Building a Relief Road:
Relieving Congestion – Reducing CO_2?

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ARUP

Outline

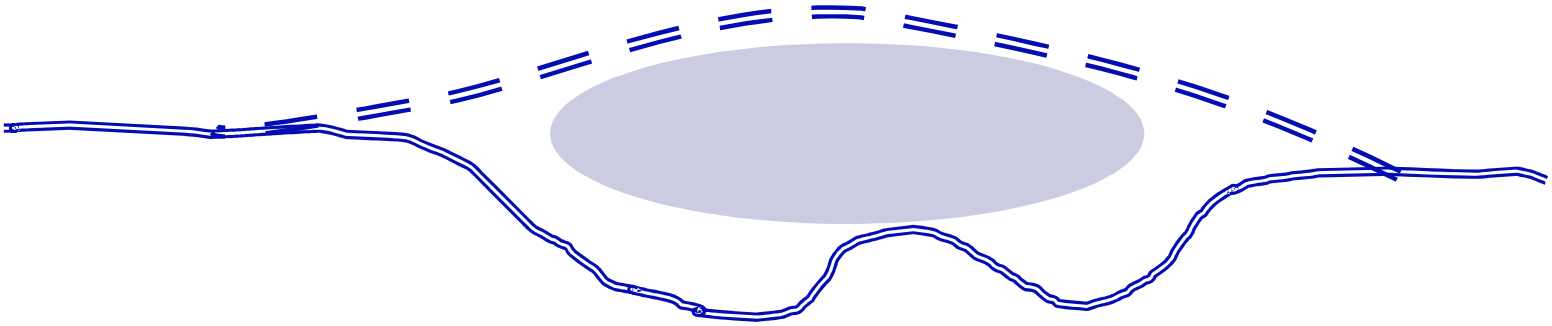
- Introduction
- Study Project
- Emissions Modelling
- Instantaneous Emissions Modelling
- Microsimulation Model
- Study Results
- Other Applications
- Conclusions

Introduction

- **CO_2 and Climate Change**
- **Road Transport 21.7% of UK CO_2 Emissions**
- **10 Year Trends**
- **‘Traditional Thinking’**
  - More Roads
  - More Cars
  - More Pollution

Study Project

- Sub-standard Motorway
- Peak Time Congestion
- Proposed Parallel Motorway
- Confidential



