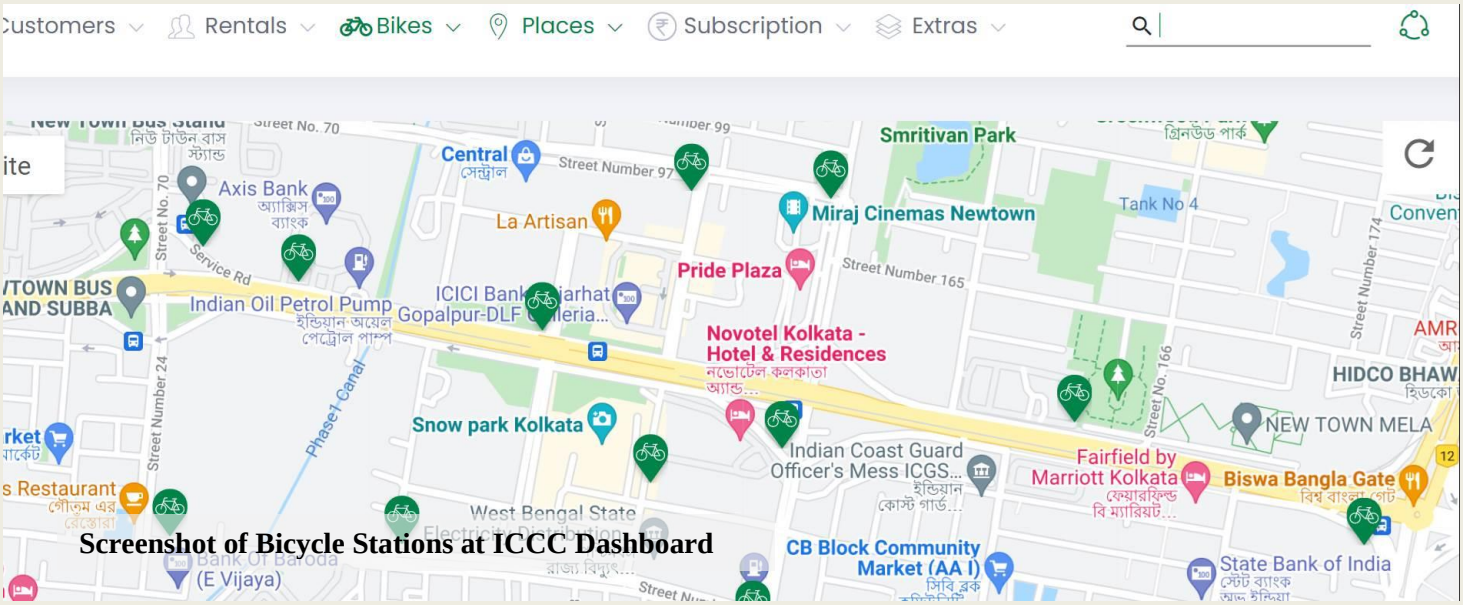
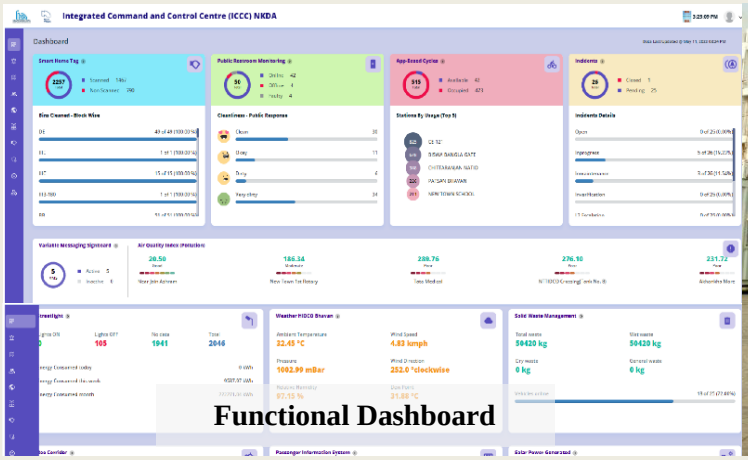
NEWTOWN KOLKATA
GREEN SMART CITY CORPORATION LTD

