

LAND USE, TRAVEL BEHAVIOR AND TRANSPORT PLANNING

LAND USE TRANSPORT INTEGRATION THROUGH A USER BEHAVIORAL PERSPECTIVE: CASE OF GREATER COCHIN

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Hyderabad

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Warrier**
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LONDON



Canary Wharf Development



Higher **accessibility** to Public Transport – increased the scope for development of High density of housing



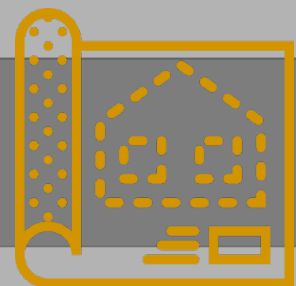
Multimodal and transit facility integration – integration of improved walking and PT services

SINGAPORE



Integrated Transit Facilities –
innovative transit facilities
realized through **Institutional**
Framework

CURITIBA



Land Use Planning – Trinary Road system – stimulate development



Institutional Mechanism

AHMEDABAD



Policy reformations – to imbibe the principle of TOD
Introduction of BRTS

LAND USE TRANSPORT INTEGRATION



Aims at the integration of spatial and transport development

LAND USE TRANSPORT INTEGRATION - WHERE IS THE GAP?



<https://www.youtube.com/watch?v=6xqtSykWXaU>



<https://timesofindia.indiatimes.com/citizen-reporter/stories/condition-of-power-blocks-so-churchgate/crshow/57494249.cms>

What do we see??

- Unsustainable practices
- Increased Vehicle emissions
- Increased travel time
- Reduced Quality of living
- Poor Access to Public Transport

What do we experience?

- Difficulty in accessing the roads
- Difficult in accessing PT stop
- Lack of last mile connectivity
- Improper transit infrastructure
- Poor connectivity

LAND USE TRANSPORT INTEGRATION

Like all of us have several feedbacks, the thought for the study had come up with the idea of recording them

“User behaviour perspective”

The methodology followed by UNEP to prepare LUTP **does not mandate survey regarding capturing information about the qualitative aspects of a travel.**

House hold surveys only are **able to provide quantitative information** which is the major base data for the leading transport proposals.

Whereas, travel pattern has a lot more dependency on **individual travel behavior and preferences** which in fact is greatly influenced by **quality of travel.**

“Land use Transport Integration through a user behavioral perspective : Case of Greater Cochin”

LAND USE TRANSPORT INTEGRATION

Land use Decisions

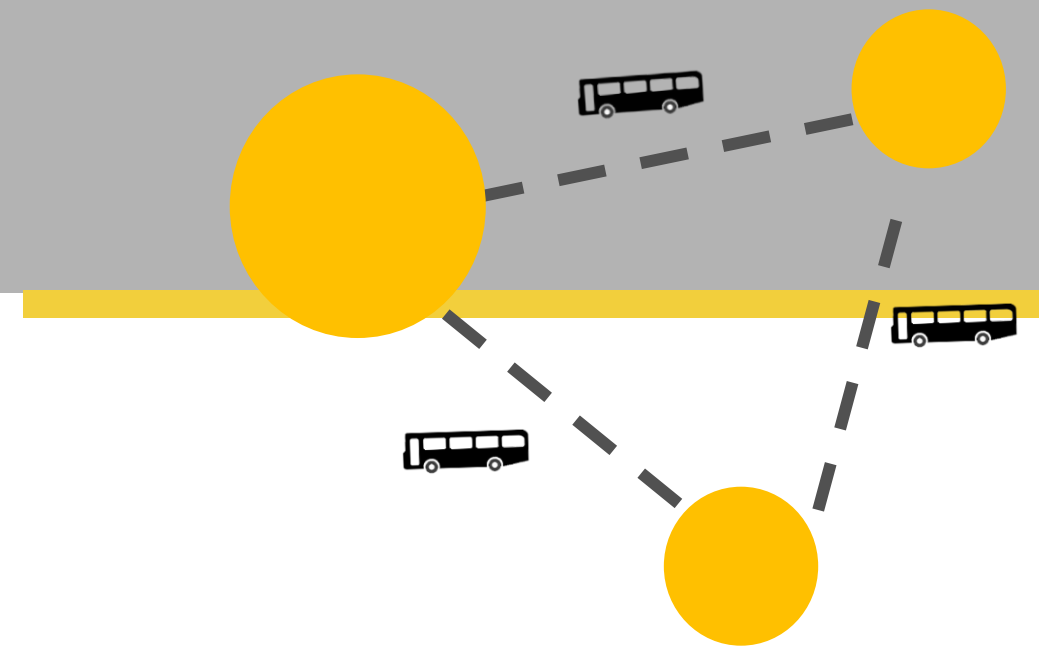
Transit Oriented Development

Accessibility Improvements

Integrating transit facilities

Integrated Fare systems

Transport Decisions



LAND USE TRANSPORT INTEGRATION–QUALITATIVE PARAMETERS

FACTORS CONSIDERED

Accessibility

- Distance
- Mode
- Frequency

Connectivity

- Last mile connectivity
- Ease of connectivity
- Footpath continuity

Safety and Comfort

- Quality of infrastructure
- Quality of service

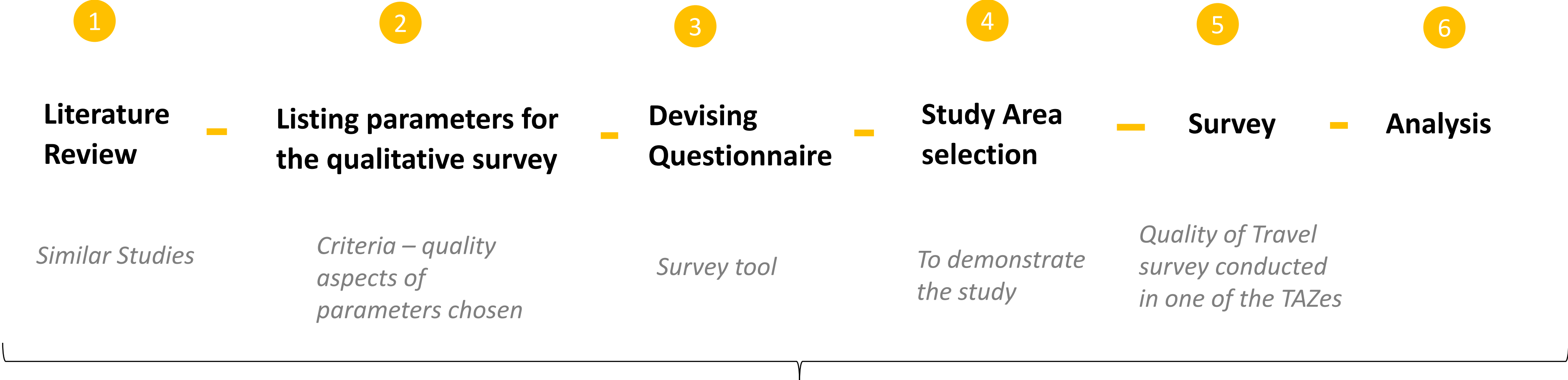
Reliability

- Time factor

Affordability

- Fare system
- Quality of service against rate

METHODOLOGY



How the qualitative survey can help in understanding quality of travel and user behavior?

