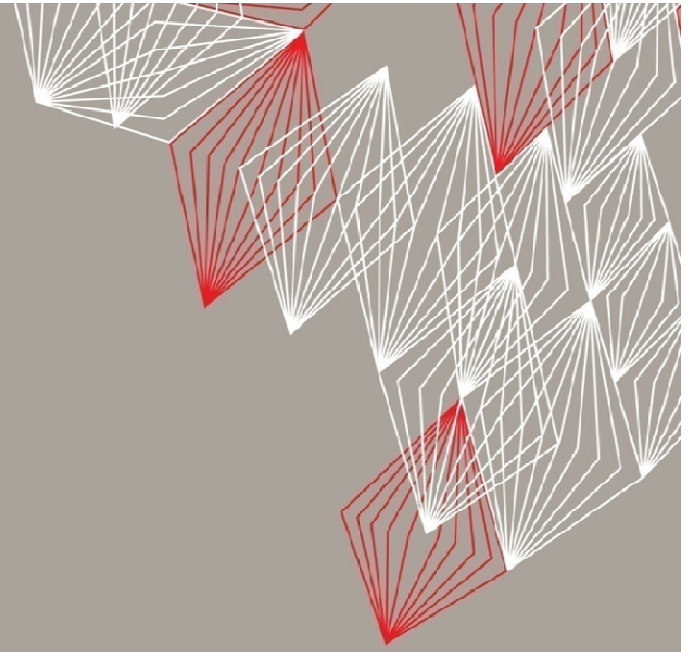


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PARKING IN BALANCE:

A Geospatial analysis of efficiency of parking system

AUTHOR:

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CO-AUTHORS:

Dr. Ir. M.H.P. (Mark) Zuidgeest

Ir. M.J.G. (Mark) Brussel



FACULTY OF GEO-INFORMATION SCIENCE AND EARTH OBSERVATION

PARKING STATUS QUO

“Politics ain't worrying this country one-tenth as
much as where to find a parking space”

Will Rogers (1879-1935)