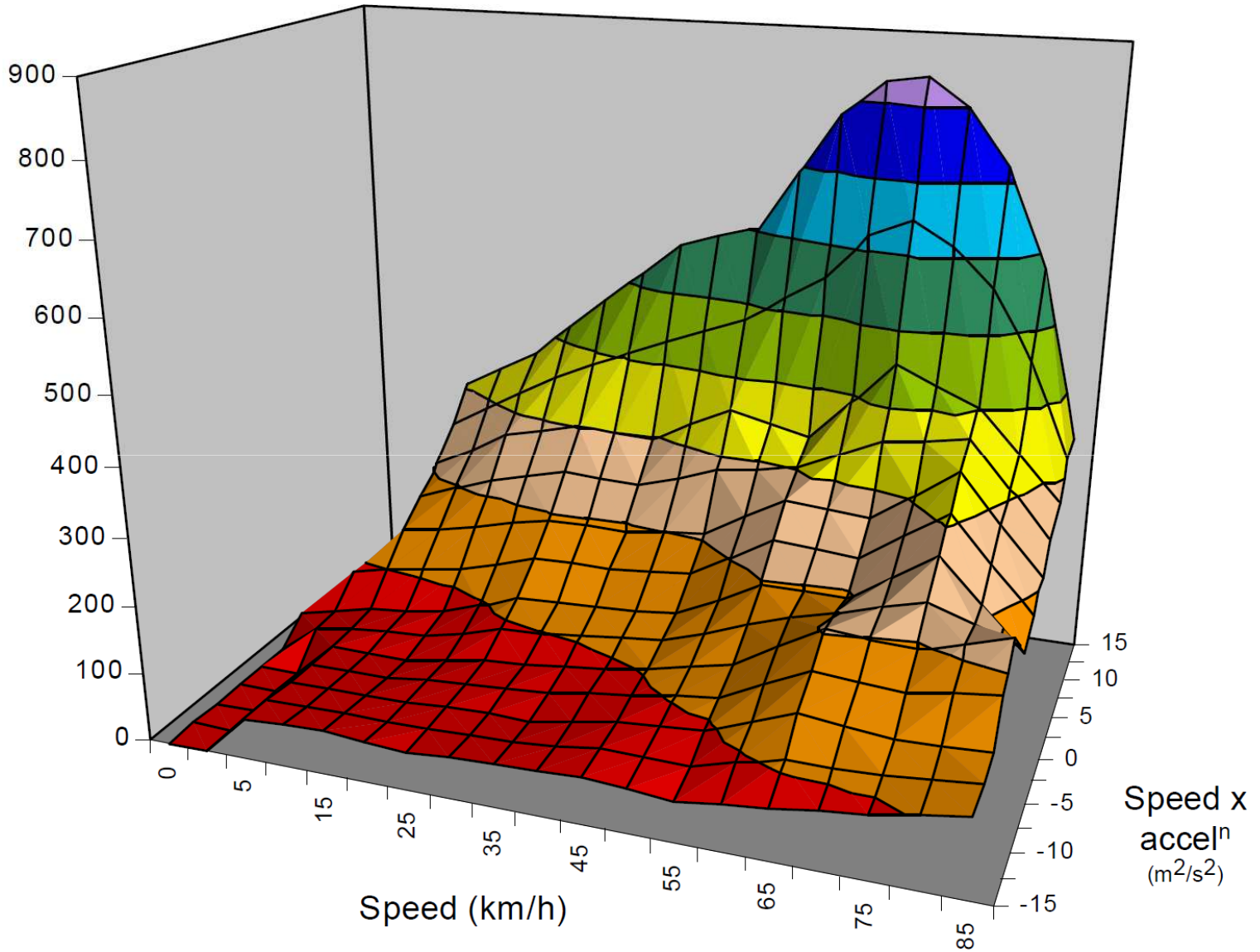
Emissions Modelling

- **Strategic Traffic Model (SATURN)**
  - Average Flow
  - Average Speed
- **TUBA and Bespoke Tool**
- **4%-7% Increase in Traffic Volumes**
- **3%-7% Increase in CO_2 Emissions**
- **Over Simplification**

Instantaneous Emissions Modelling

- **DMRB requirement for ‘complex situations’**
- **Vehicle Emissions Database**
- **MODEM**
  - 150 vehicles
  - 12 vehicle classes
  - Matrix of Measured Emissions
  - HC, NO_x, CO, CO_2, PM
- **VERSIT+, PHEM**