Recommendations

PARTS TO WHOLE APPROACH

✓ Comfortable walking along streets

✓ Accessible PT stops

✓ Shaded Walkways

✓ Good connectivity

✓ Good last mile connectivity


✓ Safer streets

✓ Quality transport infrastructure

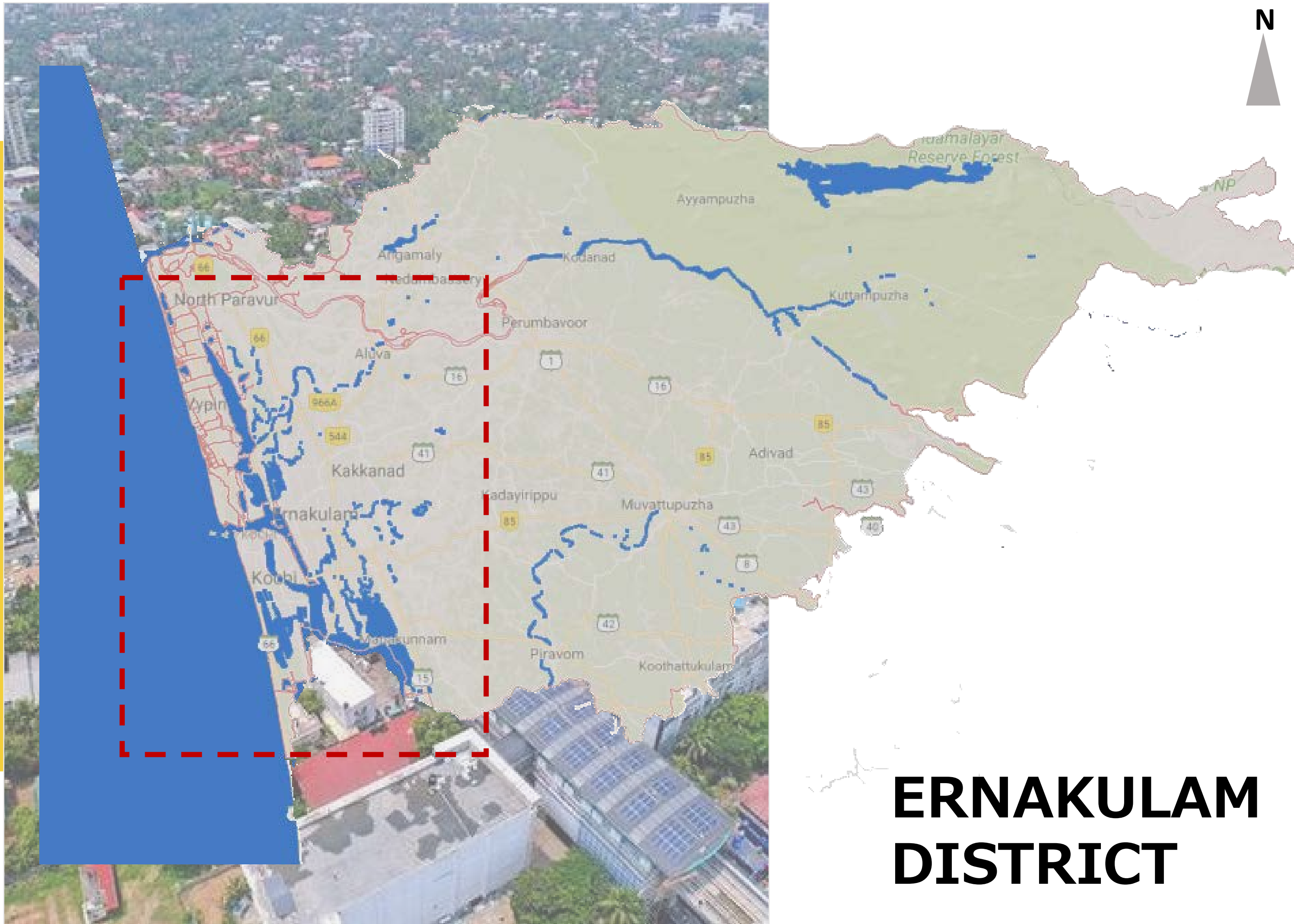
✓ Comfortable public transport travel

- More focused Approach
- Incremental Designing Procedure
- Recommends small scale interventions
- More contextual
- More attention to smaller components

PARTS TO WHOLE APPROACH

- 
- ✓ Difficulty in walking along the roads
 - ✓ Lack of last mile connectivity
 - ✓ Difficult in accessing Public Transport stop
 - ✓ Road accidents
 - ✓ Improper shading
 - ✓ Lack of proper transport infrastructure
 - ✓ Poor connectivity
 - ✓ Uncomfortable public transport travel

- More focused Approach
- Incremental Designing Procedure
- Recommends small scale interventions
- More contextual
- More attention to smaller components



3,068 sqkm



32.9 lakhs.



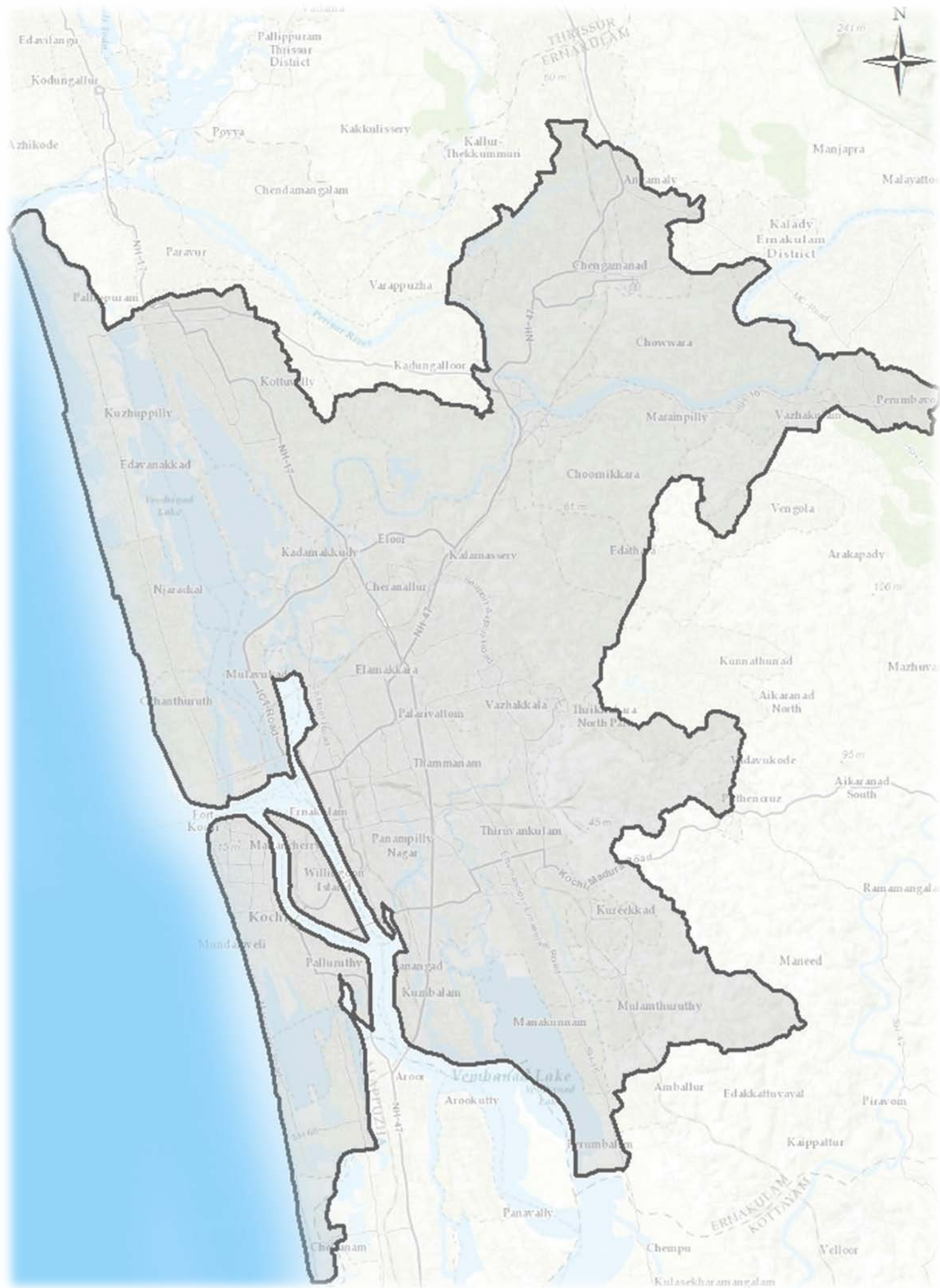
1,069 ppl per sqkm



95.6%



ERNAKULAM DISTRICT



- 1 Kochi Municipal Corporation
- 9 Municipalities
- 29 Panchayats
- 143 Traffic Analysis Zones

