Challenges in Achieving Flood-resilient Public Transport

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Metro Manila's Floods

Encroachment of concrete surfaces

Densification of buildings and residential areas

Narrowing of rivers due to floodplain development

Draining and filling in of small rivers

Rapid urbanization

Forest degradation

Silting of riverbeds and canals

Obstruction of watersways by informal settlers

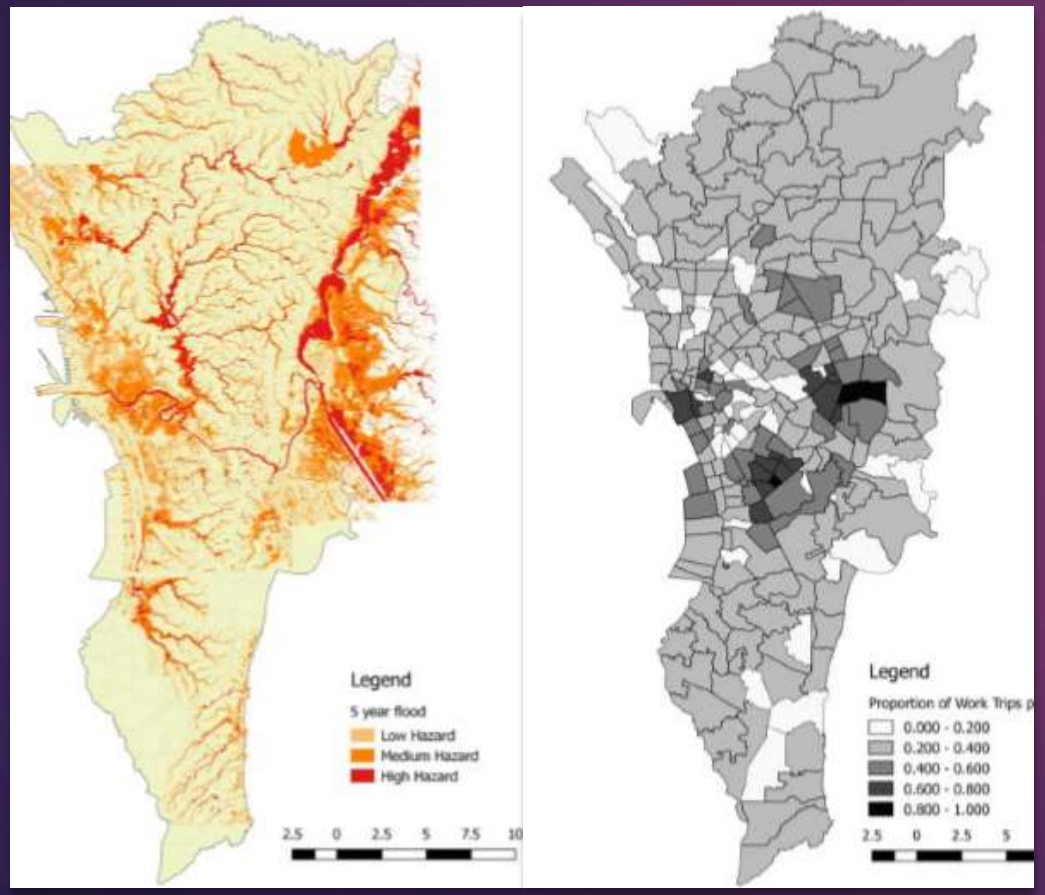
Clogging of floodways by garbage

Reclamation of coastal lands

Floods

Traffic Congestion

Metro Manila: Flood and Work Trip Maps



- Annual exceedance probabilities or AEPs are normally used in defining the maximum amount of rainfall within a specific period
- Most of the home-to-work trips were located in the central portions of Metro Manila. Specifically, these areas could be found in) where most business districts are located.

