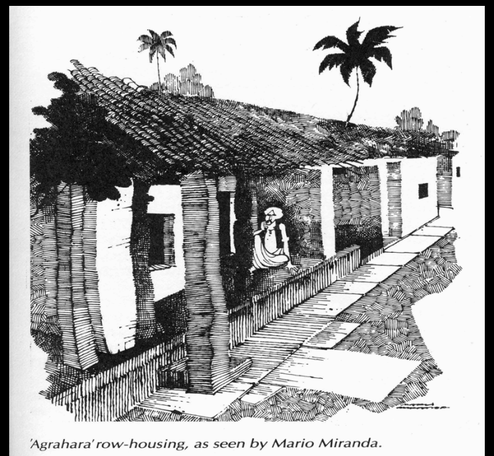
Lifestyle adaptation and its implication on sustainable housing: contextual study of Mysore, India



'Agrahara' row-housing, as seen by Mario Miranda.

Satish B. K

Edinburgh School of Architecture and Landscape Architecture
The University of Edinburgh

Programme Leader, ATE
Lecturer, School of Architecture,
Plymouth University

‘Innovative Engagement for Sustainable Development: the Edinburgh-India Story’
16 May 2014

"There is enough for everybody's need, but not enough for anybody's greed” M K Gandhi

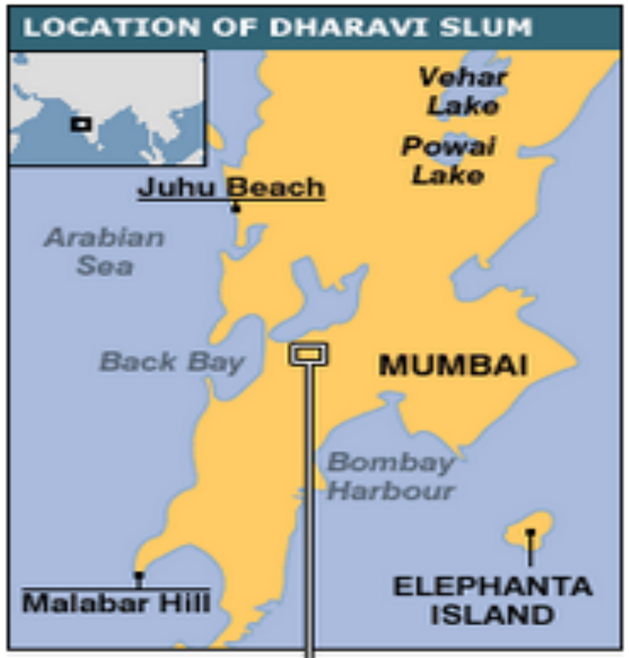
CONTEXT

Air traffic control

Beneath the helipads will be an "airspace floor", acting as control room for the helicopters landing above

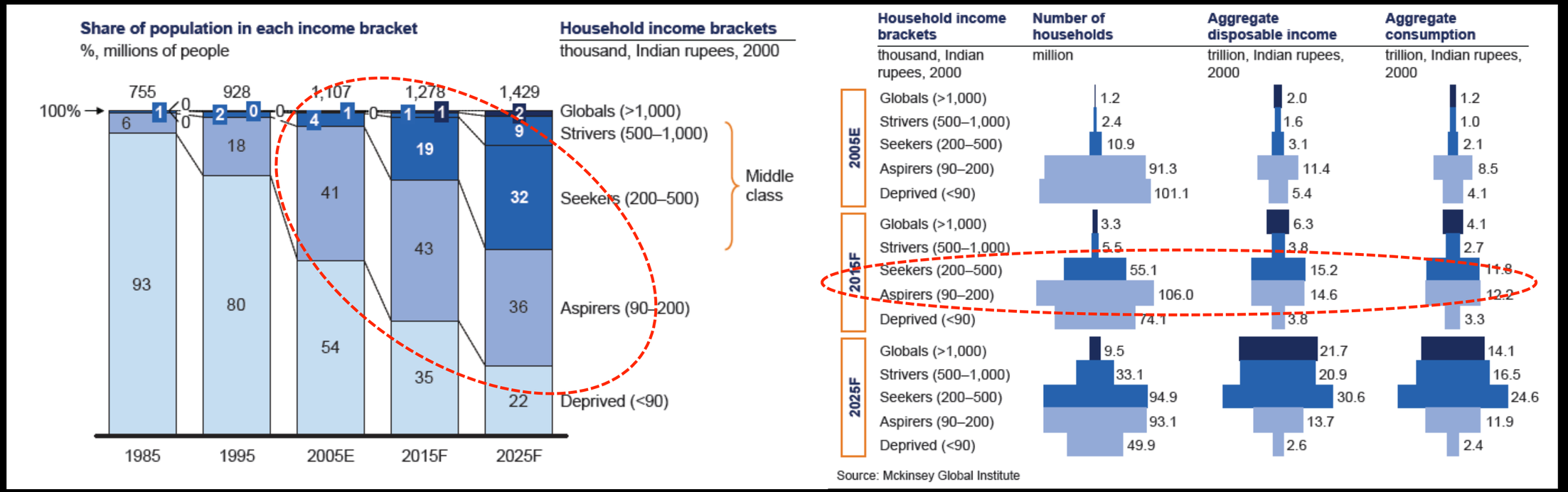
Antilia: Mukesh Ambani's home in Mumbai

CONTEXT


LOCATION OF DHARAVI SLUM
Vehar Lake
Powai Lake
Juhu Beach
Arabian Sea
Back Bay
MUMBAI
Bombay Harbour
Malabar Hill
ELEPHANTA ISLAND

INDIA HOUSING MIDDLE CLASS

INDIAN MIDDLE CLASS



MIDDLE CLASS GROWTH INCOME CONSUMPTION

(McKinsey: http://www.mckinsey.com/Insights/MGI/Research/Asia

Sustainable society
(Skea 2008)

Developed Nations

Developing Nations

"inventing low carbon technology and reducing carbon dioxide emission by the middle of 20th century"

achievement of Sustainable communities must go hand in hand with achieving wider development goals

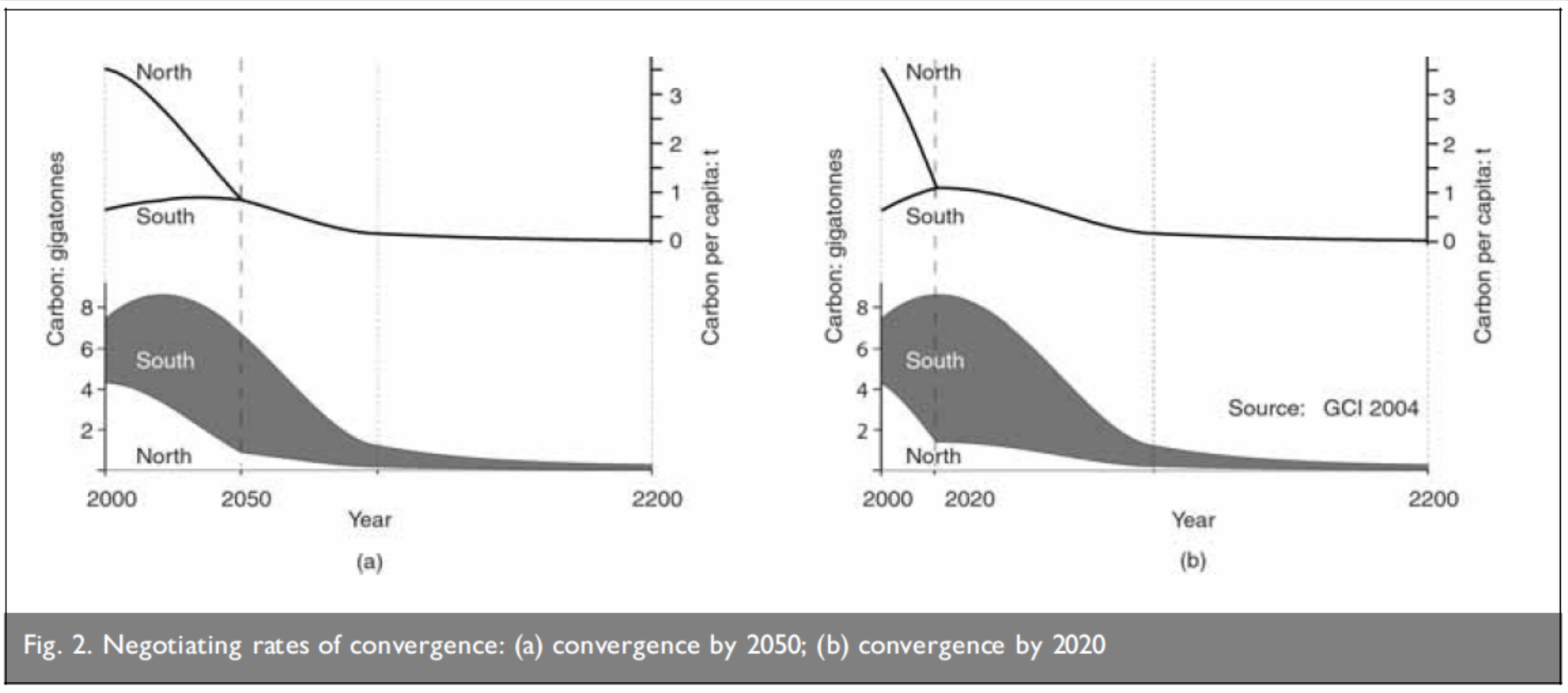
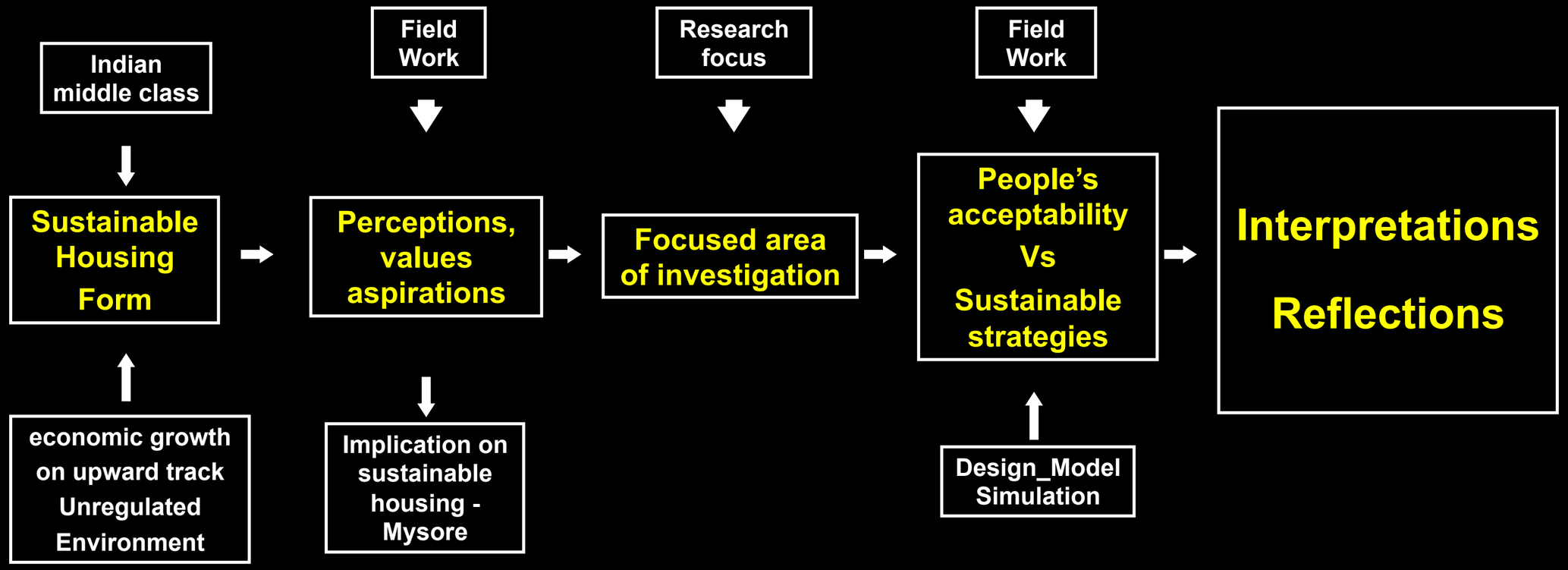


