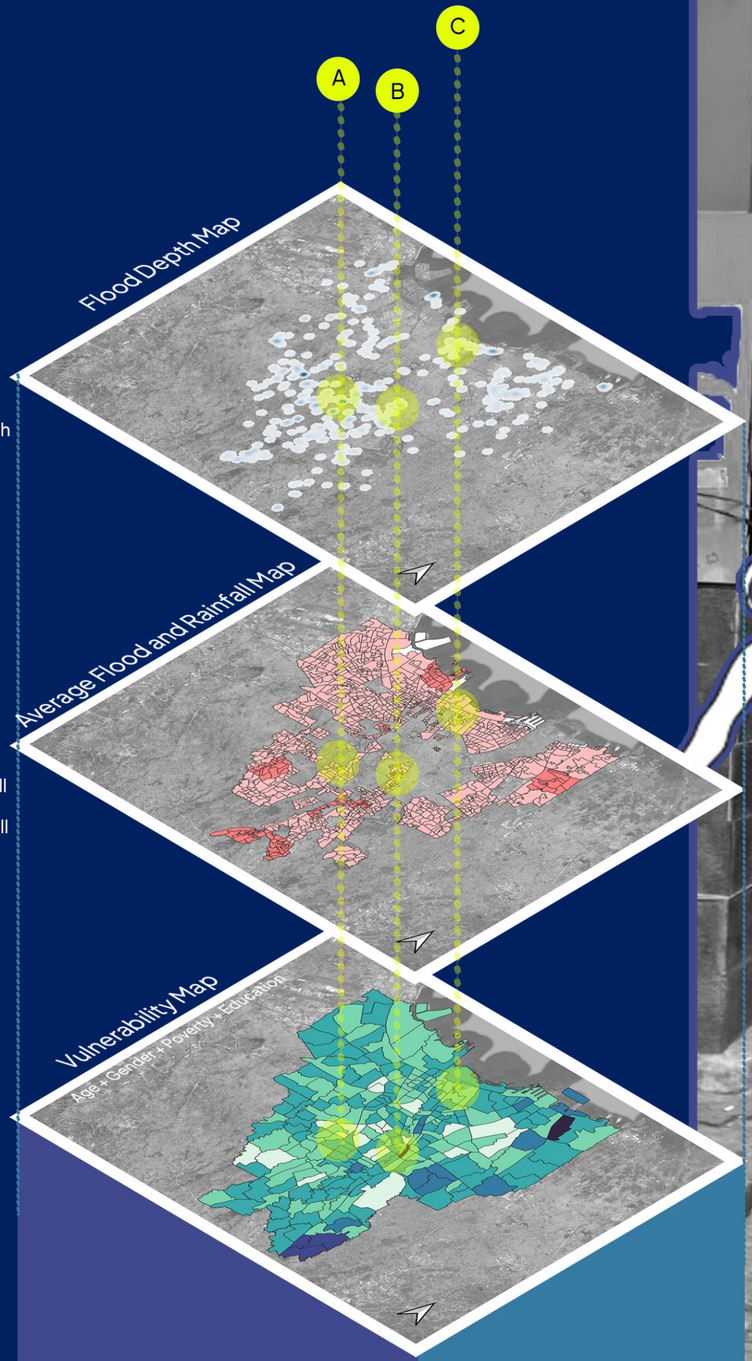
BedahGang

A Design Toolkit for Flood-Resilient Kampung Alleys



Jalur Air Sosial: A Design Toolkit for Flood-Resilient Kampung Alleys

Interactive Urban Flood Micro-Intervention for Kampung Context

Hack4Resillient Jakarta 2025

Gang Up Team

Issue and Problem Statement

Flooding in Jakarta's Narrow Alleys

Jakarta's kampung neighborhoods face recurring floods every year.

Gang Flooding [3]

Narrow alleys known as *Gang*, often turn into flood paths but are also critical social spaces.

Poor drainage and impermeable concrete surfaces worsen local flooding.

Clogged Drainage [2]

Residents cope by raising house floors, which is costly and unsustainable.

