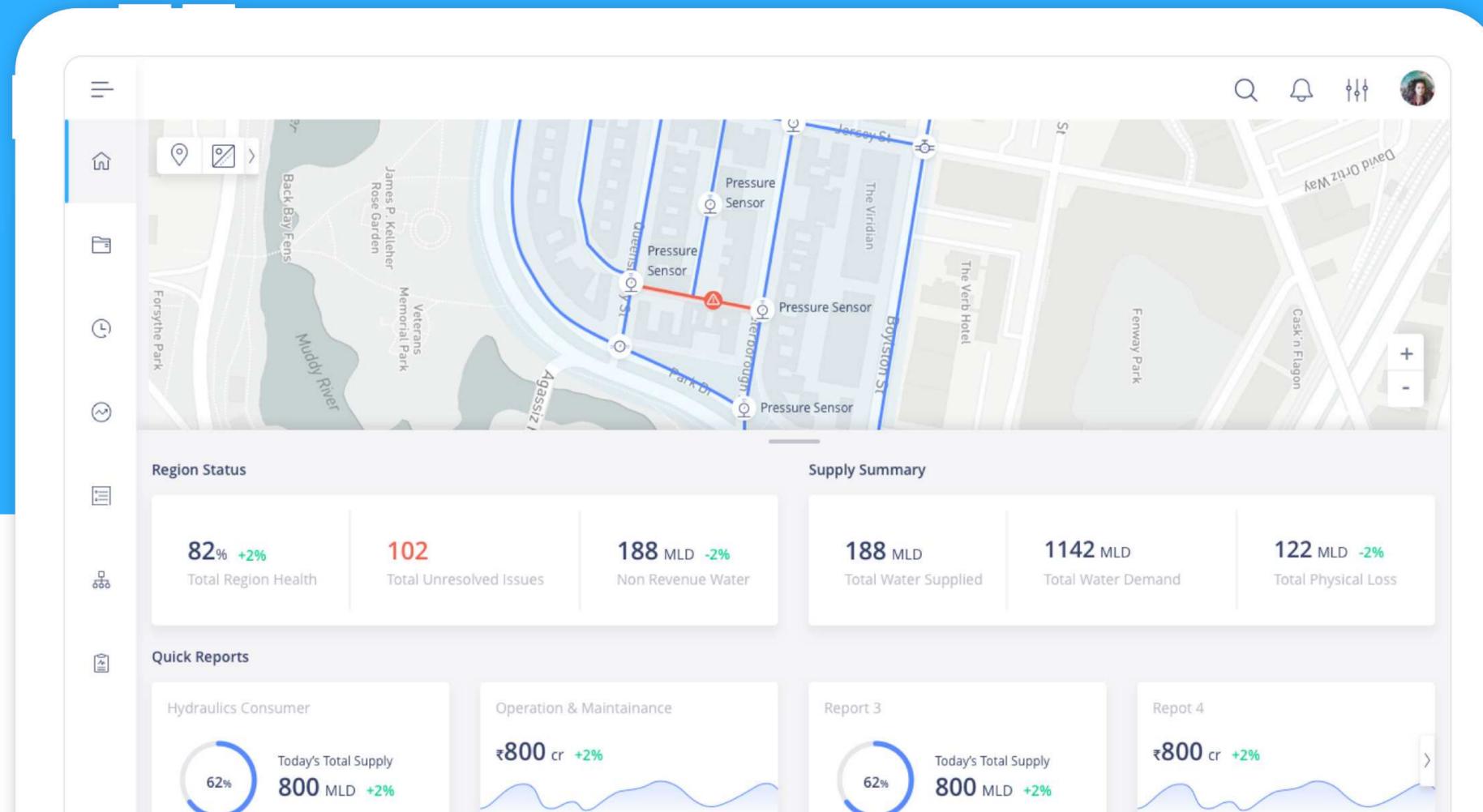


# Digitalising Bengaluru's Water Management

An application that helps Government(BWSSB) to control & track real time water supply and thus make Bengaluru to overcome the water scarcity.



# Overview

## Project Description

Bangalore's water crisis demands urgent action. With unaccounted water levels soaring, the BWSSB's visibility on water distribution is murky. To address this, we propose **digitalizing the water supply network for efficient management**. By leveraging technology, we aim to minimize losses and ensure equitable water distribution citywide.

## My Role

In my role as the sole UX designer, I led the development of user-centric solutions encompassing both **web and mobile applications**. I employed a range of methodologies, as outlined below.

## Process

### Research & Observation

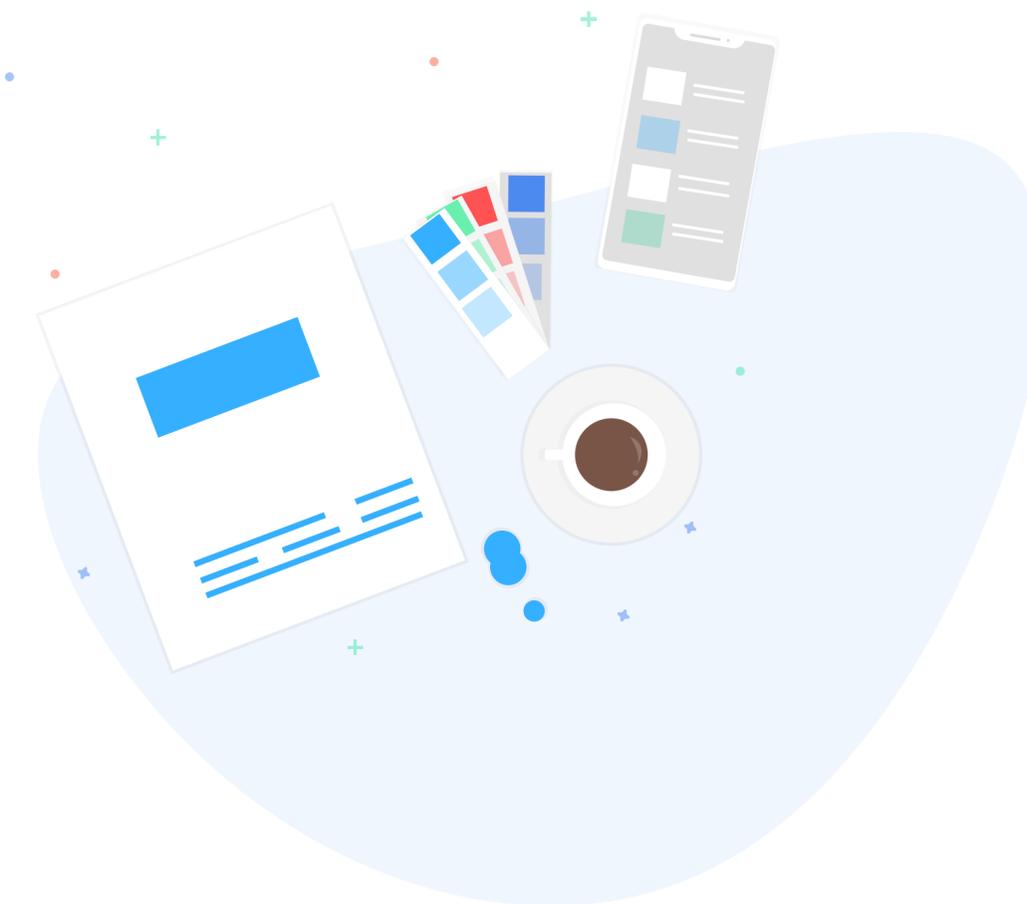
- Stakeholder interview
- Domain Research
- Stakeholder mapping
- User Interview

### Define

- Persona
- User Journey
- Bull's Eye Diagram
- Problem Statement
- User flow

### Design

- Napkin Sketches
- Wireframe
- Moodboard
- Visual Design



# Stakeholder interview

## Background

My process began with the client kickoff meeting, where my goal was to thoroughly understand the client's objectives to discover the best possible solution.

I started with basic and open-ended questions, delving deeper until we discussed the future business model. This approach provided insight into the scope of the project, including the incorporation of technical terms such as 'embedded system' and 'hydraulic calculation'

## Take away

My client's primary focus is to assist BWSSB in controlling and monitoring water flow within the network to meet consumer demand while simultaneously detecting and recording illegal or leakage flows.