NEW TOWN ICCC CASE STUDY: #002- PBS

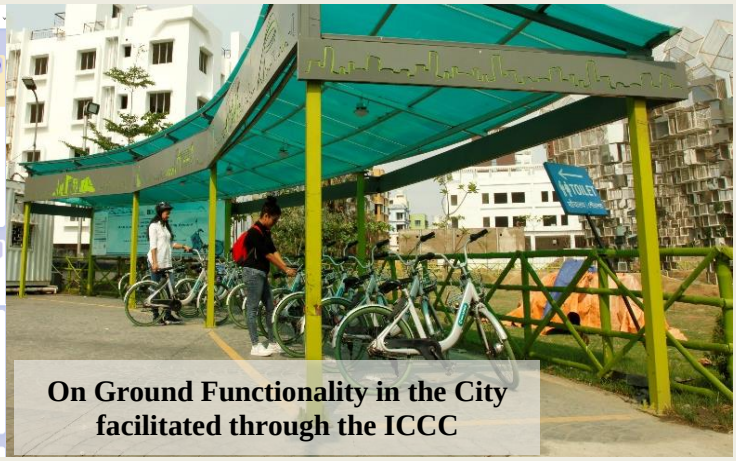
Integration of App based Public Bicycle Sharing Project with ICCC of New Town Kolkata



Screenshot of Bicycle Stations at ICCC Dashboard



Functional Dashboard



On Ground Functionality in the City facilitated through the ICCC

ICCC Background

New Town Kolkata's **Integrated Command & Control Centre (ICCC)** acts as a center of operations for all city level services, day-to-day alert handling, and disaster/ emergency response planning. The ICCC is powered with information, communication, and technology (ICT) based sensors and cameras to monitor city wide safety and security, public transport, pollution, water and waste management, renewable energy generation, street lighting etc. to ensure efficient city administration, urban governance, and municipal service delivery.
The ICCC can integrate up to 92 projects and as of October 2023, the integration of 24 projects has already been completed among which is SCADA.

App based Public Bicycle Sharing Project Background

To enhance mobility in the city and to ensure the transition to non-motorized transport, New Town Kolkata introduced the Public Bicycle Sharing Scheme in 2020.

The technology-led public bicycle sharing system along with the well-connected cycling lanes across the city, cycle docking stations and cycle signals, have ensured end to end connectivity across all major locations of footfall in the city. 400 pedal bicycles and 100 e-bikes are operational across the city under the scheme. The app-based bicycle sharing scheme is completed by the following key features:

a. Over 35 km of completed cycle tracks and ~50 km more in the planning
b. Cycle signals and signages across the city
c. Cycle crossovers at major junctions and crossings
d. Cycle docking stations at key locations
e. Regulatory requirement for government offices to create bicycle parking spaces
f. Cycle training classes by city authority
g. Mobile Cycle Clinic
h. Bollards on cycle lanes to separate motorized traffic from the non motorized ones

The key features of the Public Bicycle Sharing System include:

a. App-based Public Bicycle Sharing system is funded through a VGF model – and is one of the most budget friendly commute options
b. The rate charge for the pedal bicycles are given below:
    - INR 1 to start
    - INR 31-60 mins – INR 5 for 30 minutes, 50 p / minute after 60 minutes
c. The rate charge for the e-bicycles are given below:
    - INR 5 to unlock
    - 50 p / minute post unlock
d. PBS Map based Dashboard displaying cycle concentration, active rides and active subscriptions

The dashboard has enabled the city authorities to assess the travel by citizens and the need for new cycle tracks and docking stations.
The bicycles have proven to be extremely popular among the citizens of New Town with approximately **500 bicycle trips** and **1800 kilometers** of cumulative distance covered by the users **per day**. ***These figures rise exponentially during important events and festivals such as Durga Puja.***