Raised House Floors in Pela Mampang

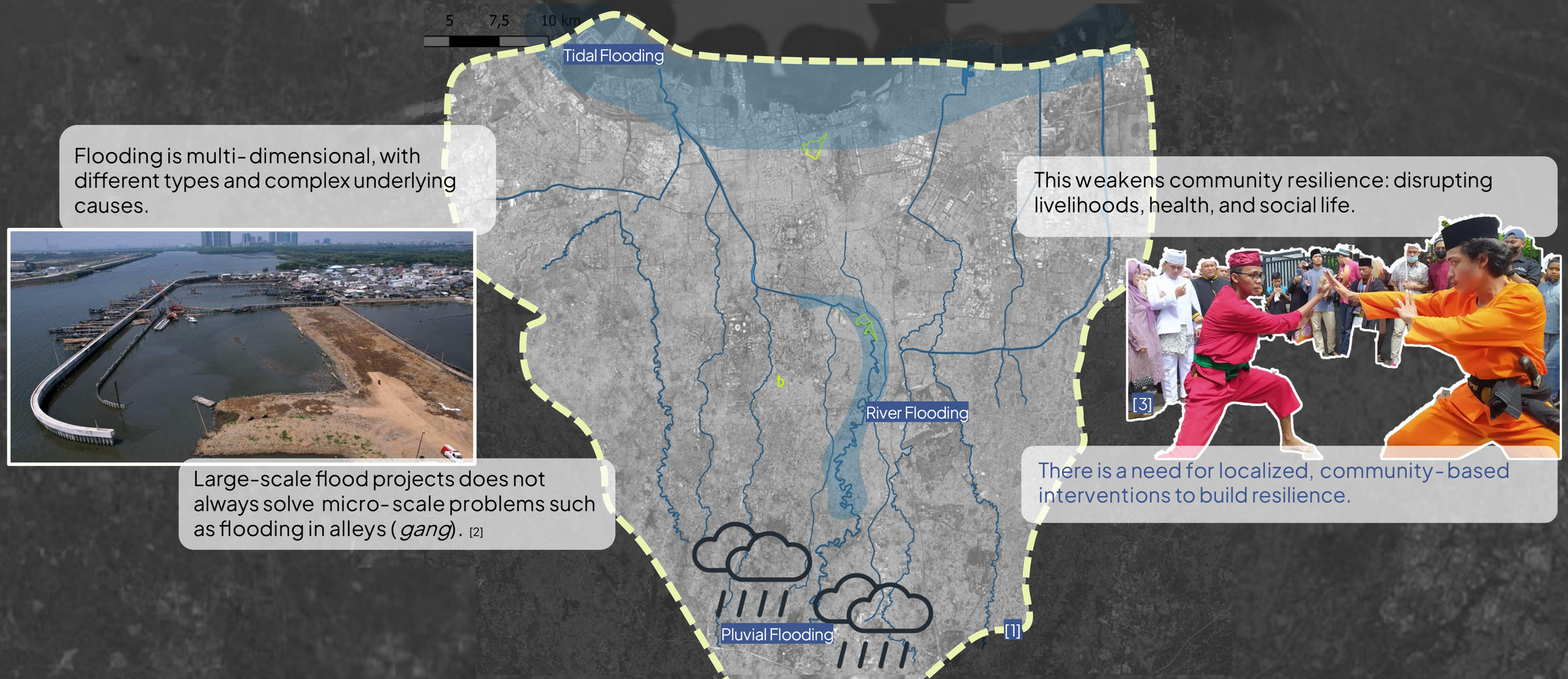
[1] Shabrina, Z., Muharram, F. W., Dhirgantara Putra, D., Rui, J., & Asa, M. (2025). Hack4Resilient Jakarta 2025: Sinking City [Data set]. Zenodo. https://doi.org/10.5281/zenodo.16836145

[2] https://kupang.tribunnews.com/2017/07/02/tersumbat-sampah-drainase-di-jalan-pemuda-matawai-waingapu-tak-berfungsi

[3] https://www.tempo.co/arsip/-muara-angke-jadi-langganan-banjir-rob-dki-jakarta-843532

Issue and Problem Statement

Flooding in Jakarta's Narrow Alleys



Flooding is multi-dimensional, with different types and complex underlying causes.

Large-scale flood projects does not always solve micro-scale problems such as flooding in alleys (*gang*). [2]

This weakens community resilience: disrupting livelihoods, health, and social life.

There is a need for localized, community-based interventions to build resilience.

[1] Shabrina, Z., Muharram, F. W., Dhirgantara Putra, D., Rui, J., & Asa, M. (2025). Hack4Resilient Jakarta 2025: Sinking City [Data set]. Zenodo. https://doi.org/10.5281/zenodo.16836145

[2] Farid, Mohammad, et al. "Study on Effectiveness of Flood Control Based on Risk Level: Case Study of Kampung Melayu Village and Bukit Duri Village." *MATEC Web of Conferences*, vol. 101, 2017, p. 05003, www.matec-conferences.org/articles/matecconf/pdf/2017/15/matecconf_sicest2017_05003.pdf, https://doi.org/10.1051/matecconf/201710105003. Accessed 4 Jan. 2022.

[3] https://www.senibudayabetawi.com/6576/tak-hanya-setu-babakan-inilah-tiga-kampung-betawi.html