## Persona Identified

- Officers(Covered in this pilot project)
- Contract Labours



# Domain Research

## Bengaluru Water Crisis: Water Supply to be Disrupted in City

### BENGALURU COULD GO THE CAPE TOWN WAY

Waterbodies reduced by **79%** due to unplanned urbanisation and encroachment

Built-up area increases from **8%** in 1973 to **77%** now

Water table shrinks from **10-12 METRES** to **76-91 METRES** in just two decades

Number of extraction wells gone up from

**5,000** to **4.5 LAKHS** in 30 years

Bengaluru's population could reach

**20.3 MILLION**

by 2031 - and is growing by 3.5 per cent annually

City only uses **HALF** of its treatment capacity to treat waste and substantial amount is dumped into its waterbodies.

Bellandur Lake frothing due to toxic substances flowing into it through untreated sewage system from chemical factories and housing colonies around it.

**1450 MLD**

Central Bangalore Receives water per day

**1680 MLD**

Shortfall of water per day

**60% - 700 MLD**

Bengaluru's population depends on tanker water.

**66.6% increase**

Price of Private water tankers

### Measures Taken by BWSSB

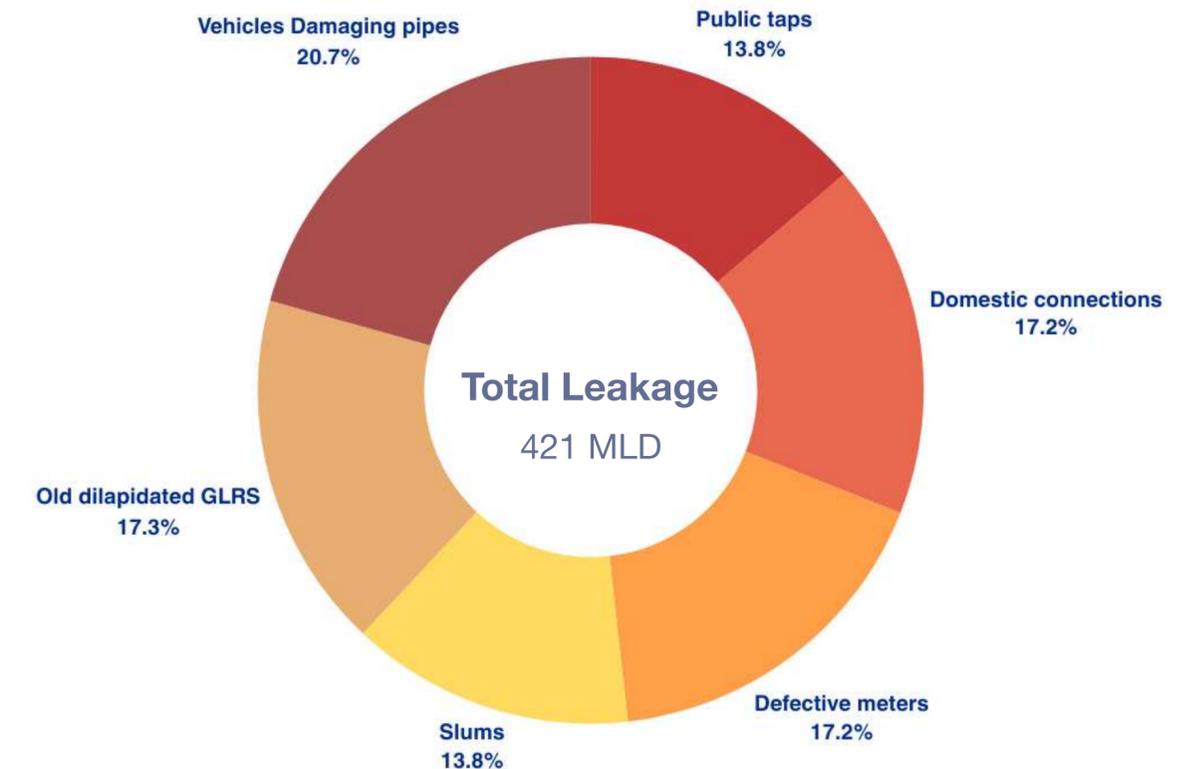
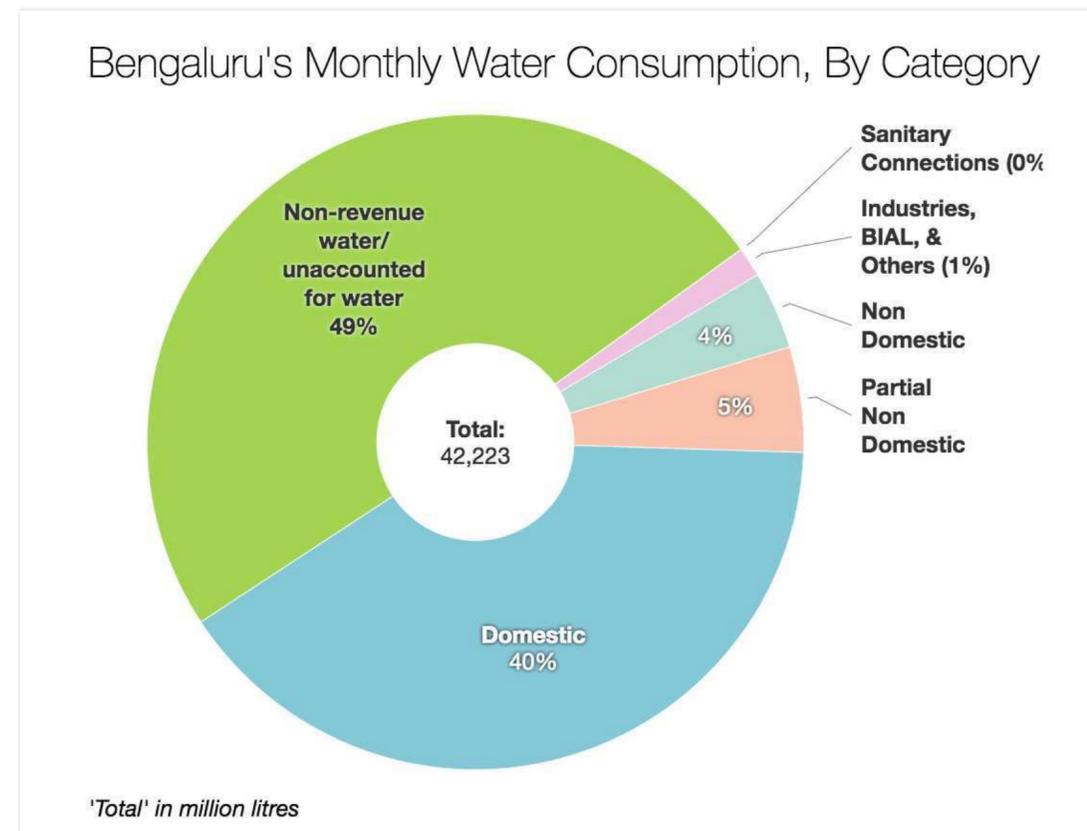
**86 Tankers**

Tankers deployed by BWSSB along with 200 Private Tankers

**Rs 200 crore**

Allotted in budget to provide water infrastructure and replacement of age old pipe.

# Domain Research



## Some key findings:

- Up to 49% of the water supplied to the city is classified as 'non-revenue water' or 'unaccounted for water' – water lost in distribution. Former BWSSB chairman, T M Vijaybhaskar, acknowledged this loss in 2016.
- Widespread leaks, unauthorized water connections, and water theft across Bengaluru are additional challenges that the government has struggled to address.

# Stakeholder mapping

Due to the numerous stakeholders involved, I identified and assessed key stakeholders while keeping long-term objectives in mind. This approach facilitated effective engagement with them.