SUPPLY IMBALANCE

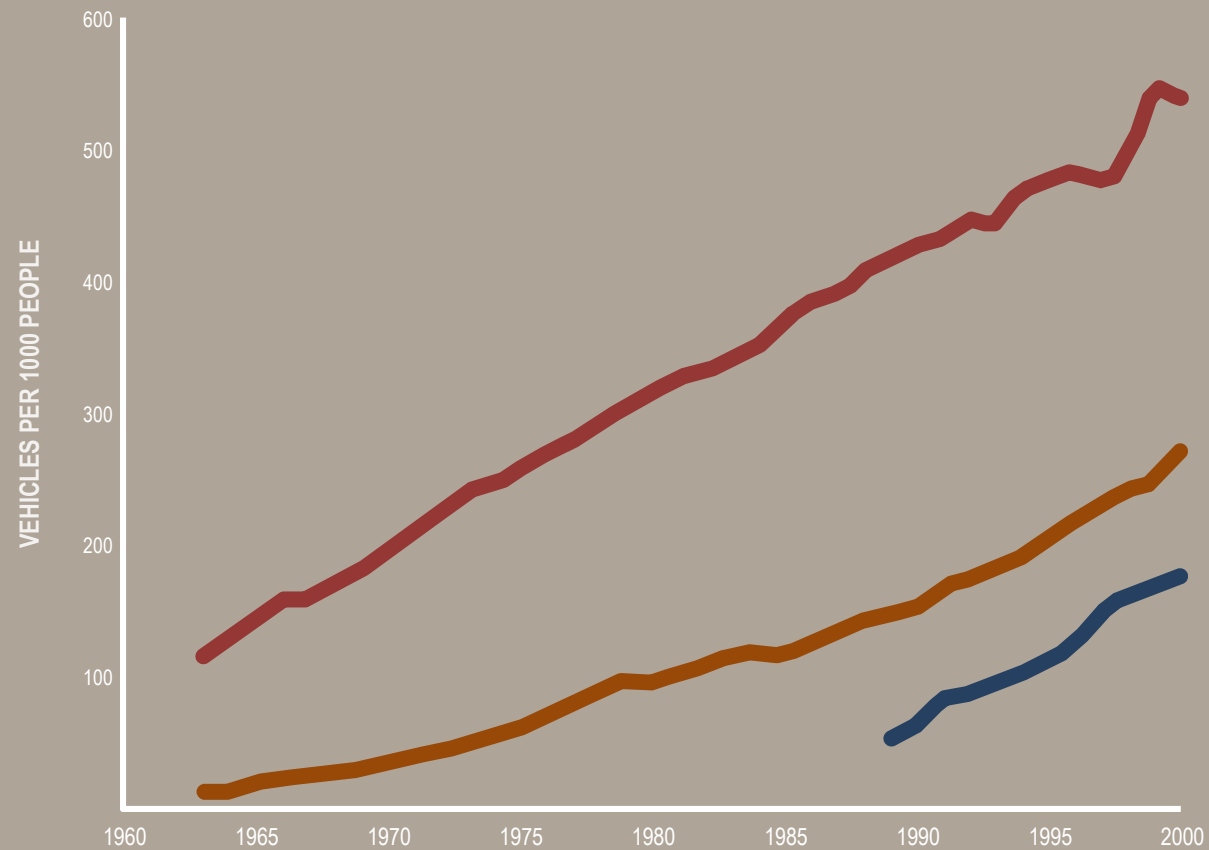


PARKHAUS GARAGE PARKING, ENSCHEDE

**ON - STREET
PARKING**



INCREASING VEHICULAR OWNERSHIP



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WESTERN EUROPE

EASTERN EUROPE

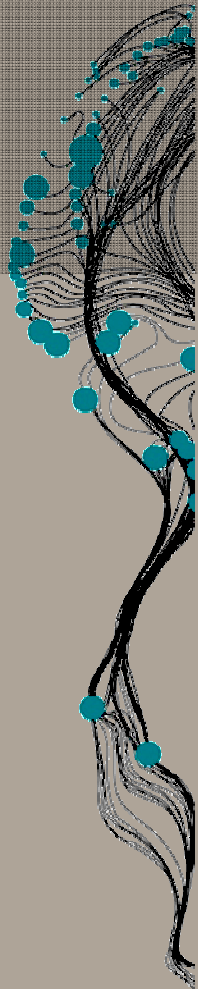
C.I.S. COUNTRIES

PARKING PROBLEMS
EXISTING APPROACH

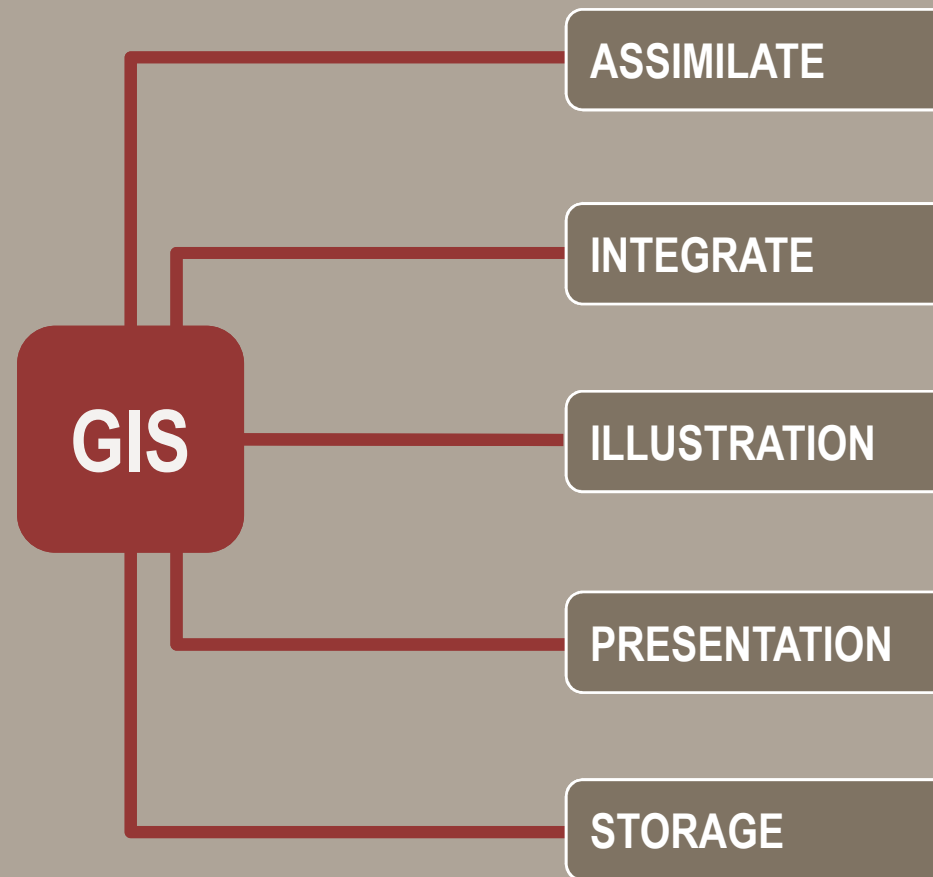
PROBLEMS



EFFECTIVENESS



A GIS BASED MODEL





ADVANTAGES

A GIS BASED MODEL

Scenario
Development

Spatial
Analysis

Multi – Criteria
Analysis

Faster Analysis &
Visualisation

Easier Data
Management

Simulation &
Modelling





GOAL

A GIS BASED MODEL

“

To **devise a GIS tool** which can simulate the working of **parking policy** interventions, assess the effects of these interventions on the parking system and **indicate the future problem** areas.

”



PARKING POLICY

BASIC CHALLENGES

DEFINING DEMAND VARIABLE	CONSIDERING NON-MONETARY COSTS
1	2
4	3
DEFINING SCALE OF IMPACT	MEASURING EFFECT OF A POLICY

HOW DO WE OVERCOME THESE CHALLENGES?

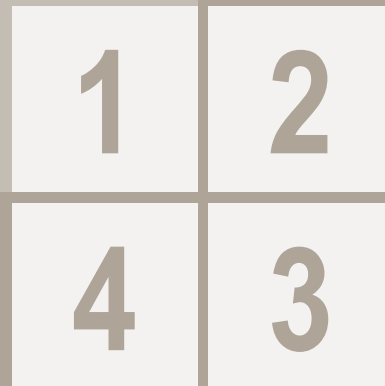




PARKING POLICY

BASIC CHALLENGES

DEFINING DEMAND
VARIABLE



VEHICLE OWNERSHIP ?

UTILISATION?