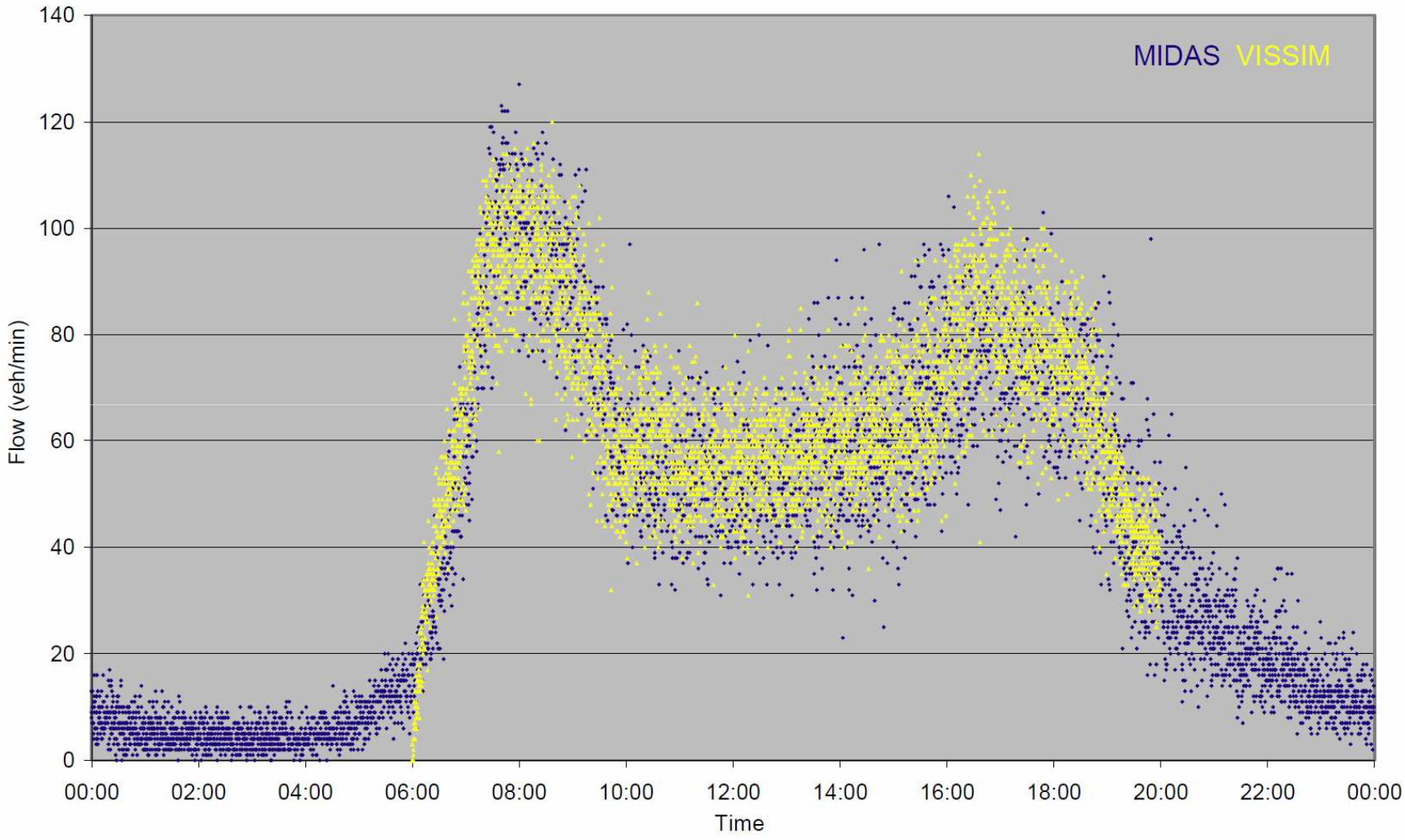
Instantaneous Emissions Modelling



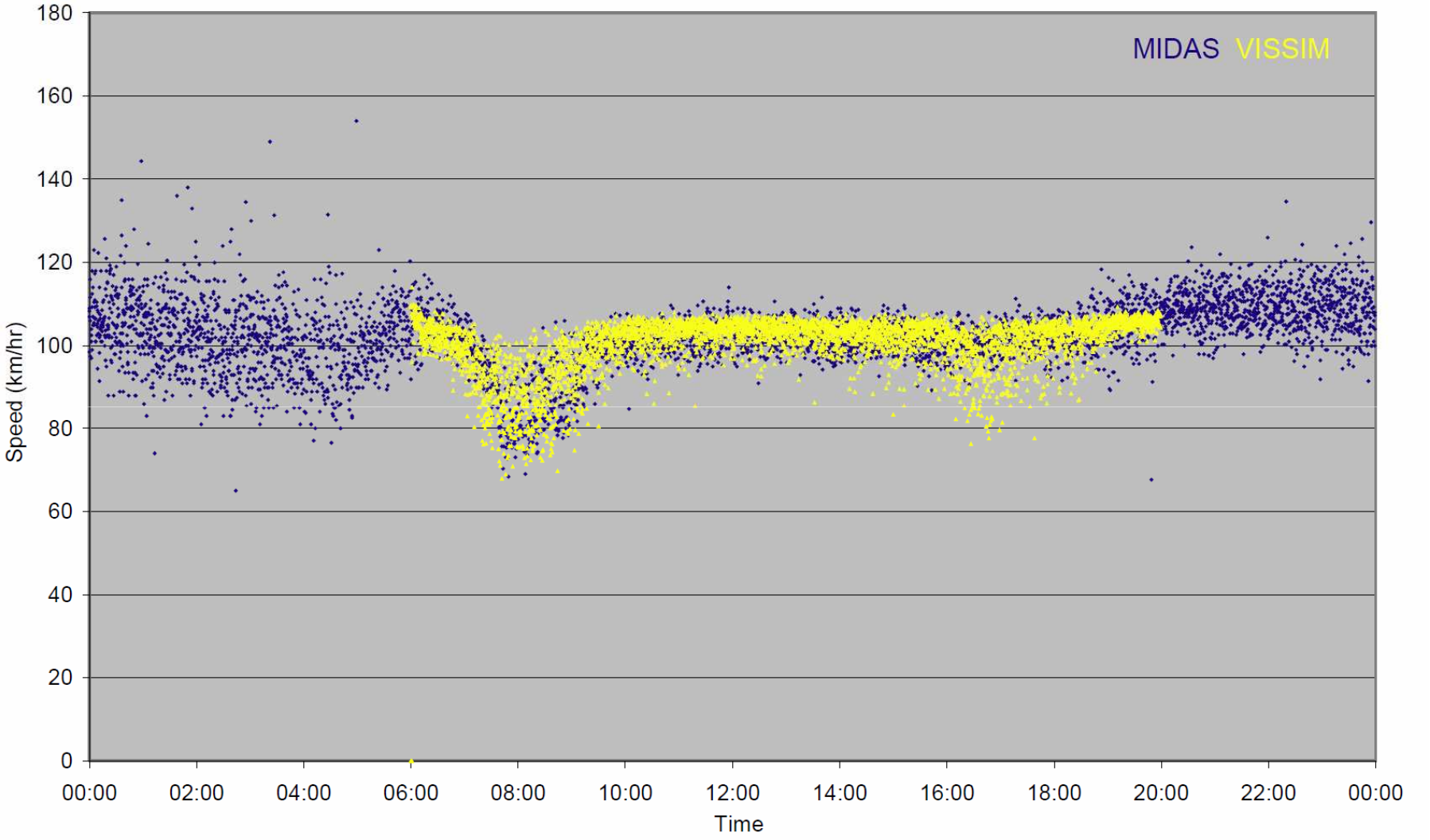
Microsimulation Model

- **VISSIM**
- **14 Hour Modelled Period**
- **Driver Behaviour**
- **Random Variation**
- **Calibration**
- **Validation (MIDAS)**
  - Hourly Flow
  - Instantaneous Flow
  - Instantaneous Speed

Microsimulation Model



Microsimulation Model



Study Results

- 4-7% Increase in Traffic Volumes
- 5-7% Reduction in Total CO_2
- 14% Reduction in g/km CO_2

- Tonnes of CO_2 per day

	2016	2031
Do Minimum	261	271
Do Something	241	256

Other Applications

- **‘Traditional Thinking’**
  - More Roads
  - More Cars
  - More Pollution
- **Study Outcome**
  - More Roads
  - More Cars
  - **Less** Pollution
  - Reduced Congestion
- **Other Highway Improvement Schemes**
- **Individual Merit**

Conclusions

- Focus CO_2 Emissions
- ‘Traditional Thinking’
- May Reduce Emissions
- Case-By-Case Basis
- Embodied Carbon

Questions?