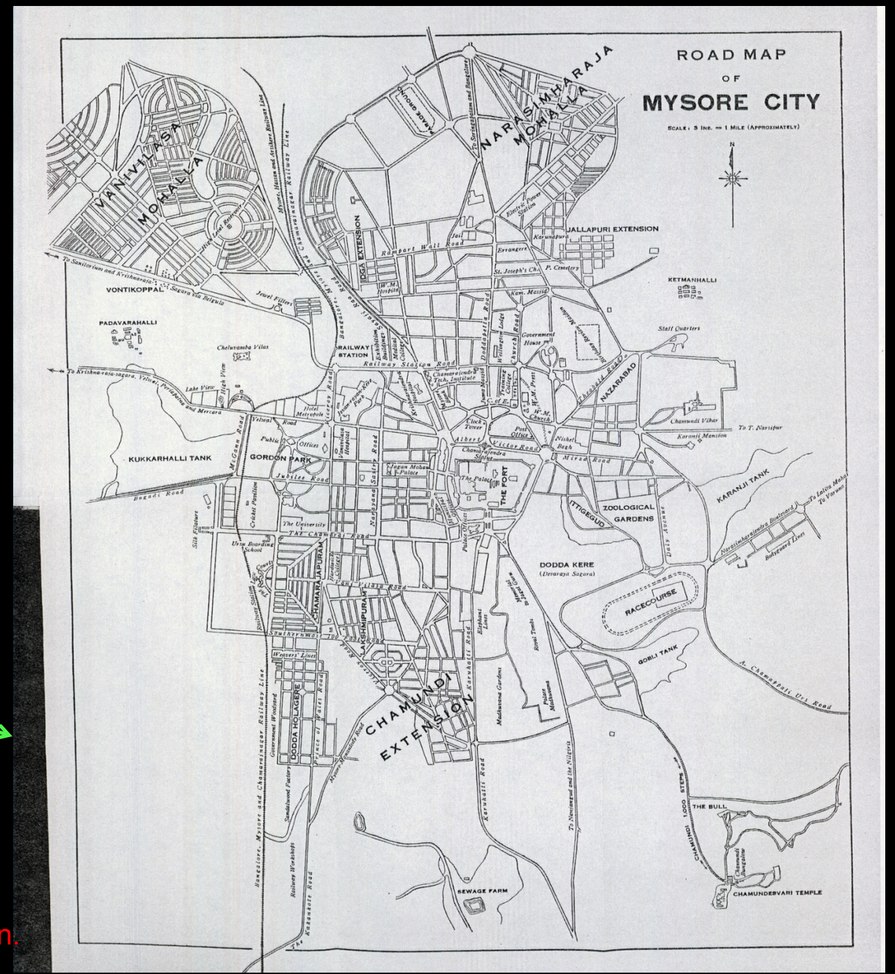
Fig. 2. Negotiating rates of convergence: (a) convergence by 2050; (b) convergence by 2020

Contraction and convergence (A Meyer 2004)

Presentation Outline



Study area

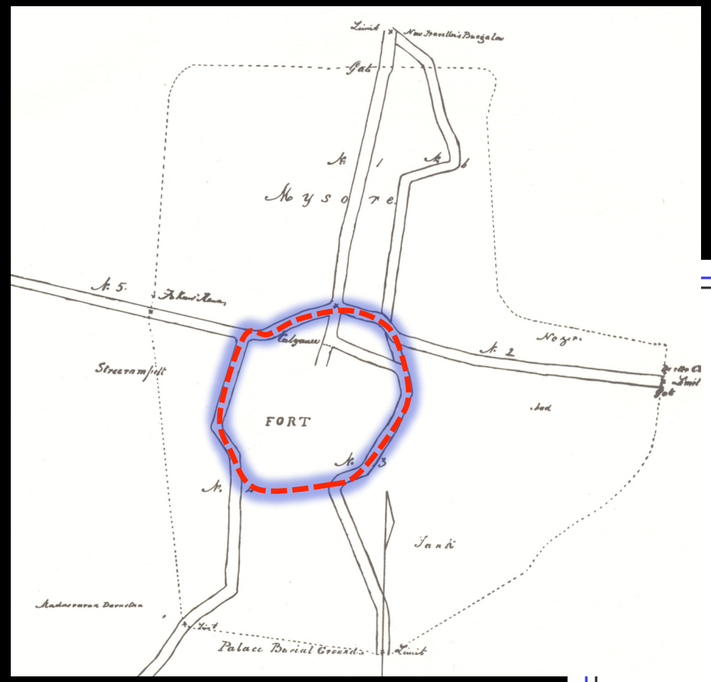


India

Mysore - 1938

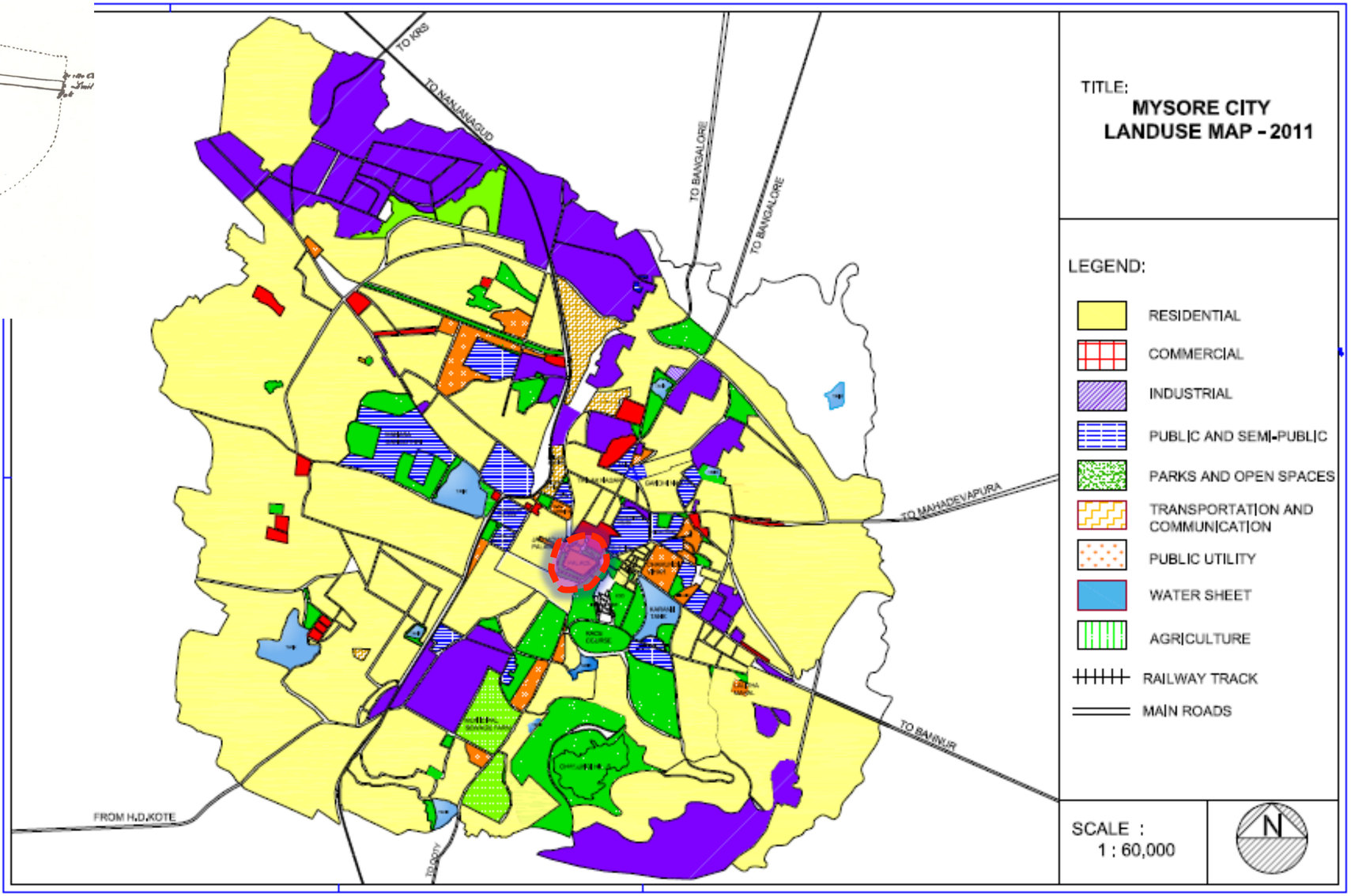
Source: Parsons, Constance E. 1930. “Mysore City”, Oxford University press, London.

Study area



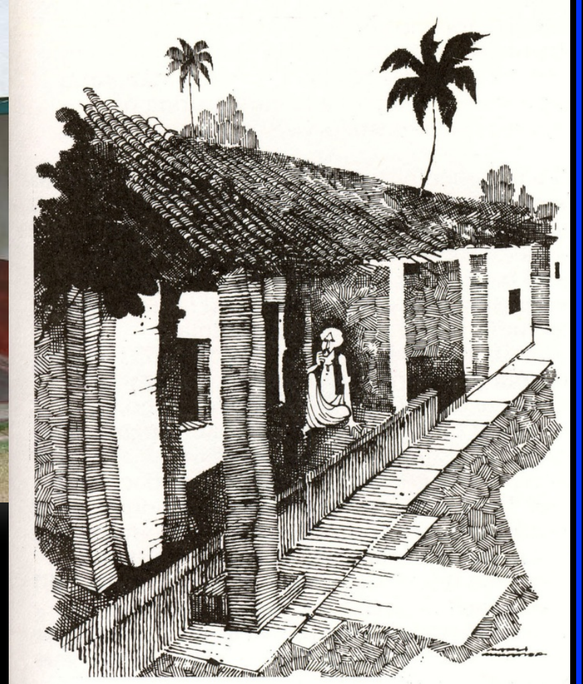
Mysore - 1865

Source: Issar T P. 1991, "mysore – the Royal City". Bangalore, My tec Process pvt ltd.