TRIPS MADE



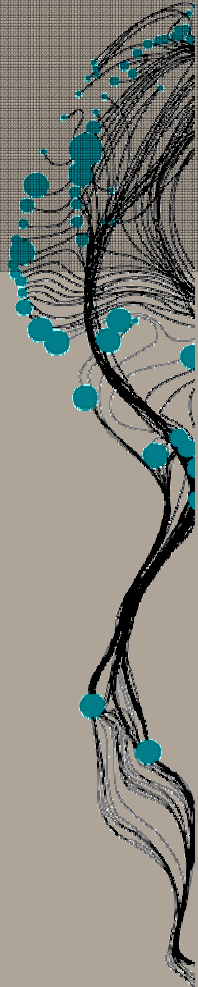
PARKING POLICY

BASIC CHALLENGES

DEFINING DEMAND VARIABLE	CONSIDERING NON-MONETARY COSTS
1	2
4	3

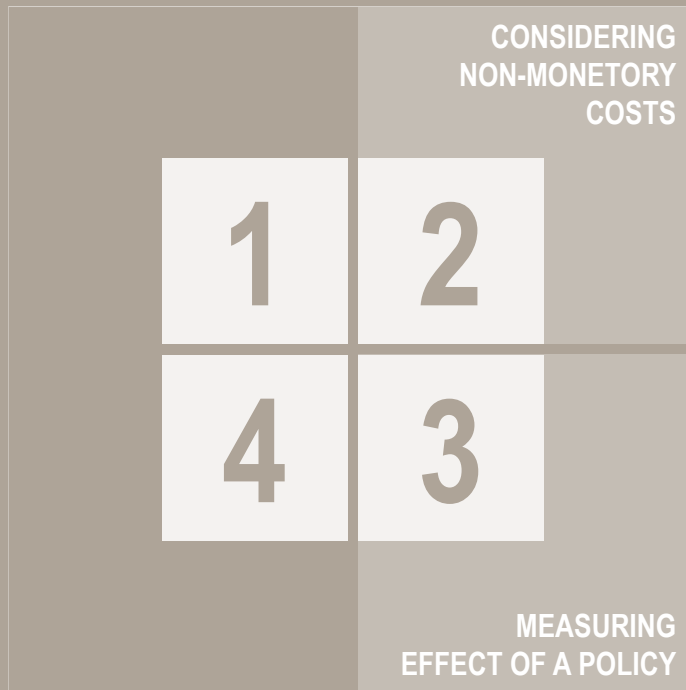


PROXY INDICATORS

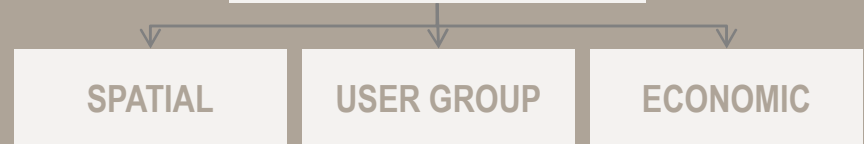


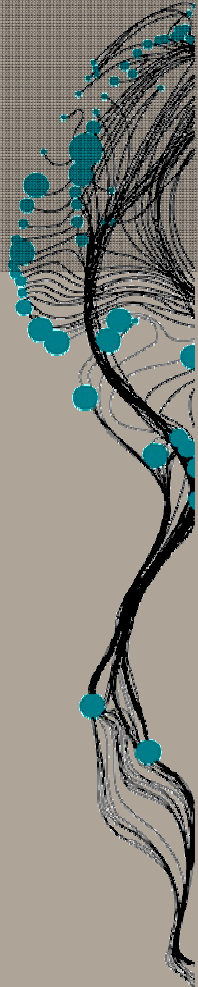
PARKING POLICY

BASIC CHALLENGES



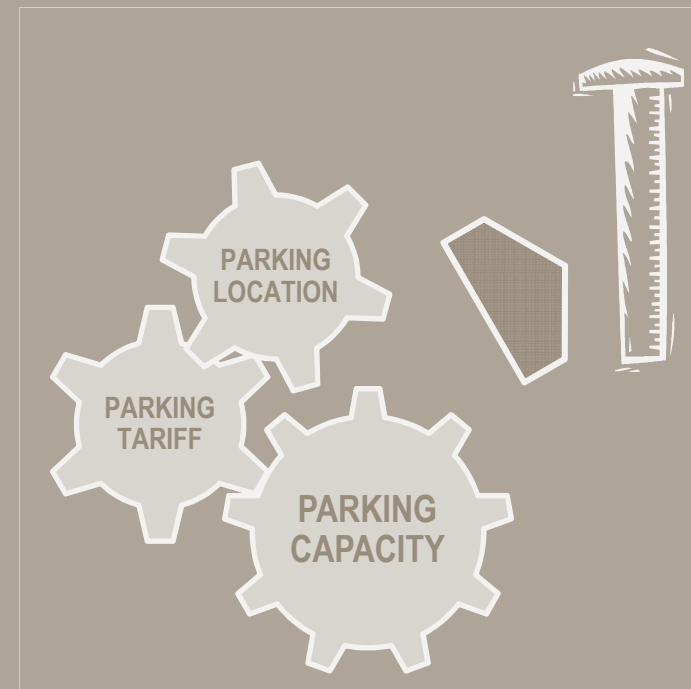
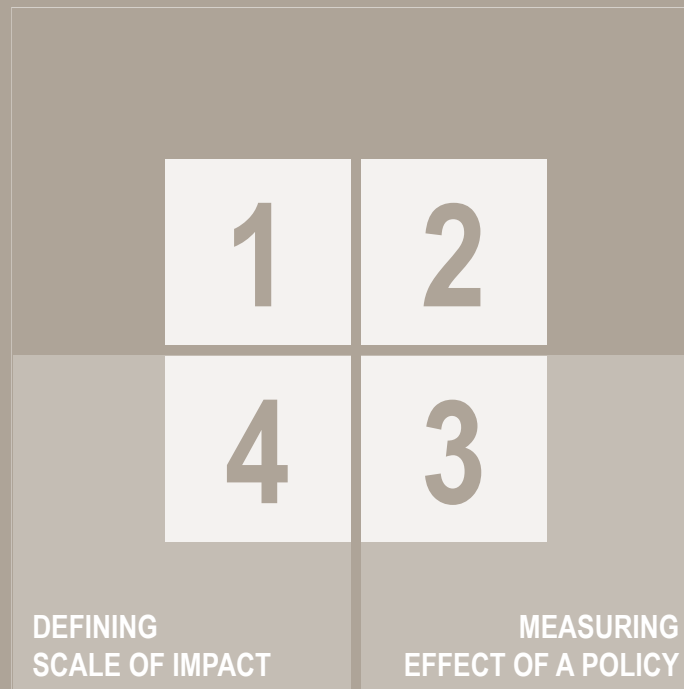
EFFICIENCY



