



GROUP TWO

PHYSICAL INFRASTRUCTURE

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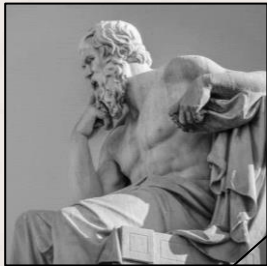
- Road networks, sizes, types, names
- Pedestrian/ Vehicular Traffic Volumes and Projections
- Parking Spaces
- Circulation Patterns
- Distribution of activities

Conclusion

04



What Do They Say?



Socrates

By far the greatest and most admirable form of wisdom is that needed to plan and beautify cities and human communities.



Jan Gehl

All the cities of the world are going to expand. We need to better understand what makes good urban habitats for homo sapiens. We are obligated to make the new places more liveable, sustainable, and healthy. We have the tools.



Chanda Kochhar

Investment in infrastructure is a long-term requirement for growth and a long-term factor that will make growth sustainable.



What Is Physical Infrastructure?

“The framework of interdependent networks and systems comprising institutions and distribution capabilities that provide a reliable flow of products and services.....”

**-1997, Report of the President's
Commission on Critical
Infrastructure Protection**

Physical infrastructure takes a look at the basic physical structures required for a local economy to thrive and survive.

The infrastructure mentioned here includes, but is not limited to:

- Transportation networks
- Power grids and distribution
- Water supply
- Sewerage
- Waste disposal