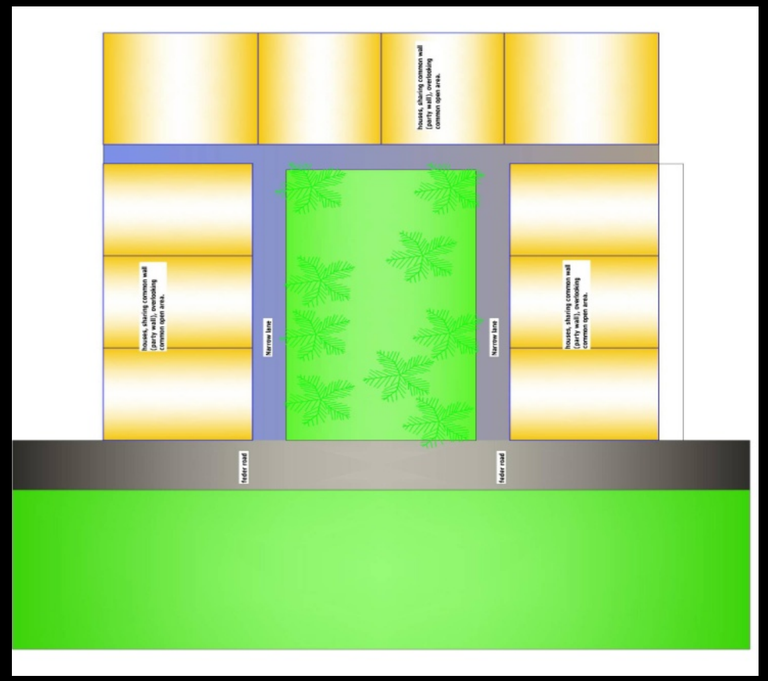
Mysore - 2011

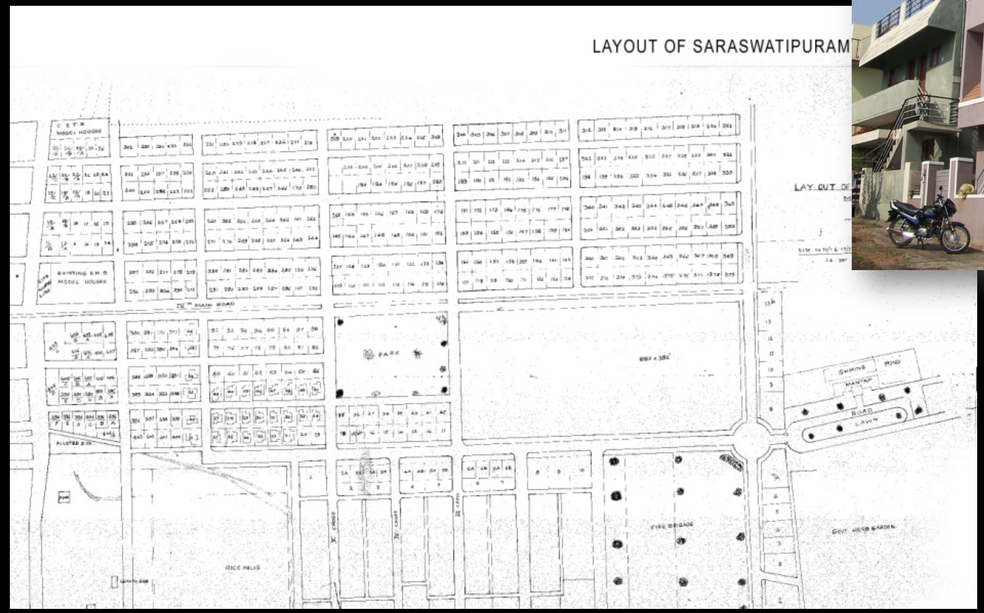
HOUSING TYPOLOGY



'Agrahara' row-housing, as seen by Mario Miranda.

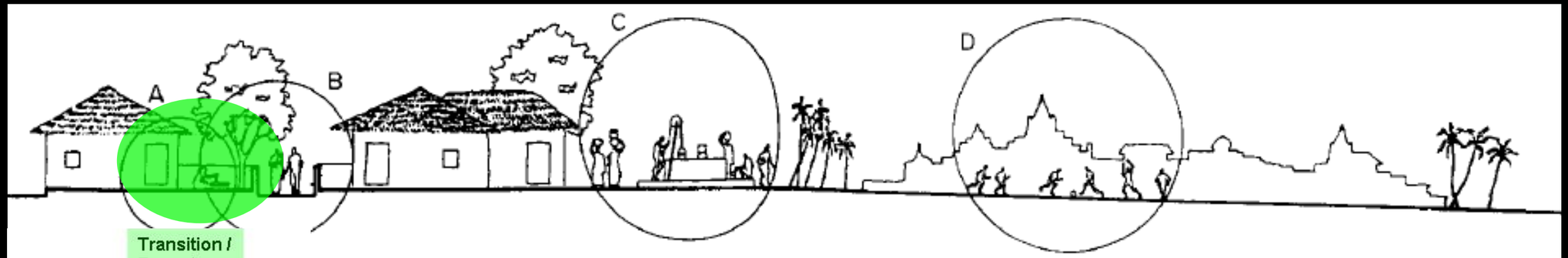
Pre-Independence: 'Agrahara' Typology



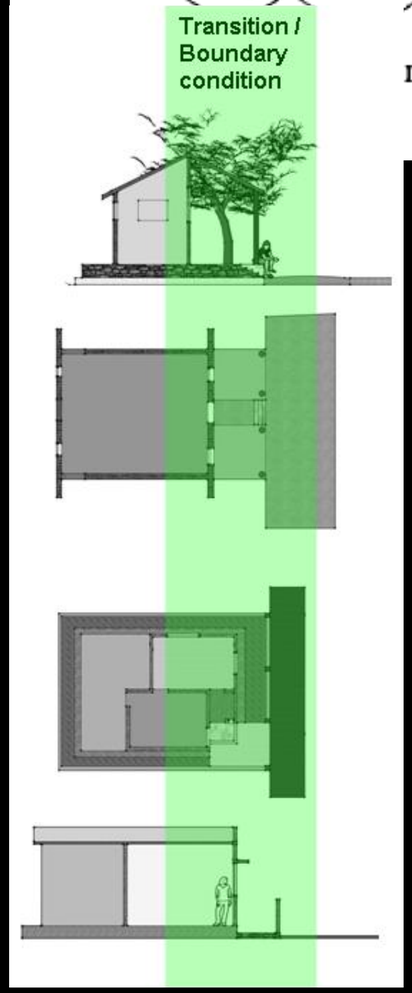


Post - Independence: Contemporary Housing Typology

BOUNDARY CONDITION



rarchy of spaces. (A) Courtyard ; (B) doorstep ; (C) water tap ; (D) the community space.