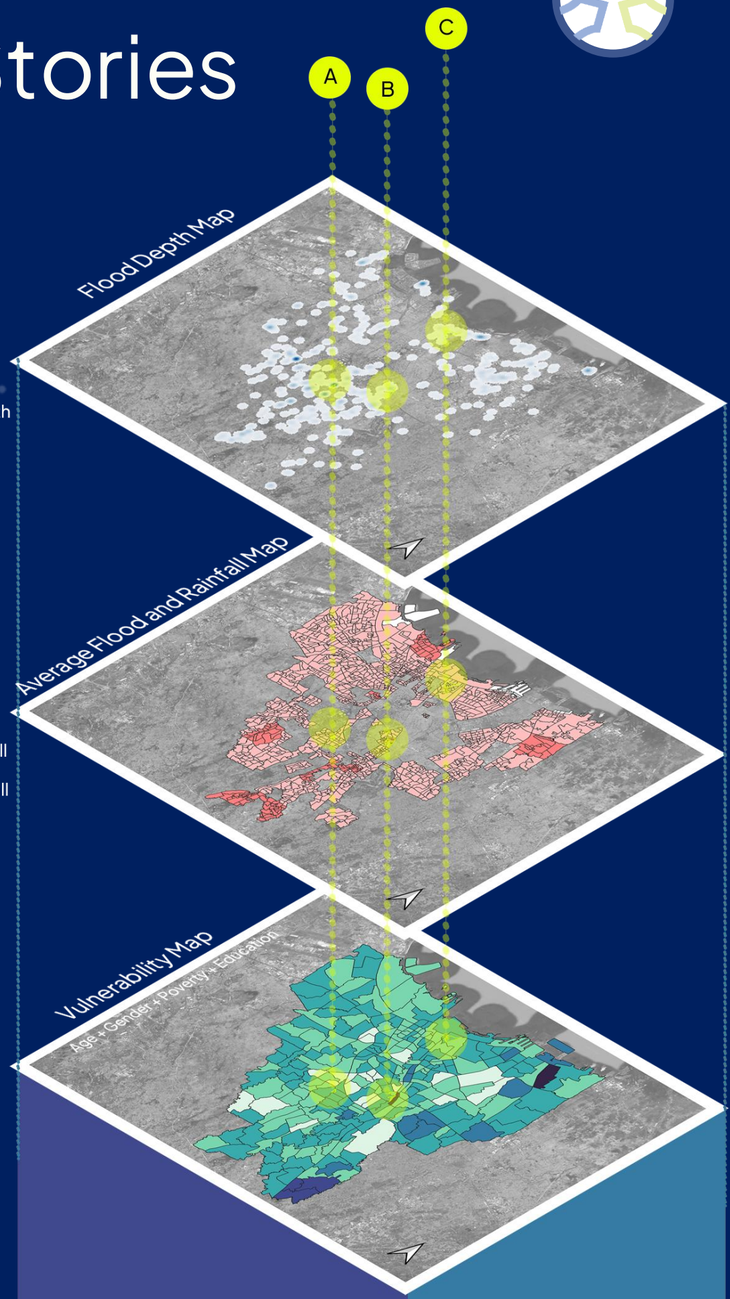
Evidence and Data

Combining Spatial Data and Community Stories

"If possible, the road should just be paved with asphalt so it looks better." -Head of Household at Kampung Melayu

"The kampungs that get flooded badly are the ones down below, since it's downhill. Here, our kampung is higher." – Pela Mampang Warung Clerk

This reflects how many residents still prioritize visible improvements such as paved roads, rather than flood-adaptive infrastructure. It shows a gap in awareness about how surface treatments like asphalt can actually worsen water absorption and flood risk.



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Objective

Goals and Idea Framework

Connect

Bridge communities and various stakeholders through solutions grounded in evidence and lived experience.

Engagement

Participatory Design

Understanding

Create

Deliver adaptable design guidelines with cost estimation for diverse flood-risk typologies across Jakarta.

Co-Creation

Design Toolkit

Refinement

Commit

Strengthen kampungs by centering community voices in design and decisions.

Implementation

Guided by the website (BedahGang)

Methodology

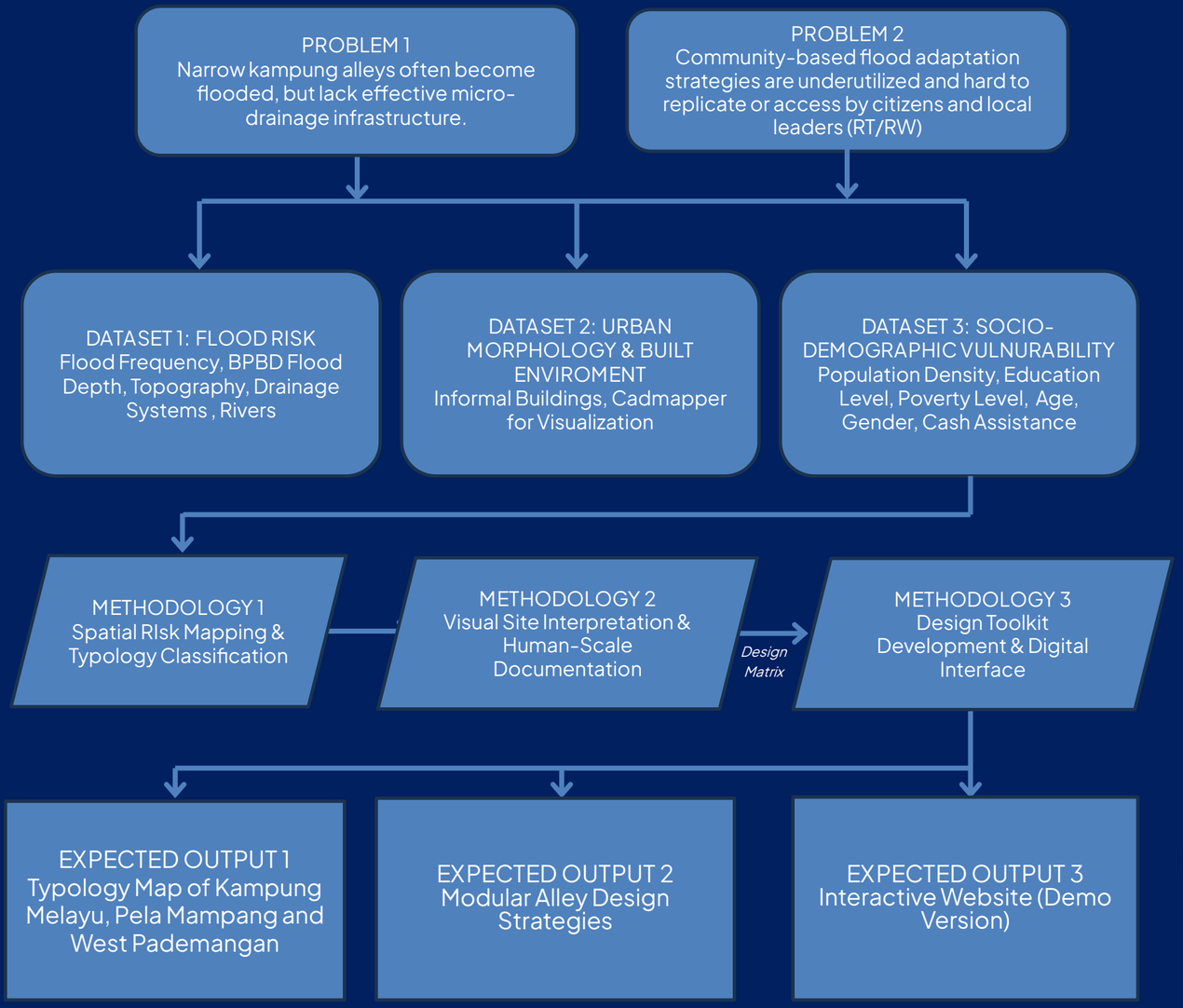
Who are the Users?