Major public transport services and their routes

Jeepney

Bus

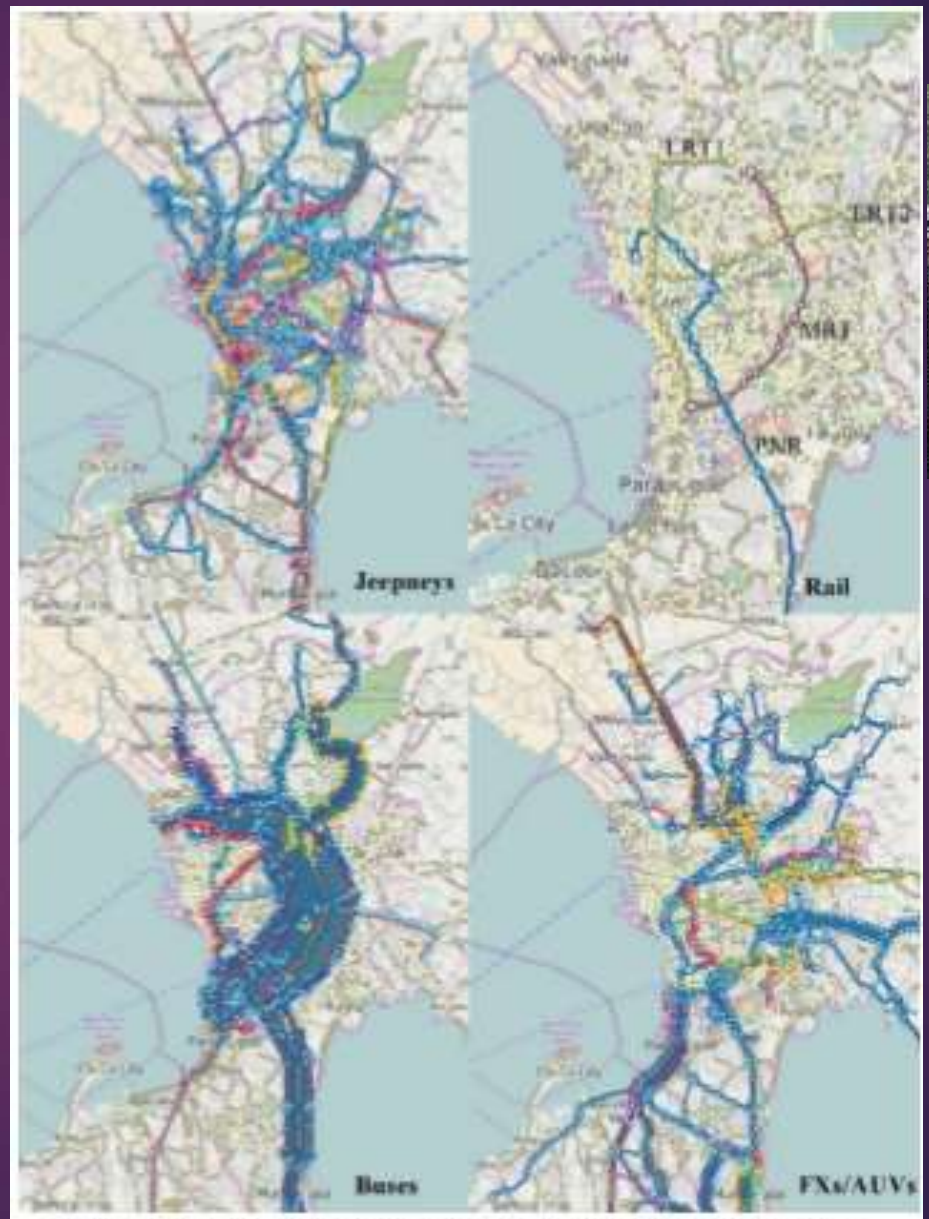


Figure 2 Public Transportation Routes in Metro Manila

Rail

Asian Utility Vehicles or AUVs

Effects Rain-triggered Floods on Road-based transport services

completely inaccessible

partially inaccessible

forcing travelers either to change their travel behavior

forcing travelers to wait until flood waters recede

Effect of Floods on Commuting Passengers

Continue the journey	Willing to wait	Trip postponement
• left to tread flooded areas • use informal modes of transit • ride services that are operating beyond its intended capacity • stranded at bus stops or stations	• may choose to wait until flood waters subside • experience longer waiting times at terminals because of unavailable transit services	• postponing their trips until conditions and transit services have returned to normal

Analyzing Public Transportation Services

HIS

- identifying common destinations of home-to-work trips from household interview surveys

GIS

- Demographics of households and individual respondents were analyzed and visually compared using Geographic Information Systems