STUDY AREA

BOUNDARY CONDITION

STUDY MODELS

MODEL _ SIMULATION

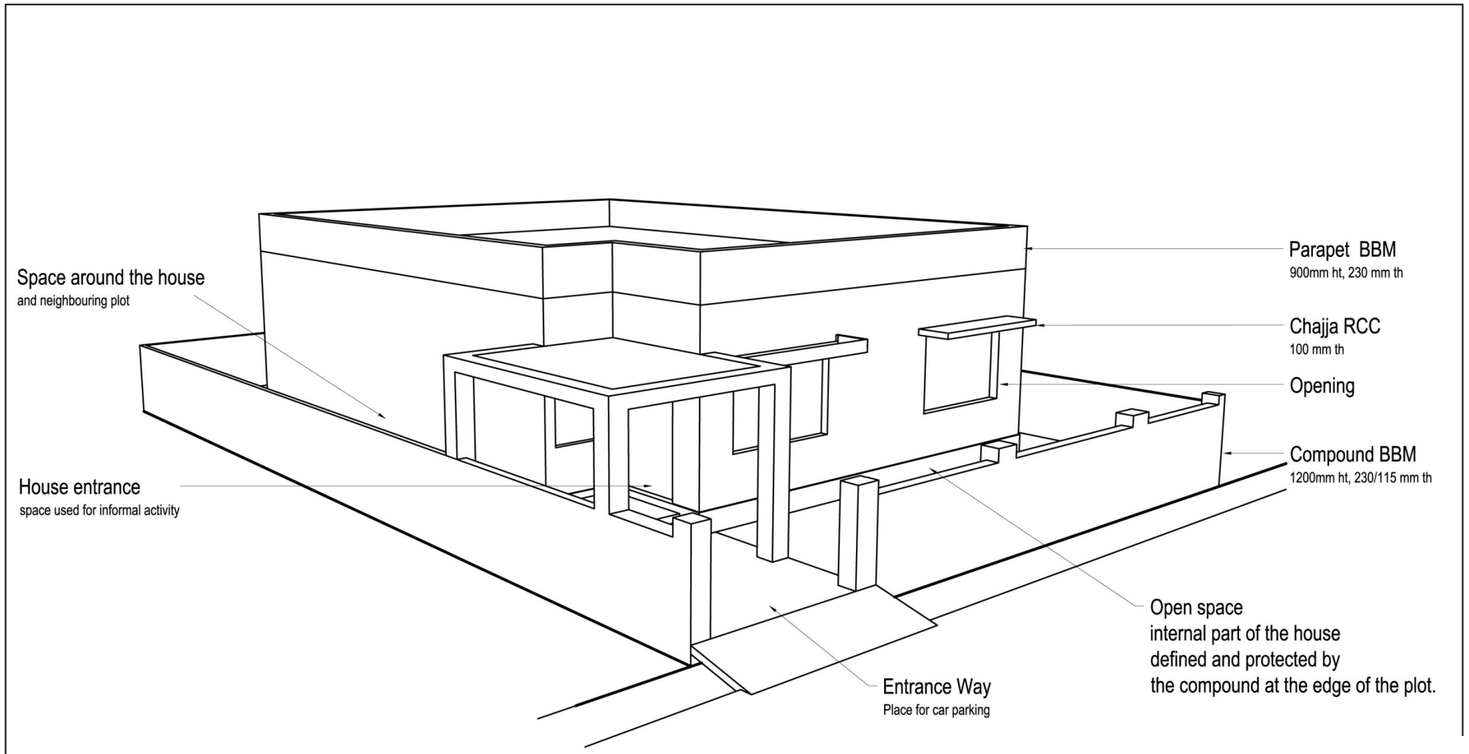


Figure 3.1: Typical Plot Typology House Model

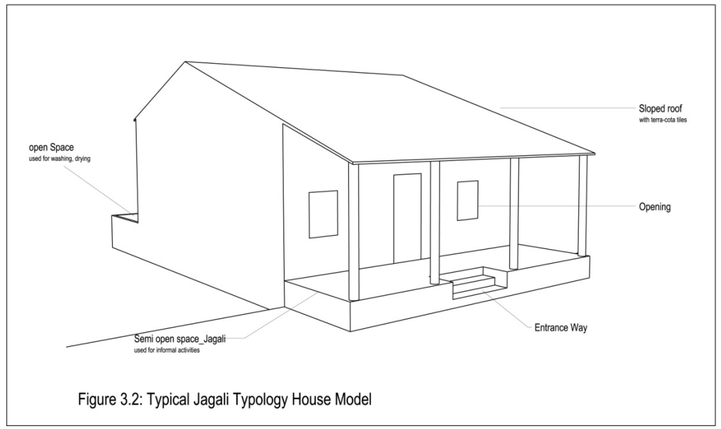


Figure 3.2: Typical Jagali Typology House Model

Plot with high gate

Jagali

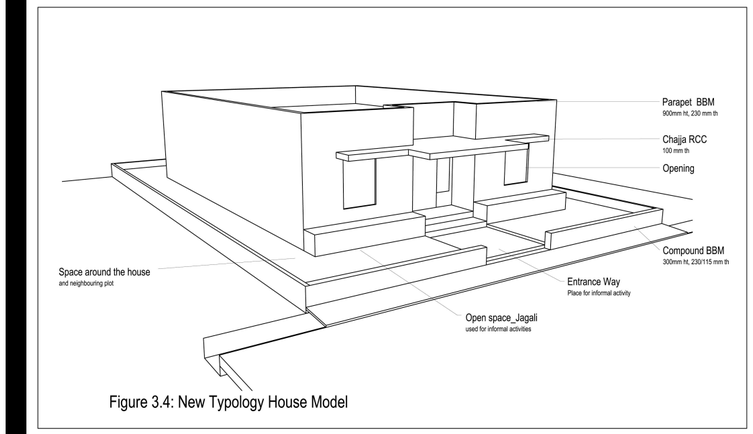


Figure 3.4: New Typology House Model

Plot with Jagali

Plot

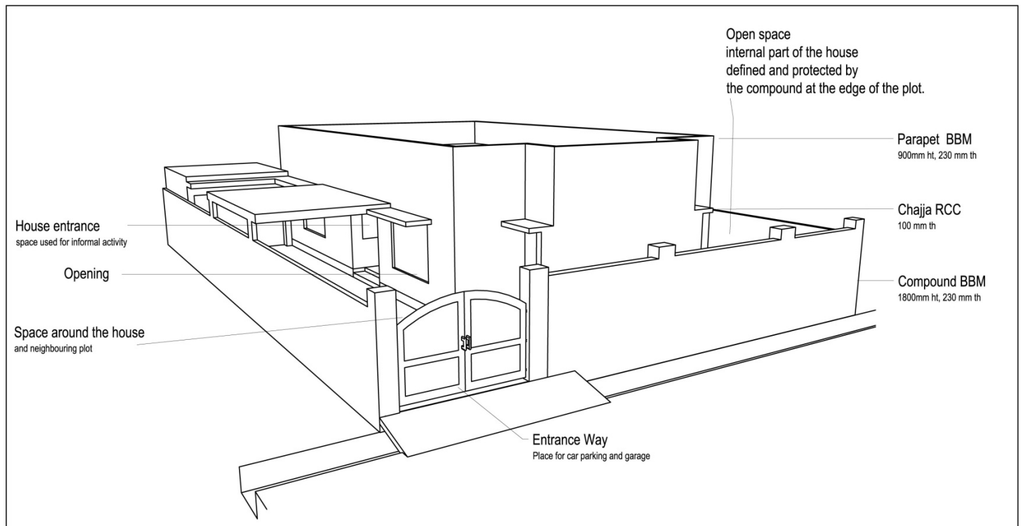
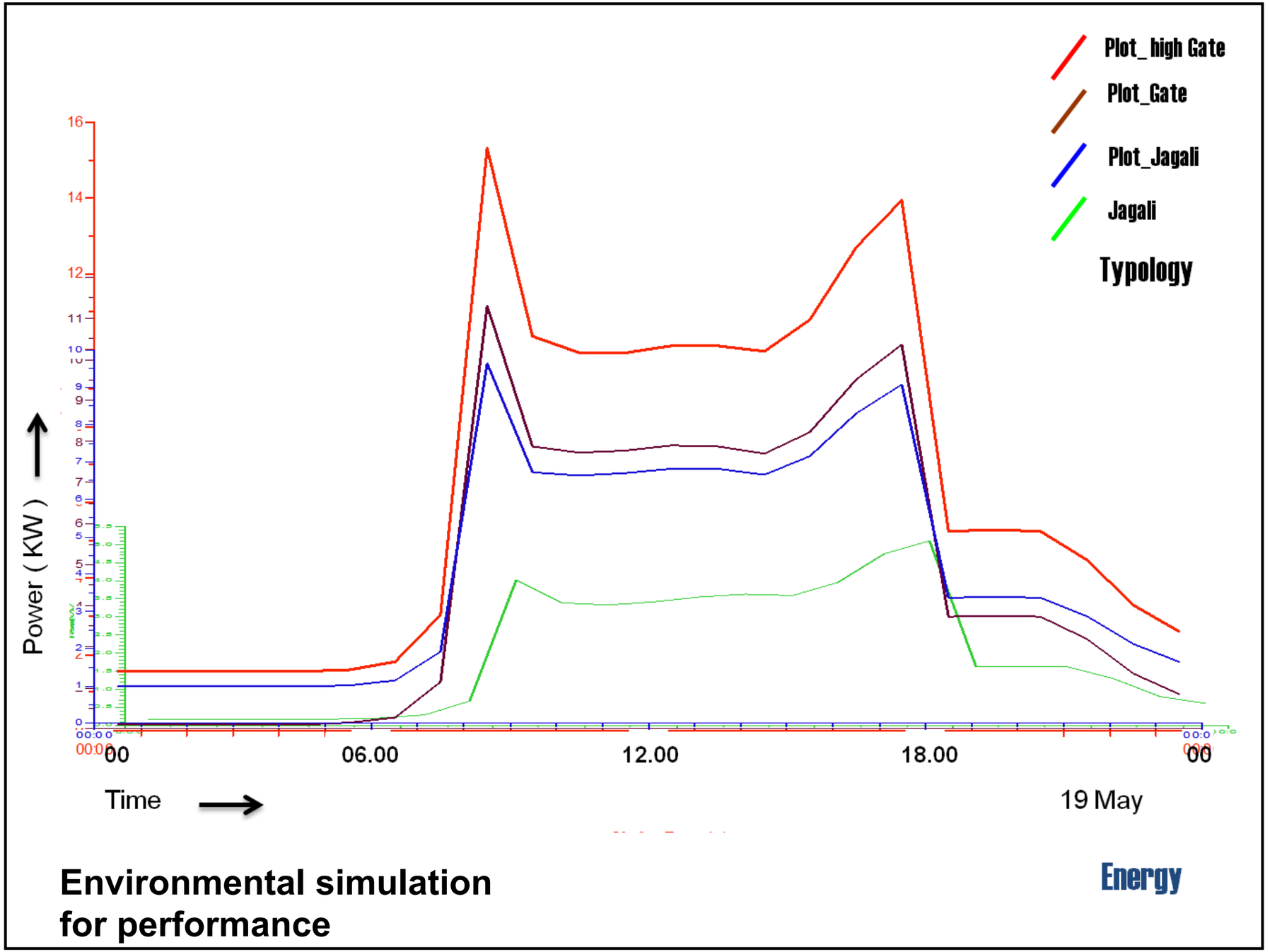