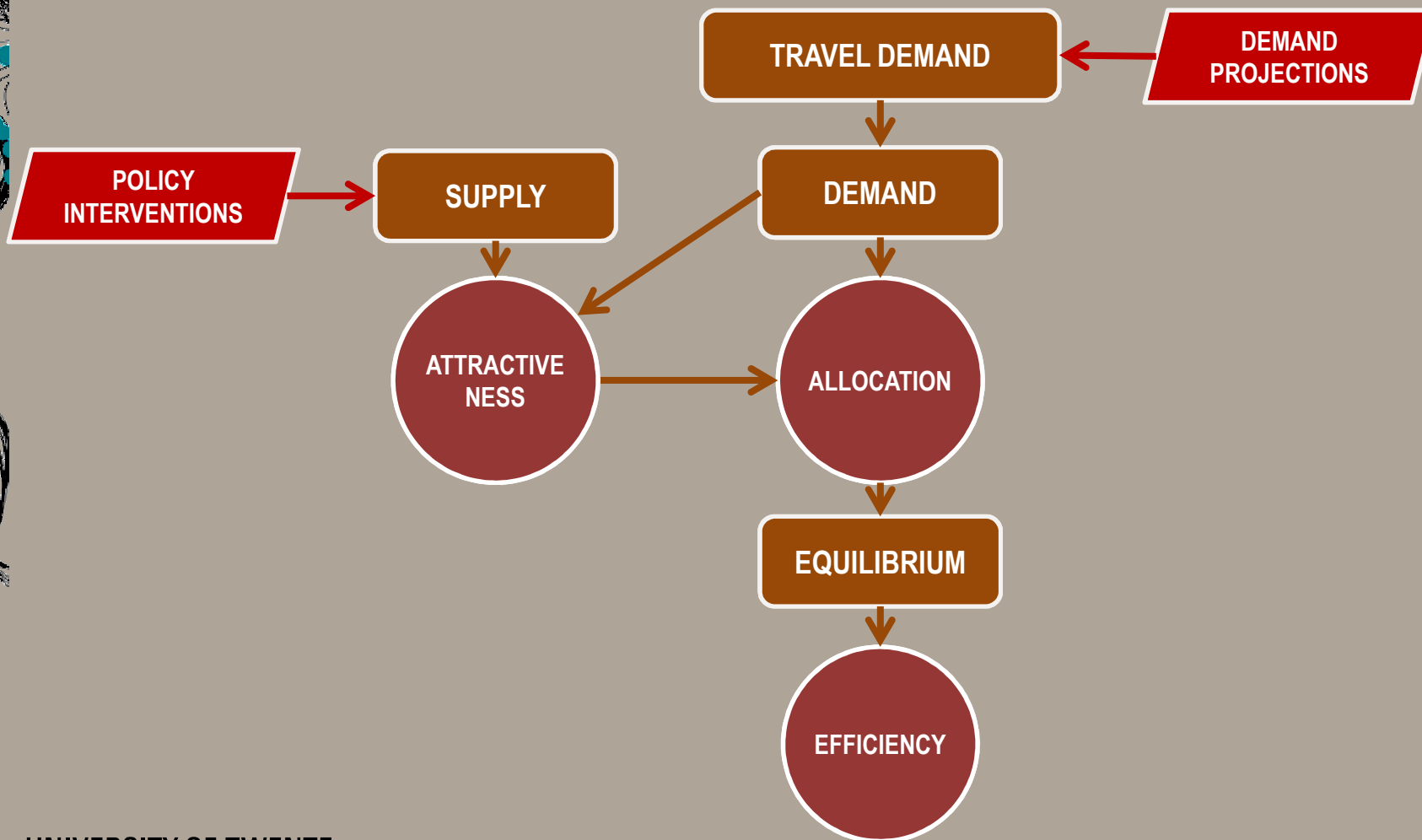


PARKING POLICY

BASIC CHALLENGES



CONCEPTUAL FRAMEWORK





DATA REQUIREMENTS

PARKING SUPPLY

Character wise

- On street
- Off street

Attributes

- Location
- Capacity
- Tariff
- Operating time
- Maintenance costs

Parking zoning system

PARKING DEMAND

O/D data

- Weekday peak
- Weekend peak
- Weekday off peak

Actual Utilization

- Weekday peak
- Weekend peak
- Weekday off peak

PARING LOT ATTRACTIVENESS

Behavioural surveys

Trip characteristics

OTHER

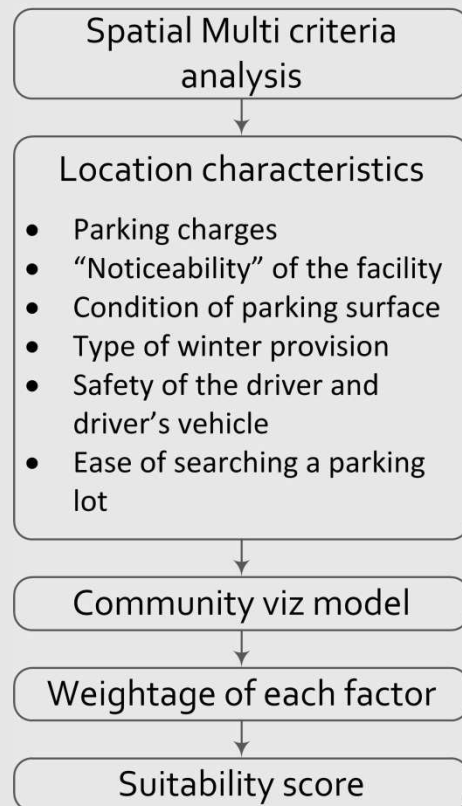