Importance of Physical Infrastructure



Economic Growth



Improved Quality of Life



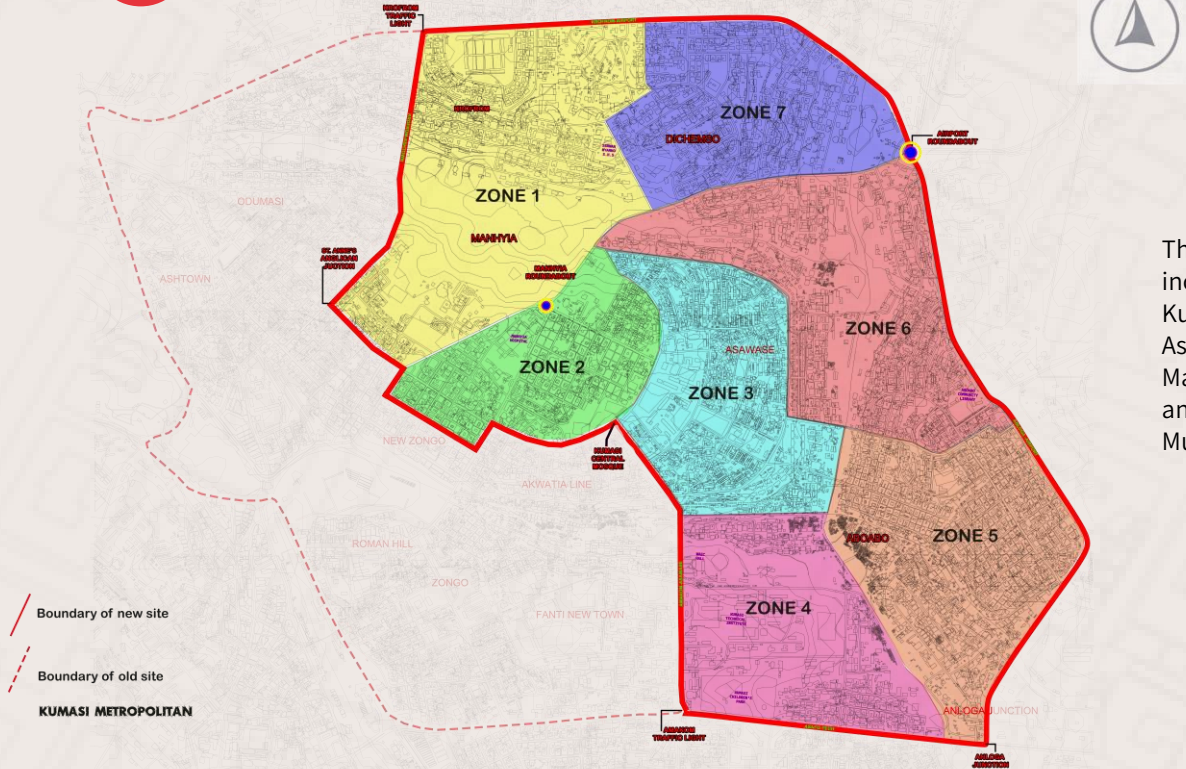
Employment



Proper Urban Planning



Area of Study



The area to be studied includes sections of Kumasi Metropolitan Assembly, Asokore Mampong Municipality and Oforikrom Municipality.

- Zone 1
- Zone 2
- Zone 3
- Zone 4
- Zone 5
- Zone 6
- Zone 7

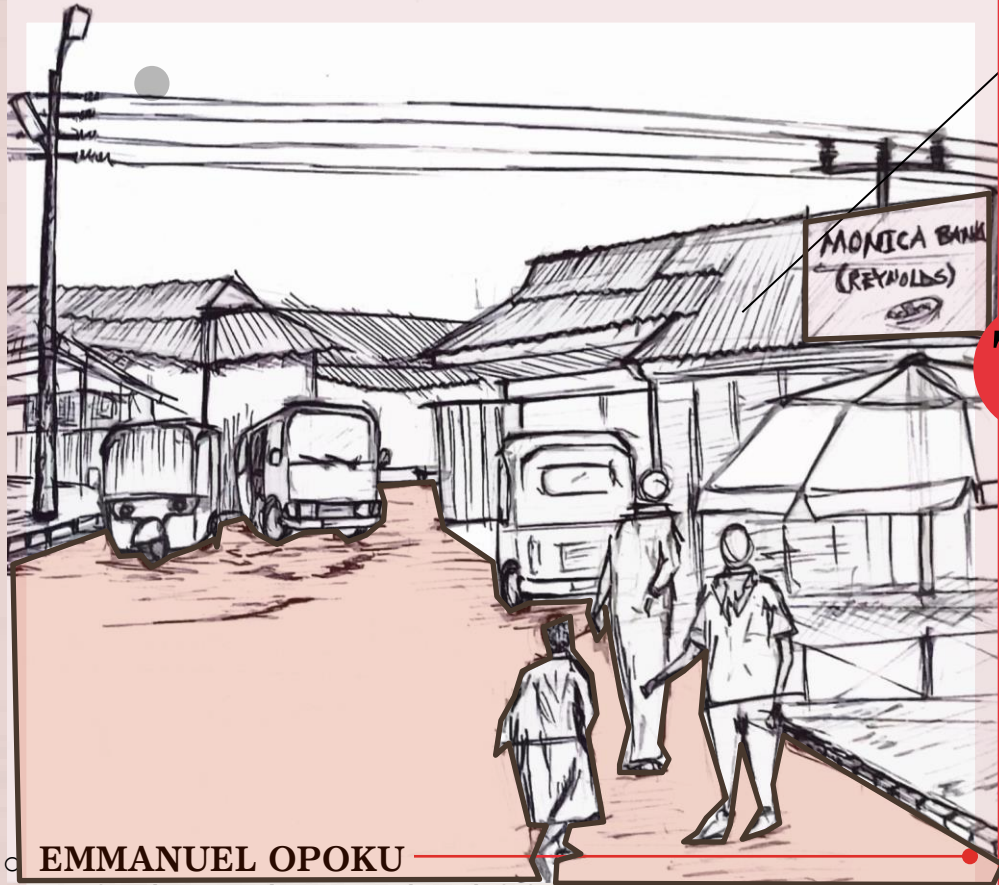
PART 1

Transportation and Traffic Considerations

- Road networks, sizes, types, names
(A)
- Pedestrian/ Vehicular Traffic Volumes and Projections
(B)
- Parking Spaces
(C)
- Circulation Patterns
(C)
- Distribution of activities
(D)