Each user has a role in sustaining flood-resilient kampungs.

From residents who live in the kampung, to local leaders, NGOs, and private sectors, our toolkit is designed to be usable and adaptable by all stakeholders.

Methodology

Project Workflow



Design Matrix

Length	Width	Surface	Drainage	Flood Risk	Activity	Design Module
5m	1	Concrete	Yes	High-Medium (3-5)	Pedestrian, Vehicle	Permeable Paving + Drainage
5m	1.5	Concrete	Yes	High-Medium (3-5)	Pedestrian, Vehicle	Permeable Paving + Drainage
5m	2	Concrete	Yes	High-Medium (3-5)	Pedestrian, Vehicle	Infiltration Tank
5m	1	Asphalt	Yes	High-Medium (3-5)	Pedestrian, Vehicle	Permeable Paving + Drainage
5m	1.5	Asphalt	Yes	High-Medium (3-5)	Pedestrian, Vehicle	Permeable Paving + Drainage
5m	2	Asphalt	Yes	High-Medium (3-5)	Pedestrian, Vehicle	Infiltration Tank
5m	1	Dirt	Yes	High-Medium (3-5)	Pedestrian, Vehicle	Permeable Paving + Drainage
5m	1.5	Dirt	Yes	High-Medium (3-5)	Pedestrian, Vehicle	Permeable Paving + Drainage
5m	2	Dirt	Yes	High-Medium (3-5)	Pedestrian, Vehicle	Permeable Paving + Drainage
5m	1.5	Concrete	Yes	Low (1-2)	Sosial, Komersial	Vertical Garden
5m	2	Concrete	Yes	Low (1-2)	Sosial, Komersial	Vertical Garden
5m	1	Asphalt	Yes	Low (1-2)	Sosial, Komersial	Mitigation (Signage)
5m	1.5	Asphalt	Yes	Low (1-2)	Sosial, Komersial	Vertical Garden
5m	2	Asphalt	Yes	Low (1-2)	Sosial, Komersial	Vertical Garden
5m	1	Dirt	Yes	Low (1-2)	Sosial, Komersial	Permeable Paving + Drainage
5m	1.5	Dirt	Yes	Low (1-2)	Sosial, Komersial	Permeable Paving + Drainage
5m	2	Dirt	Yes	Low (1-2)	Sosial, Komersial	Permeable Paving + Drainage
5m	1	Beton	No	Low (1-2)	Sosial, Komersial	Permeable Paving + Drainage

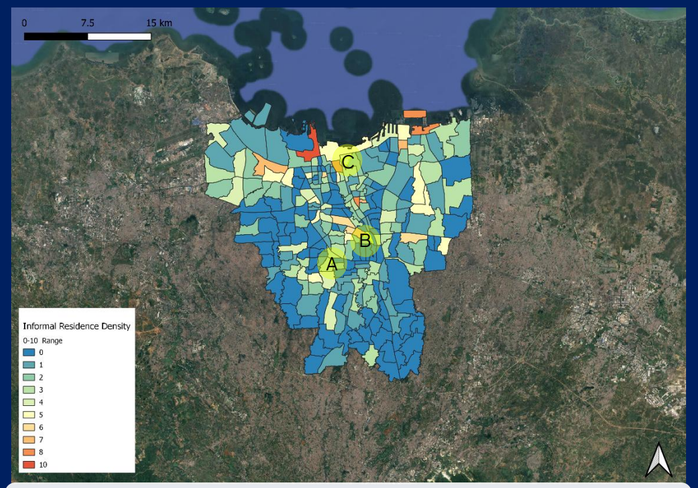
Made into a 5 m2 module for Cost Estimation Feature on the website