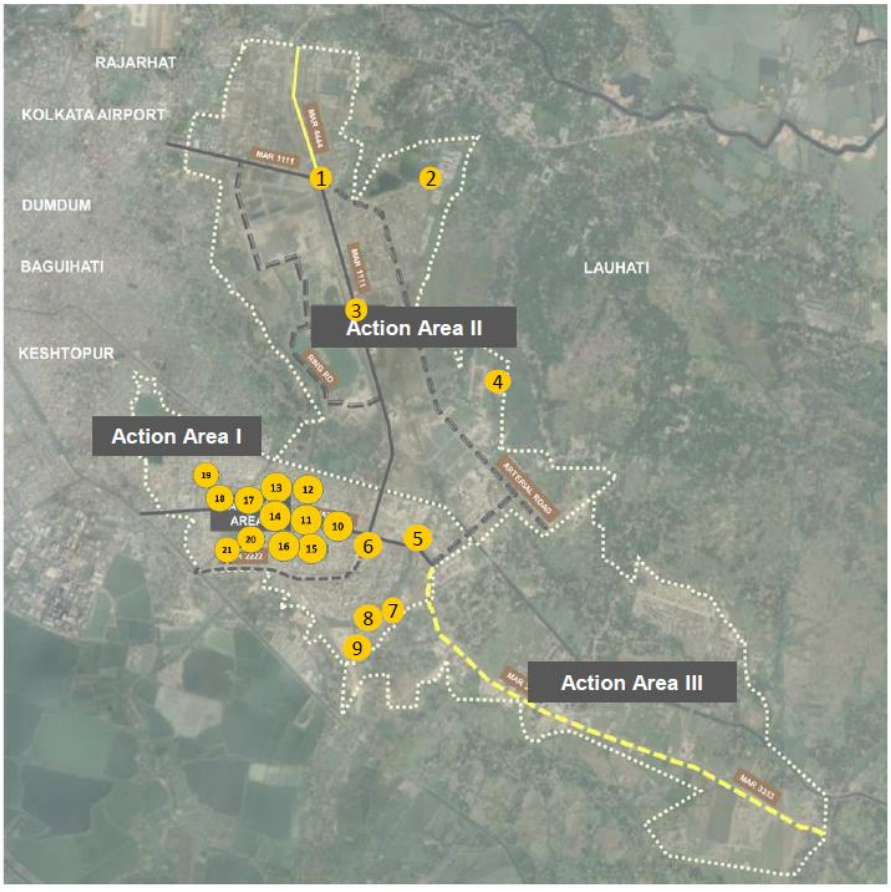
Problem: Increased usage, demand and popularity of the PBS system among the citizens of New Town Kolkata

The PBS system has proven to be extremely popular among the citizens of New Town Kolkata resulting in increased demand causing the below complaints:

a. **Non-availability of bicycles on-demand**
b. **Non-availability of docking stations at the preferred destination**

Based on user complaints on the PBS to the 24x7 Toll free helpline of the ICCC, a need was felt to propose new docking stations and enhance the existing docking stations in New Town leveraging the ICCC PBS data and primary user surveys
A bicycle user survey and data analysis was thus conducted to determine the **usage pattern** of the bicycles and **areas** of high bicycle demand.

Location of Existing Cycle Docking Stations



1. Akankha Square
2. Eco Urban Village
3. Eco Park Gate 4
4. Coffee House
5. OHIO Hospital
6. Biswa Bangla Gate
7. Upasana Biswarjan Ghat
8. Newtown School
9. CNCI National Institute
10. Swapno Bhor Gate 1
11. Novotel
12. NKDA E-bus Depot
13. Kiranmala Housing
14. Clock Tower
15. CE 121
16. Axis Mall
17. Dongfang
18. Newtown Bus Stand
19. DCP Office
20. Patsan Bhawan
21. AL Block

Action Area I: 81%
Action Area II: 19%

Objectives of the PBS User Survey and Analysis- Enhancement of the Public Bicycle Sharing System

Based on the above problem statement, a PBS user survey and analysis was conducted with the below objectives:

a. To determine the **areas of new docking stations**:
   - To provide equitable distribution of the docking stations as per activity zone and demand
   - To cater to the activity areas in line with the temporal demand

b. To **enhance the existing docking stations**:
   - To cater to the real time user demand
   - To continue with the existing number of cycles as of now. The redistribution can be done accordingly

The below sections mention the findings from:

- **Data Analysis** of PBS System from ICCC
- **Survey findings** of users

Data Analysis of the PBS system from ICCC:

The PBS data of ICCC was analysed for last 13 months (June'22-July'23). The two types of bike data available in New Town was analysed (Electric bike & Eco-bike (Manual cycle)) from 21 docking stations.