632 sqkm 

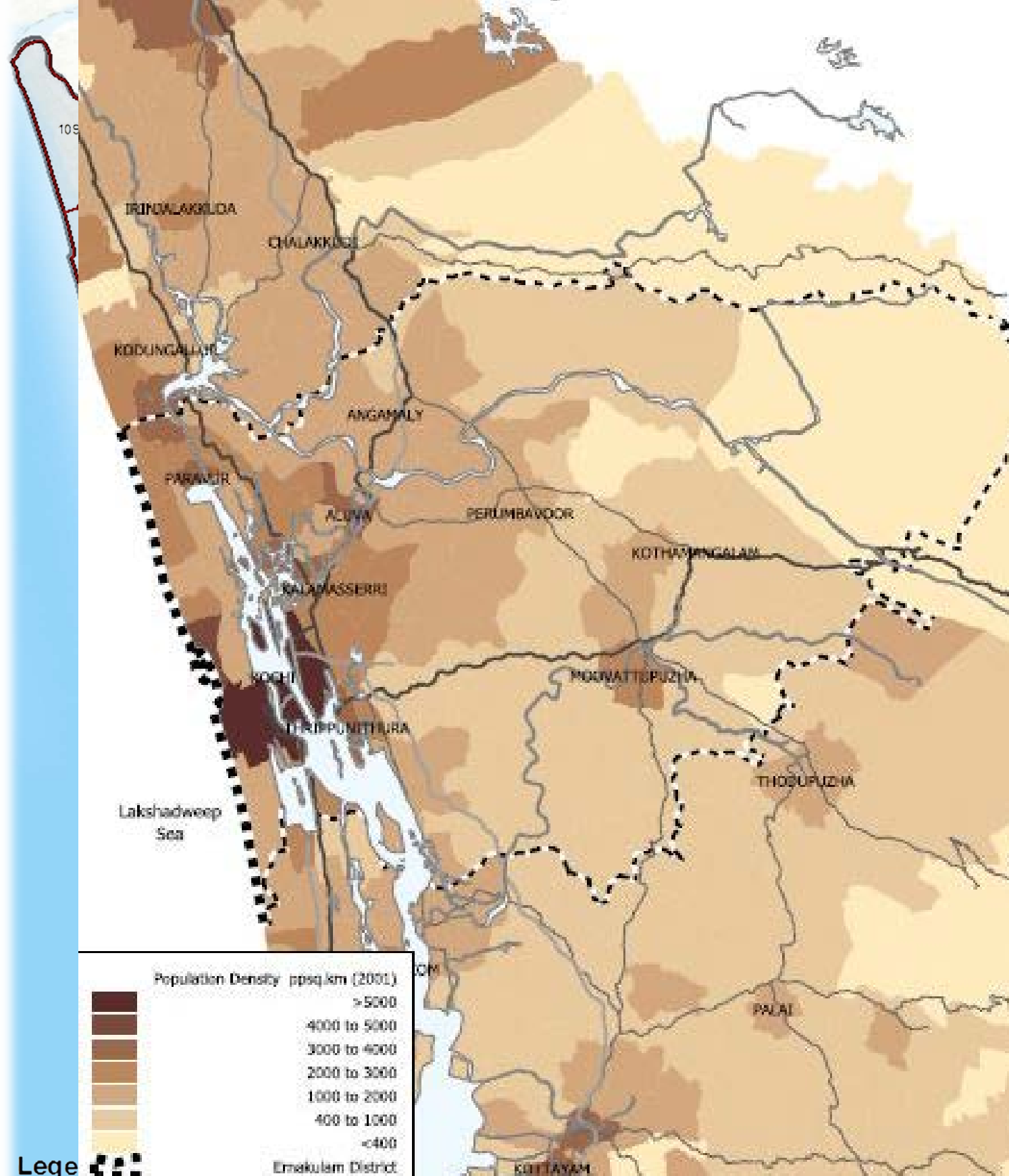
20.01 lakhs. 

6,340 ppl per sqkm 

97.5% 

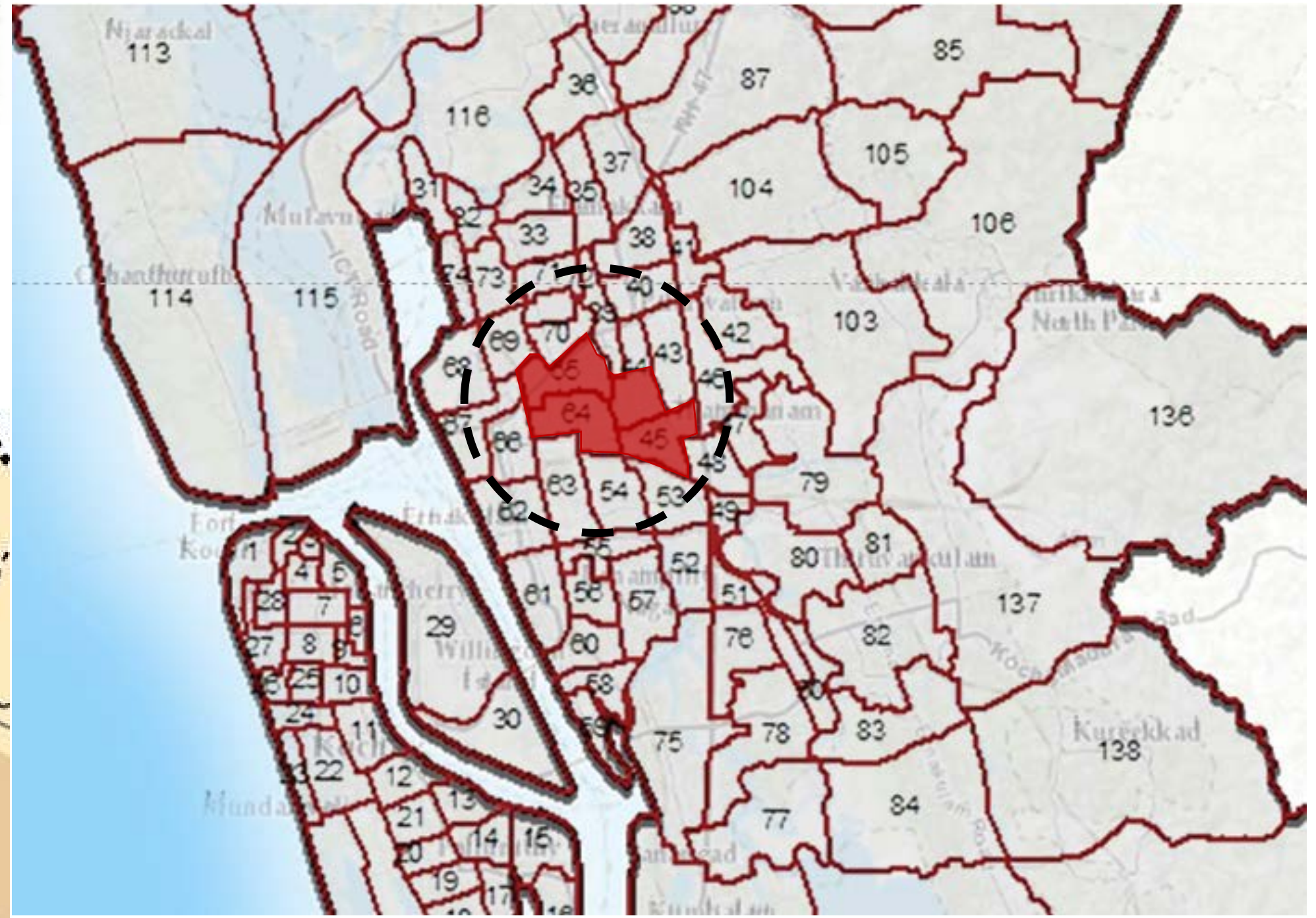
143 

GCD



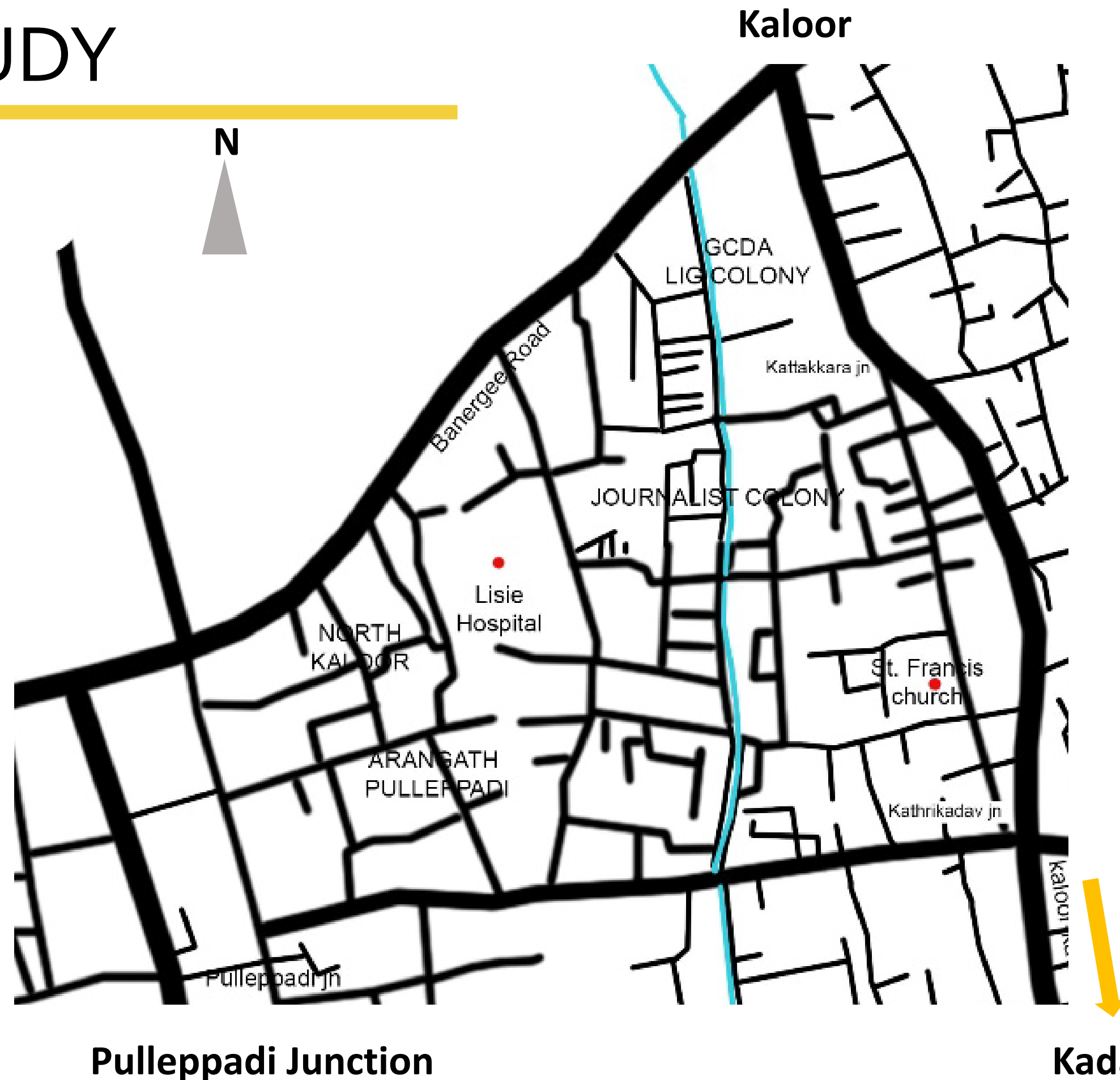
Legend:
 [Black dashed line] GCDA Boundary
 [Red outline] TRAFFIC ANALYSIS ZONES

Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo.