Major Activity location

Current parking policies

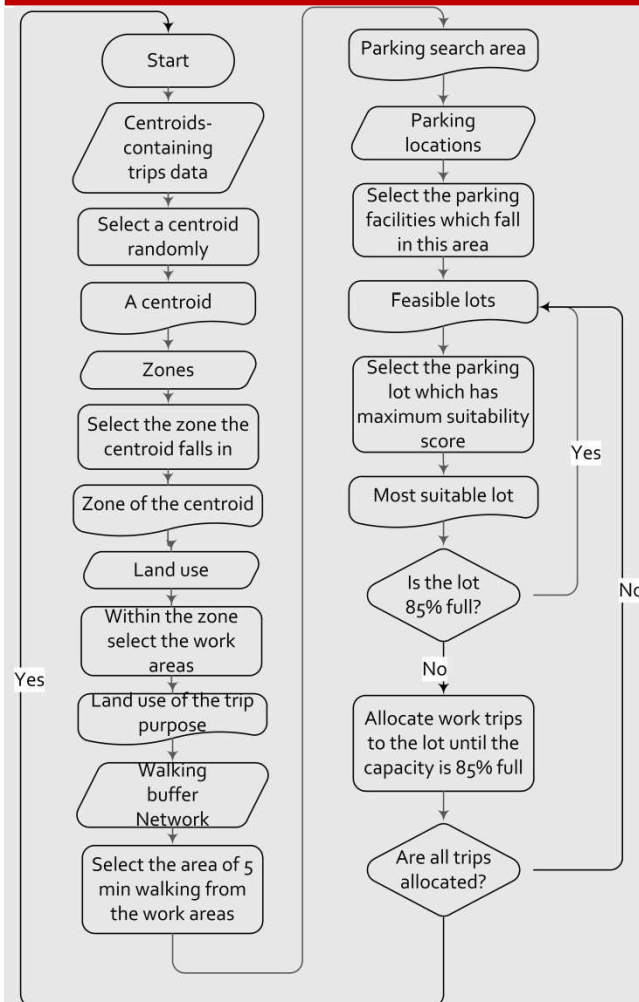
Future land use developments

METHODOLOGY

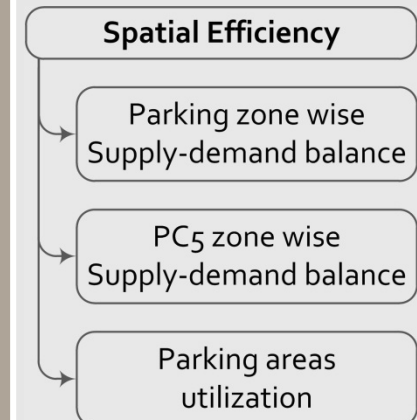
Parking Choice model

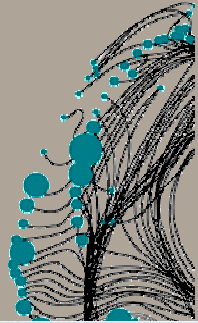


Parking allocation model



Parking efficiency





COMMUNITY VIZ. MODEL

PARKING CHOICE SMCE MODEL

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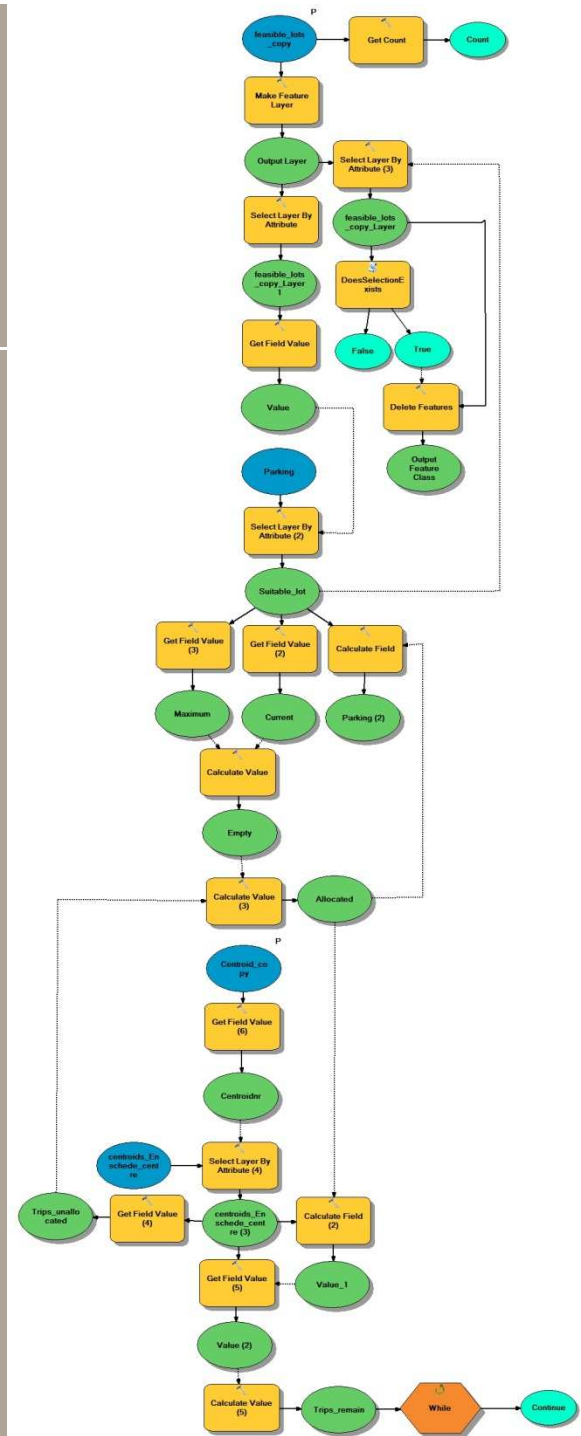
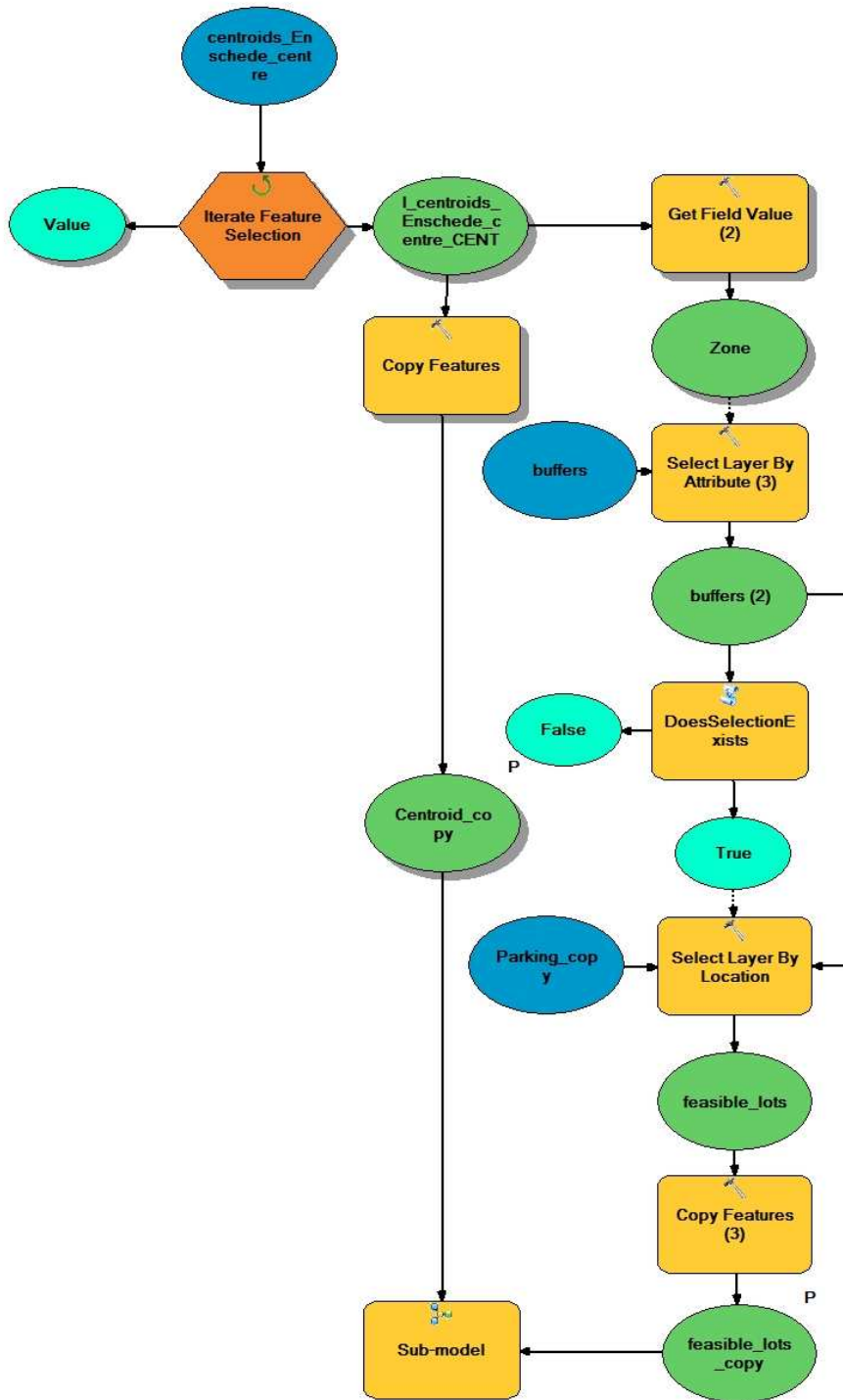
- Base Scenario
- D:\0. Final Research
 - Parking