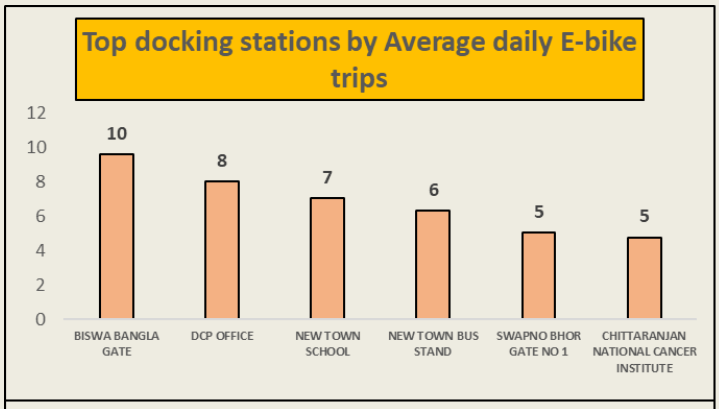
Analysis Approach

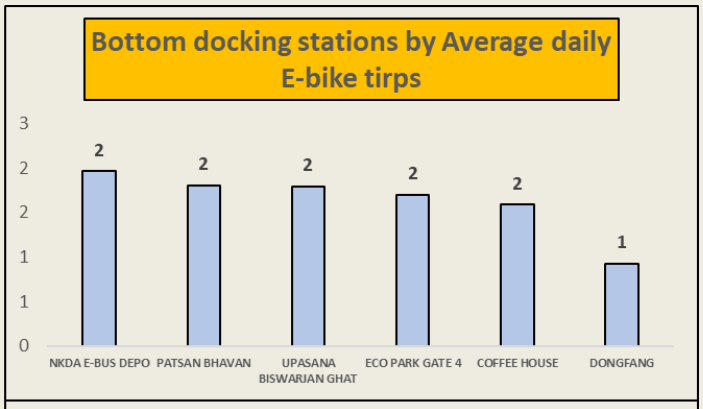
a. Breaking down trip days by different slots (Morning/ Day/ Noon/ Afternoon/ Evening/ Night)
b. Finding Months from the dates and trip duration
c. Analyzing top trending docking stations by trips
d. Origin & Destination preference analysis of riders
e. Analyzing trending slots by trips & rental duration

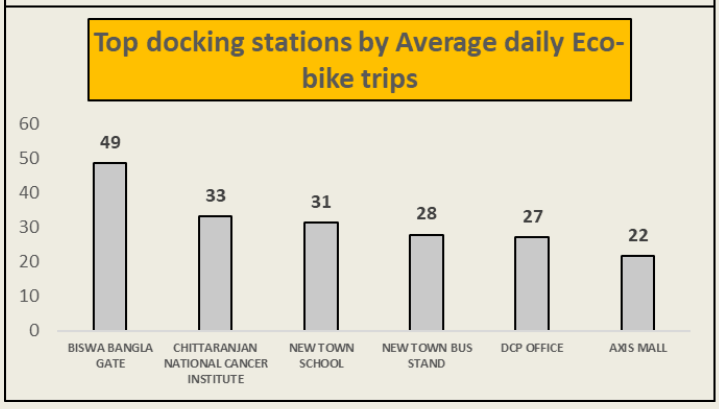
Findings from Data Analysis of PBS

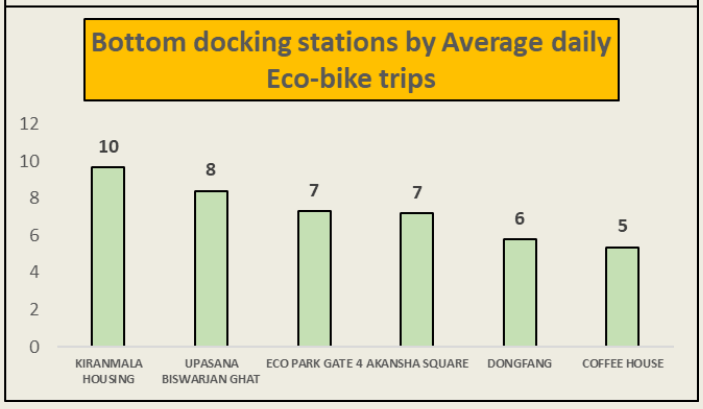
Top trending docking stations by trips

- Biswa Bangla Gate, New Town Bus Stand & School, Chittaranjan National Cancer Institute and DCP office are experiencing **high daily rides**.
- Upasana Ghat, Eco Park Gate 4, Coffee House & Dongfang had very less daily rides, hence bikes can be distributed there in utility basis









Top trending timeslots by trips

- As per the trend, timeslots with top commute are Night (8pm-12am), Evening (6-8pm), Afternoon (3-6pm) & Day (8am-12pm).
- Bicycles and staff allocation priority can be basis trip frequencies by slots

Origin and Destination preferences of Riders

An analysis was carried out to understand preferred destinations of riders; i.e. when the destination points are different from originating point

- For most of the cases, both Ebikers & Eco-bikers (manual bikers) leave the bikes where availability of public transport (Bus/Auto/Toto) is high.
- Riders also use bikes to reach Malls, Eateries, Hospital & School for daily commute.
- Availability of Bikes can be increased in those points

E-BIKE

Origin station	Frequent slots	Preferred Destinations
BISWA BANGLA GATE	Day, Afternoon, Evening	CNCI, Newtown School
NEW TOWN BUS STAND	Evening	Axis mall, DCP Office
DCP OFFICE	Night	Newtown Bus stand, Swapno Bhor Gate 1
AXIS MALL	Night	Newtown Bus stand, Biswa Bangla Gate
NEW TOWN SCHOOL	Night	Biswa Bangla Gate