**Highest Residential Population Density
Kathrikadavu Area**

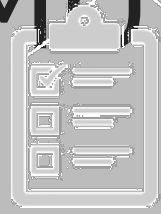
STUDY



Kathrikadavu

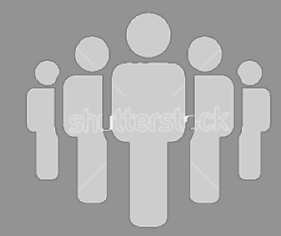
- Midway between two major intersections **Kaloor and Kadavanthra**
- A **major residential area**, upcoming commercial establishments
- Ease of **Access to other parts of Kochi**

QUESTIONNAIRE FORMULATION



32 sample

RANDOM SAMPLING



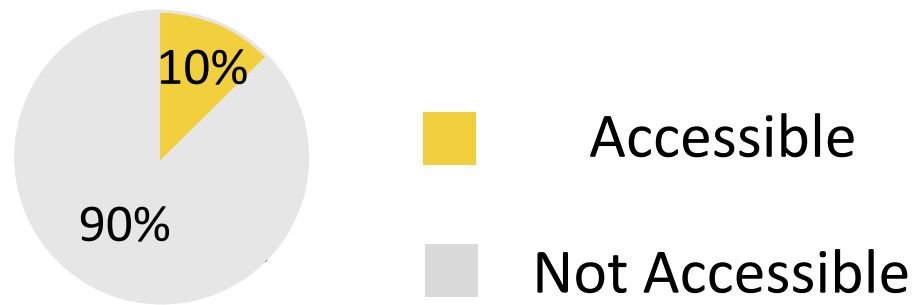
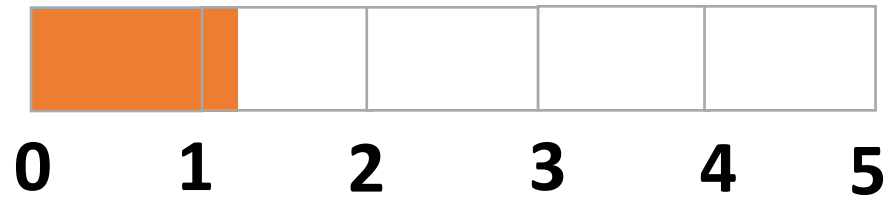
All age groups

- Accessibility**
- Connectivity**
- Safety and Comfort**
- Reliability**
- Affordability**



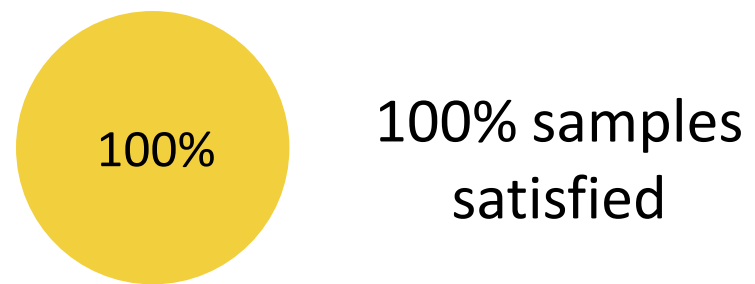
Accessibility

Quality of walk

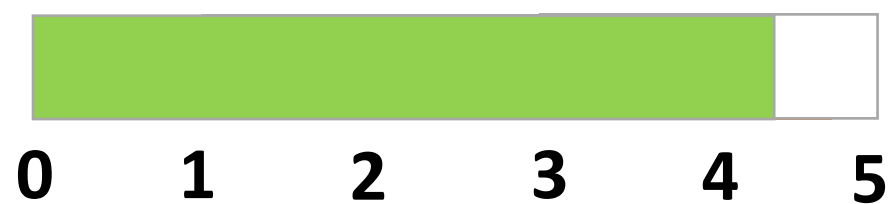


Affordability

Fare



Quality against fare



1. How far is a Public transport accessing stop from your home?

Within 500m 500 to 1 km 1 km and above

2. How often do you use public transport?

Daily Weekly Monthly Never

3. How do you access Public Transport?

By walk Auto rickshaw Private vehicle

4. Describe the footpaths present along the roads?

Continuous Discontinuous

Shaded Exposed

Paved Unpaved

Safe Unsafe

5. If by walk, rate your quality of walk (out of 5), 5 the greatest and 1 the lowest.

1 2 3 4 5

6. Are you able to find an Auto rickshaw within 200 m distance from your house or PT Stops?

Yes No Sometimes Rarely

7. How easy is to get a bus from your nearest PT stop to other parts of Kochi, rate from 1 to 5? 1 being difficult and 5 the easiest.

1 2 3 4 5

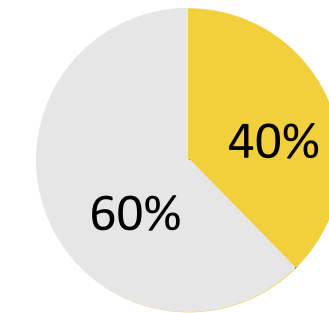
8. Are the Public Transport options Affordable, rate from 1 to 5?