Figure 3.3: Typical Plot with high gate Typology House Model

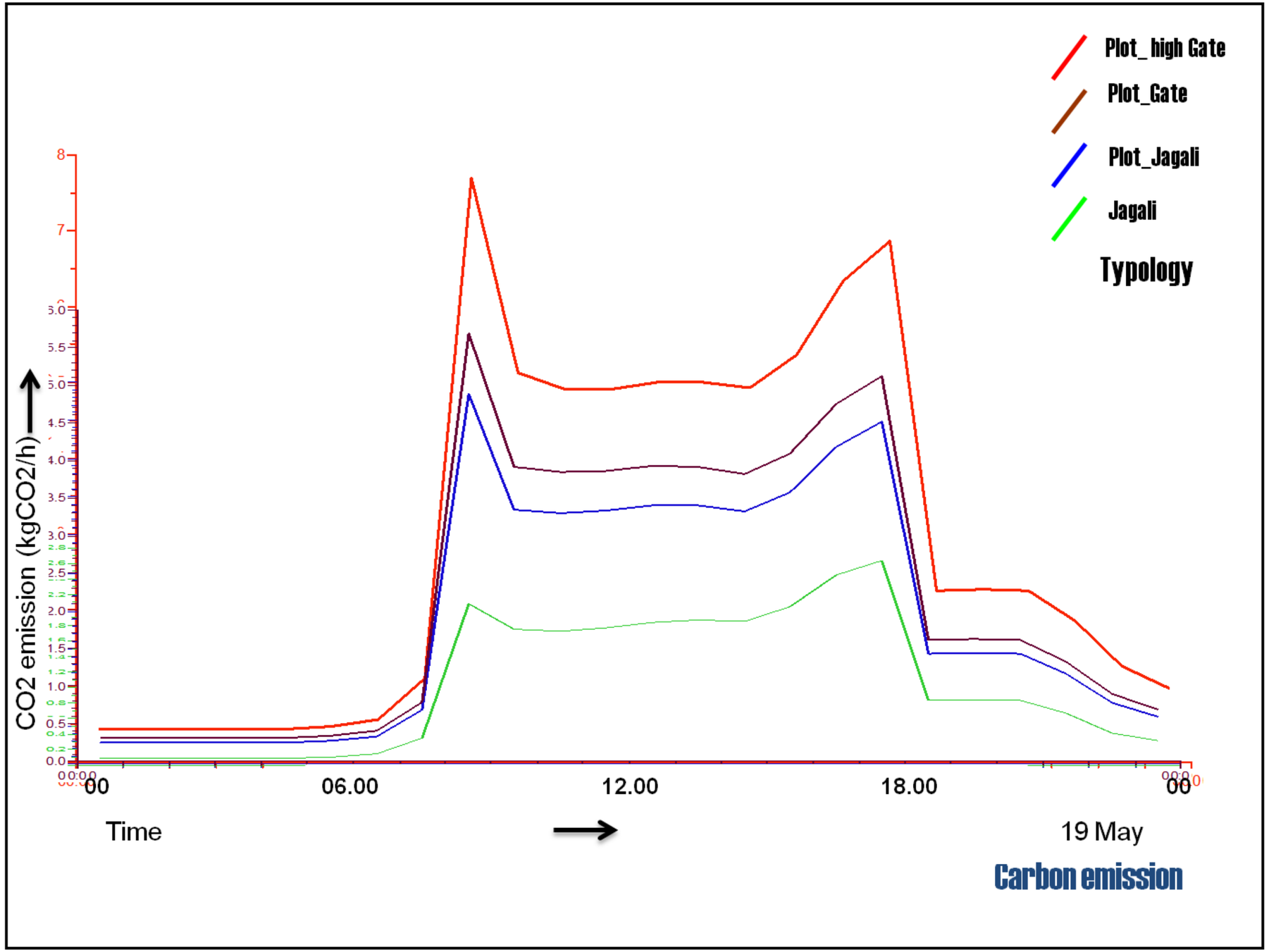
MODEL _ SIMULATION



Environmental simulation for performance

SIMULATION ANALYSIS

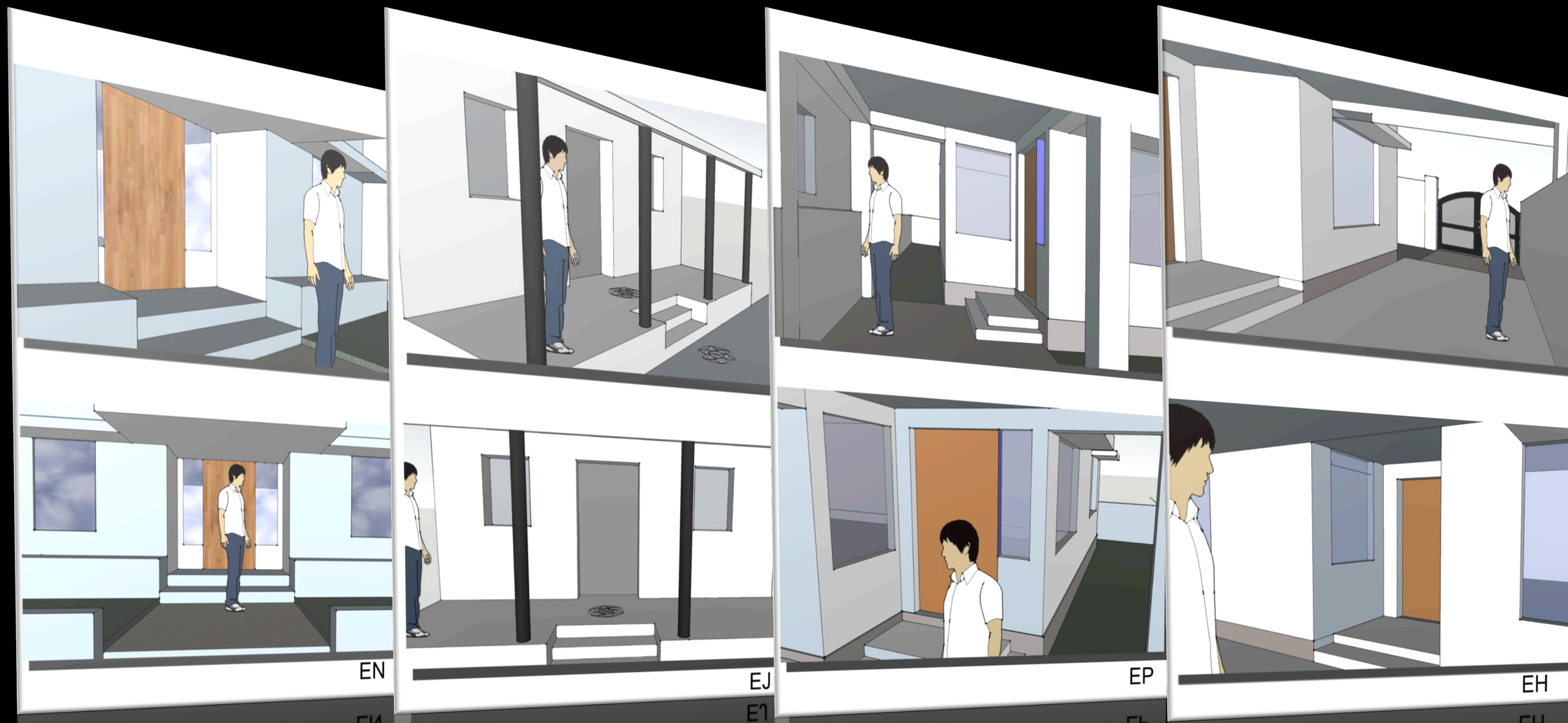
MODEL _ SIMULATION



IES Simulation Result	Typologies ->	Model 1 Jagali Typology	Model 2 Jagali + Plot	Model 3 Plot + Gate	Model 4 Plot + High Gate
Parameters	General description				
Energy Consumption / SMT	Energy consumed by electrical appliances is considered. For uniformity's sake, it is converted to SMT and all the models are compared to the base results of Jagali typology as 0	Bench mark	20 % more than Jagali Typology	35 % more than Jagali Typology	65 % more than Jagali Typology
Cooling load	This simulation result accounts for the energy consumed to cool the internal spaces to a comfortable temperature of 23 degree.	Bench mark	100 % more than Jagali Typology	200 % more than Jagali Typology	300 % more than Jagali Typology
conduction gain	Window size is altered in each typology and with other construction materials being constant, the simulation result reflects the conduction heat gain due to size of the opening	Bench mark	58 % more than Jagali Typology	65 % more than Jagali Typology	90 % more than Jagali Typology
Embodied Energy	Source of the material, energy consumed for the processing and transportation are considered to qualify the other simulation results	Locally resourced material and construction system. Least materials imported from beyond 10 miles	Most of the materials Locally resourced and few materials imported from beyond 10 miles	Some of the materials are locally resourced and few materials are imported from beyond 100 miles	Least materials used. Locally sourced and most of the materials are imported from far away
Total energy consumption	It includes energy consumed due to electrical appliance, maintenance and cooling load.	Bench mark	138% more than Jagali Typology	175% more than Jagali Typology	275 % more than Jagali Typology
Carbon emission / SMT	Total carbon emission due to energy consumed due to maintenance and cooling energy. To bring in uniformity, it is converted to SMT and all the models are compared to the base results of Jagali typology as 0	Bench mark	20 % more than Jagali Typology	35 % more than Jagali Typology	65 % more than Jagali Typology
Summary		Most sustainable typology	Some of the features are sustainable	Some of the features are unsustainable	Least sustainable typology

Figure 6-12. IES simulation result

QUALITATIVE STUDY



multi sorting task

Entrance Sequence

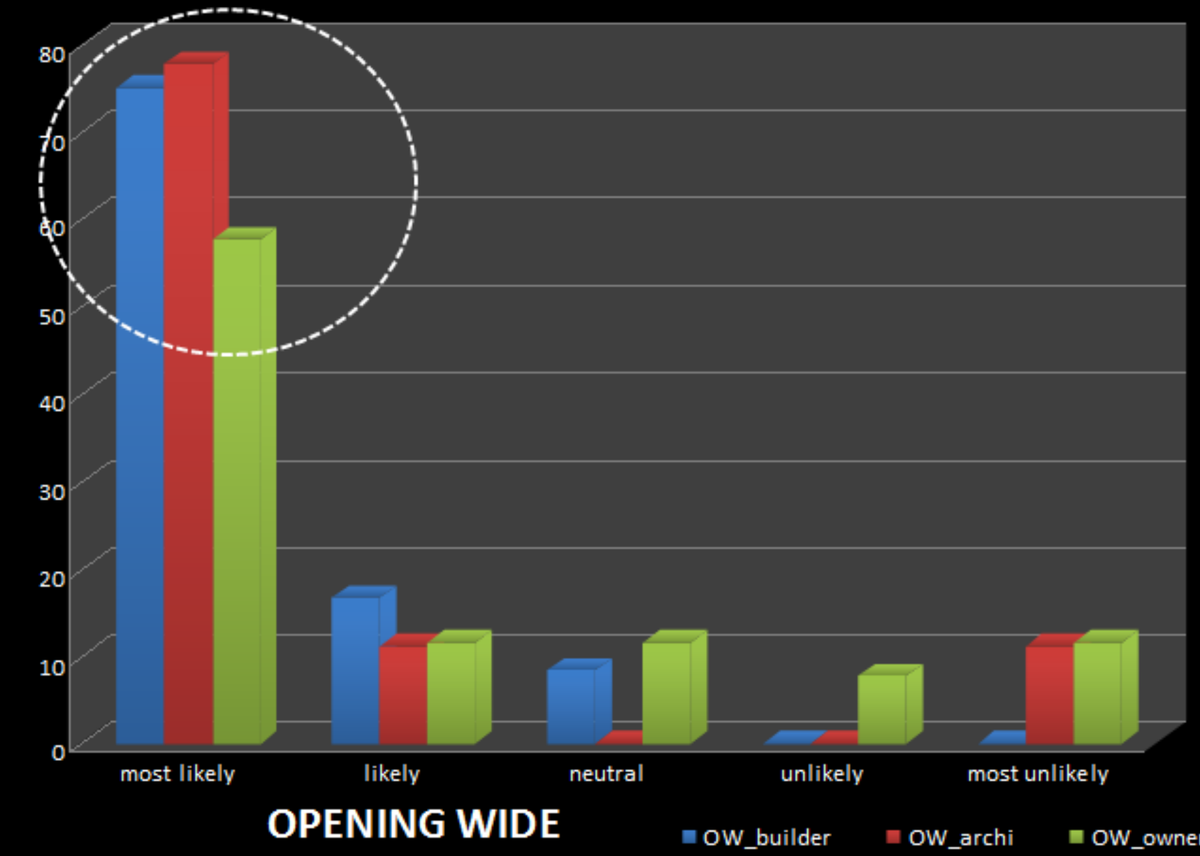
Model Cards
prepared for
the field work

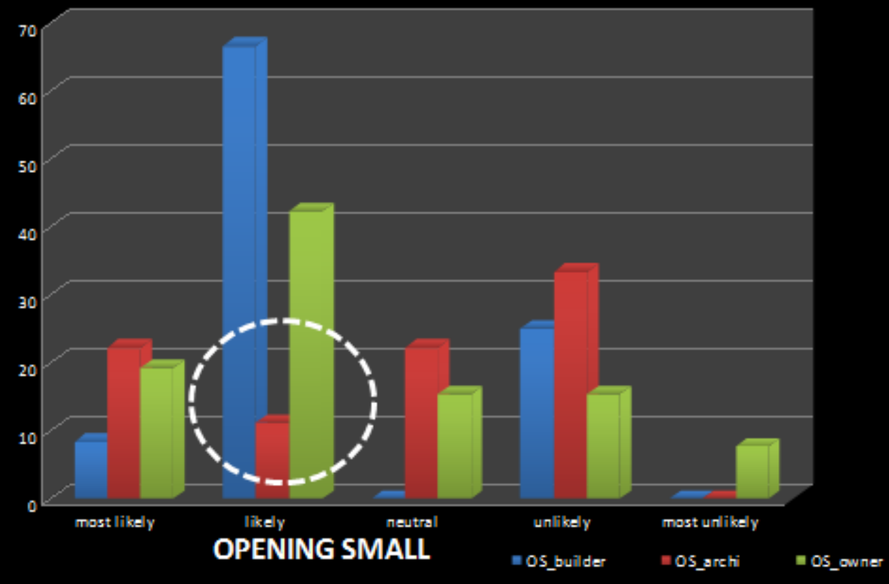
QUALITATIVE STUDY

Name					Age group			Owner
Area/ Address								
Room Area		Opening area						Remarks
	most	5	4	3	2	1	least	
Volume	First							
	Second							
Entrance	First							
	Second							
Opening	First							
	Second							
Security	First							
	Second							
Interaction	First							
	Second							
Skin	First							
	Second							
Other relevant Discussion								

