An overview of transport modelling tools
Practical applications and future opportunities
George Lunt, AECOM
AECOM’s professionals around the world are united by a common purpose –

To create, enhance and sustain the world’s built, natural and social environments

A set of common values is at the heart of our culture

Integrity
Employees
Clients
Excellence
Innovation
Agility
Safety
AECOM in Bristol

107 technical staff
Transportation
Buildings
Environment
Programme, Cost, Consultancy

University of Bristol, Queens Road Building
Building Services, BREAM

Bristol Royal Infirmary
Structural Engineering, Civil/Infrastructure Engineering,
Geotechnical, Ecology, Transportation, Acoustic Engineering, CDM-Coordinator

Bristol Arena, Cost Consultants
• To give an overview of transport modelling tools and approaches, and how new technology is influencing their application

  – Why model?
  – Typical Models
  – The Future
Why model transport?

- Understand Current Conditions
- Identify Improvements
- Assess Improvement Options
- Present Options to Key Decision Makers / Stakeholders
- Improve Transport Provision

- Economy
- Environment
- Health and Wellbeing
- Society
What kind of transport models are there?

Wide Area

GIS

And others!

Local Area
How do you model the movement of people and goods from origins to destinations, and the resulting impact on the transport network?
Wide area modelling

Trip Generation

Trip Assignment

Mode Choice

Trip Distribution

Bristol 2011 census
50% car
20% foot
10% bus
8% bike
5% pass’ger
2% train
Local area modelling: Junction Modelling
Local area modelling: Microsimulation
Local area modelling: Pedestrians
GIS / Accessibility: Permeability Assessment
# GIS / Accessibility: Permeability Assessment

## Permeability Assessment Tool

### Scheme Details

<table>
<thead>
<tr>
<th>Scheme ID and Name:</th>
<th>Post part 8 - Route Ballyowen Plan (Esther)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scheme Description</td>
<td>Improvements to existing route involving improved access points and a new walking and cycling path as well as toucan crossings (subject to detailed design)</td>
</tr>
</tbody>
</table>

### Catchment Size

| Population within 800m (through network) | 8521 | 4 |
| Performance against theoretical maximum | 54% | 3 |

### Socio - Demographic Profile of population within 800m of the scheme (through network)

<table>
<thead>
<tr>
<th>Value</th>
<th>Percentage</th>
<th>SCORE: 7/15</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. travel to work on foot (Average = 18%)</td>
<td>819</td>
<td>(13%)</td>
</tr>
<tr>
<td>No. Travel to work by bike (Average = 3%)</td>
<td>104</td>
<td>(2%)</td>
</tr>
<tr>
<td>No car households (Average = 14%)</td>
<td>198</td>
<td>(8%)</td>
</tr>
</tbody>
</table>

### Current Usage

| Walkers and cyclists (per hour) | 0.0 | 1 |
| Cyclists (per hour) | 0.0 | 1 |

### Calculated Walking and Cycling Distances (and times) to Key Destinations

<table>
<thead>
<tr>
<th>Distance (m)</th>
<th>Cycle Time (minutes)</th>
<th>Walk Time (minutes)</th>
<th>Anticipated Impact</th>
<th>Weighted Average Journey Time for top 5 destinations (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1362.06</td>
<td>05:04</td>
<td>16.54</td>
<td>3</td>
<td>926.206</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>01:36</td>
<td>5</td>
<td>05:19</td>
</tr>
</tbody>
</table>

### Modal Shift Potential - Quantitative Assessment Score

- **Directness**
  - Existing: 1
  - With Proposed Scheme: 4
  - Improvement: 3
- **Personal Security**
  - Existing: 2
  - With Proposed Scheme: 3
  - Improvement: 1
- **Legibility**
  - Existing: 1
  - With Proposed Scheme: 4
  - Improvement: 3
- **Quality of Environment**
  - Existing: 3
  - With Proposed Scheme: 3
  - Improvement: 0
- **Maintenance**
  - Existing: 2
  - With Proposed Scheme: 4
  - Improvement: 2
- **Road safety**
  - Existing: 2
  - With Proposed Scheme: 4
  - Improvement: 2
- **Overall Qualitative Score**
  - Existing: 21%
  - With Proposed Scheme: 67%
  - Improvement: 46%

### Contribution to Objectives (aligned to national and local policy objectives)

- **Encourage the use of walking and cycling for local trips; encouraging modal shift away from car use.**
  - This scheme would benefit a large catchment area with moderate levels of walking and cycling and few no car households. Journey time benefits are moderate, suggesting a moderate level of modal shift potential.
  - Safety and security are anticipated to improve as a result of this scheme, with a moderate quality of environment maintained.

- **Provide safe and secure walking and cycling routes which have a positive impact upon the public realm.**
  - This scheme would improve access to a school, shops and community facilities.

- **Provide routes which more directly serve key local education, employment, health, retail and community destinations.**
  - This option would improve local access to the bus network. The scheme is considered a secondary cycleway within the proposed Greater Dublin Area Cycle Network.
GIS / Accessibility: Permeability Assessment

Permeability Assessment Tool - AECOM

Summary

Created using PAT version 1.1

Schemes:
1. Shared route from Marlfield to Aylesbury
2. Fihouse Rd West to SWP, Old Bawn, Tallaght
3. Ballyowen Park to Outer Ring Road
4. Shared route at Belgard Heights, Tallaght
5. Ballyoden Way to Whitechurch
5.1 St Eanna’s / Grange Rd to Whitechurch
6. Knocklyon
7. River Carmac to Green Route
8. Shared route from Bawnogue to Grand Canal
9. Broadfield Manor
10. Willbrook Park to Lucan
11. Fihouse Road via Woodtown
12. Mount Belfrew
13. West Tallaght Link
14. Saggart to Avoca via Rathcoole Park
15. Paddocks to Hillcrest Adamstown
16. School Complex, Rathfarnham
17. Foxtworth estate, Lucan
18. Links to Kingswood Local Centre
19. Links to Kilnamangan Local Centre
20. Sarah Currin Avenue to Ballyboden Road
21. Original part 8 - Route Ballyowen Plan (Esker)
22A. Post part 8 - Route Ballyowen Plan (Esker)
22B. Post part 8 - Route Ballyowen Plan (Esker)

Scheme Benefits & Costs

-10% 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100% 110%

Audit Score
GIS Score

<table>
<thead>
<tr>
<th>Scheme</th>
<th>Benefit/Cost</th>
<th>Benefit vs Cost</th>
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<td>8</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
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<tr>
<td>17</td>
<td>18</td>
<td>55</td>
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</tbody>
</table>

€ 100,000 € 200,000 € 300,000 € 400,000 € 500,000 € 600,000 € 700,000

GIS / Accessibility: Permeability Assessment

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Future modelling opportunities
Summary

Transport Modelling is very important in order to:

• Understand current conditions
• Identify improvements
• Assess improvement options
• Present options to key decision makers / stakeholders
• Improve transport provision

Three Key Modelling tools have been presented, although many others exist:

• Wide area modelling
• Local area modelling
• GIS / accessibility

Modelling tools have not caught up with changing technology. Many opportunities to influence and change current approaches and techniques