1 2 3 4 5

9. How do you find the quality of service against what you pay?

Safety and Comfort

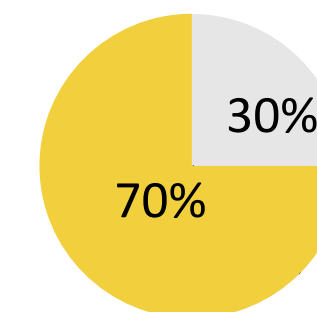
Issues related to anti-social behaviour



40% No Issues
60% Issues

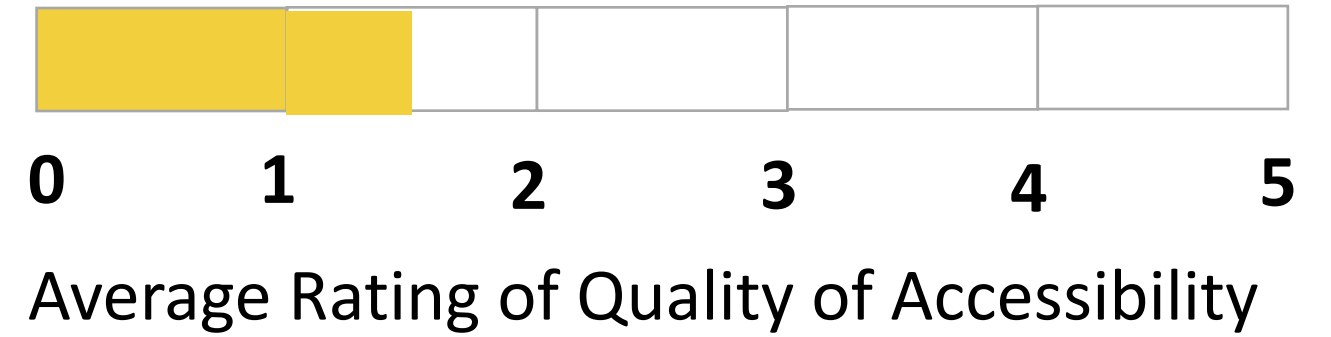
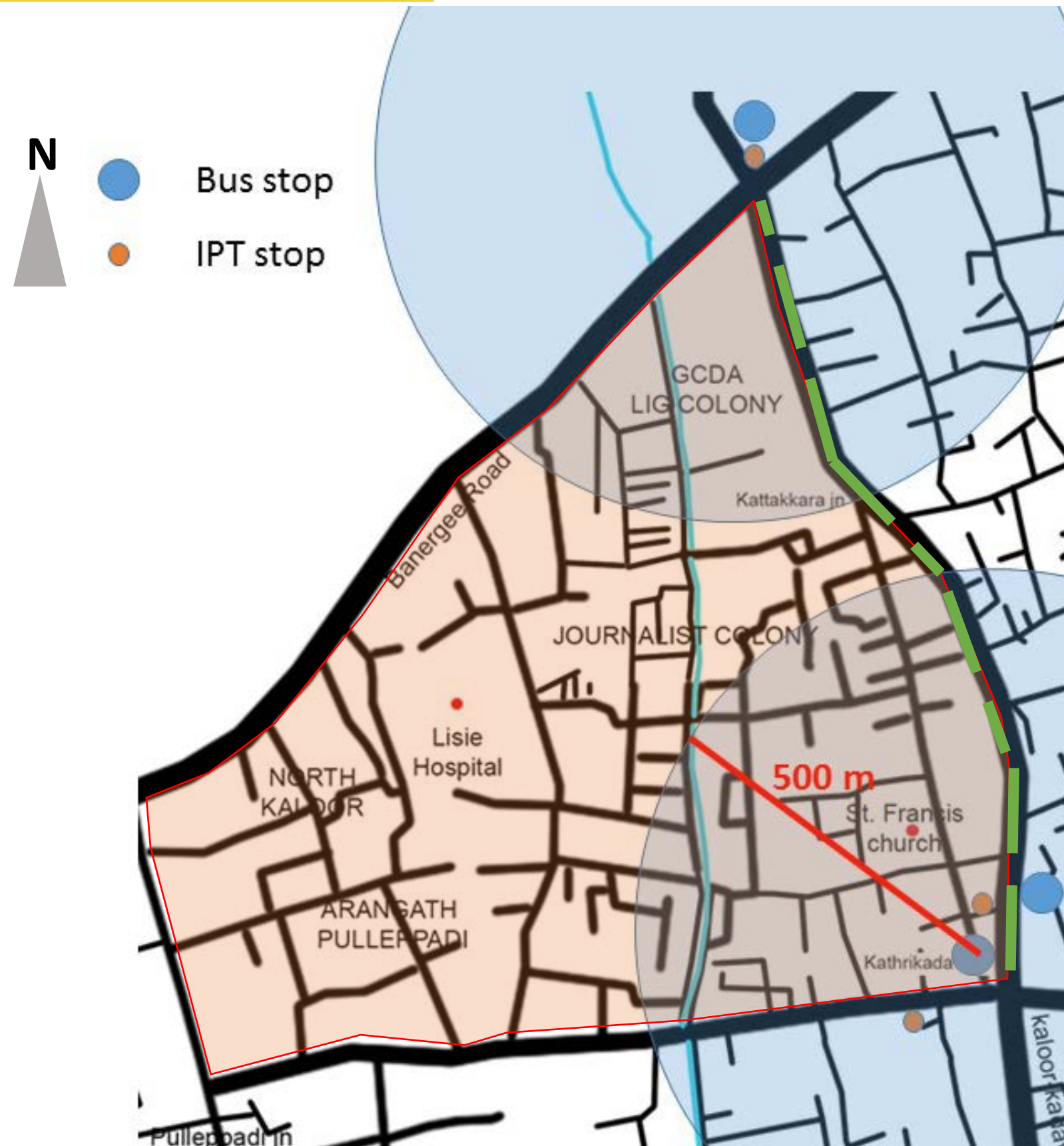
Reliability

Average waiting time for the bus



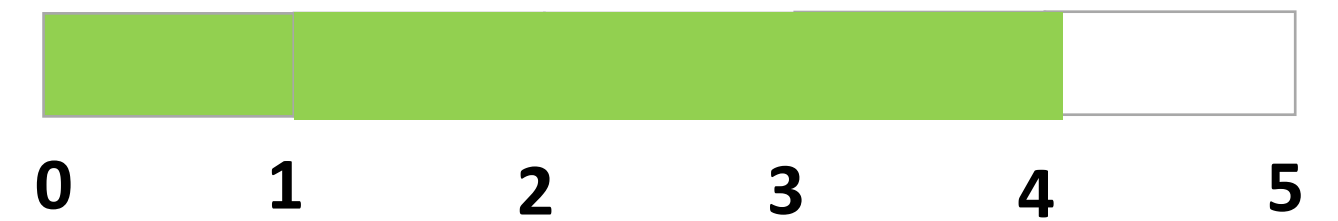
70% Issues
30% No issues

ANALYSIS



Accessibility to the transit Stops

- No Footpaths along the inner roads
- Discontinuous footpaths along the major roads
- Unpaved, Not shaded, no footpath infrastructure



Connectivity to other parts

- Connectivity from the Kathrikadavu area to other parts of Kochi is satisfactory.

ANALYSIS

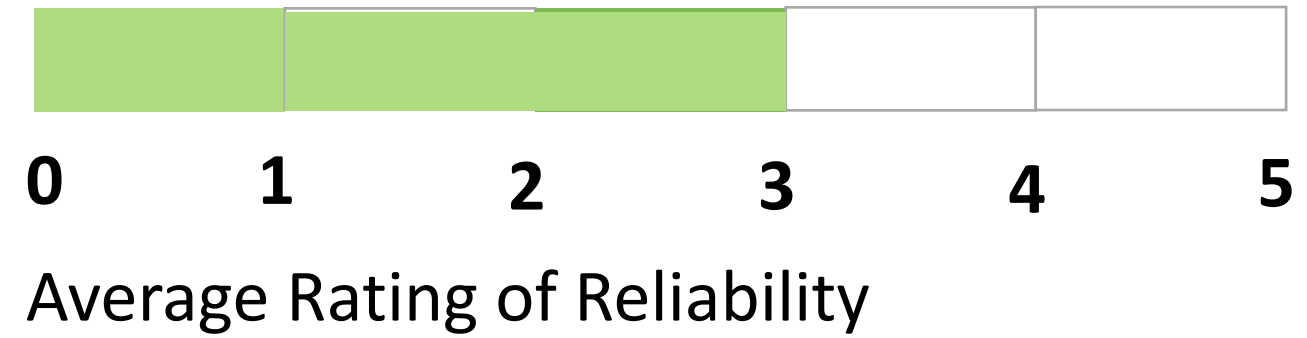


Condition of Road edges during Rainy season at Kathrikadavu

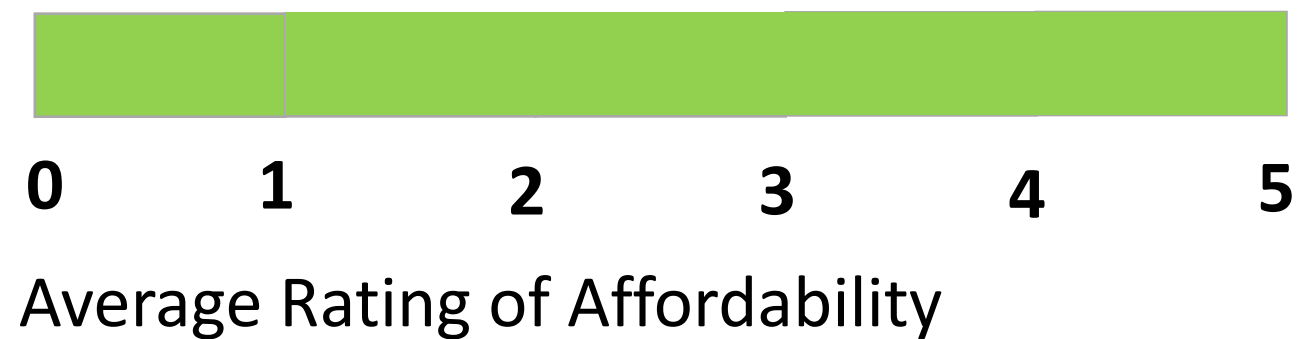


Average Rating of Safety and Comfort

ANALYSIS



- Frequency of buses are high
- They do not seem to follow fixed schedule but.



- Minimum bus fare is Rs. 7
- Most of the People find it affordable .

USER BEHAVIORAL IMPACTS – A SHORT STORY

Young man got relocated to Cochin city.
Got an accommodation at **Kathrikadavu** and has to travel to **Vytilla** which is 3- 4 km away, everyday for work

You will get buses in every 5 minutes from here...

Son, No need to take bike now, its very unsafe...

