Place Type-Oriented Land Use Simulation for Land Use/Transportation Decision Making

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Land Use Scenario and Place Type
Scenario Planning

- A process that uses scenarios to assess the future utilizes a series of scenarios to gauge possible future conditions.
- Due to the strong relationship between land use patterns and travel behavior, scenario planning integrating land use and transportation has become much more widespread.
- A survey in 2005 identified 79 land use/transportation scenario planning projects in the US.

Concept of Place Type

- Place Type - a way to design and define land use patterns
- A place Type reflects pedestrian shed
  - ¼ mile diameter area (40 acres)
  - Combination of different building/parcel types in the shed
Decomposition of Urban Space

Decomposition

The smallest Unit

Decomposition

CBD

Urban Center

Transit Center

Urban Neighborhood

Parcel

Residential Neighborhood

Suburban Subdivision
Re-composition of Urban Space

Parcels

Place Types

- Suburban Neighborhood
- Urban Neighborhood
- Town Center
- CBD
- .......
Example of Place Type

Land use detail

<table>
<thead>
<tr>
<th>Non-Developable</th>
<th>Developable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Park</td>
<td>SF House</td>
</tr>
<tr>
<td>Retention</td>
<td>Apartment</td>
</tr>
<tr>
<td>Road</td>
<td>Mixed Use</td>
</tr>
<tr>
<td>Civic</td>
<td>Retail</td>
</tr>
<tr>
<td>Parking</td>
<td>Office</td>
</tr>
<tr>
<td>Total</td>
<td>Total</td>
</tr>
<tr>
<td>GRAND TOTAL</td>
<td>100 %</td>
</tr>
</tbody>
</table>

- Dwelling Units/Acre: 5
- Non-Residential FAR: 0.72

Dwelling Units/Acre: 5
Non-Residential FAR: 0.72
CorPlan Application
- NFRPO Land Use Scenario Planning-
Land use scenario planning in conjunction with 2035 Long Range Transportation Plan (LRTP) of North Florida Transportation Planning Organization

Exploring alternative land use concepts and the associated long term transportation impacts and opportunities
Developing future land use alternatives in the region in order to accommodate projected population and employment growth.

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Clay</td>
<td>184,624</td>
<td>47,374</td>
<td>132,176</td>
<td>25,270</td>
<td>1.84%</td>
<td>1.44%</td>
</tr>
<tr>
<td>Nassau</td>
<td>67,681</td>
<td>20,213</td>
<td>38,819</td>
<td>10,782</td>
<td>1.52%</td>
<td>1.44%</td>
</tr>
<tr>
<td>St. Johns</td>
<td>157,981</td>
<td>65,666</td>
<td>168,382</td>
<td>35,027</td>
<td>2.45%</td>
<td>1.44%</td>
</tr>
<tr>
<td>Duval</td>
<td>855,572</td>
<td>509,112</td>
<td>362,428</td>
<td>271,564</td>
<td>1.18%</td>
<td>1.44%</td>
</tr>
<tr>
<td>Total</td>
<td>1,262,795</td>
<td>642,365</td>
<td>701,805</td>
<td>342,643</td>
<td>Avg. 1.48%</td>
<td>Avg. 1.44%</td>
</tr>
</tbody>
</table>
CorPlan

- A customized GIS land use simulation tool that allows creating and allocating place types.
Designing Parcel with CorPlan

- Any kind of parcels can be modeled from high-raised mixed used lot to community park.
A place type is a combination of different parcel types.
Parcels can be pulled out from the list of parcels created earlier.
Community Element for the Project
Base Polygon Preparation

- Defining geographic unit of analysis
  - Polygrids or parcel polygons
  - Homogenous land use within polygon
- Classifying a study area into three categories
  - Undevelopable area
    - environmental area, ROW, SF residential area, ...
  - Redevelopable area
    - built non-residential area
  - Developable area
    - vacant and agricultural land
Allocation of Place Types
Allocation Results Review

- **Summary Interface**
  - Providing socio-economic data based on allocation
  - Keeping tracking allocation in overall or in particular areas
Development of Four Scenarios

- Scenario A – Concentric Outer Growth
- Scenario B – North-South Centers Growth
- Scenario C – Satellite Centers Growth
- Scenario D – Transit Centers Growth
Allocation Results Export

- **Data Export Interface**
  - Summarizing allocated data by any geographical boundary (TAZ or census block) or place type
  - Allowing exporting the summarized data in a format of DBF for further analysis
  - Generating input data for transportation modeling
Scenario Comparison

- Using the GIS layer, a variety of GIS analysis can be performed for the scenario comparison purposes.

<table>
<thead>
<tr>
<th>PERFORMANCE MEASURES</th>
<th>Trend Scenario</th>
<th>Scenario A</th>
<th>Scenario B</th>
<th>Scenario C</th>
<th>Scenario D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total acreage of existing agricultural lands converted to urbanized lands</td>
<td>66,166</td>
<td>44,017</td>
<td>37,995</td>
<td>45,147</td>
<td>31,831</td>
</tr>
<tr>
<td>Persons per acre of developed lands (efficiency of urbanized land)</td>
<td>6.28</td>
<td>9.95</td>
<td>10.66</td>
<td>9.57</td>
<td>11.31</td>
</tr>
<tr>
<td>% of new households accommodated through redevelopment</td>
<td>17%</td>
<td>3%</td>
<td>2%</td>
<td>4%</td>
<td>18%</td>
</tr>
<tr>
<td>% of new jobs accommodated through redevelopment</td>
<td>18%</td>
<td>4%</td>
<td>2%</td>
<td>5%</td>
<td>22%</td>
</tr>
</tbody>
</table>
CorPlan, a customized ArcGIS application, allows creating and spatially allocating urban place types.

Variety of land use scenarios can be built from the spatial allocation of place types.

ArcGIS supports performing the spatial analysis of developed scenarios.

CorPlan supports transportation decision making by comparing different land use development patterns.