Stakeholder	Contribution	Legitimacy	Willingness to Engage	Influence	Necessity of Involvement
<b>Raghavendra</b> MECON(I), IIT - Chennai	<b>High:</b> Technical Knowledge, Requirement	<b>High:</b> Directly affected by company's activity	<b>Medium:</b> Engages with all the teams	<b>High:</b> Very influencer as he is one of the key persons	<b>High:</b> Decision maker, Clear about product
<b>Rajendra</b> B.E	<b>Medium:</b> Team managements, Coordination	<b>Medium:</b> Indirectly affected by company's activity	<b>High:</b> Proactive, Engages with all the teams	<b>Medium:</b> Not very influencer	<b>Low:</b> No Necessity
<b>Prasad</b> B.E, M.Tech	<b>High:</b> System Architect, Technical Knowledge	<b>Medium:</b> Indirectly affected by company's activity	<b>Low:</b> Not much other than dev team	<b>Medium:</b> Not very influencer	<b>Low:</b> No Necessity
<b>Parthasarathy</b> CTO - B.PAC	<b>High:</b> Technical Knowledge	<b>High:</b> Directly affected by company's activity	<b>Low:</b> Not much Engaged	<b>High:</b> Very influencer as he is one of the key persons	<b>High:</b> Decision maker

# User Interview

As this was a pilot project, it was challenging to contact potential users for interviews. However, after convincing my client, I managed to secure a brief window of 30 minutes to speak with 2 officials who were at the forefront of using this product.

## Some key findings:

I was able to identify 'I' statements that helped me step into the user's shoes and attempt to understand their motivations, goals, and pain points.

- I know we are accounting for only 50% of the water supply, which is the biggest challenge leading to water scarcity due to the absence of an automated system to detect illegal/leakage flows.
- I don't get to monitor water supply in real-time. Currently, I have to rely solely on metered reports." "Controlling water valves requires continuous follow-up with laborers and constant communication with respective officers.



# Persona

With the help of user research, it was easy to draw conclusions about the user, which aided me in keeping the user at the center of the design process. As per my client's request, I cannot disclose the identity and position of the persona



**Anand** Executive

Age 57

Bangalore

“

*I know we are having account of ~50% water supply only, it is the biggest challenge leading to water scarcity as there is no automated system to detect illegal/leakage flows.*

”

## Bio

Anand works as a chief engineer at BWSSB Bangalore. He is an eminent and reputed officer who is himself considered a strong believer in hard work and takes his professional responsibilities very seriously. He ensures that all his subordinates update him on a weekly basis and strives to deliver the best service. However, he sometimes wonders if that is enough, as there is still a lot of unaccounted work.

## Goal

- To establish a hassle-free system at work.
- To monitor and fulfil water demand more effectively.
- To set up an advanced system to log water supply and calculations.

## Frustration

- No solution to detect illegal/leakage flows.
- Difficulty in managing manual reporting.
- Difficulty in monitoring the system, as he has to rely on subordinates for any information.
- Concerned about the increasing water demand.
- Dissatisfied with performance, as he couldn't control Non-Revenue Water.

# User Journey

With the research data, Journey map (as is) was done to understand the complete sum of experience of the user.





# Problem Statement Statement

Unaccounted water is a growing concern for the government. Currently, there is no system in place for monitoring illegal/leakage water flow. By listing out the main pain points, I was able to draw a conclusion and formulate a problem statement.

- Difficulty in keeping track of water supplies
- Challenges in managing manual reports
- Difficulty in detecting pipe breakdowns
- Tracking illegal water connections

“

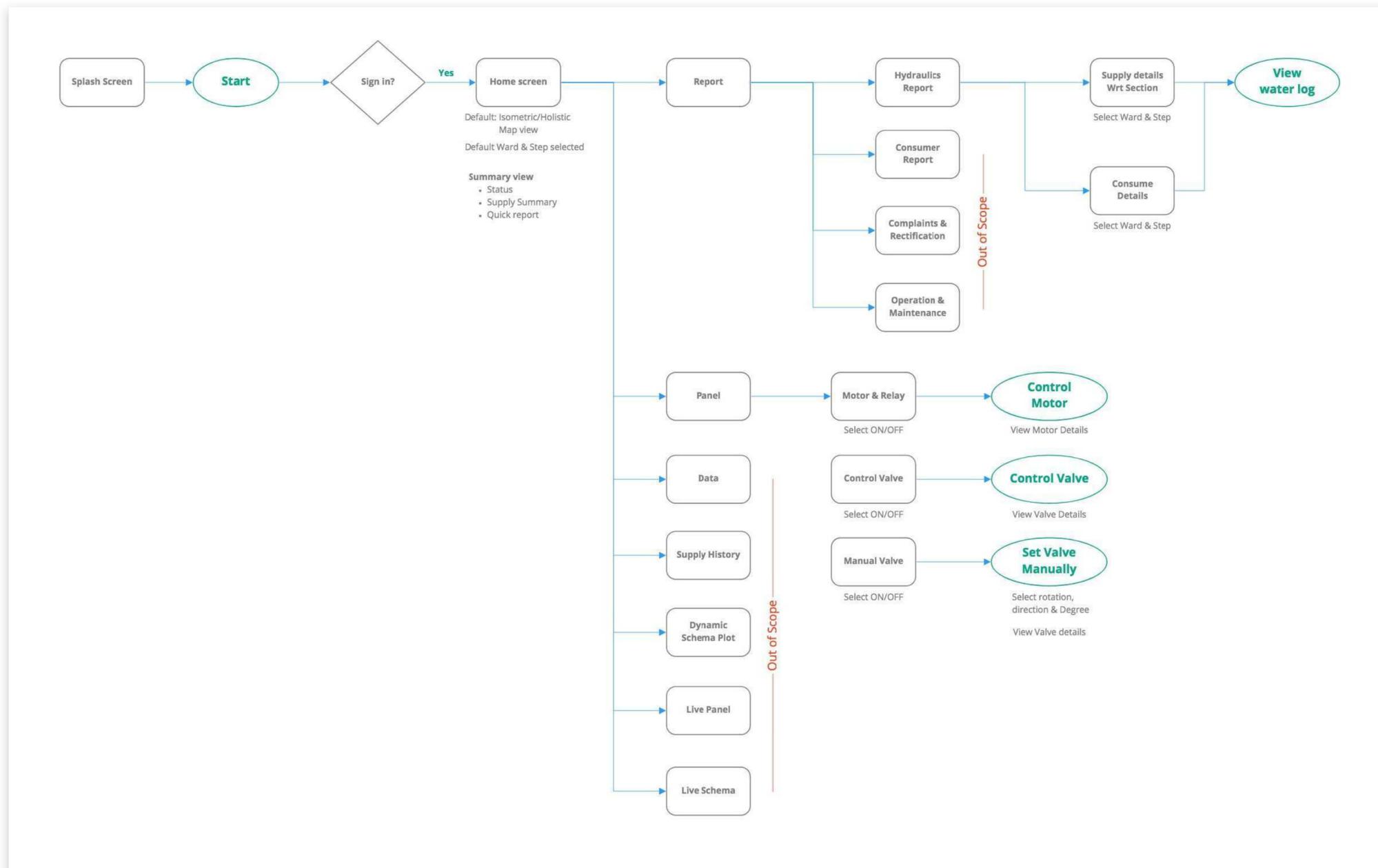
How might we enable a system to monitor water flow in the network and simultaneously record illegal/leakage flows to minimize water scarcity?

”



# User Flow Flow

As this was a pilot project, the user flow helped to clearly define the working context and set the right scope of work based on user needs and business demands.



