 6
(Handouts)
Traffic Impact Studies
Traffic Impact Studies

- Any new or revised land use will result in change of traffic volumes and patterns
- Change of traffic will impact the transportation facilities in the vicinity of the site
- Development may be approved if transportation facilities will maintain acceptable operations (without or with mitigation measures)
Scope and Tasks

- Time periods for analyses
  - a.m. peak
  - p.m. peak
  - midday peak
  - weekend peak
- Trip generation and distribution
- Trip assignment
- Operational analyses
  - Intersection
  - Arterial
  - Freeway
- Scenarios
  - Existing
  - Background
  - Total (Background + Site)
Trip Generation

- Trip generation manual (ITE)
  - Vehicle trips (total in + total out)
  - Regression models and average rates
  - Daily and peak periods (adjacent street and generator)

- General guidelines
  - Regression model: $\geq 20$ data points with $R^2 > 0.75$
  - Average rate: s.d. $\leq 100\%$ of average rate

- Example:
  Estimate trip generation for Land Use Code 130 (Industrial Park) of 800,000 sq. ft. of GFA, on a weekday during the morning peak hour of adjacent street traffic
Types of Vehicle Trips

- **Primary**
  - Specific for site visiting
  - New to adjacent street

- **Pass-by**
  - New to site but not to adjacent streets

- **Diverted**
  - New to site and adjacent streets, but not to the area
Types of Vehicle Trips

- **PRIMARY TRIPS**
  - (via area and adjacent streets)

- **DIVERTED LINKED TRIPS**
  - (via adjacent streets)
  - (via driveway only)

- **PASS-BY TRIPS**
  - (on adjacent streets)

**LEGEND**

- Trips Prior to Development
- Trips After Development

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Example
Trip Generation, Distribution, Assignment

Estimate the trip generation and Driveway 1 intersection traffic volumes for a shopping center with 580,000 sq. ft. of gross leasable area during the weekday p.m. peak hour. Assume 15% pass-by trips and 20% of total site trips using Driveway 1. Trip distribution is about 20% west, and 80% east for non pass-by trips.
Example

Total: 2000; Primary: 2000*85% = 1700; Pass-by: 300 (150 in, 150 out)

Driveway 1: 2000*20% = 400 [In: 192 (48%); Out: 208 (52%)]
Pass-by: 150*20% = 30 inbound [From East: 25(83%); West: 5]
Primary: 1700*20% = 340; In: 192-30=162; Out: 208-30=178
In: From East: 130(80%); From West: 32(20%)
Out: To East: 142 (80%); To West: 36(20%)

Driveway 2: 800
Driveway 3: 800

Driveway 1: 400 (In: 192; Out: 208)
Related Terms

- **Node**: Intersection
- **Link**: Street that connects nodes or zones
- **Zone**: Development site that generates new trips
- **Gate**: Origin/destination for distributing the site-generated trips
- **Path**: A set of nodes and links that serves trips between a zone and a gate
Inbound/Outbound Path(s)

Gate

Zone

20% 20%

50% 10%

25% 20%

10% 20%

5%

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Study Scenarios

- **Existing**: Traffic demand and intersection geometry prior to site development.
- **Background**: The condition when the site will be developed, but without site-generated traffic.
- **Total (Background + Site)**: Background condition plus the traffic generated by the site.
Framework of TIS Report

- Executive summary
- Scope and objectives
- Description of site and vicinity area
- Existing conditions
- Anticipated nearby development (background)
- Trip generation, distribution, assignment
- Future (total) traffic demands
- Operations with the site development
- Recommendations
TRAFFIX Instructions

- The Help menu has detailed instructions
- Step 1 – Determine study area
  - Zones, Gates, Intersections
  - Land uses, Trip generation, Trip distribution, Geometry, Volume
- Step 2 – Global data and define scenarios
  - DO NOT put land use here
  - Define Trip Generation and Trip Distribution and Select (e.g., AM Peak)
- Step 3 – Create network
  - Draw zones, gates, intersections, and links
  - Enter zone data (land use)
  - Create paths (Shift + Arrow)
- Step 4 – Select Zone(s) and Intersection(s) for analyses (Forecast)
<table>
<thead>
<tr>
<th><strong>Zone</strong></th>
<th>the source of new trips generated within the network contains land use, trip generation rates, and trip distribution percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gate</strong></td>
<td>the perimeter entry/exit points of the network generated trips travel between zones and gates</td>
</tr>
<tr>
<td><strong>Signalized Intersection</strong></td>
<td>an intersection with signalized controls (either fixed-time, actuated or semi-actuated)</td>
</tr>
<tr>
<td><strong>Cross Street</strong></td>
<td>a node used in the creation of the network, but not a subject analysis</td>
</tr>
<tr>
<td><strong>4-way Stop Intersection</strong></td>
<td>an unsignalized intersection with all-way stop controls</td>
</tr>
<tr>
<td><strong>Unsignalized Intersection</strong></td>
<td>an intersection with stop or yield control on the minor street only</td>
</tr>
<tr>
<td><strong>Roundabout Intersection</strong></td>
<td>an intersection with all-way yield controls</td>
</tr>
<tr>
<td><strong>Text</strong></td>
<td>used to annotate the network for street, zone, and gate identification, among other uses</td>
</tr>
<tr>
<td><strong>Link</strong></td>
<td>the roadways connecting intersections, cross streets, zones, and gates; links are drawn as one-way facilities, so two links are needed to represent a two-way street; to draw two-way links, hold the CTRL key while drawing links</td>
</tr>
<tr>
<td><strong>Picture</strong></td>
<td>Used to load, position and scale graphic underlay images in the work area</td>
</tr>
</tbody>
</table>