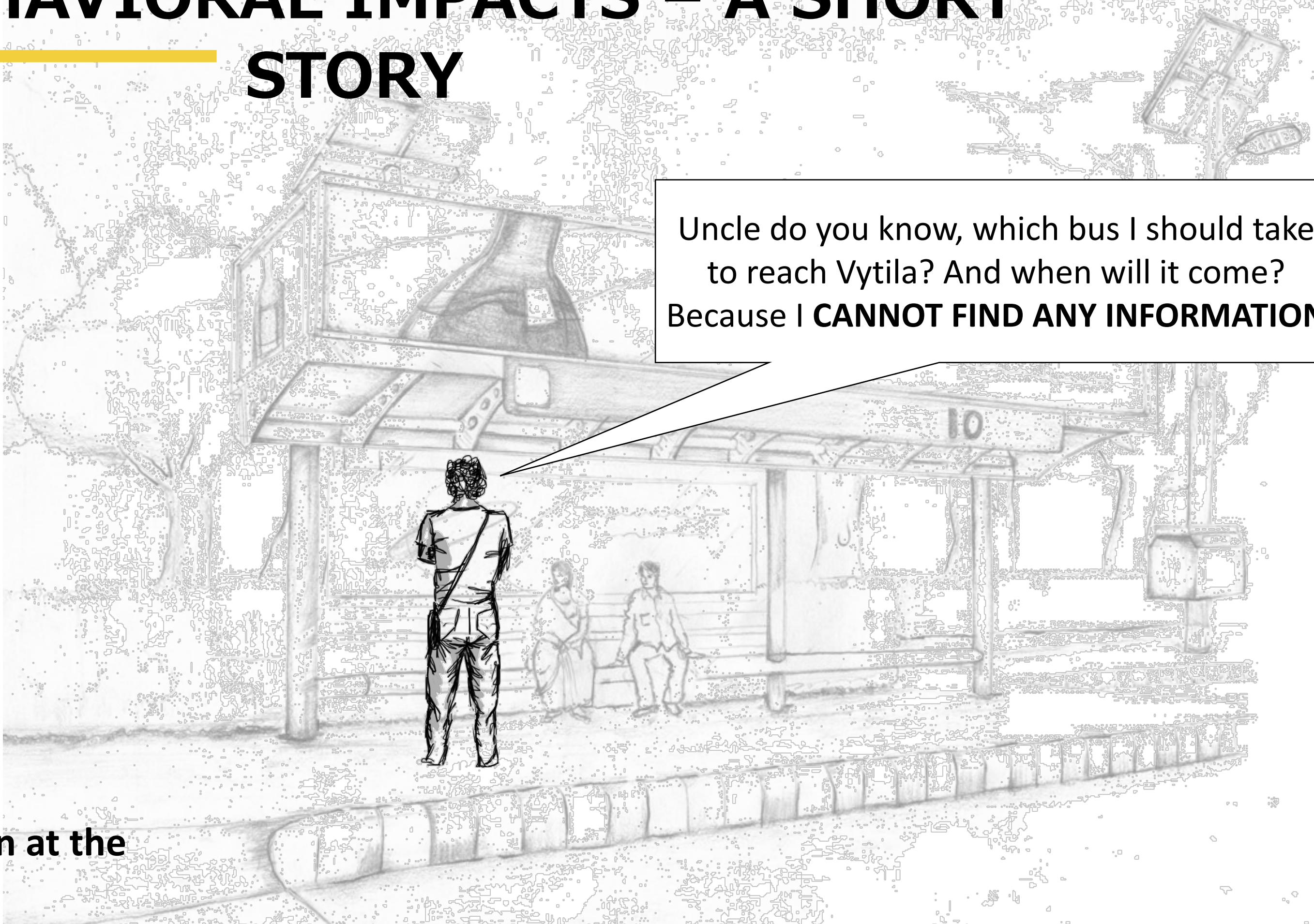


USER BEHAVIORAL IMPACTS – A SHORT STORY



**Lack of infrastructure;
Congestion and over
speeding**

USER BEHAVIORAL IMPACTS – A SHORT STORY



Uncle do you know, which bus I should take to reach Vytilla? And when will it come? Because I **CANNOT FIND ANY INFORMATION**