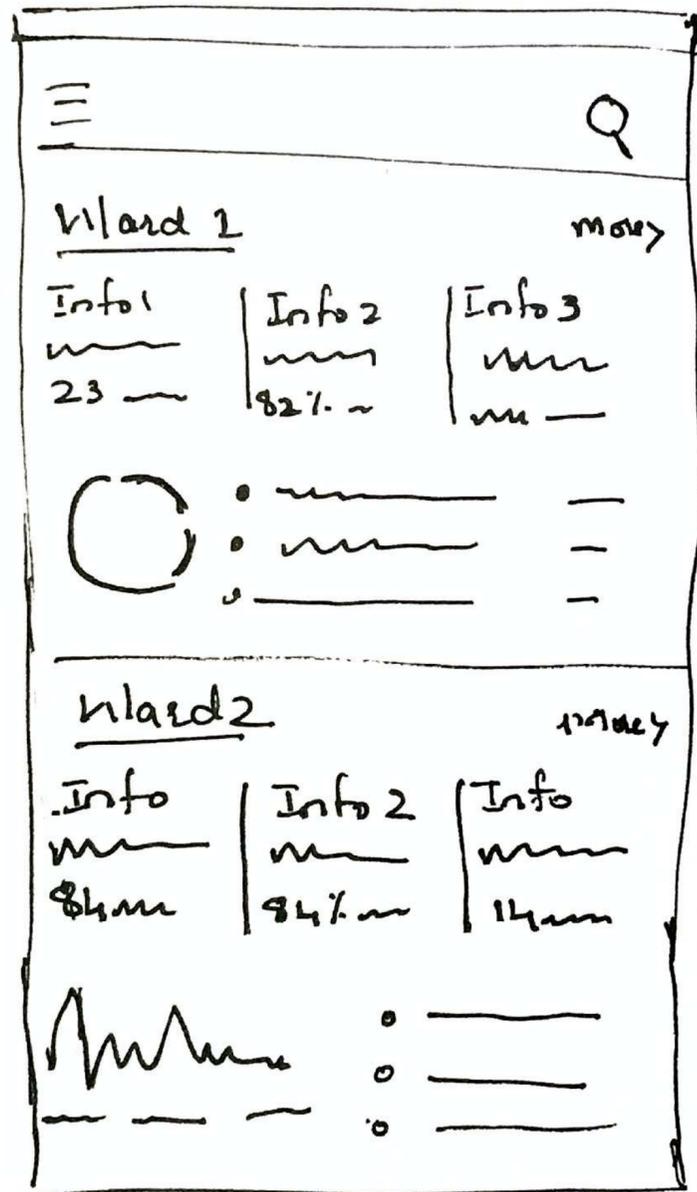
# Concept Sketches

After understanding the requirements, I listed the features that could satisfy users' needs. Once listed, I discussed these features with stakeholders, which were finalized for the pilot run. Subsequently, I began creating napkin sketches with a mobile-first approach.

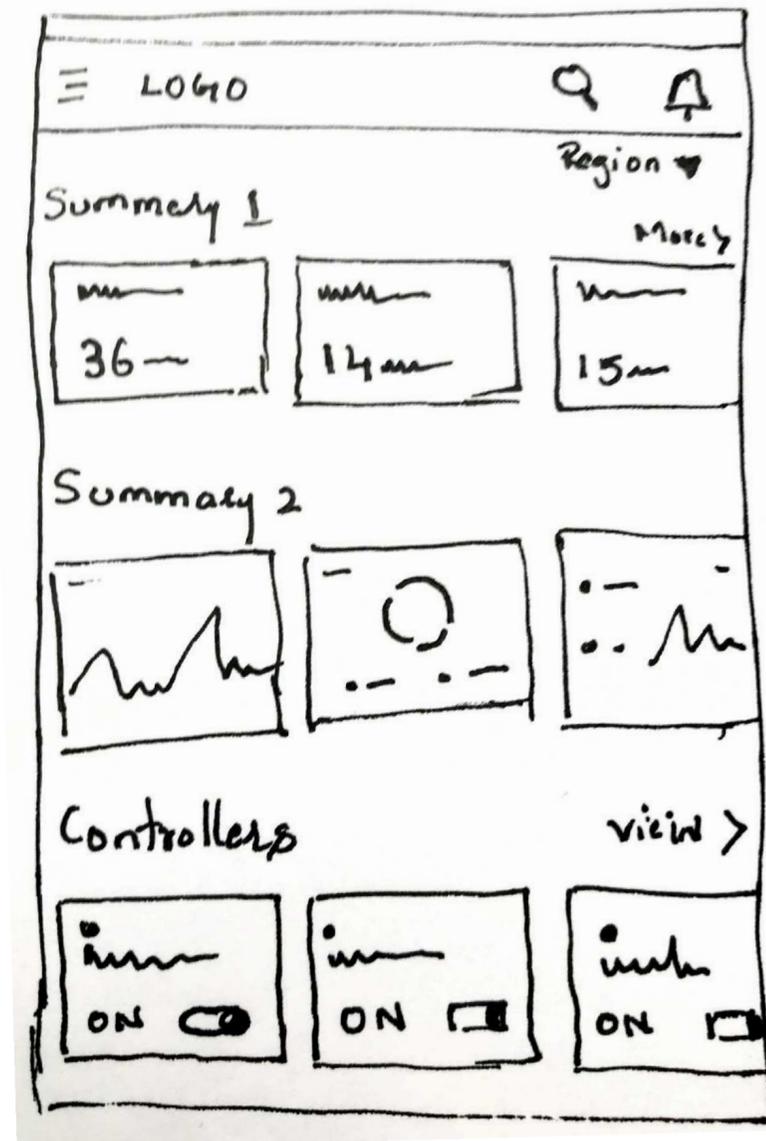


# Concept Sketches

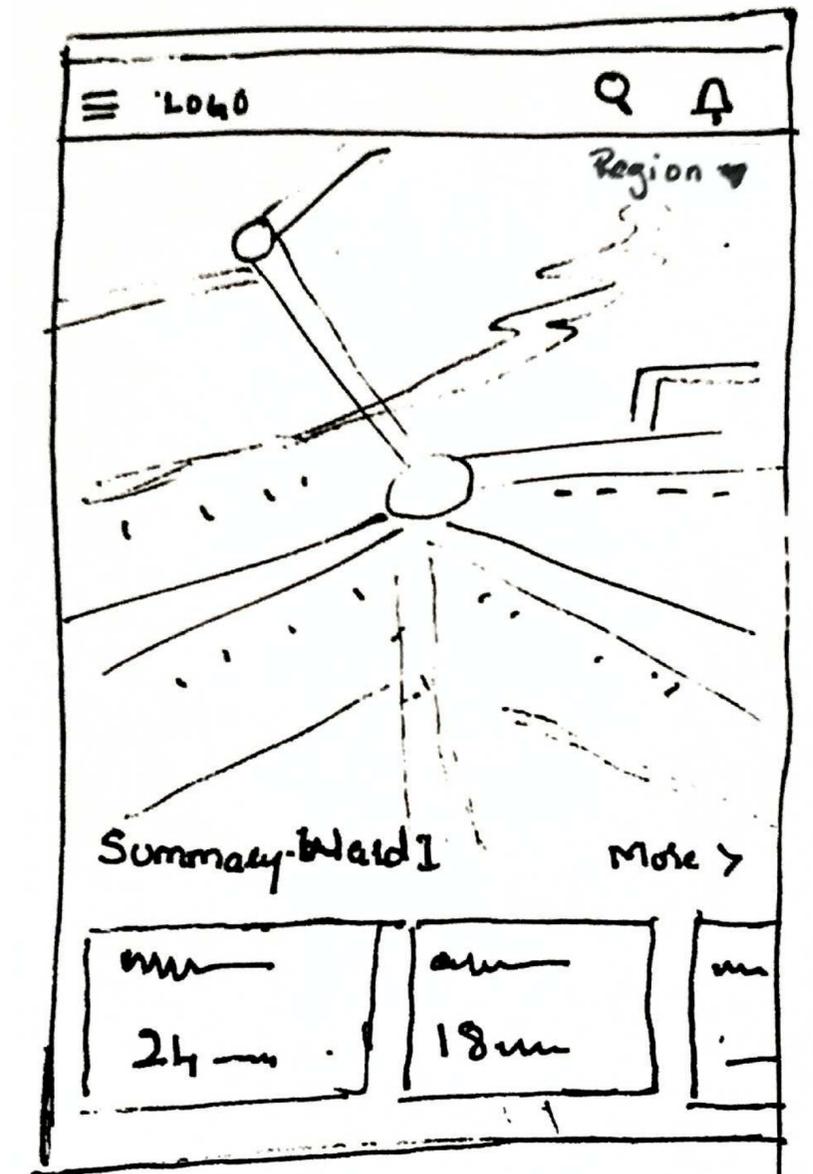
After understanding the requirements, I listed the features that could satisfy users' needs. Once these were discussed with stakeholders and finalized for the pilot run, I began creating paper prototypes to facilitate rapid iterations.