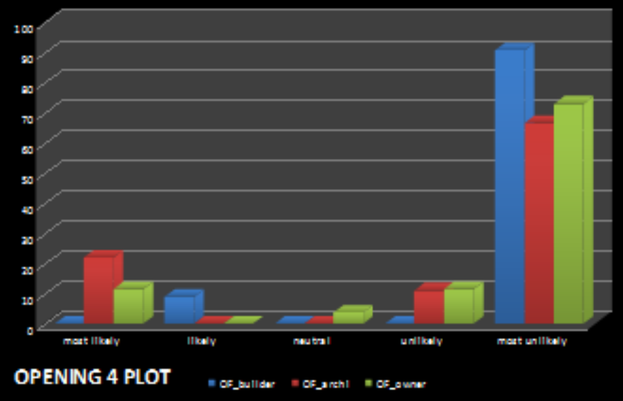
multi sorting task

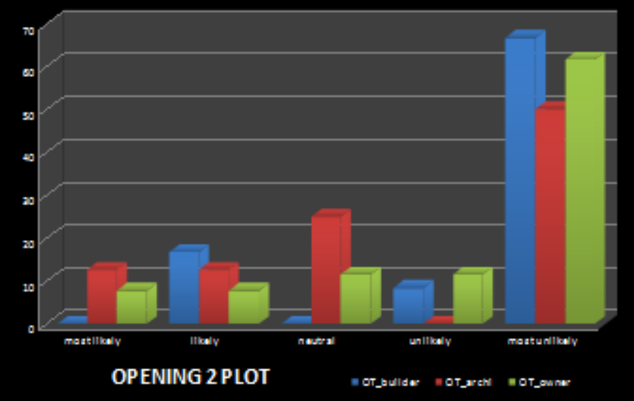
FIELD WORK _ ANALYSIS

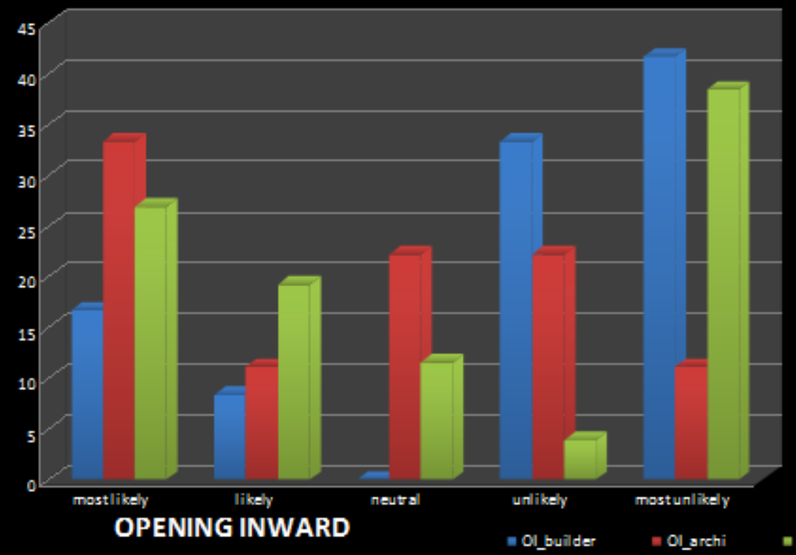




OPENING Analysis



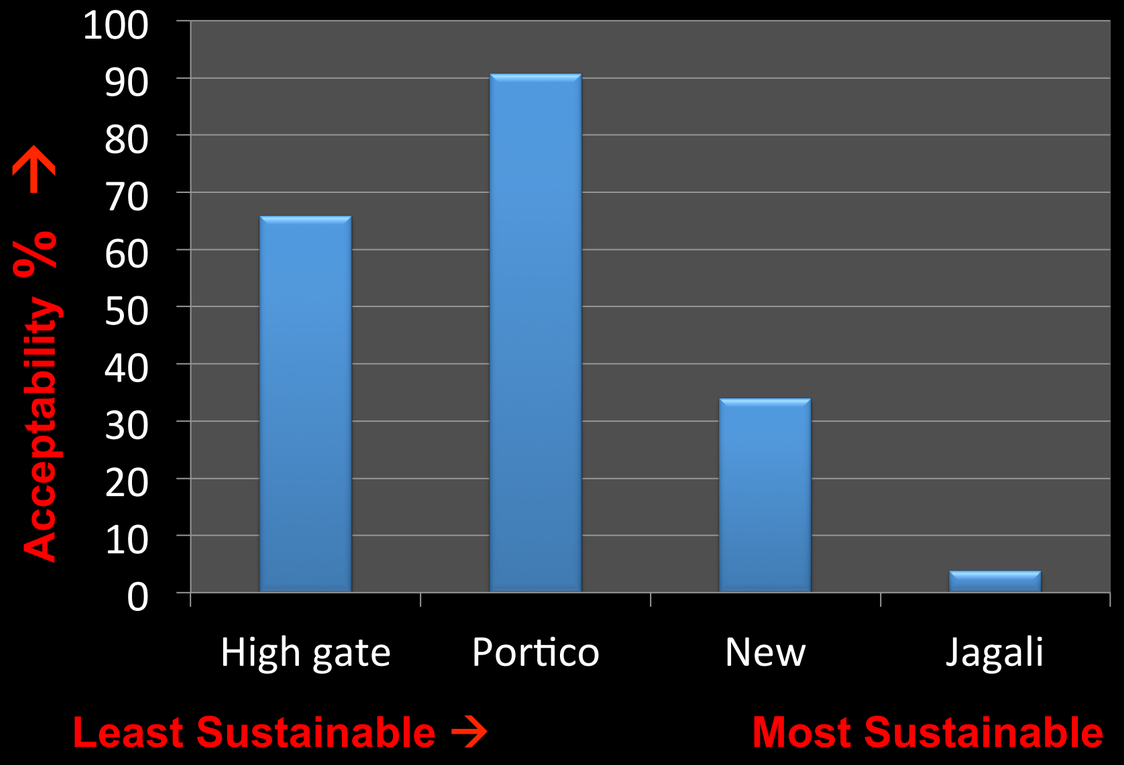




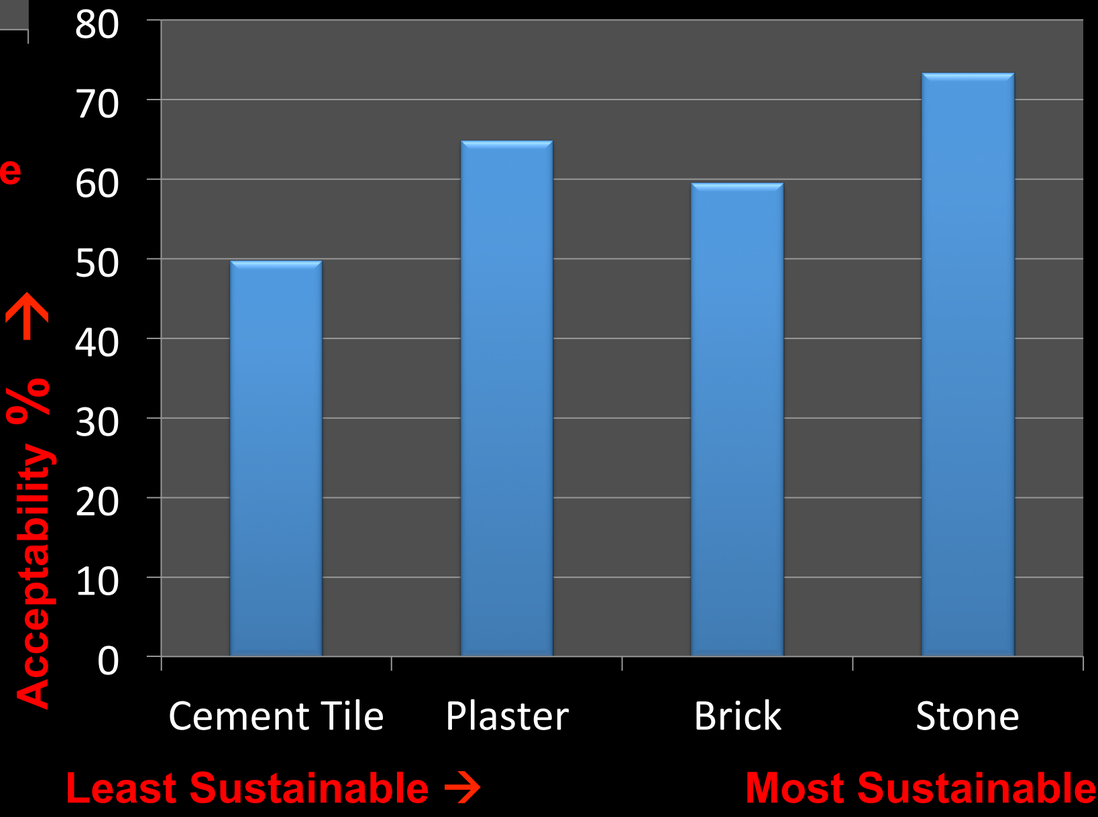
THE UNIVERSITY OF EDINBURGH

ANALYSIS

FIELD WORK _ ANALYSIS



Entrance Sequence



Building Skin

FIELD WORK _ REFLECTIONS

Field Work Reflections

	level of acceptance of sustainable models	Probability of aligning towards Sustainable Housing
Volume	Least	Negative
Entrance	Least	Negative
Openings	Most	Positive
Interaction	Moderate	Perhaps
Security	Least	Negative
Skin	Most	Positive