No information at the transit stops

USER BEHAVIORAL IMPACTS – A SHORT STORY



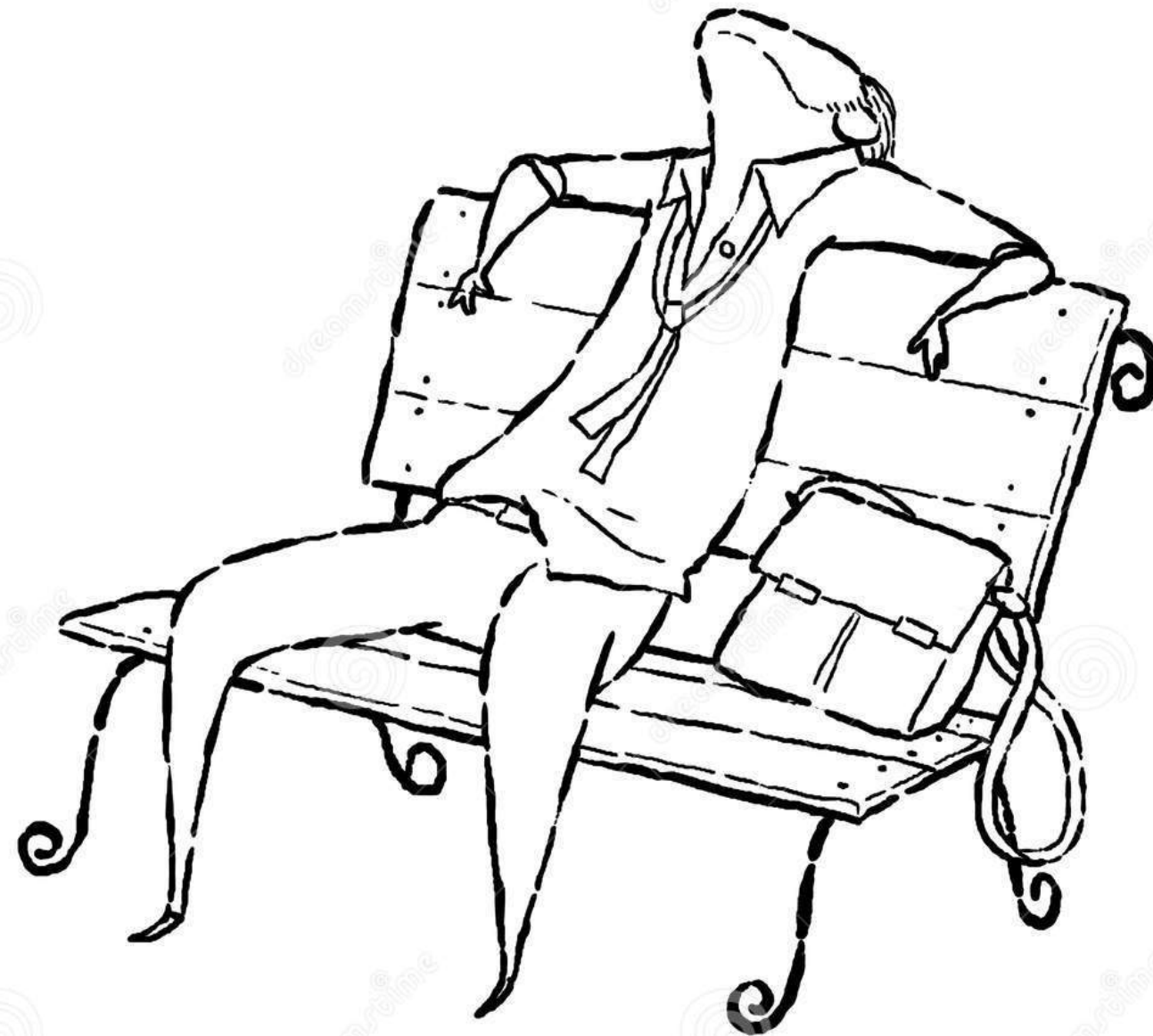
**Overloading And
Discomfort In Buses**

USER BEHAVIORAL IMPACTS – A SHORT STORY



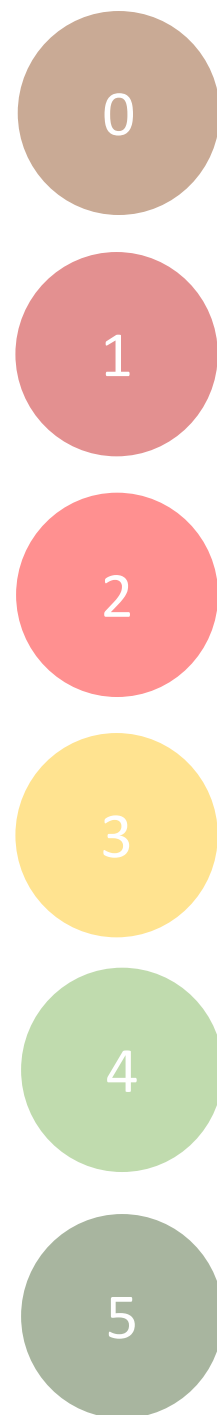
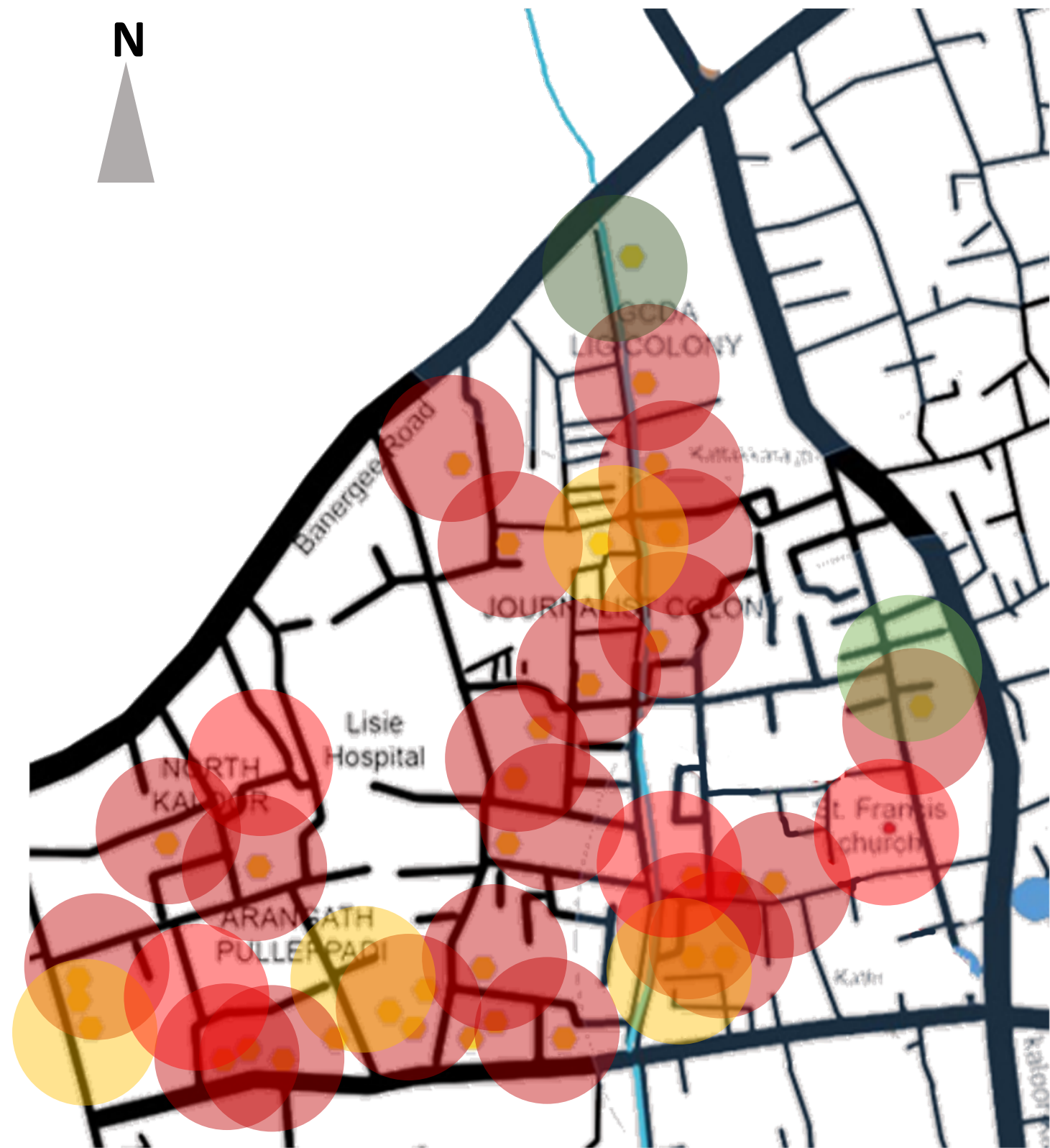
Traffic congestion and
Delaying

USER BEHAVIORAL IMPACTS – A SHORT STORY



I AM GOING TO BUY A BIKE!!!