Data to input on the website

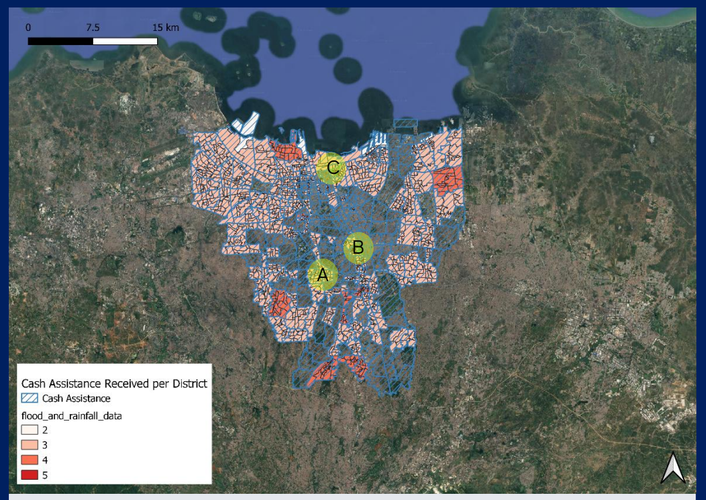
Output Design Solution

Macro Analysis

Prioritizing Kampungs at City Scale

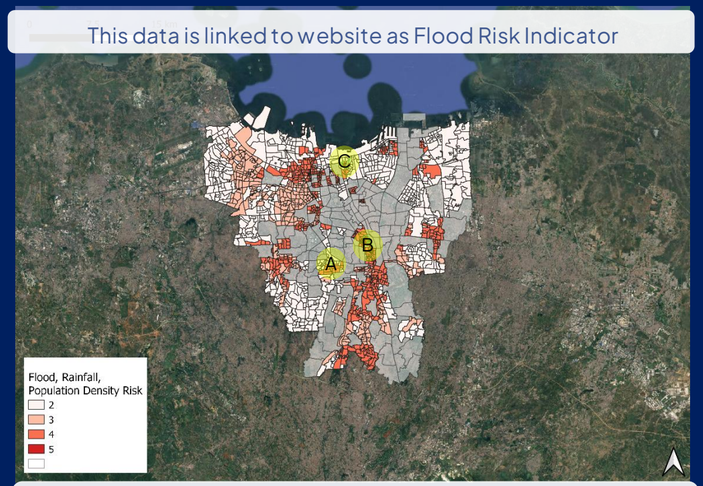


Informal Residence Map



Cash Assistance, Flood and Rainfall

This data is linked to website as Flood Risk Indicator

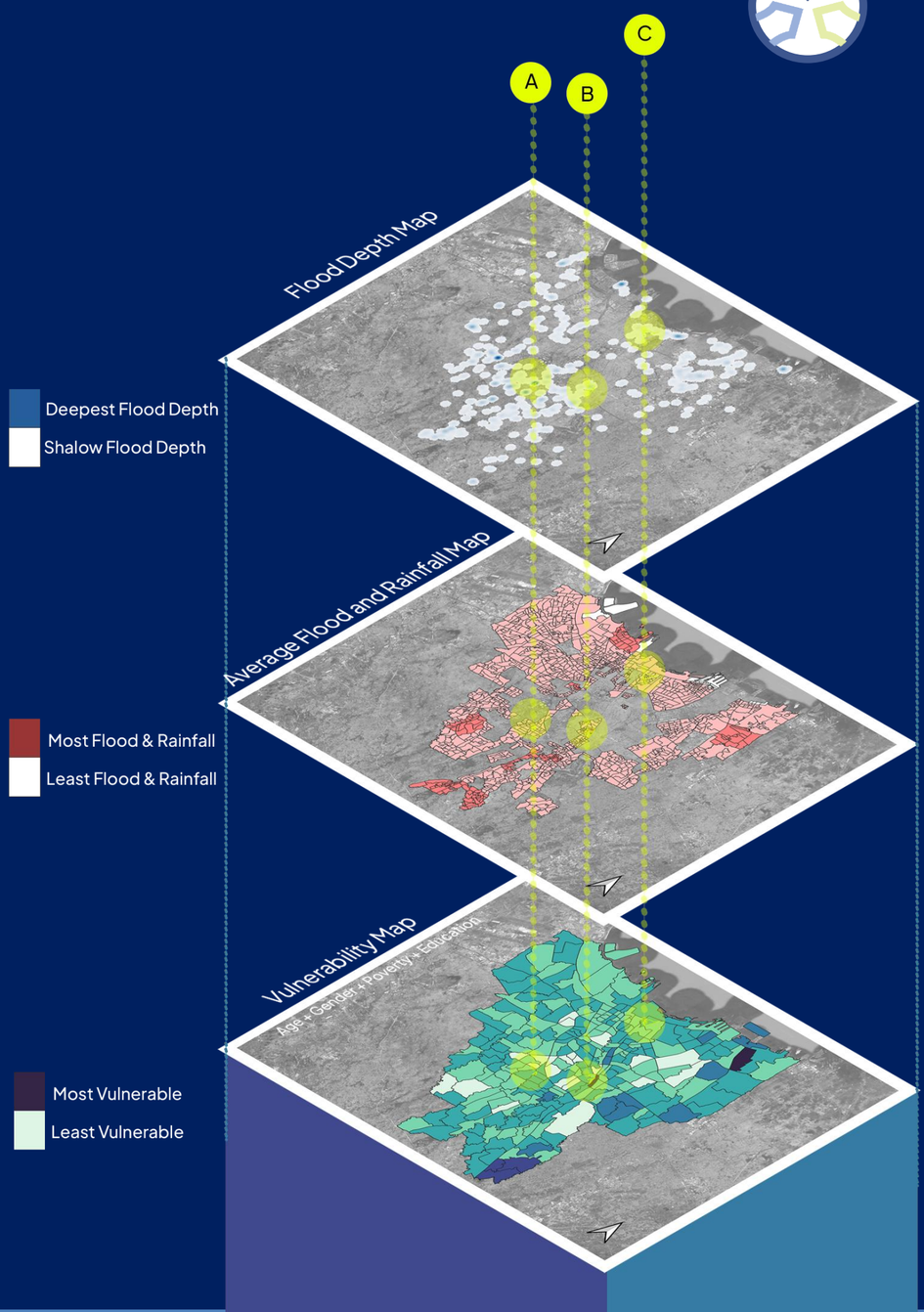


Flood, Rainfall, Population Density Risk

Pela Mampang | Kampung Melayu | West Pademangan