V1.0

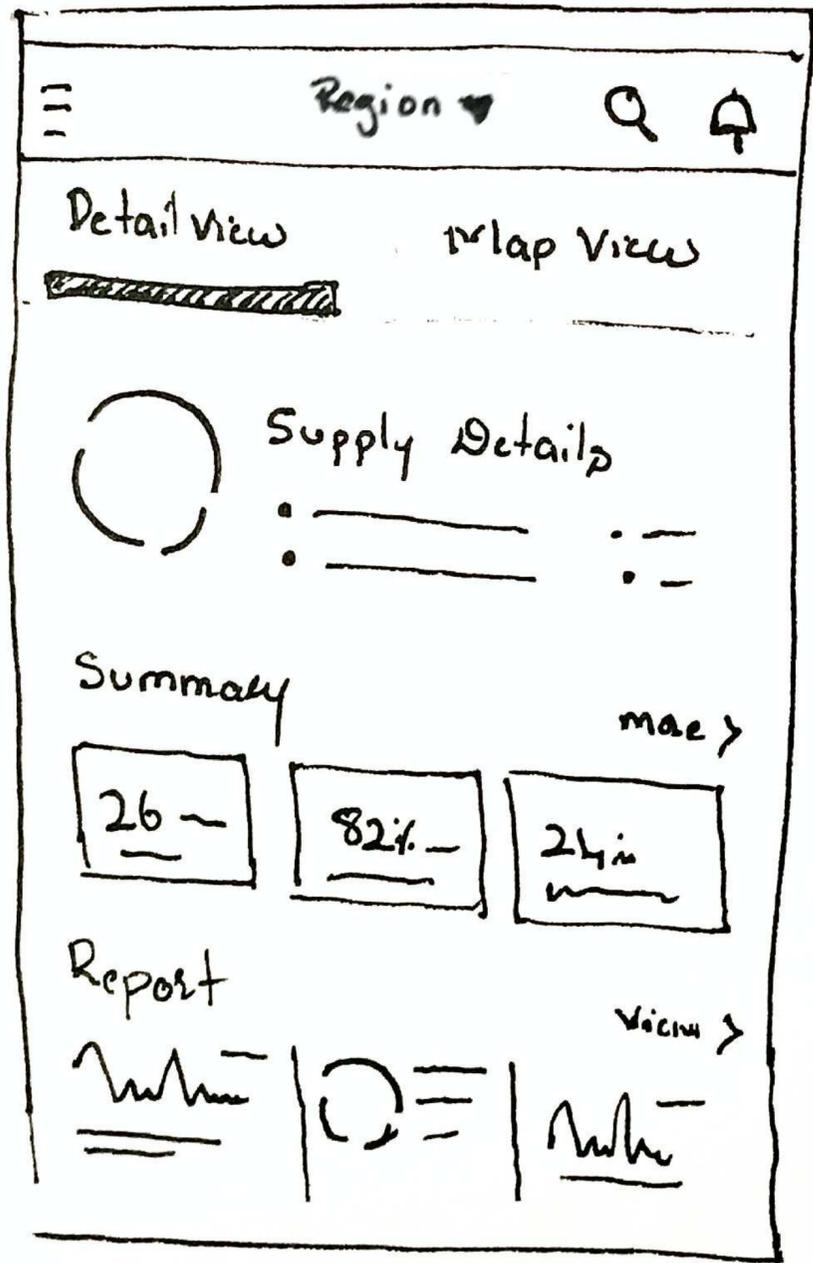


V2.0

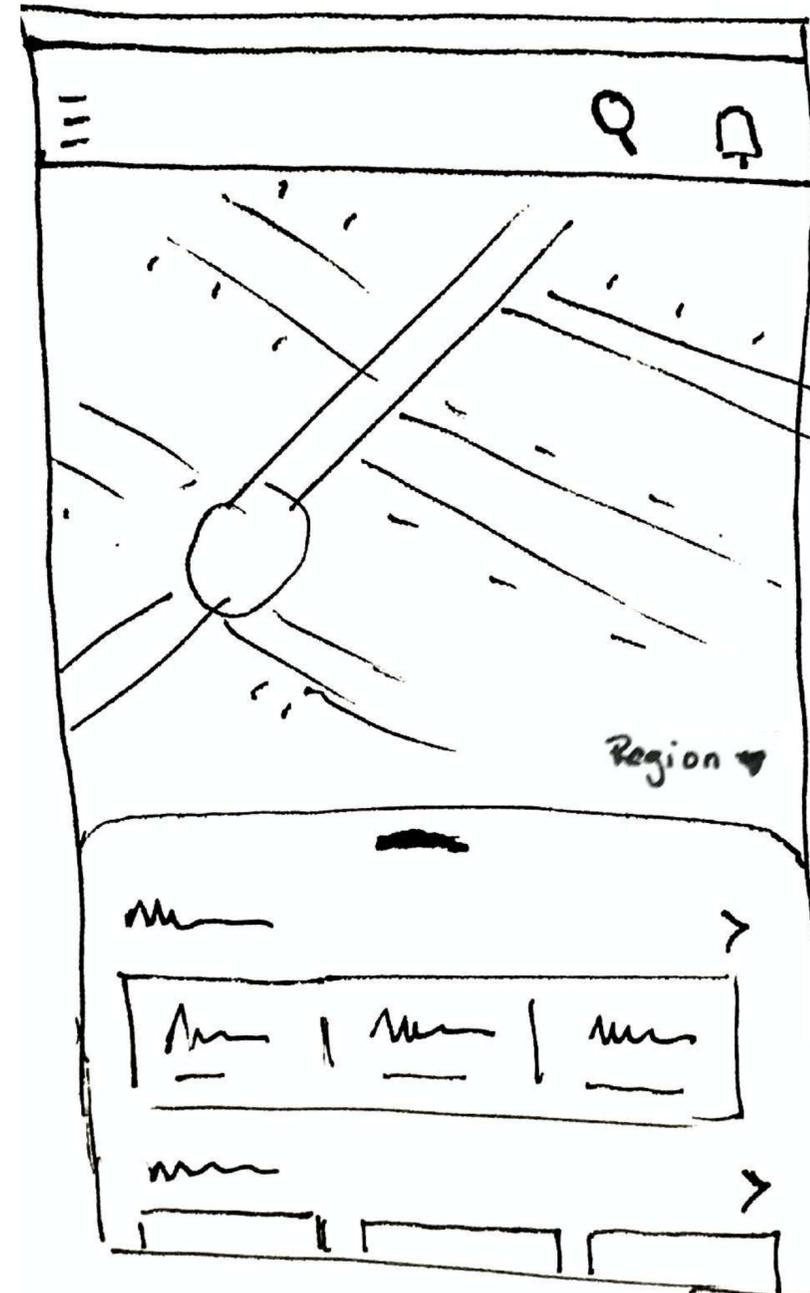


V3.0

# Concept Sketches



V4.0

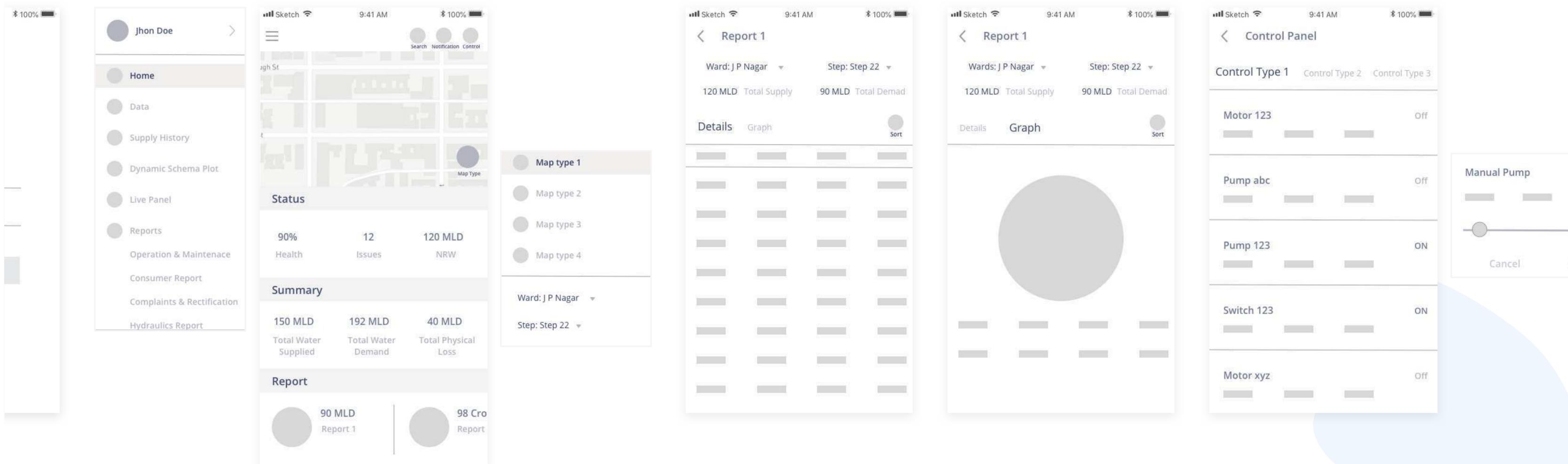


V5.0

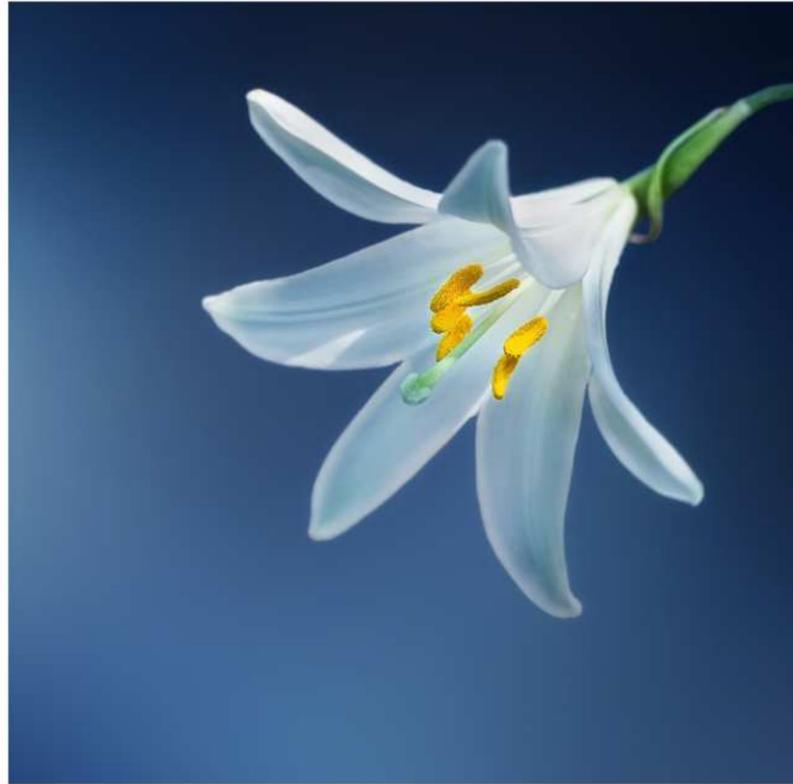
# Wireframe

With an iterative approach and feedback from stakeholders (and users), I finalized the concept and began creating wireframes to outline interaction patterns, content hierarchy, and workflow on the user interface.

Since my focus was on structure rather than the visual and emotional perception of details, it was easy for stakeholders to visualize