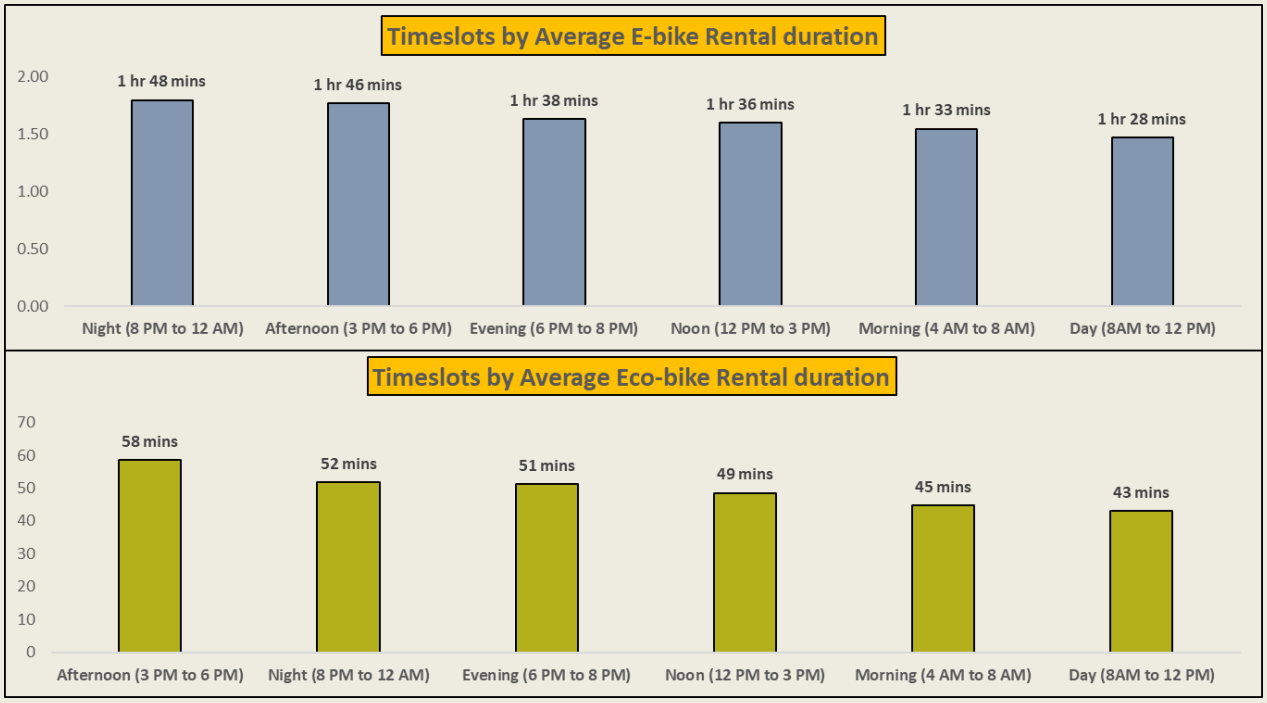
Eco-BIKE

Origin station	Frequent slots	Preferred Destinations
BISWA BANGLA GATE	Afternoon, Evening, Night	CNCI, Newtown School
CHITTARANJAN NATIONAL CANCER INSTITUTE	Day, Noon, Afternoon, Evening	Biswa Bangla Gate
AXIS MALL	Evening, Night	Newtown Bus stand, DCP Office
NEW TOWN BUS STAND	Evening, Night	Clock tower, DCP Office
CLOCK TOWER	Night	Newtown Bus stand, DCP Office

Average Rental Duration trend per Timeslots

An analysis was carried out to understand preferred destinations of riders; i.e. when the destination points are different from originating point

- As per the trend, Timeslots with top average Rental duration are Night (8pm-12am), Evening (6-8pm) & Afternoon (3-6pm).
- Probable causes are shopping, outing & dining



Deficiencies in the Data Analysis above

Following information is not captured in the current data, for more contextual planning of the enhancement of the PBS Network;

- Age of the rider
- Gender of the rider
- Area residing in
- Purpose of trip (Joyride/Daily commute/Delivery)
- Any issue faced/grievances such as Availability/ Quality/ App malfunction

Way Forward post data analysis: *User Survey for better understanding of pain-points*

A sample-based questionnaire is planned for better understanding of ride purpose. Average Rides per day is calculated ~450. 10% of these riders (~45) can be chosen for the survey based on the percentage share for each timeslots. *(10% is considered as higher number of sample may lead to higher sampling error)*

Survey of the PBS Users in New Town Kolkata:

The survey was conducted and data was captured based on the **below questionnaire**

Fields	Responses
Name	
Age	
Gender	
Area residing in	
Cycle use purpose (Joyride/Daily commute/Delivery)	
Any issue faced/grievances such as Availability/Quality/App malfunction	

Survey Overview

- The survey was conducted for 14 consecutive days (1st -15th September).
- 45 riders are chosen in random daily & were surveyed as per percentage share in different timeslots.
- Total 14*45 = 630 unique records are captured for the questionnaire.
- The purpose of the survey was to better understand the reason of cycle use along with general trends of timeslot, gender & age groups
- Riders were not interested to share the purpose or locations of halt during rides; however, they provided Yes/No responses. Analysis was carried out on basis on these records.