Trip Characteristics

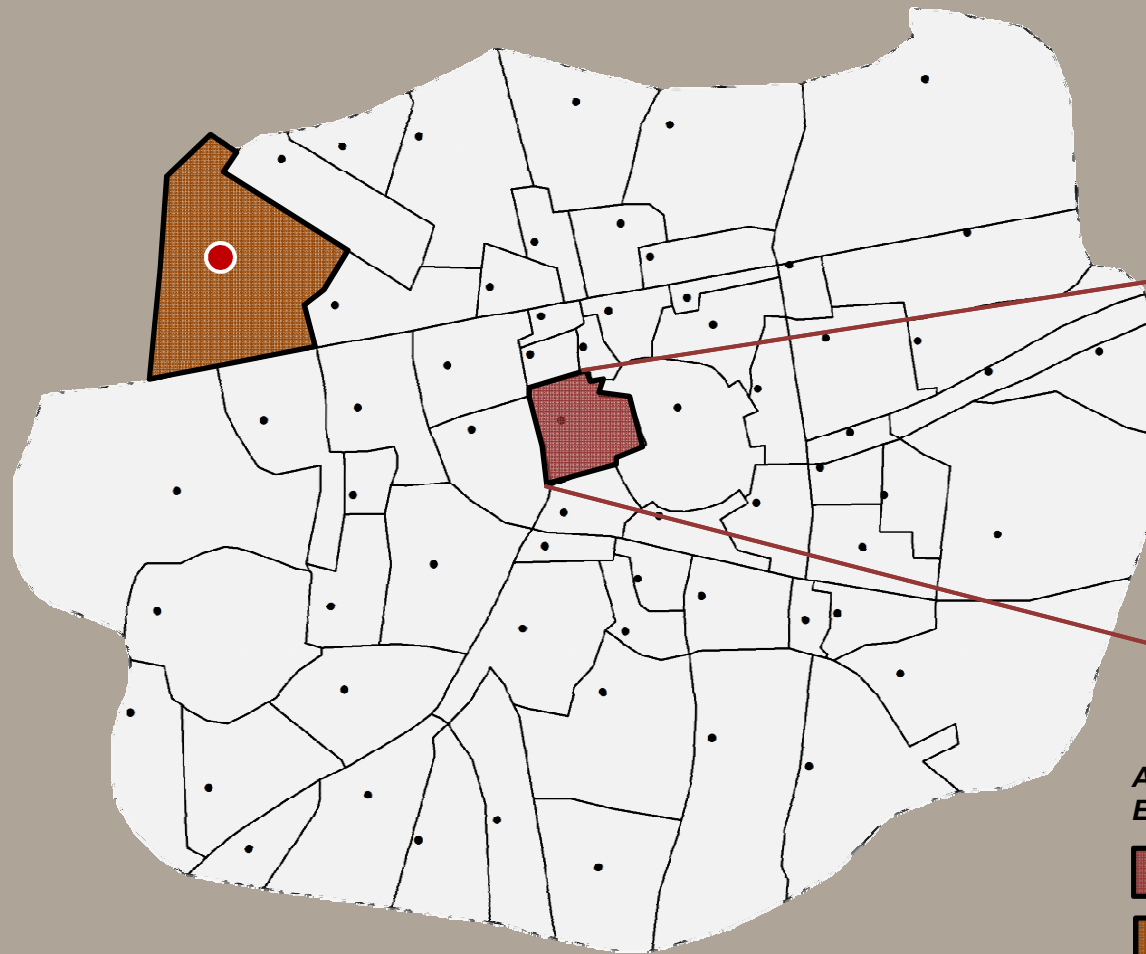
- Walking time from parking place to destination (in minutes)
- Trip purpose

Location characteristics

- Parking charges
- “Noticeability” of the facility (assumed to be related to the size of the facility).
- Condition of parking surface (whether smooth paved, rough paved with potholes or cracks, gravel or dirt)
- Type of winter provision
- Safety of the driver and driver’s vehicle- assumed to concern vandalism
- Ease of searching a parking lot (assuming that if it is on street it is well visible)