FIELD WORK _ REFLECTIONS

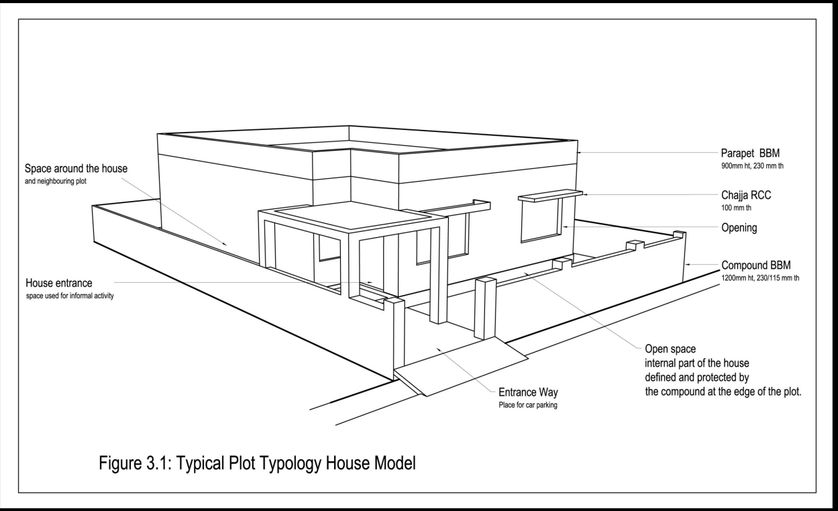
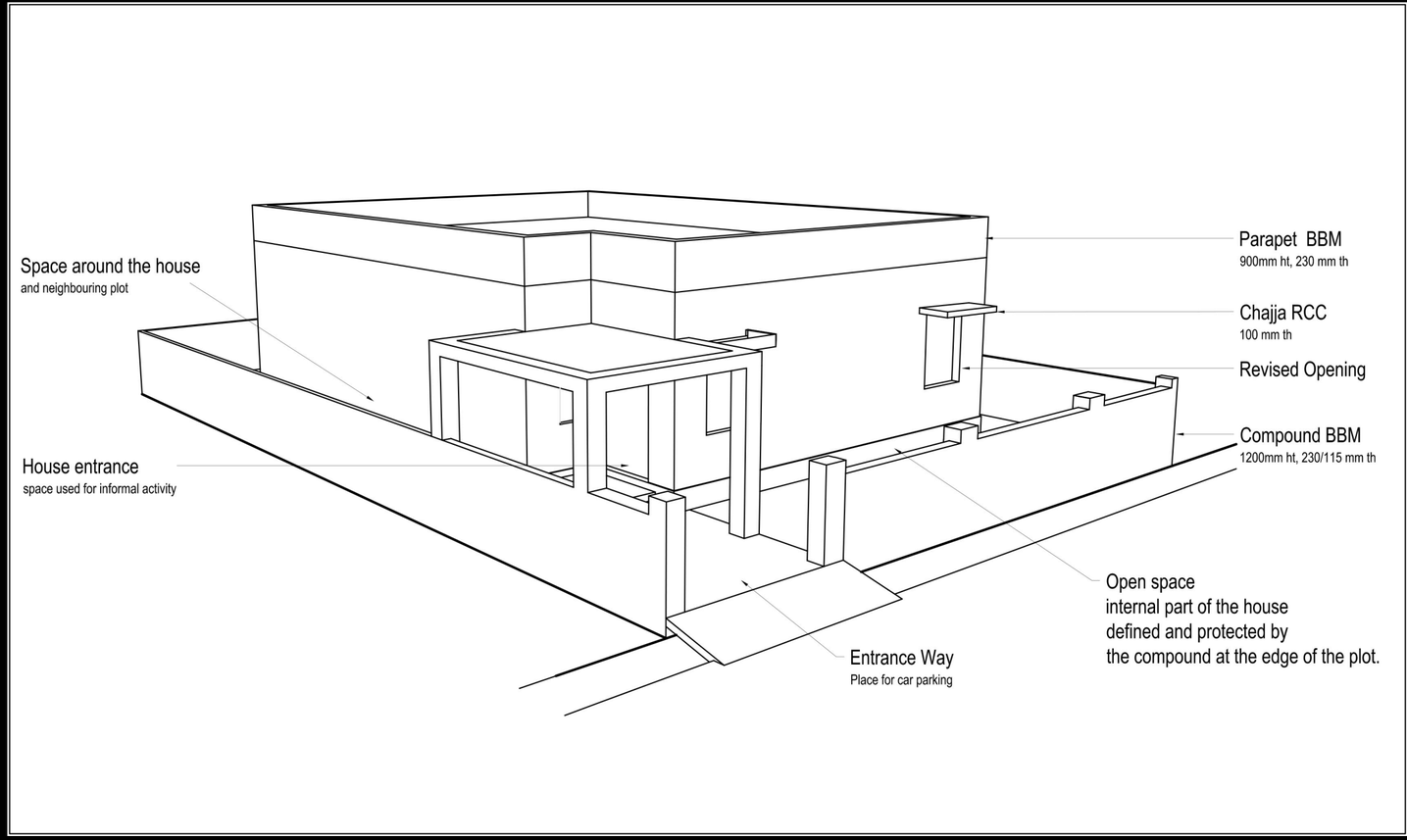


Figure 3.1: Typical Plot Typology House Model

Initial Model

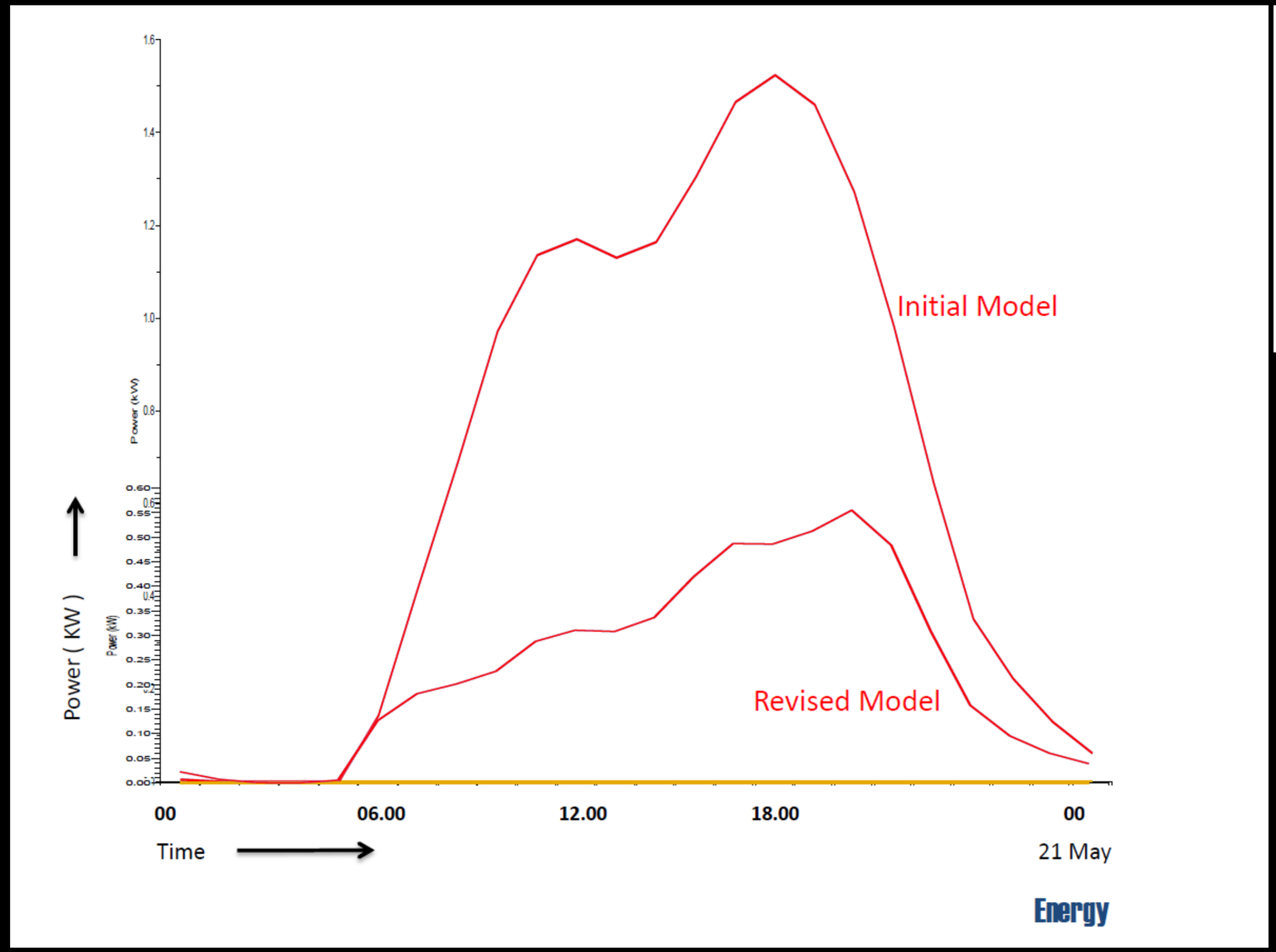


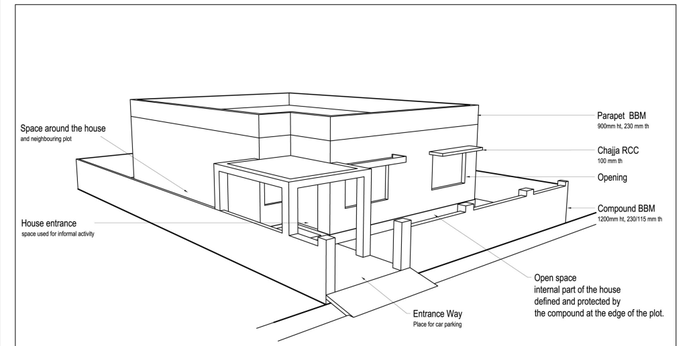
Revised Model

RESEARCH_ REFLECTIONS

Reflective Themes

Mysore: A return to traditional values?