Transport Modelling

- transportation modeling software was used to determining the impacts of flooding on transportation accessibility

Three scenarios

Base

- represents normal transit operations and current traffic conditions

Terminated service

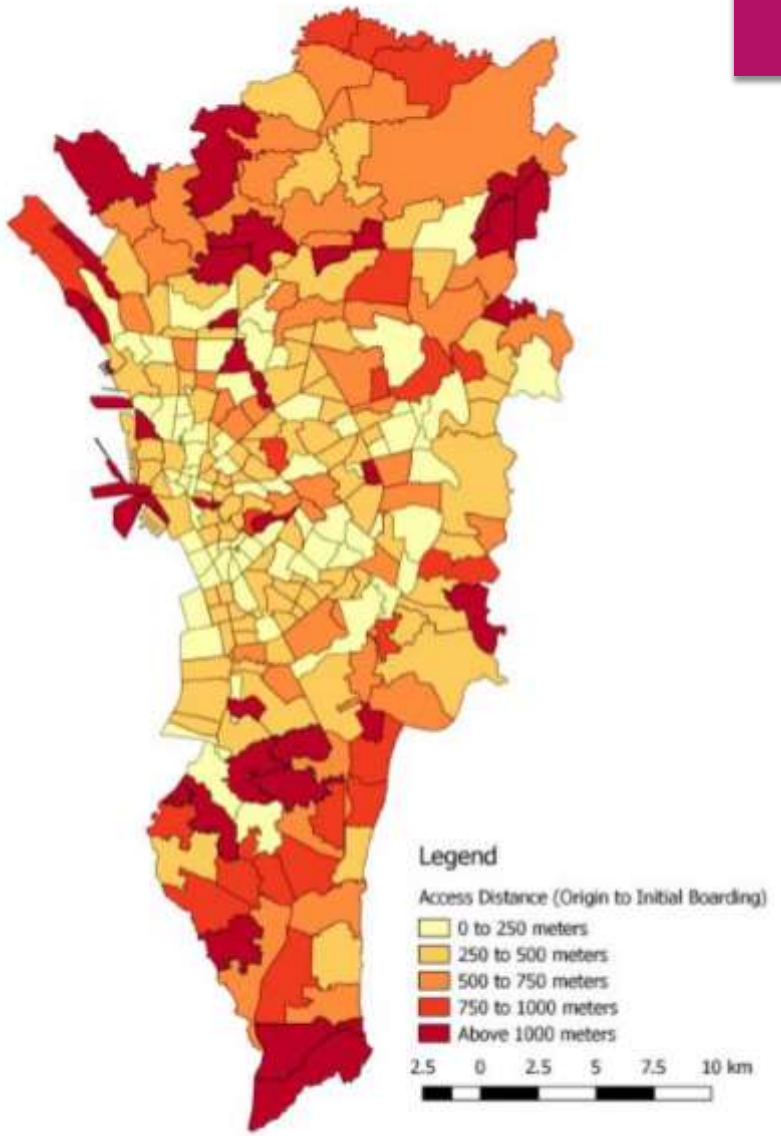
- that operators would not run their fleet because of the possibility of experiencing severe disruption along the route

Shortened service

- that operators still run their fleet but on shortened service by the time it reaches flooded areas