and understand from an early stage without getting bogged down in the minutiae.



# Mood-Board Board



# Design Aesthetic

The design aesthetic is crafted with simplicity and ease of use in mind, while also providing a delightful experience for the user.

## Color



## Typography - Open Sans

**Aa** Aa Aa

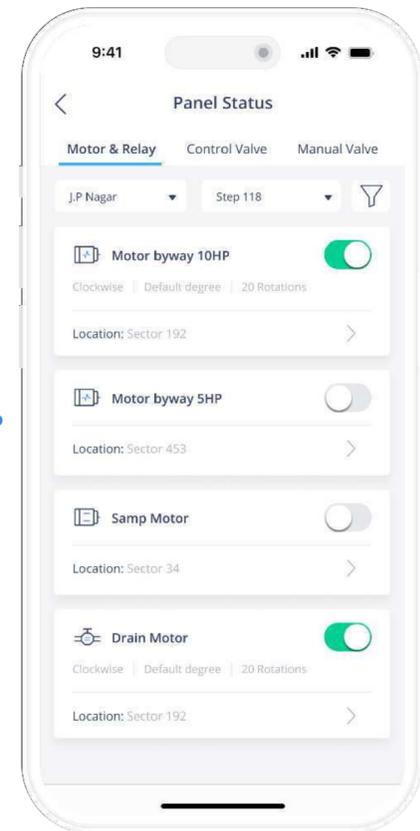
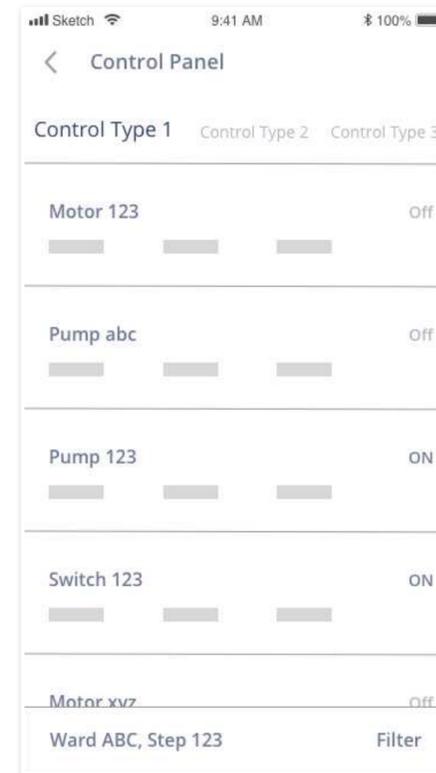
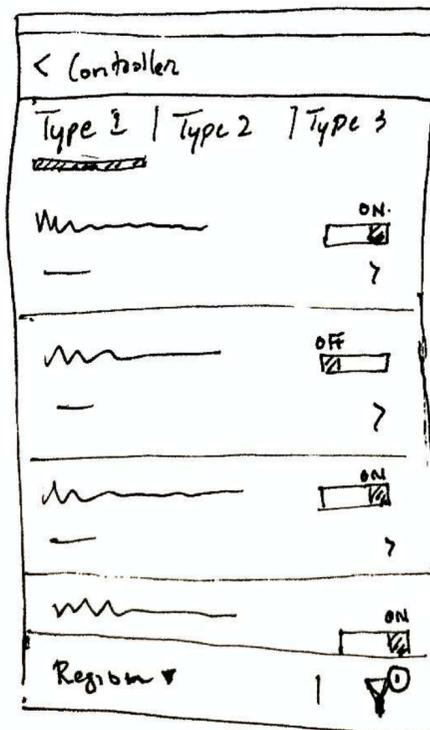
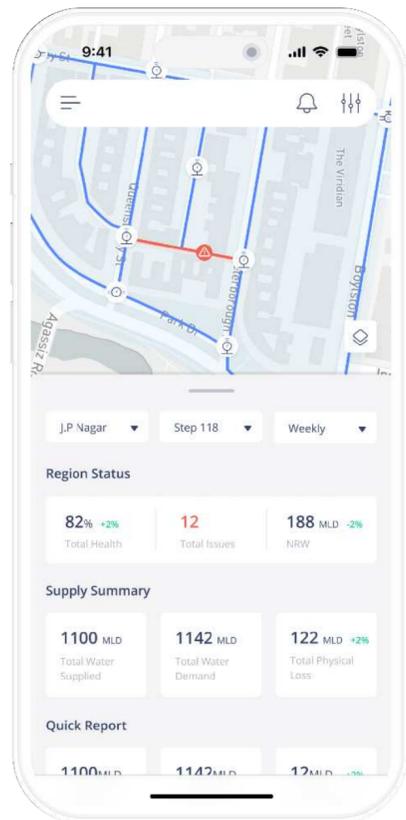
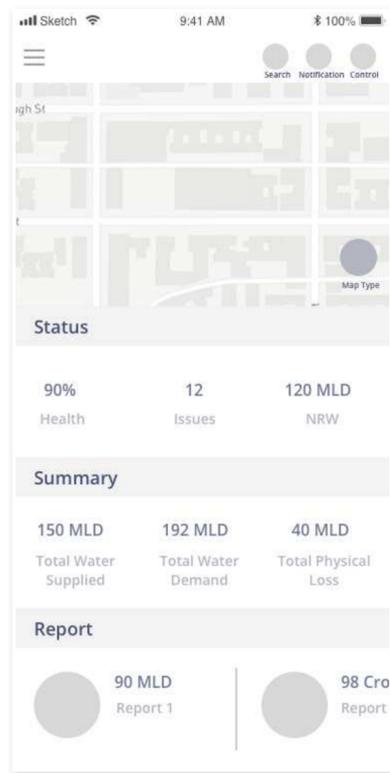
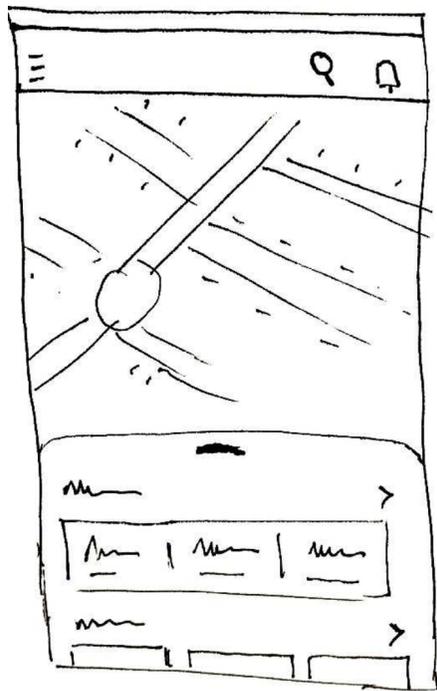
## Iconography