Transportation and traffic considerations



EMMANUEL OPOKU

MICHAEL MAWUENA BACCAH

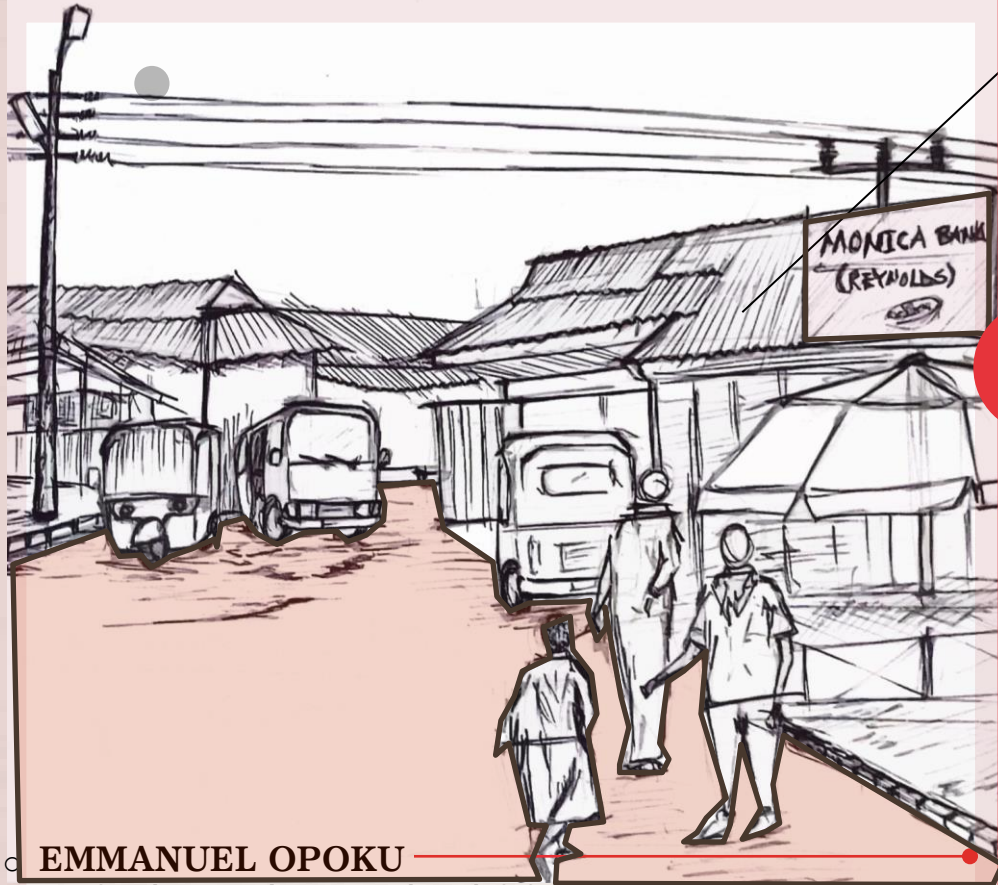
SURVEY 2023

Map Schedule

MAP DESCRIPTION	PAGE NUMBERS
ROADS INCLUDED IN THE FIELD SURVEY	A02
Road Classifications I & II	A03, A04
Road Classifications	A13, A14, A15, A16
Road Material Finishes	A17, A18, A19
Road Condition	A20
Traffic Control Systems	A23, A24, A25
Traffic Conflict Zones	A26, A27

Road Transportation

Road transport is a type of transport using roads which can be roughly grouped into the transportation of goods and transportation of people between two destinations –
The Economic Times, 2015.