Findings from Rider Survey

Analysis of cycle use purpose

- **18-35 years** age group are mostly using cycles for Joyride (~60%)
- **36-45 years** age group is equally giving preference in both daily commute & health fitness (~37% each)
- **46-60 years** age group riders preferring joyride (50%); daily commute appeared 2nd (~37%)
- **Weekend vs Weekdays:** In both weekdays & weekends joyrides are preferred; Weekends are slightly higher (62%) than weekdays (60%)
- **Gender:** 65% of female riders are preferring joyrides while 59% of male riders are preferring the same

Analysis of Age Groups in timeslots

- **18-35 years** of age group riders are preferring rides in **Evening (~26%) & Night slots (~28%)**
- **36-45 years** riders ride mostly in **Morning**, then in Evening (~30%)
- **46-60 years** age groups are riding in **Day & evening** (~38% each)
- **Kids** (Less than 18 years) are preferring rides in **afternoon** slots
- **Age group using PBS most in Weekdays**: **18-25** age group is covering 53% of trips & 26-35 years are covering 43%
- **Age group using PBS most in Weekends: 26-35** age group is covering higher percentage (48%) of trips than 18-25 age group (46%)

Analysis on Halts midtrip by riders

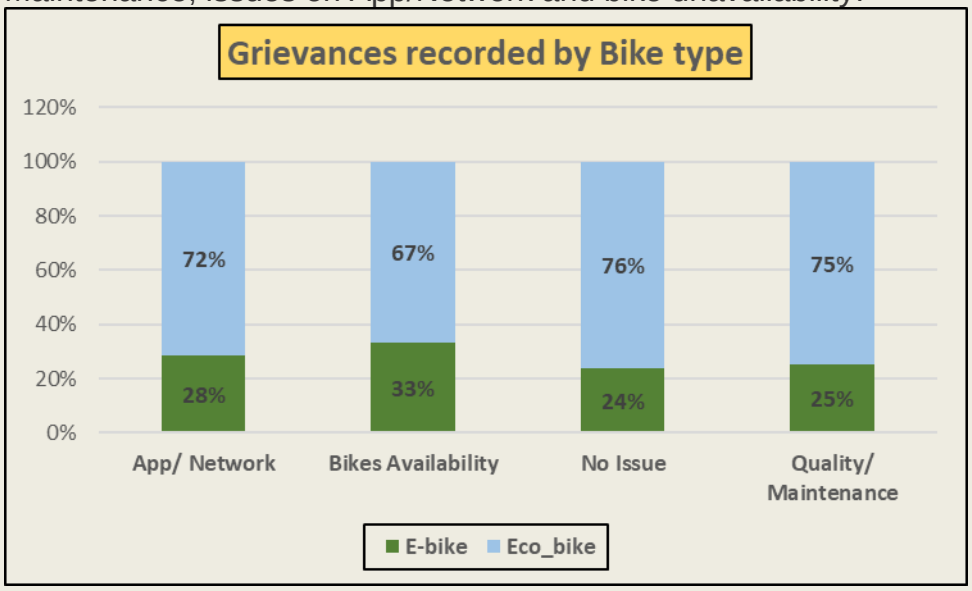
- **30%** of the total riders halt during their trips
- Male riders (77%) mostly halt during trips *(corroborated by findings above where most females use the cycles for joyride)*
- Most halts are happening during **Evening & Night** & for 18-35 age group
- Almost 80% of 18-35 years age group riders are halting in weekdays
- **Age wise breakup** of halts in weekdays and weekends is as below:

Age group	Weekdays	Weekend
18-25 years	80%	20%
26-35 years	76%	24%
36-45 years	100%	0%
Less than 18 years	0%	100%

  - More no of halts implies scope for PBS docking stations in areas most halted in