This analysis examines three kampungs with distinct characteristics and challenges, highlighting patterns of informal settlements, flood exposure, population density, and social vulnerability to guide intervention priorities.

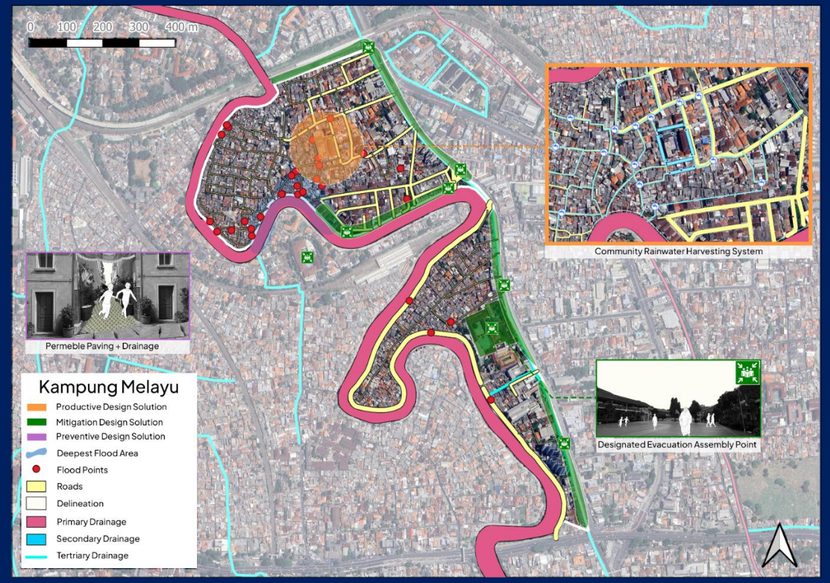
Shabrina, Z., Muharram, F. W., Dhirgantara Putra, D., Rui, J., & Asa, M. (2025). Hack4Resilient Jakarta 2025: Sinking City [Data set]. Zenodo. https://doi.org/10.5281/zenodo.16836145



Meso Analysis

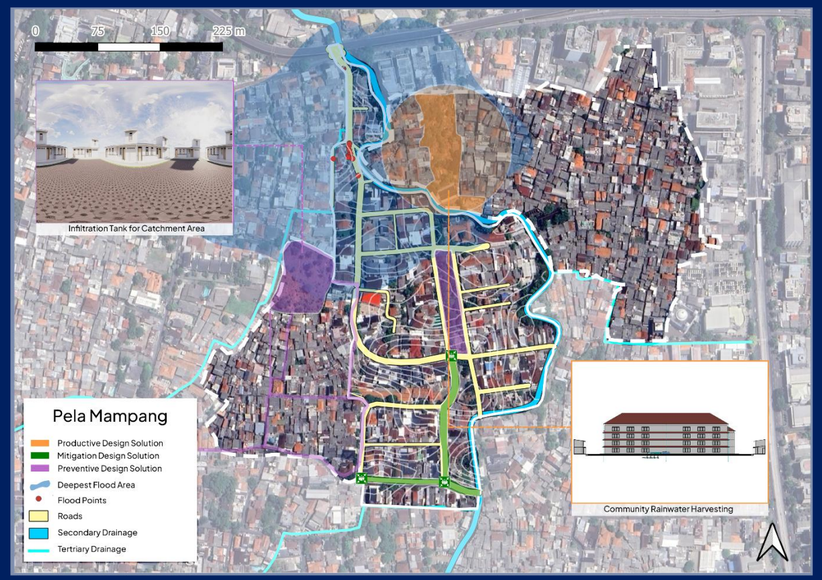
Meso-Scale Vulnerability & Opportunity Mapping