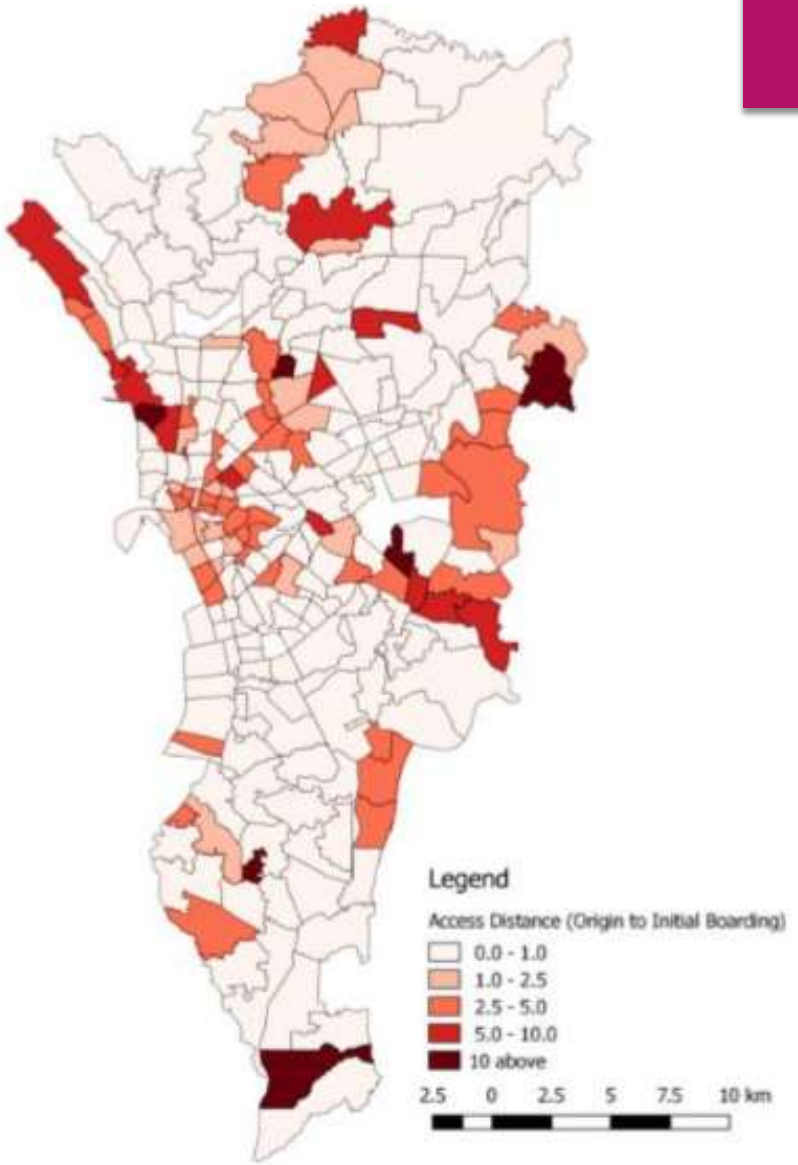
Results: Base

- The abundance of transport services in the central section of Metro Manila has given it the smallest access distance for trips going to Central Business Districts or CBDs.
- It can be seen that zones near the periphery of the metropolis have higher access distances.
- This only shows that even at base conditions, these zones should be provided with better transport services.