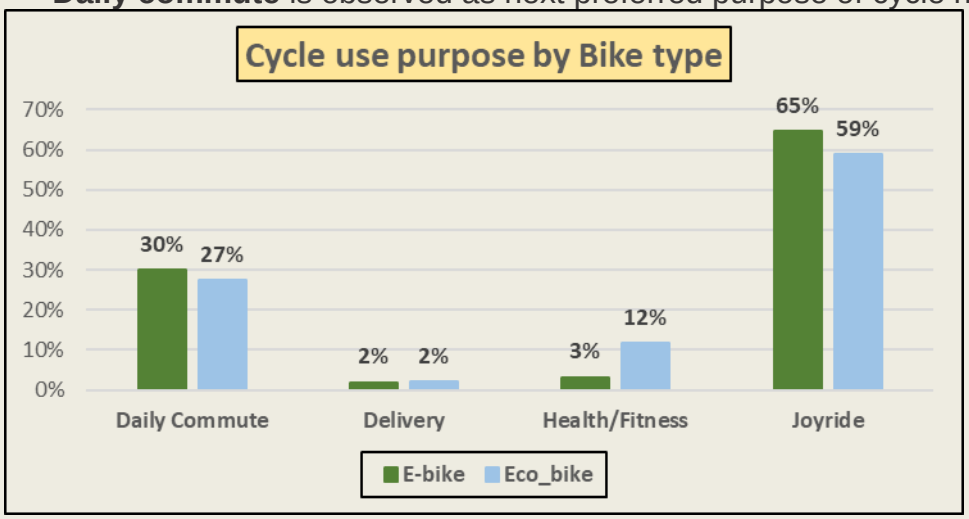
Analysis on Grievances by riders

- Most of the grievances are due to **App/ network (~58%)**
- Followed by **Quality/ Maintenance (~39%)** grievances are recorded\
- Complaints are lesser for E-bikes.
- For Eco bikes (manual bikes), most concerns are raised for Quality & Maintenance, issues on App/Network and bike unavailability.



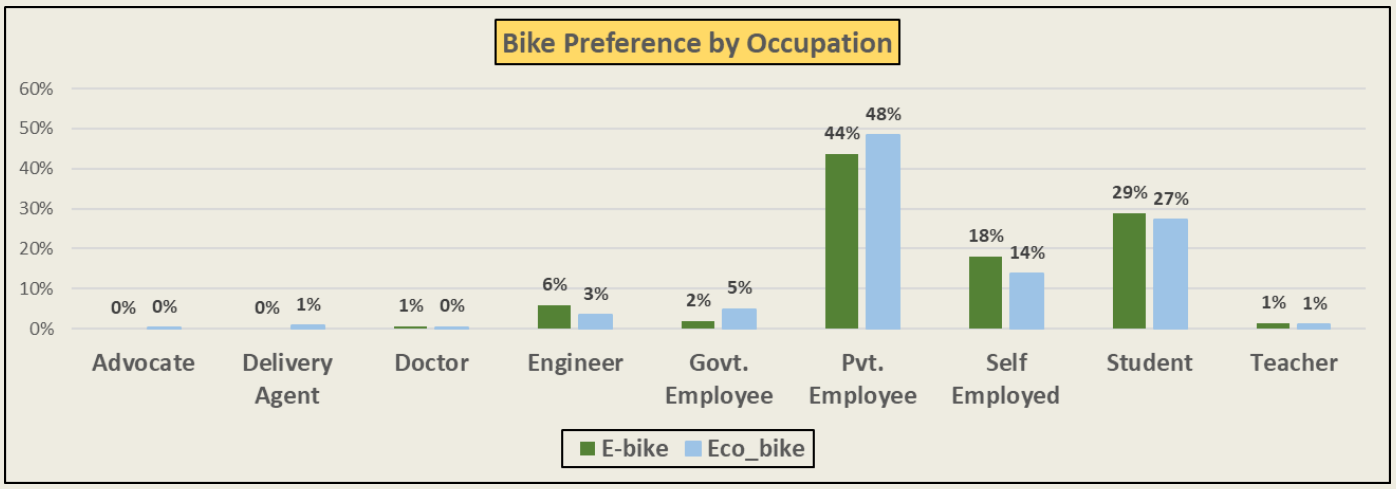
Analysis on Bike Usage

- Both E-bikes & Eco-bikes are mostly being used for **Joyride**;
- **Daily commute** is observed as next preferred purpose of cycle ride



Analysis on Ride Profile

- Both Eco & E-bikes are mostly used by **Private employees**
- Students are the next prominent user group



Inferences from the Data Analysis and Rider Survey of the PBS system

The Data Analysis and Survey findings of the previous sections were utilized for relevant inferences to:

a. Enhance the capacity of most used Docking Stations and in their preferred slots
b. Propose new docking stations based on rider preferences