Kampung Melayu



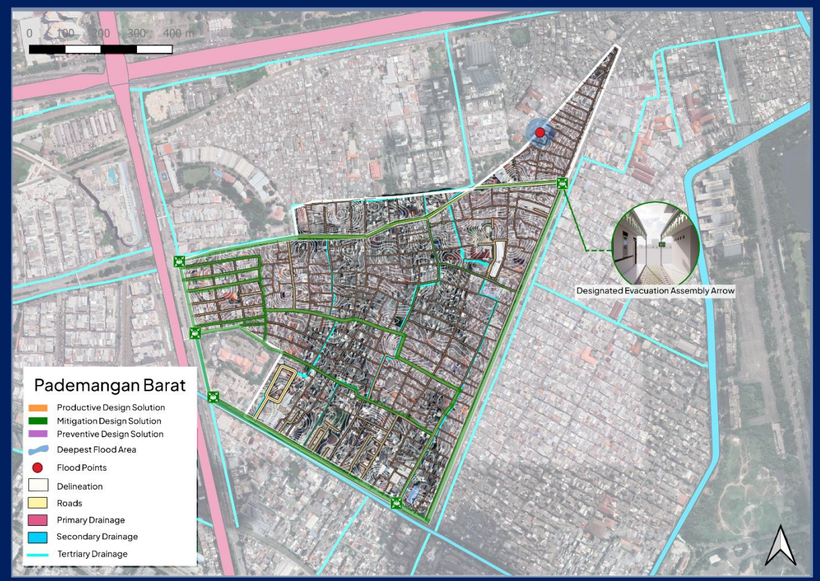
Near the River, Medium Depth of Flood, Yearly Flooding

Pela Mampang



Formal housing between 2 dense Kampungs, very deep flooding in the north

West Pademangan



Low flood depth, Flood source mainly from Tidal Flooding

Viewing meso-scale maps across three kampungs helps reveal different constraints and risk patterns. This broader perspective guides the development of context-sensitive micro-scale design solutions.

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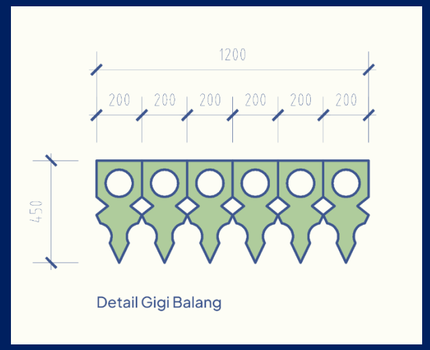
Micro Analysis

Alley Design Solutions

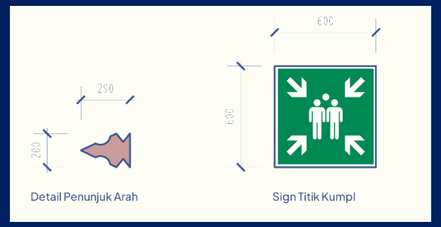
Through the meso-level analysis of the three kampungs, we identified five key design solutions. To make them more structured, these solutions are classified into three categories: Mitigation Solutions, Preventive Solutions, and Productive Solutions. Importantly, these solutions are not fixed; they are designed to be adaptive and can be further developed or expanded over time in response to changing needs and contexts.

Mitigation Solutions

Signage and Assembly Points



Detail Gigi Balang

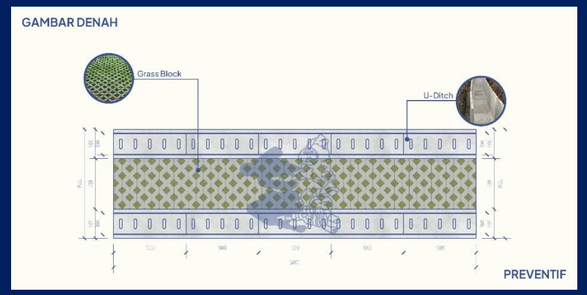


Detail Penunjuk Arah

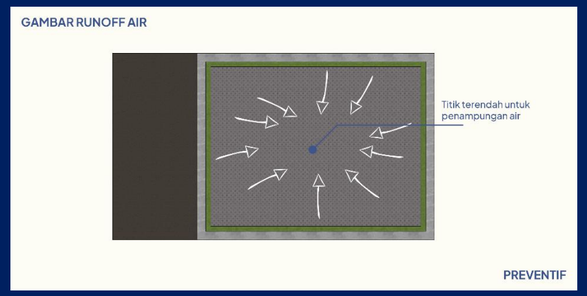
Sign Titik Kumpl

Preventive Solutions

Permeable Paving

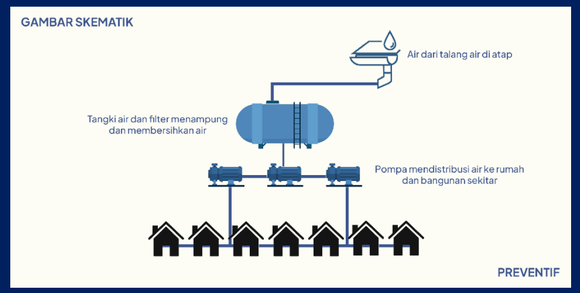


Infiltration Tank in Catchment Area



Productive Solution

Community Rainwater Harvesting



Vertical Garden

Demo

Interactive Web Tool kit

About the BedahGang

The platform bridges communities and various stakeholders by providing evidence-based, adaptable design guidelines for diverse flood-risk typologies, while centering community voices in decision-making.