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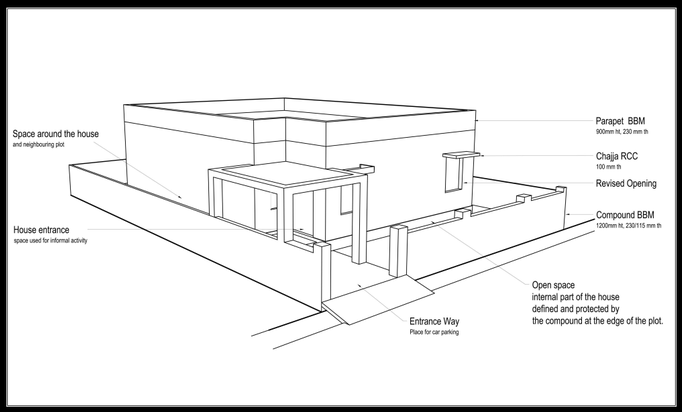
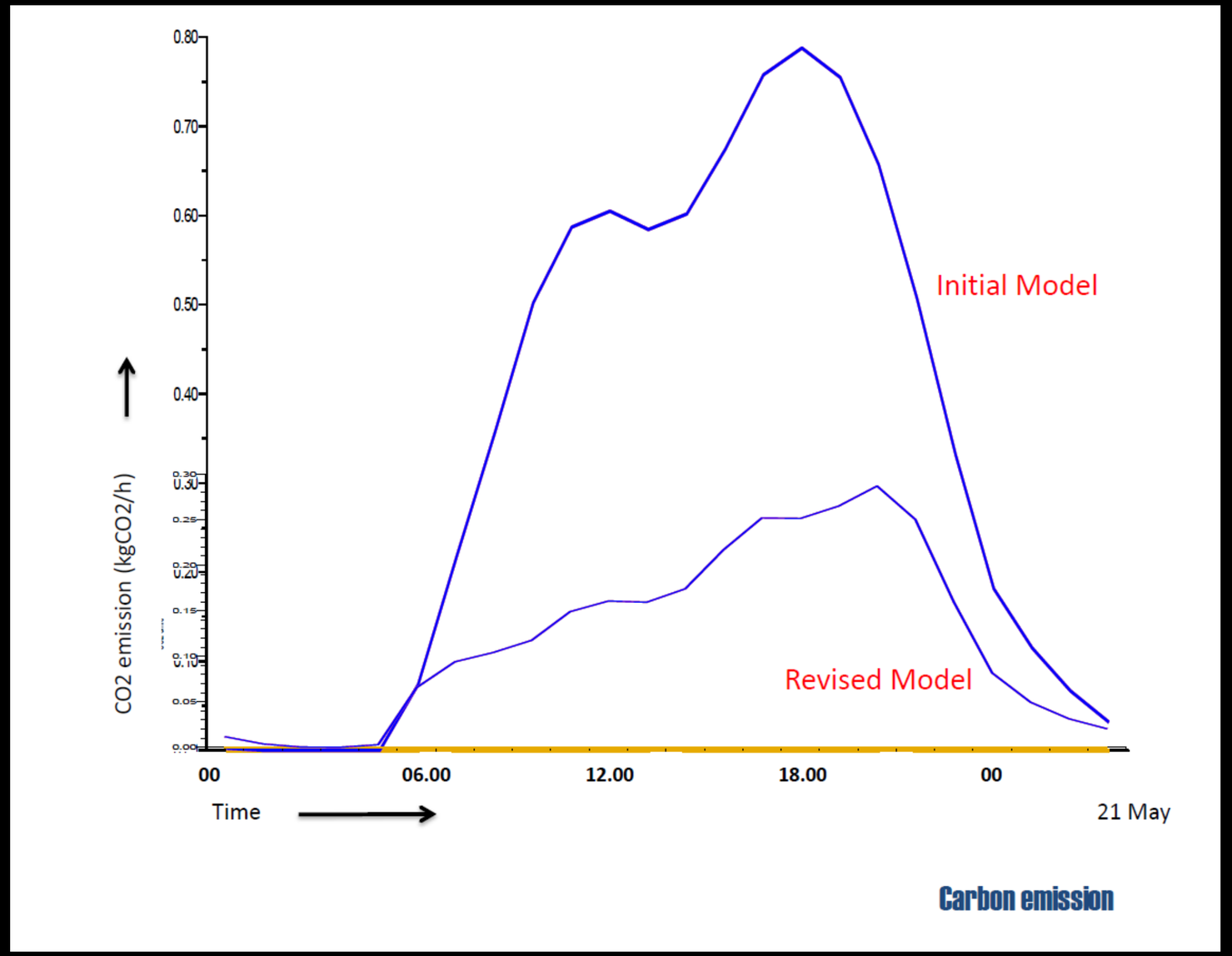


Post field work simulation

RESEARCH_ REFLECTIONS

Reflective Themes

Mysore: A return to traditional values?



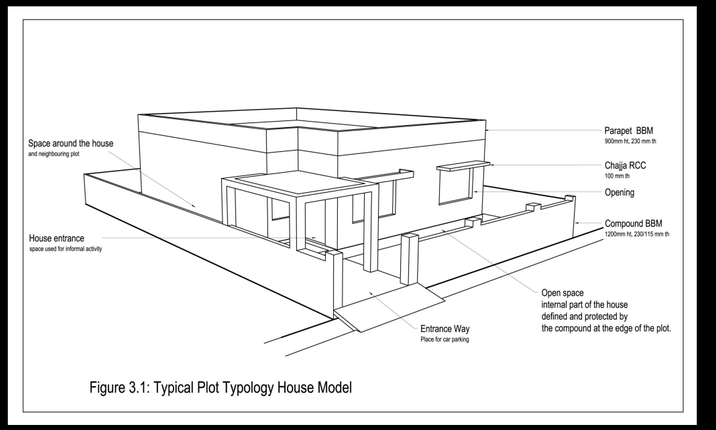
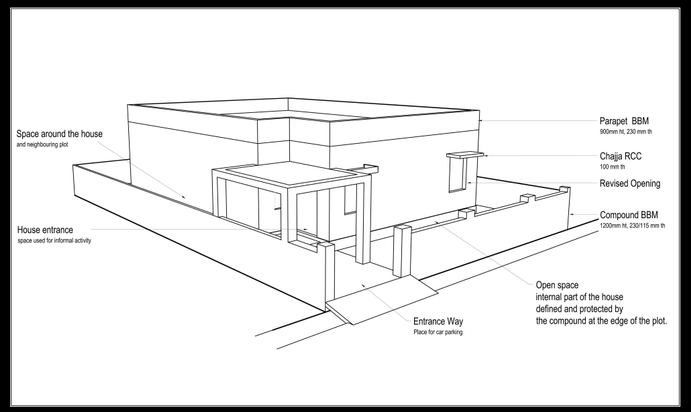


Figure 3.1: Typical Plot Typology House Model



Post field work simulation

Reflective Themes

Mysore: A return to traditional values?

Perceptions of Security

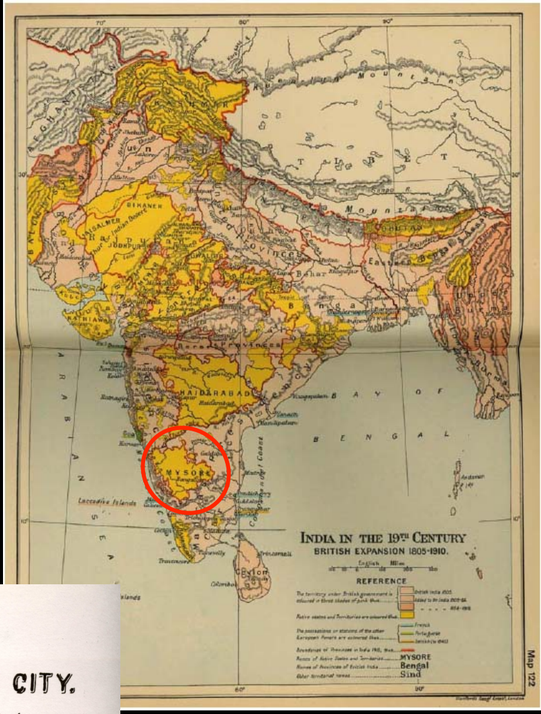
Paradoxes

Environmental sustainability versus sustainable social mobility

Class segregation: from implied to defined boundary

Challenges
Harmonising expectations

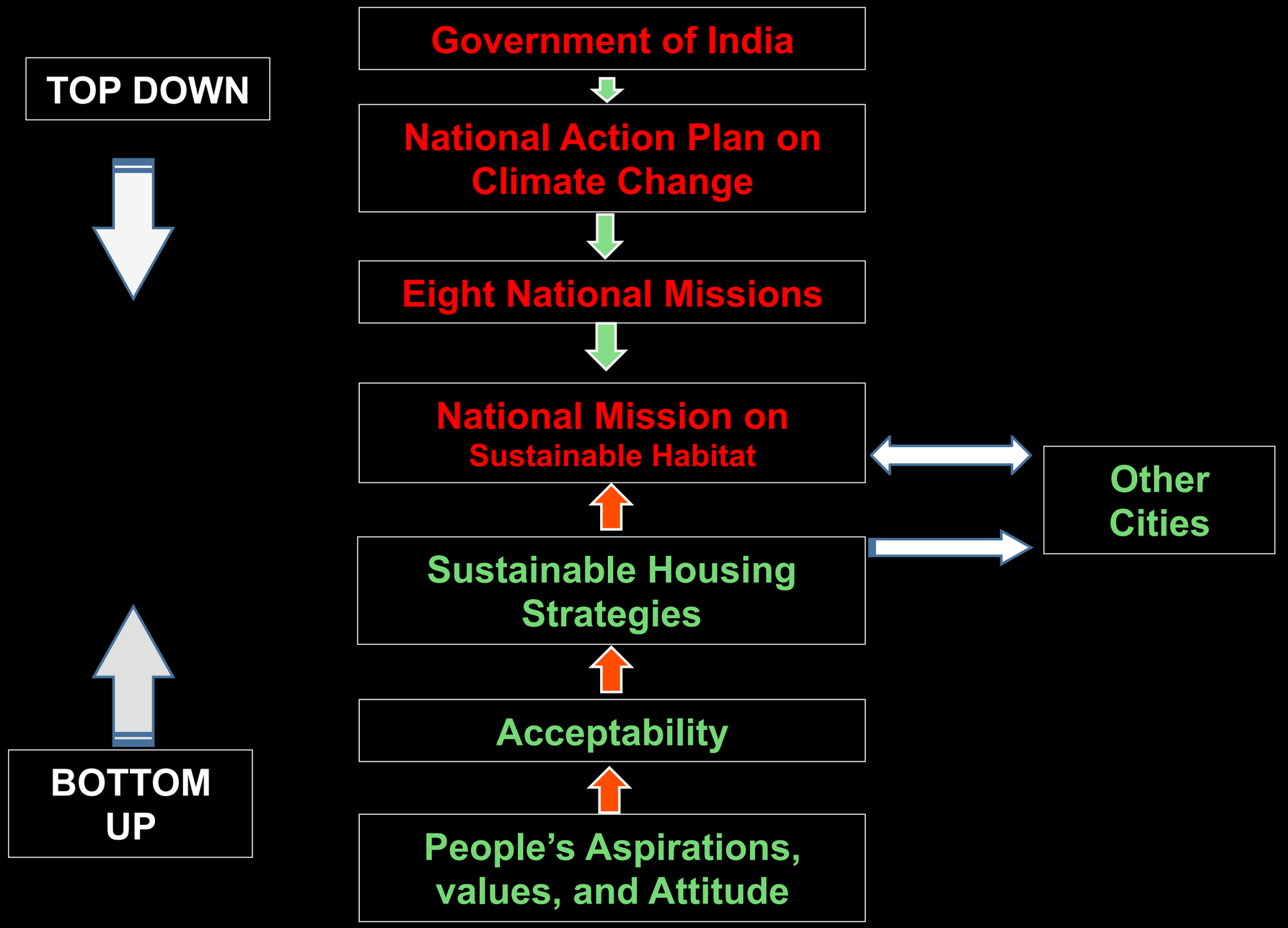
A Climate of regulation:



India - 1910

Mysore - 1902

CONTEXT


TOP DOWN
Government of India
National Action Plan on Climate Change
Eight National Missions
National Mission on Sustainable Habitat
Other Cities
Sustainable Housing Strategies
Acceptability
People's Aspirations, values, and Attitude
BOTTOM UP

Mysore during the night

satish.bk@plymouth.ac.uk