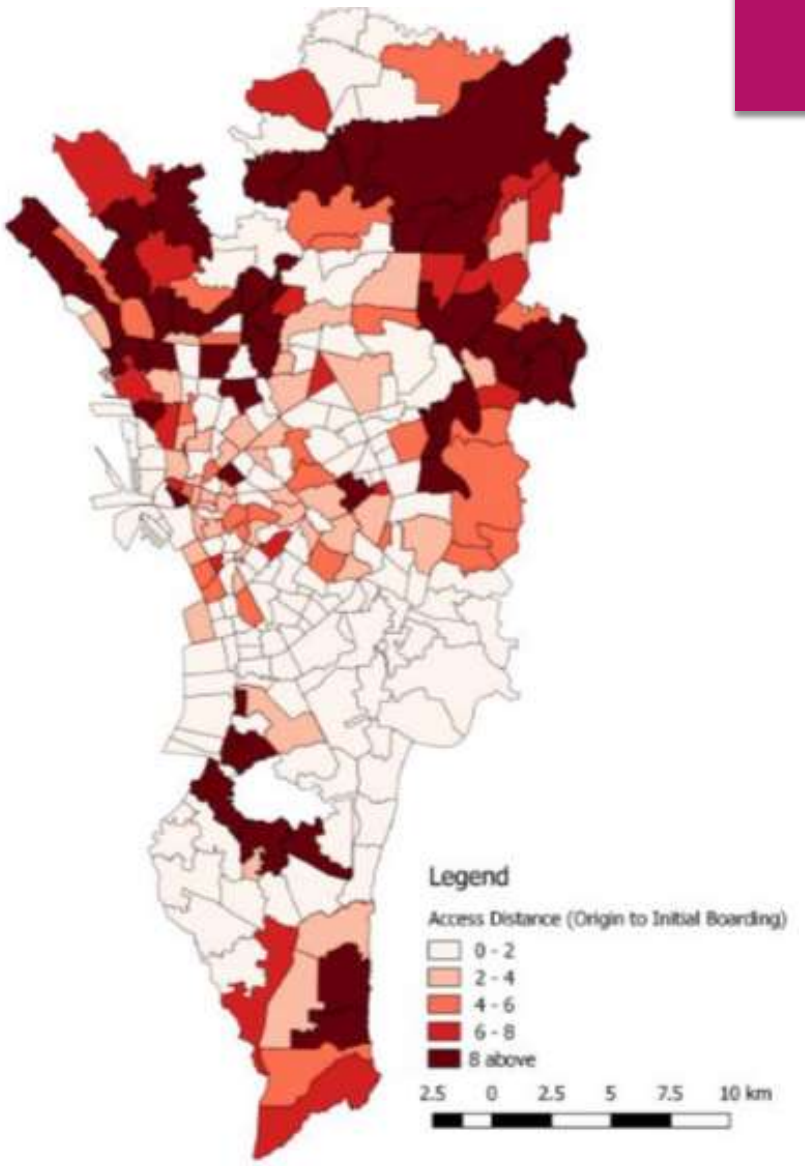
Results: Terminated service

- When transit services were discontinued, the increase in access distance was so significant with some zones experiencing an increase of access distance by a factor of 8 to 10.



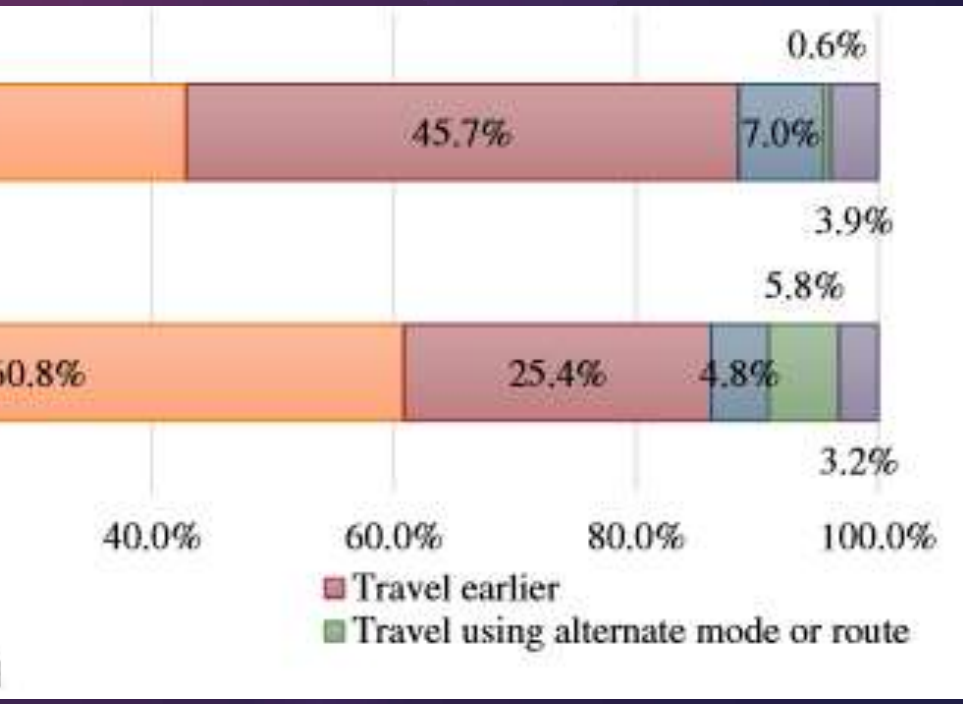
Results: Shortened service

- Shortened transit services resulted in lesser increase in access distance to almost all zones.



Results: Travel Behavior of those with alternative route

- Many shifted their departures to an earlier time
- Majority do not have alternate travel routes and majority of these respondents were forced to make necessary adjustments in their trips.



Conclusion

- For addressing floods
  - Elevation of road
  - Construction of water retention basin under the street
  - Flood mitigation projects
- Public transit operators should anticipate the high demand for services especially during peak hours

Conclusion

- to review the extent of the public transportation services in the study area.
- To relaxed policies on tardiness and early departure promote flexibility of travel in the event of a disruption
- to assess the viability of telecommuting especially to areas that have high flood hazards

Thank you!