## Icon Illustration

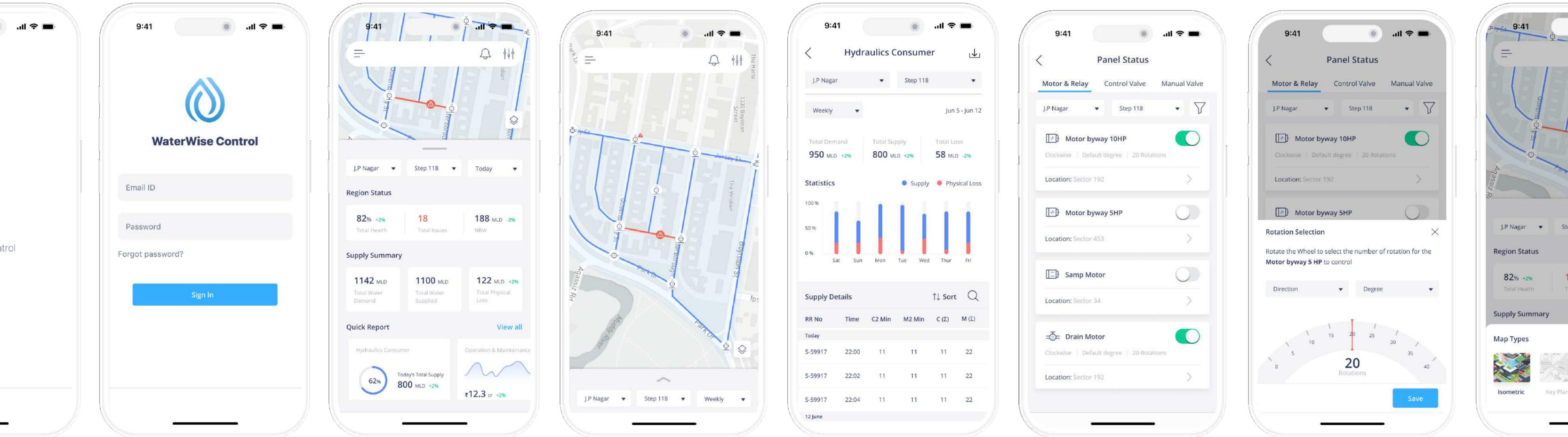


# The Process

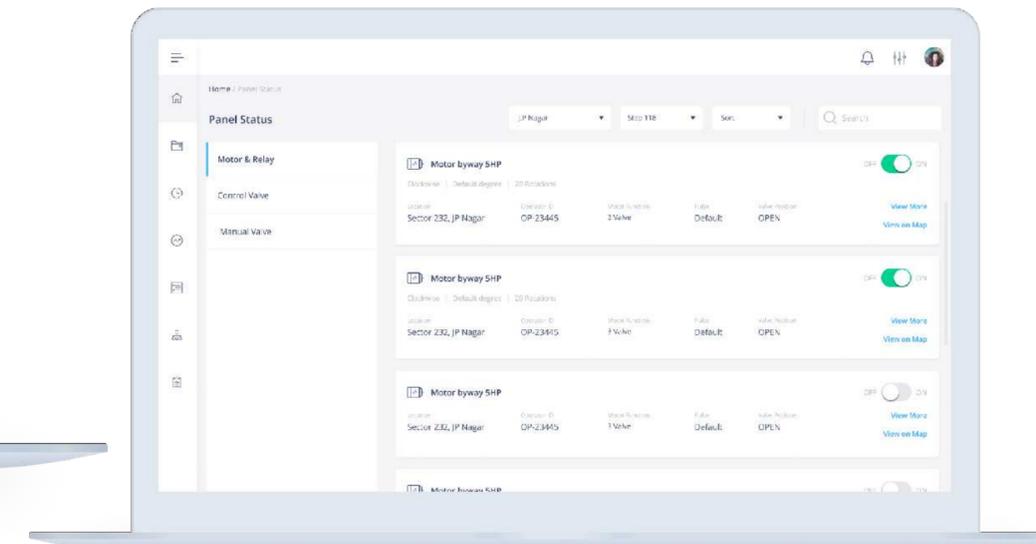
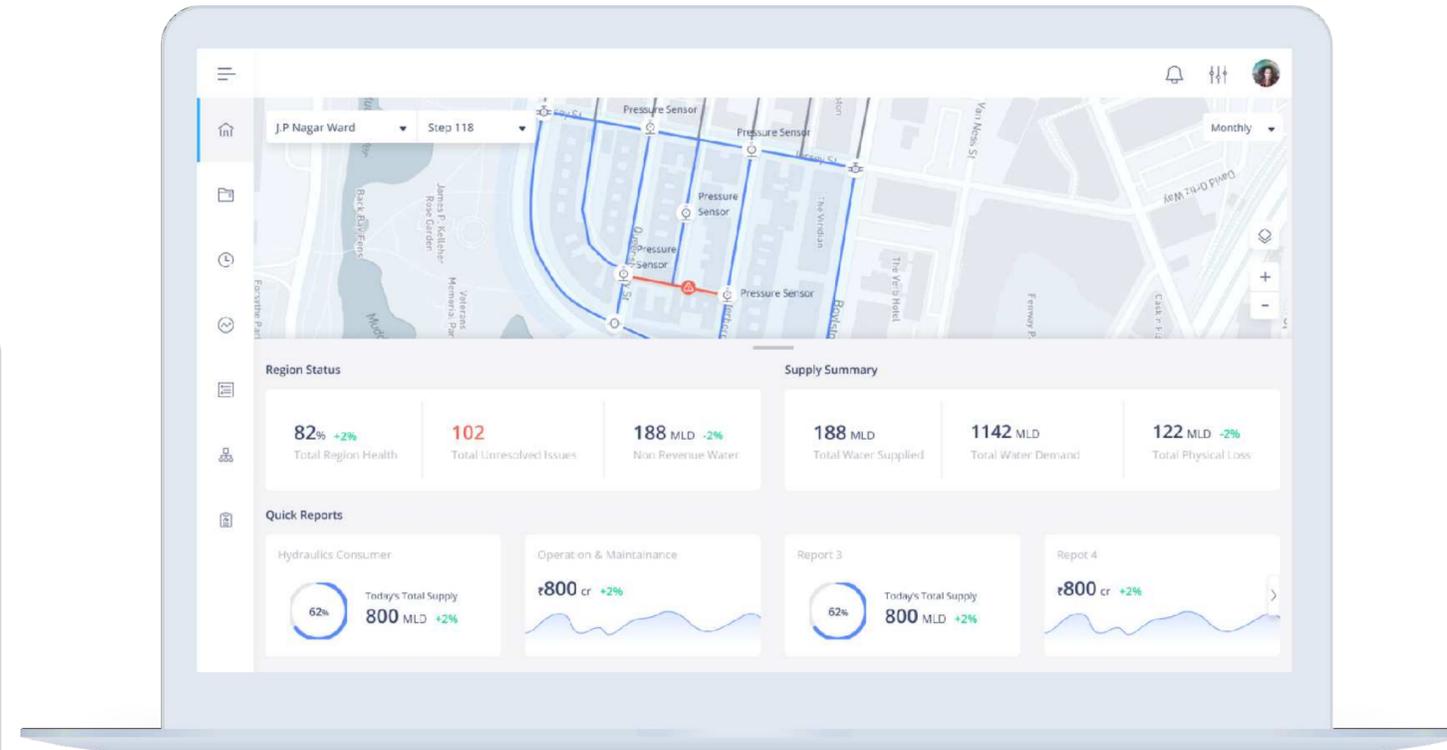
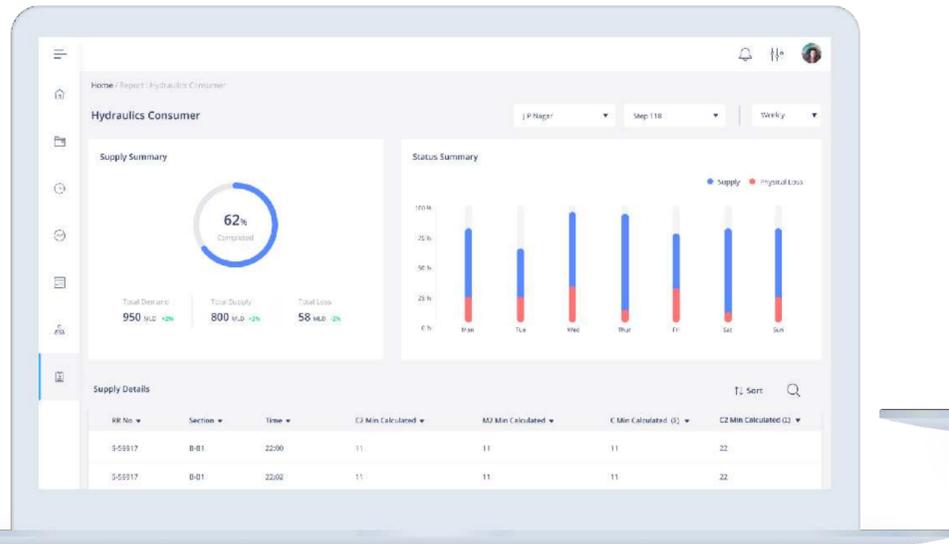