Enhancement of existing docking stations

Based on:

a. Trips per day
b. Frequent requirement of balancing the cycles
c. Destination Preferences of Riders
d. Enhancement is proposed in:
    i. **Biswa Bangla Gate**
    ii. **CNCI**
    iii. **Newtown School**
    iv. **Newtown Bus Stand**
    v. **DCP office**
    vi. **Mela Ground**

Proposal for New Docking Stations

Based on various parameters and rider feedback, the need for new docking stations was analysed:

Evaluation Matrix for New Proposals

Location/ Parameters	Shanku Park/ 7th Rotary	Shapoorji	UEM/ Rose dale	Unitech Gate 1	Tarulia	Nazrul Tirtha	Ram Mandir	Beside Akankha Housing	Beside Co-working Co-living
Population/ Footfall	3	3	3	3	2	3	2	2	2
Activity Zones in the Vicinity	3	3	2	3	2	3	2	2	1
Distance from nearby docking station	3	3	3	3	3	2	2	2	2
Peripheral Accessibility	3	3	3	2	3	2	3	3	2
Multi Modal Hub	3	2	2	2	2	3	2	2	2
User Demand	3	3	2	3	1	2	1	2	2
Cumulative Score	18	17	15	16	13	15	12	13	11

* Subjected to land availability

Most Suitable | Moderately Suitable | Less Suitable

Phasing of New Docking Stations proposed

The establishment of new docking stations can be undertaken phase wise as illustrated below:

Phasing of the New Proposals

PHASE- I

Proposed Cycle Docking Station	Cumulative Score
Shanku Park/ 7th Rotary	18
Shapoorji	17
UEM/ Rose dale	15
Unitech Gate 1	16
Nazrul Tirtha	15

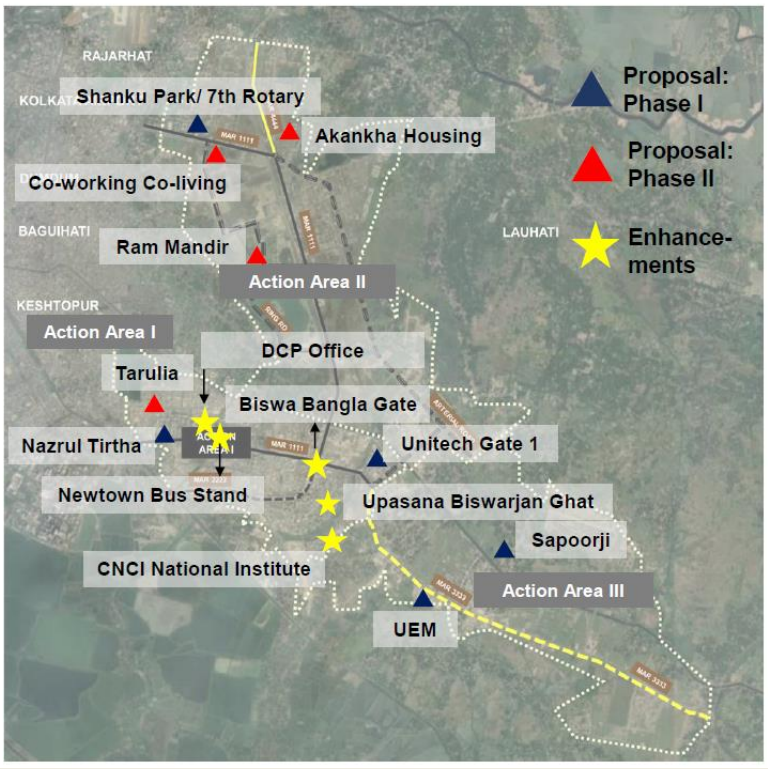
PHASE- II

Proposed Cycle Docking Station	Cumulative Score
Tarulia	13
Ram Mandir	12
Beside Akankha Housing	13
Beside Co-working Co-living	11

Location of new proposals and enhancements

The new bicycle docking stations proposed and proposed enhancements are as below:

Location of the Proposals



ACTION AREA I

Proposal: Phase I	Proposal: Phase II
1	1

5 Enhancement

ACTION AREA II

Proposal: Phase I	Proposal: Phase II
1	3

ACTION AREA III

Proposal: Phase I	Proposal: Phase II
3	0

Distribution of bicycles as per busiest timeslots of usage

Based on PBS data analysis it is proposed that the downtime and maintenance of the bicycles be done from 4 AM- 8 AM or 12 PM to 3PM

Maximum availability of bicycles must be ensure at night (8 PM to 12 AM), evening (6 PM-8 PM) and afternoon (3 PM to 6 PM).