OUTCOMES

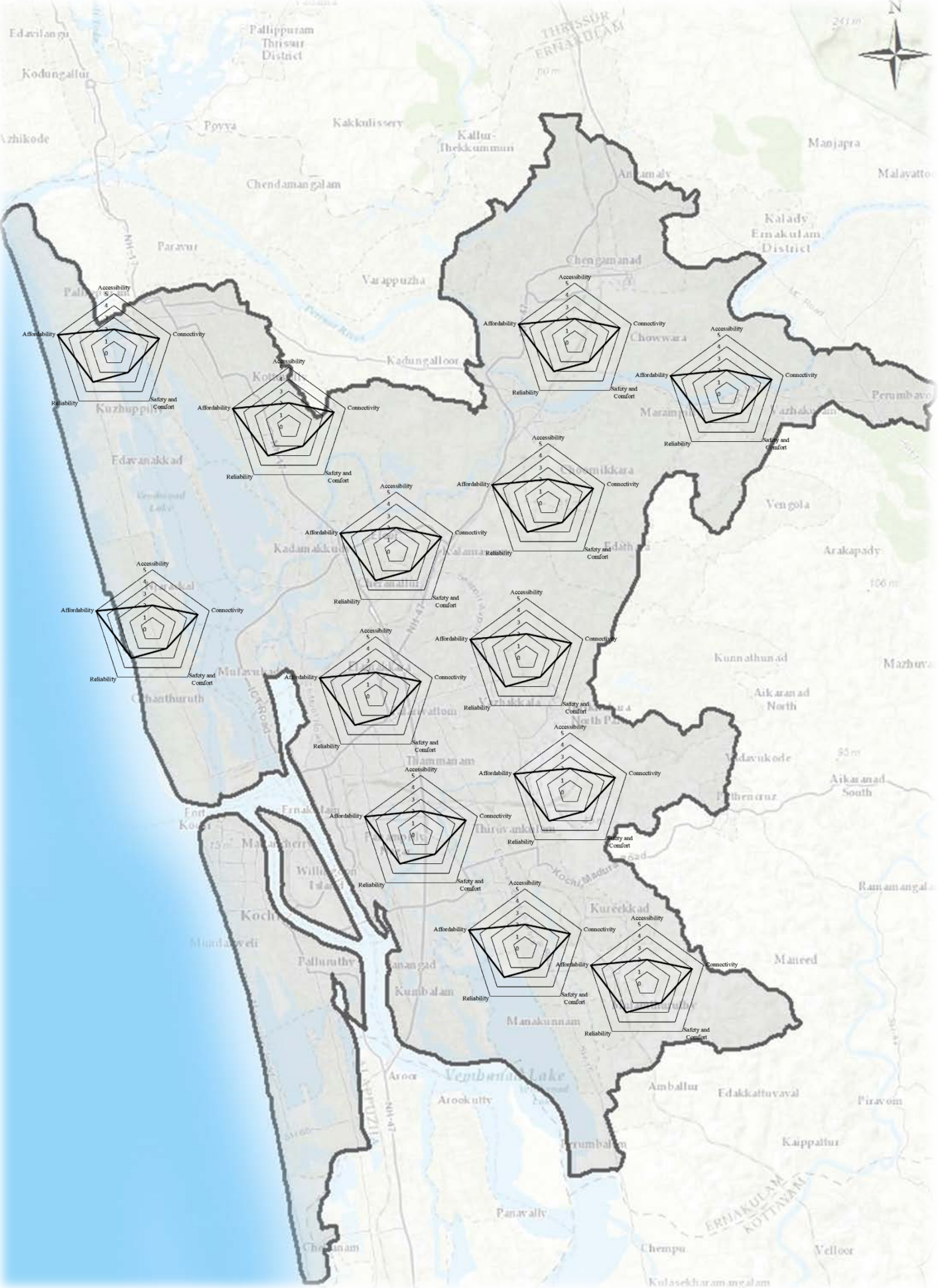


Quality of Accessibility



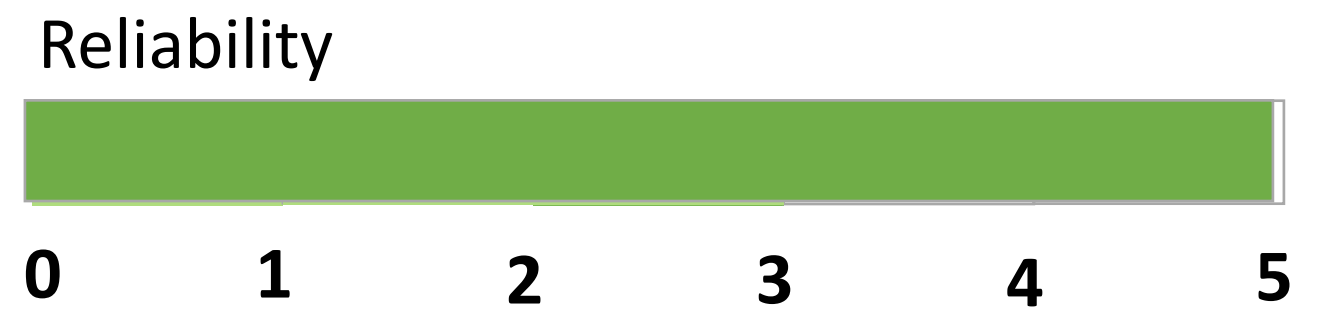
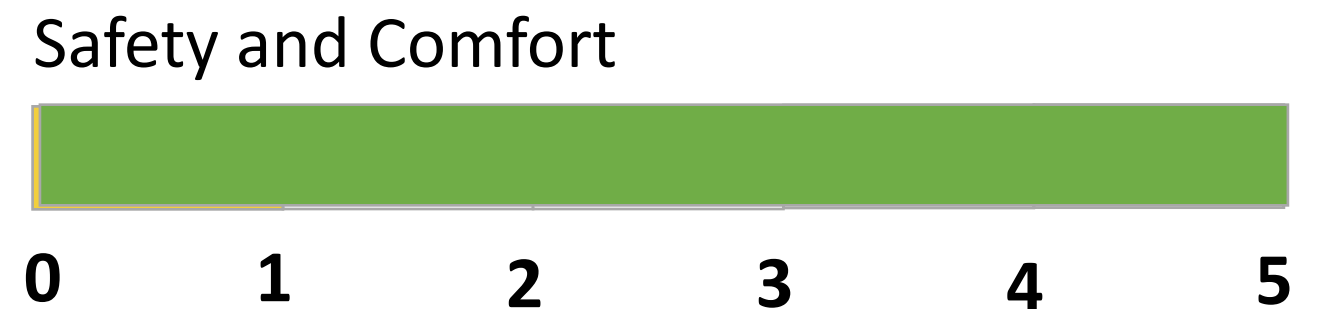
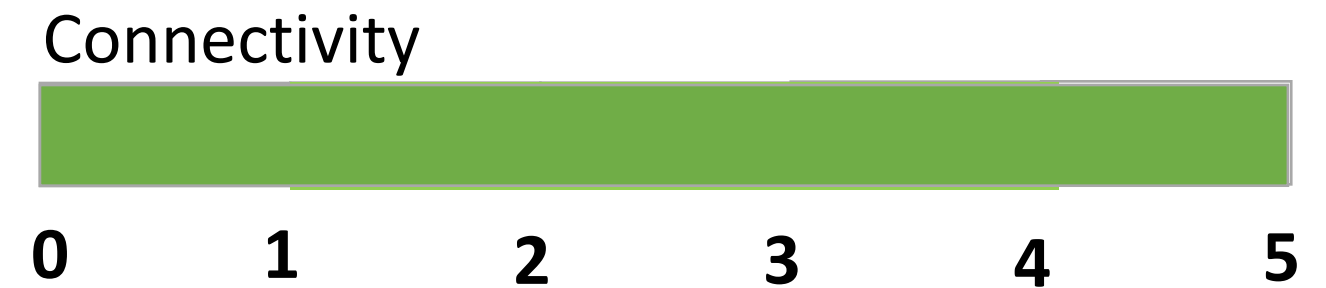
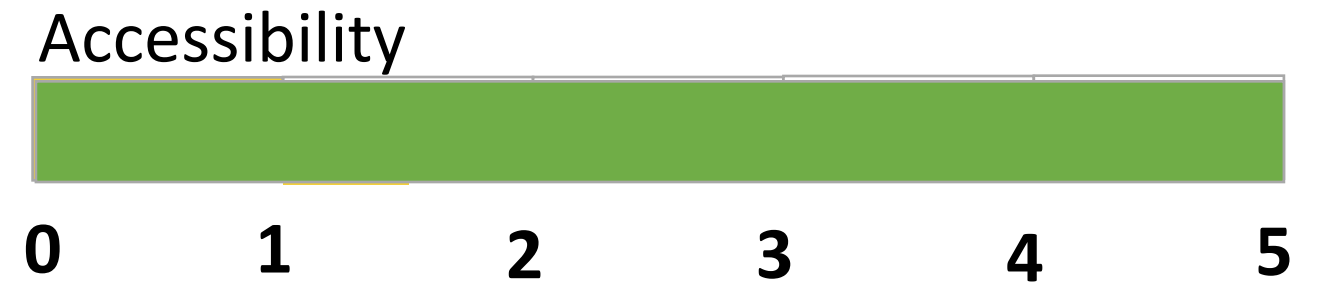
Parts to Whole Approach helping in understanding issues at household level.

RECOMMENDATIONS

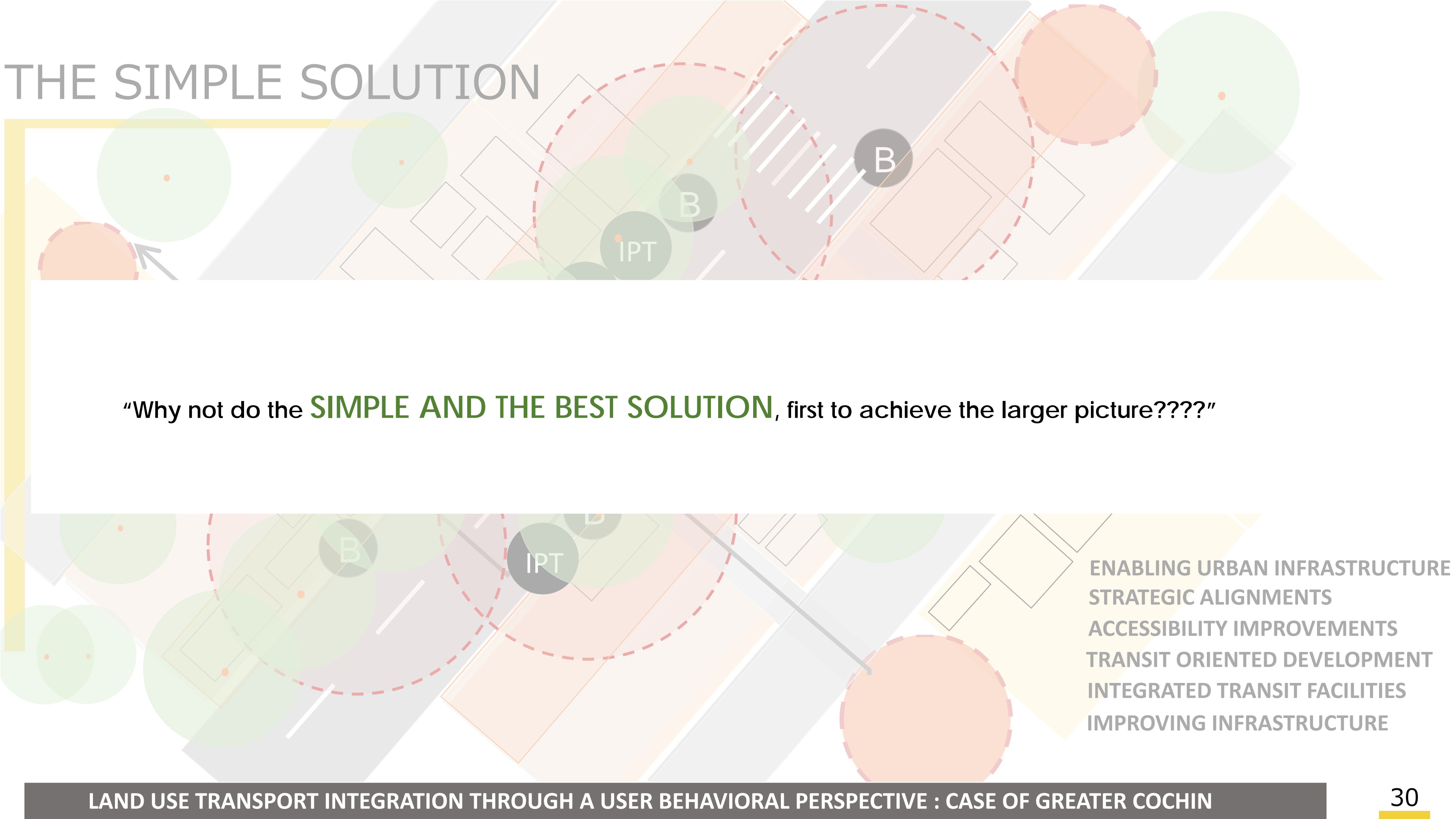


RECOMMENDATIONS

- Incorporating Quality Assessment survey in the household survey of the Planning process.
- Quality parameters shall be measured and reviewed constantly at a local level.
- WRI Stamp Accelerate program is one of the best initiatives in similar lines
- Make it a Ground Reality.



THE SIMPLE SOLUTION



“Why not do the **SIMPLE AND THE BEST SOLUTION**, first to achieve the larger picture????”

- ENABLING URBAN INFRASTRUCTURE
- STRATEGIC ALIGNMENTS
- ACCESSIBILITY IMPROVEMENTS
- TRANSIT ORIENTED DEVELOPMENT
- INTEGRATED TRANSIT FACILITIES
- IMPROVING INFRASTRUCTURE

REFERENCES

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Thank You