# Visual Design Design

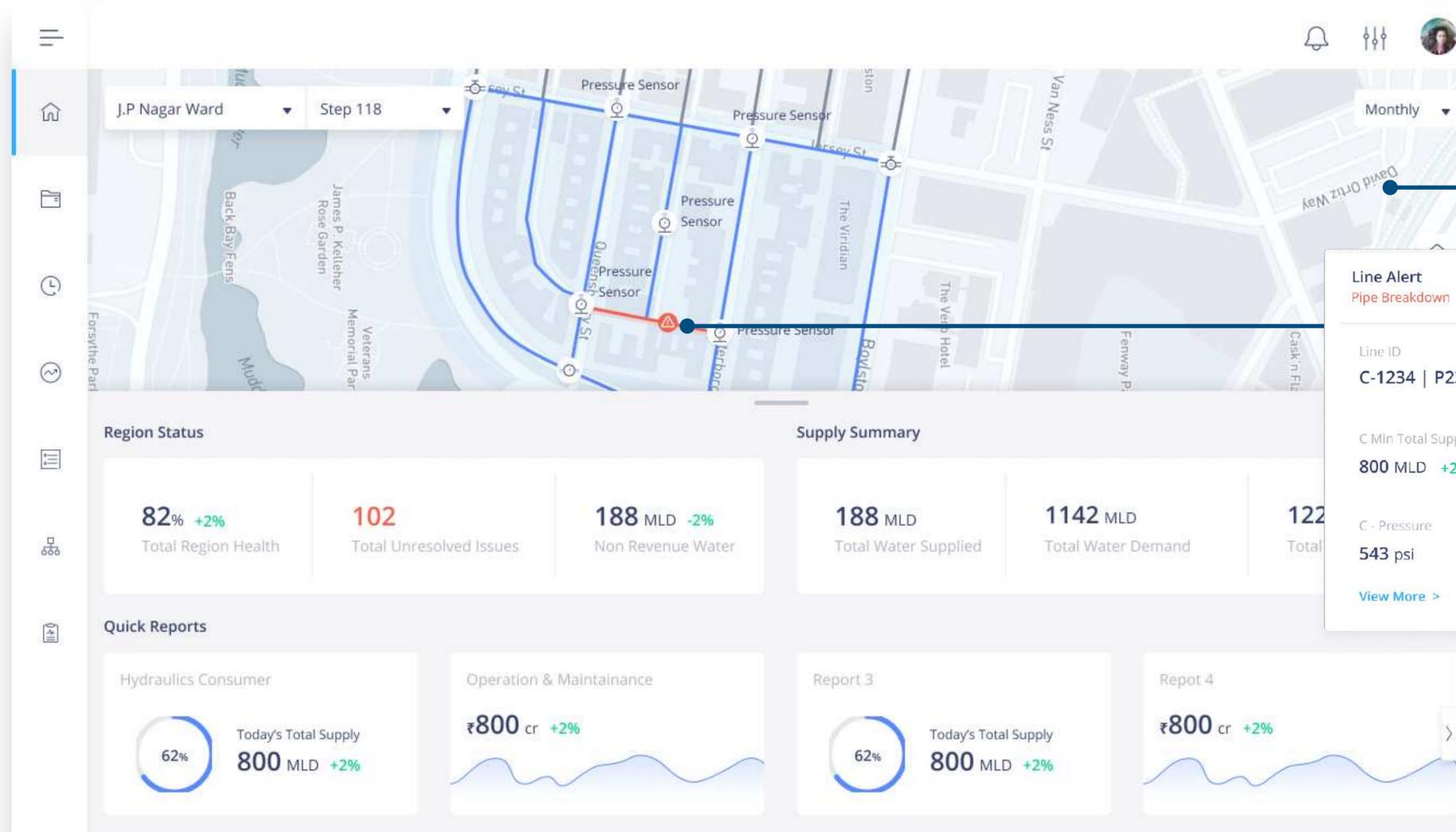
The UI design was kept simple and neat, with minimal graphical elements to ensure minimal yet effective visual appeal.



# Visual Design - Web



# Visual Design Design



Provides an overview of the water supply network.

The system alerts users about any illegal water supply or leakage.

Offer high-level information on the report and its current status

**Line Alert**  
Pipe Breakdown | J.P. Nagar | Step 118

Line ID	Reported on
C-1234   P234	12/06/2023
C Min Total Supply	Total leakage
800 MLD +2%	1.6 MLD
C - Pressure	Pulse
543 psi	Open

[View More >](#)

# Usability Feedback

The primary goal of this usability feedback is to uncover usability issues and assess how well the product is being adopted. Assigned with a few general and specific tasks, I was able to identify issues. Through iteration, I refined and addressed the discovered findings.

## Some key findings:

- Some of the icons were too generic to grasp at first glance. Issue: #Learnability #Memorability
- Needs quick access to recently viewed wards. Issue: #Efficiency



# Takeaway

## Take Away

- Finding the balance between business and user needs is crucial, especially when there is hardware dependency.
- To effectively communicate, understanding the right audience is key.
- Stakeholder mapping helped me with this. I gained insight into how government departments operate.
- The UX process helped to scope the requirements.

## Impact

- My design was presented and approved at the board meeting, signaling its readiness for implementation. Currently, the deployment is in progress.
- Recently, my client acquired a new project, and once again sought out my expertise. I was pleased with the rapport I had established with the client.



**THANK YOU**