CONCEPTUAL MODEL CASE- ENSCHEDE, THE NETHERLANDS



*Administrative Divisions,
Enschede city*

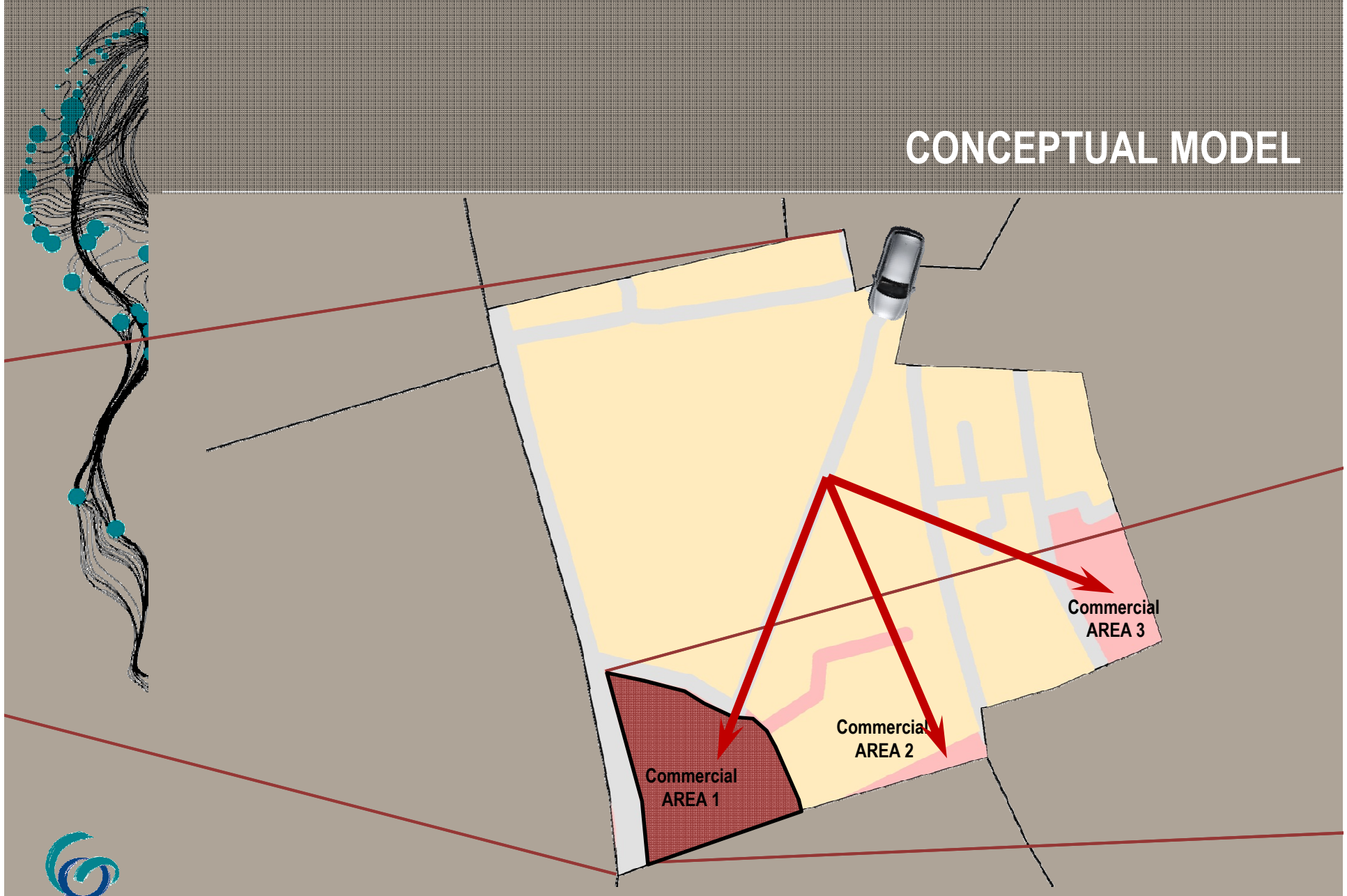
 DESTINATION ZONE

 ORIGIN ZONE

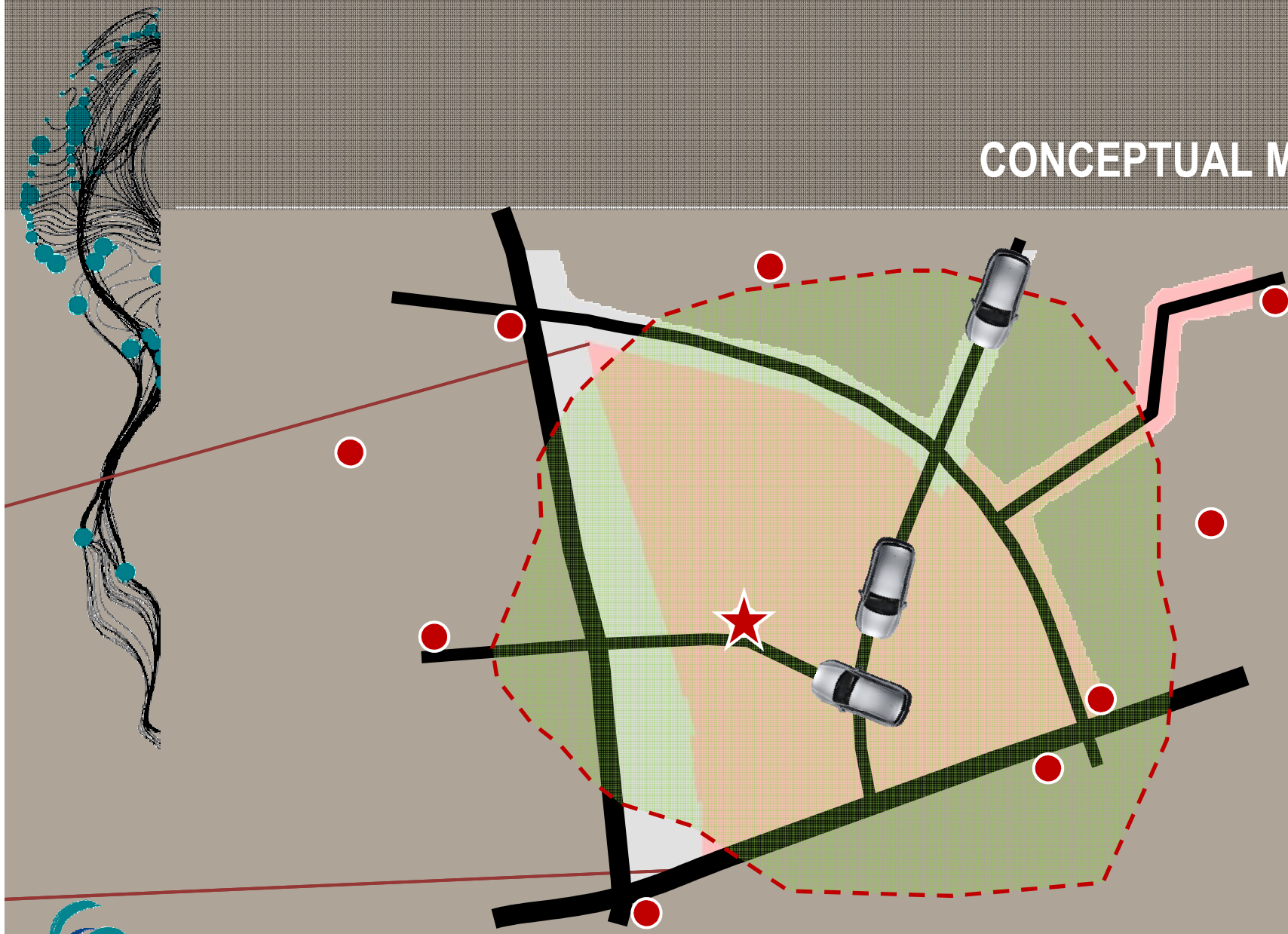
 AGENT / TRIP



CONCEPTUAL MODEL

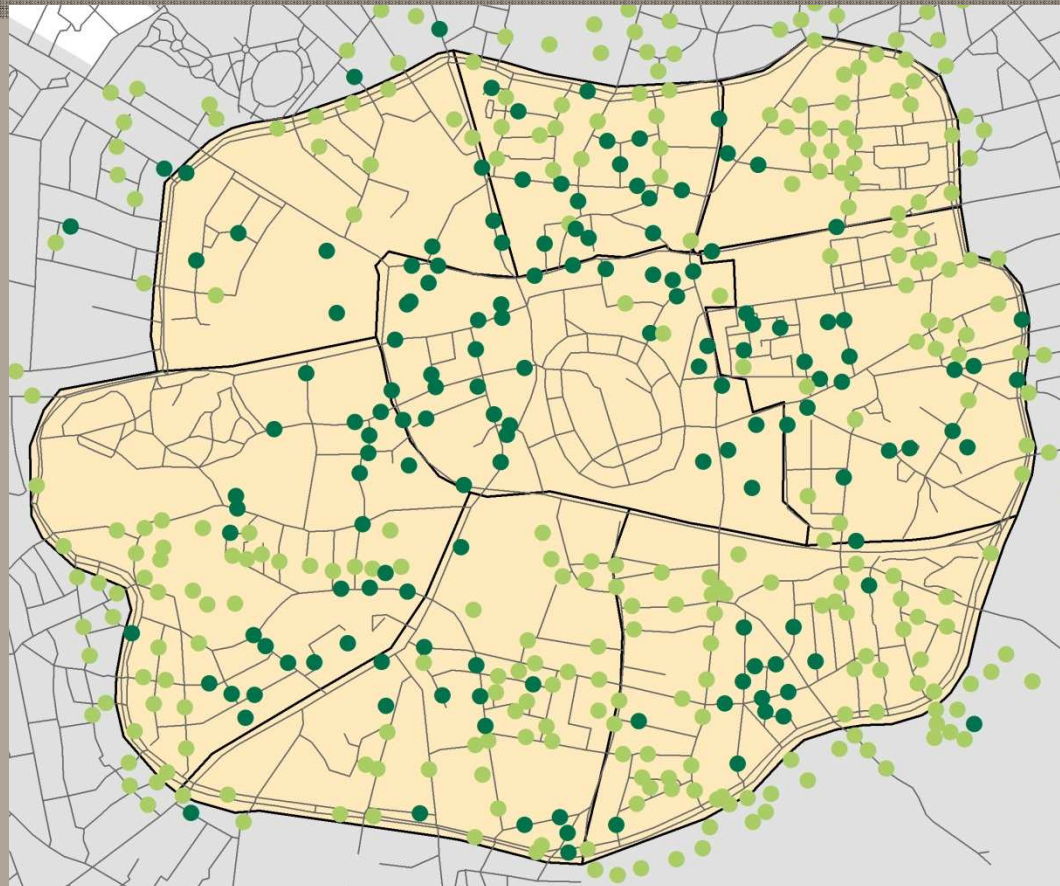


CONCEPTUAL MODEL



FINDINGS

BASE SCENARIO



Legend

- Roads_enschede
- ▭ Parking zones
- ▭ Areas_region Twente
- Parking lots**
- Less than 25% utilization
- More than 85% utilization

0 125 250 500 750 1,000 m



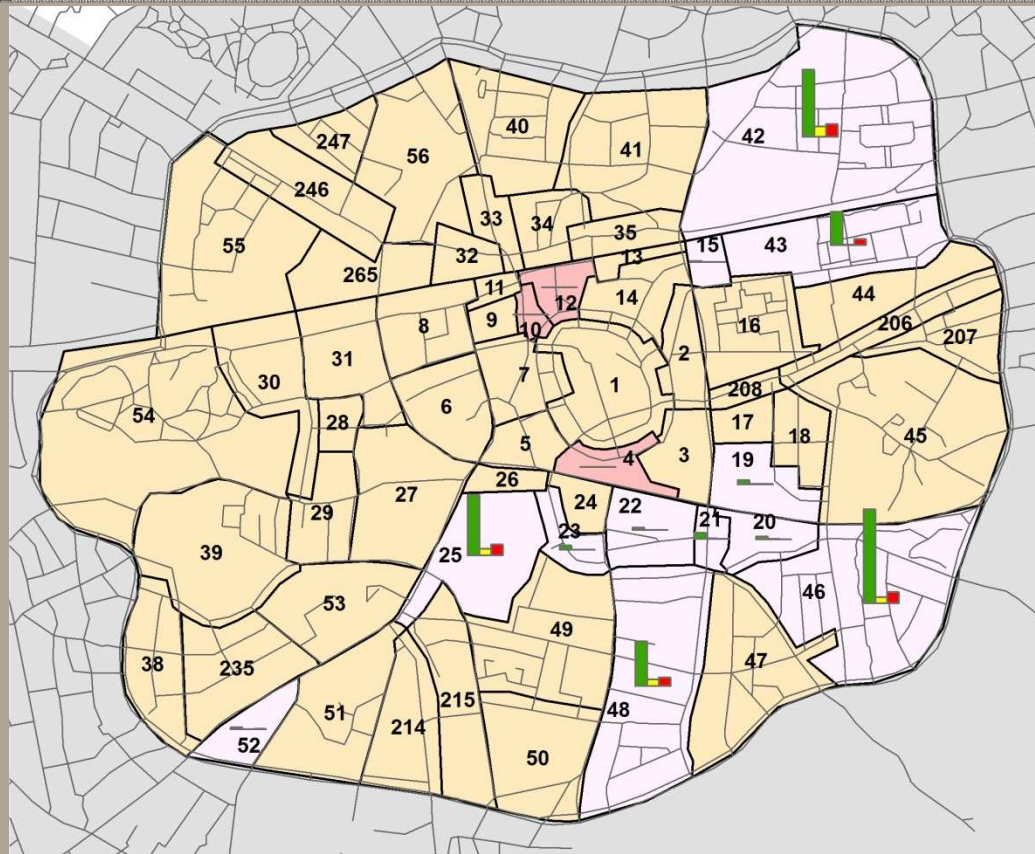
- Parking lots in zones 2 and 7 are less than 25% utilized
- 3 zones have demand spilling and parking lots in 10 zones have less than 25% utilization
- Most of the parking lots in the center are over utilized
- Parking lots in the periphery are underutilized

FINDINGS

SCENARIO 1A- PARKING TARIFF IN ZONE 1 INCREASED BY 20%

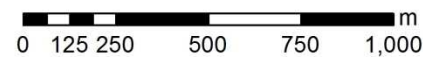
BASE SCENARIO

- By increasing the tariff it was expected that the utilization of the lots outside the centre will increase while reducing the stress within the centre but only a minimal reduction is noticed