Data to Input

Location

Surface

Activity

Dimension

Drainase

Mulai **BedahGang**!

Walaupun kecil dan mudah dilewatkan, **sebuah gang menyimpan banyak cerita.**

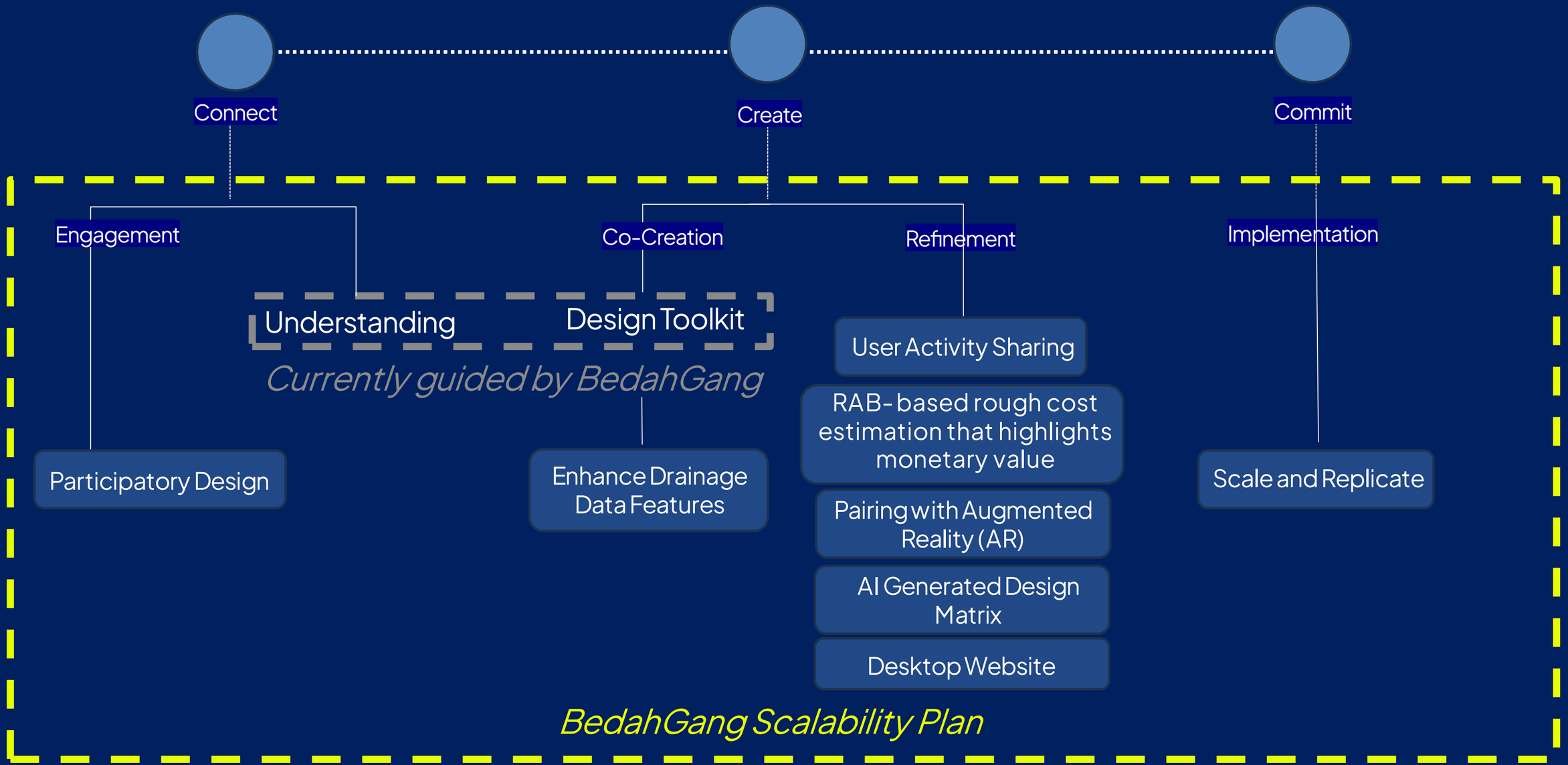
BedahGang adalah inisiatif yang dimulai dari keinginan untuk menyorot kehidupan yang berada pada dan di antara gang. Hubungan yang dekat dan erat antar masyarakat tetap tumbuh beriringan dengan meningkatnya risiko akan bencana alam.

Melalui riset dan desain, kami berupaya menjembatani komunitas menuju kampung yang lebih tangguh dalam menghadapi banjir.

Kenali BedahGang

Scalability Plan

What's Next?



Beyond floods, towards resilience

Jalur Air Sosial opens pathways not only for water, but for people to live and grow together.