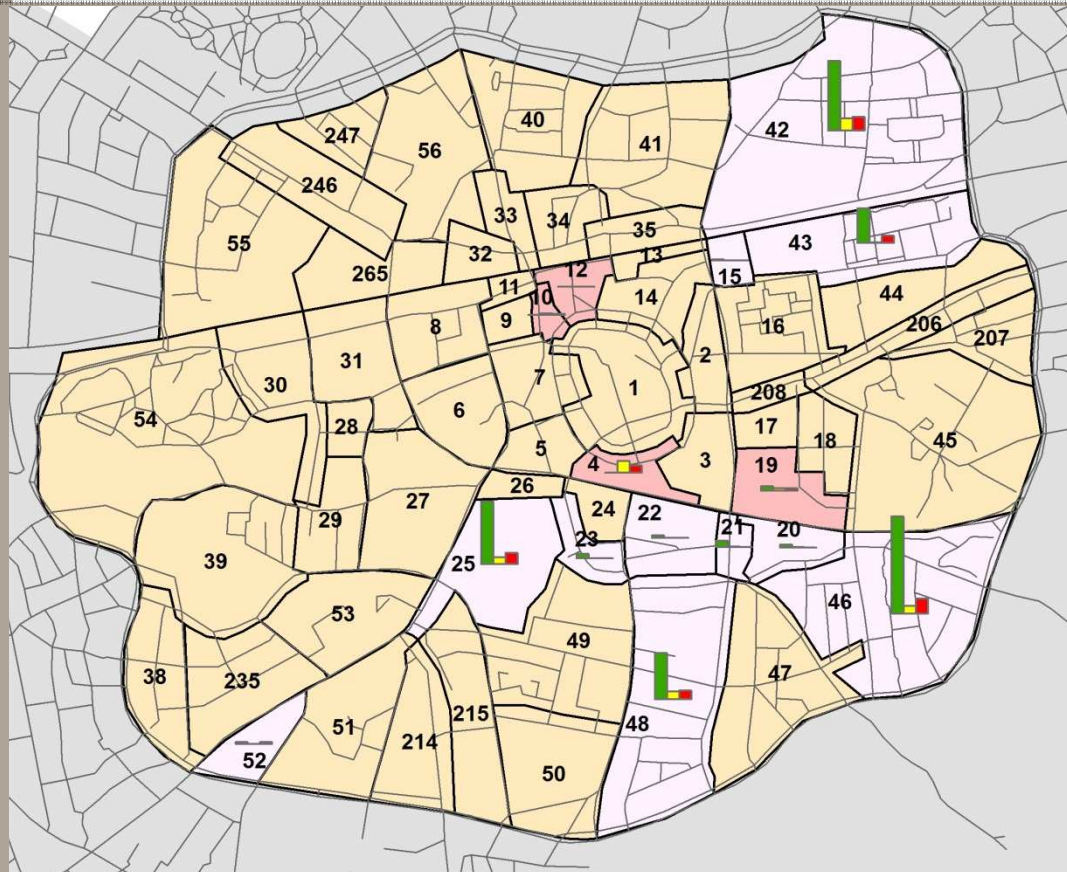
Legend

- Roads_enschede
- Parking demand excess
- Less than 25% utilisation
- Areas adequate utilization
- Areas_region Twente
- 950
- Parking capacity
- Morning peak allocation
- Evening peak allocation



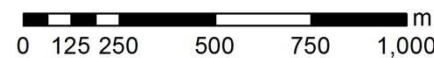
FINDINGS

SCENARIO 1B- PARKING CAPACITY IN ZONE 1 DECREASED BY 20%



Legend

- Roads_enschede
- Areas_region Twente
- Areas adequate utilization
- Parking demand excess
- Less than 25% utilization
- 950
- Parking capacity
- Morning peak allocation
- Evening peak allocation



BASE SCENARIO

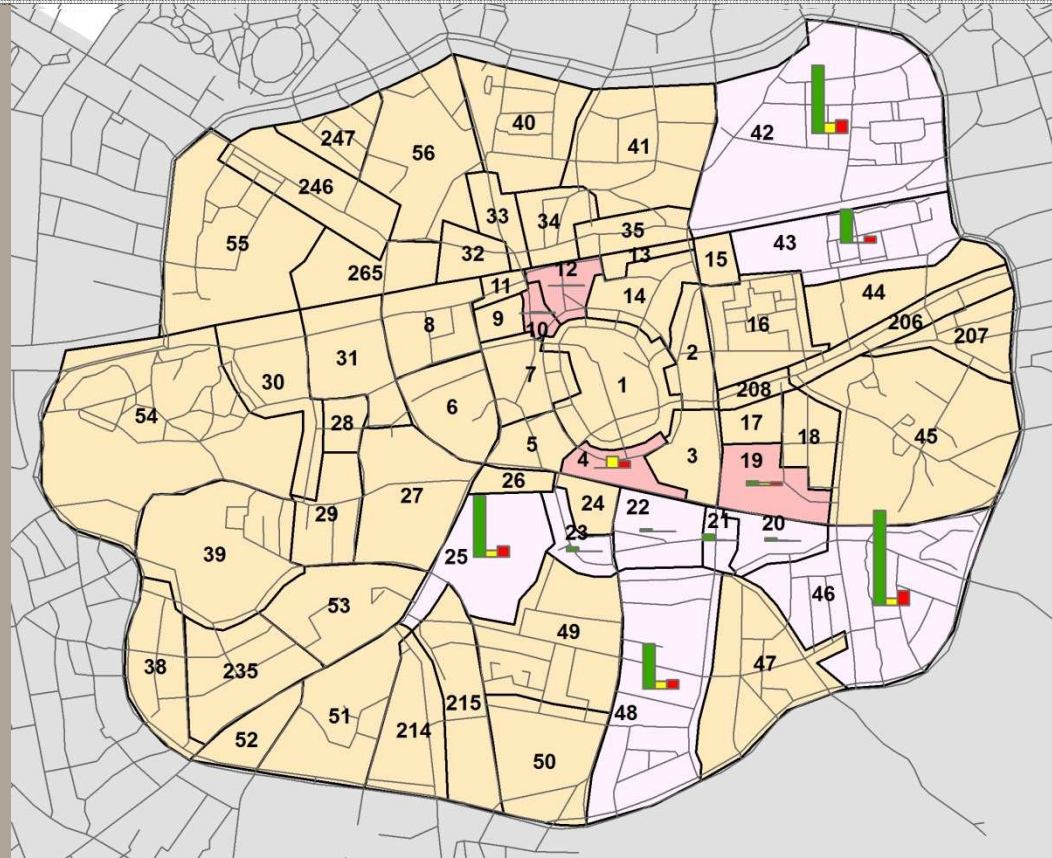
- By decreasing the capacity it was expected that the utilization of the lots within the centre will be to capacity and problems of underutilization outside the centre will reduce although only few zones noticed changes in spatial balance.



FINDINGS

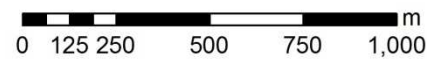
SCENARIO 2- FUTURE TRAVEL DEMAND

BASE SCENARIO



Legend

- Roads_enschede
- Areas_region Twente
- Areas adequate utilization
- Parking demand excess
- Less than 25% utilization
- 950
- Parking capacity
- Morning peak allocation
- Evening peak allocation



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HOW DOES THE STUDY HELP?

USES

INFORMED DECISION MAKING

Assess existing
parking balance

Assess future
problem areas
on which
policies should
focus

Assess effects
of different
parking policy
interventions



RECOMMENDATIONS

Within the framework

- Calibration of the model
- Integrated model
- Interactive tool

Further research

- Model behaviour of users
- Modal shift patterns

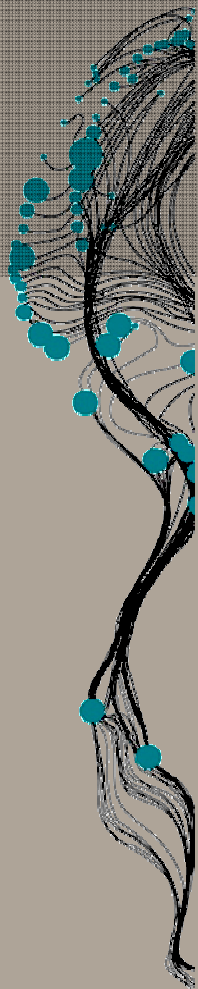


THANK YOU...



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QUESTIONS...



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