EMMANUEL OPOKU

MICHAEL MAWUENA BACCAH

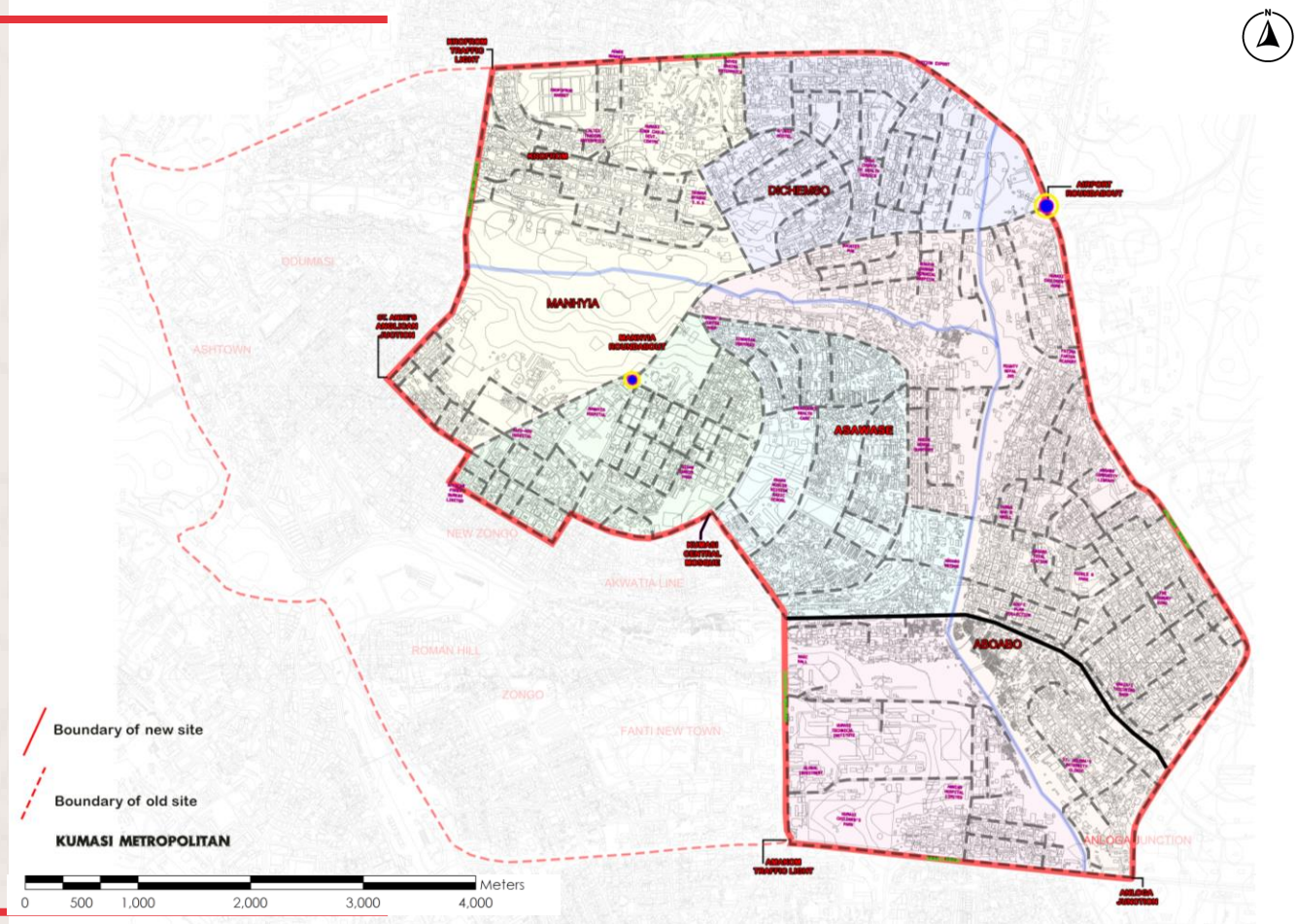
Table of Content

The thematic areas studied under transport and traffic consideration include...

Criteria for Road Classification	Includes road classification and the percentages of the various roads represented on maps and charts.
Road Finishes	Includes materials used for roads illustrated on maps and charts
Road Conditions	Identifies the state of roads and locates where there are potholes
Traffic Control Systems	Locates the various traffic control systems utilized and their adequacy
Traffic Conflict Zones	Indicates locations where there are a lot of vehicular conflicts
Ongoing and Abandoned Projects	Locates the various ongoing and abandoned projects with their coordinates

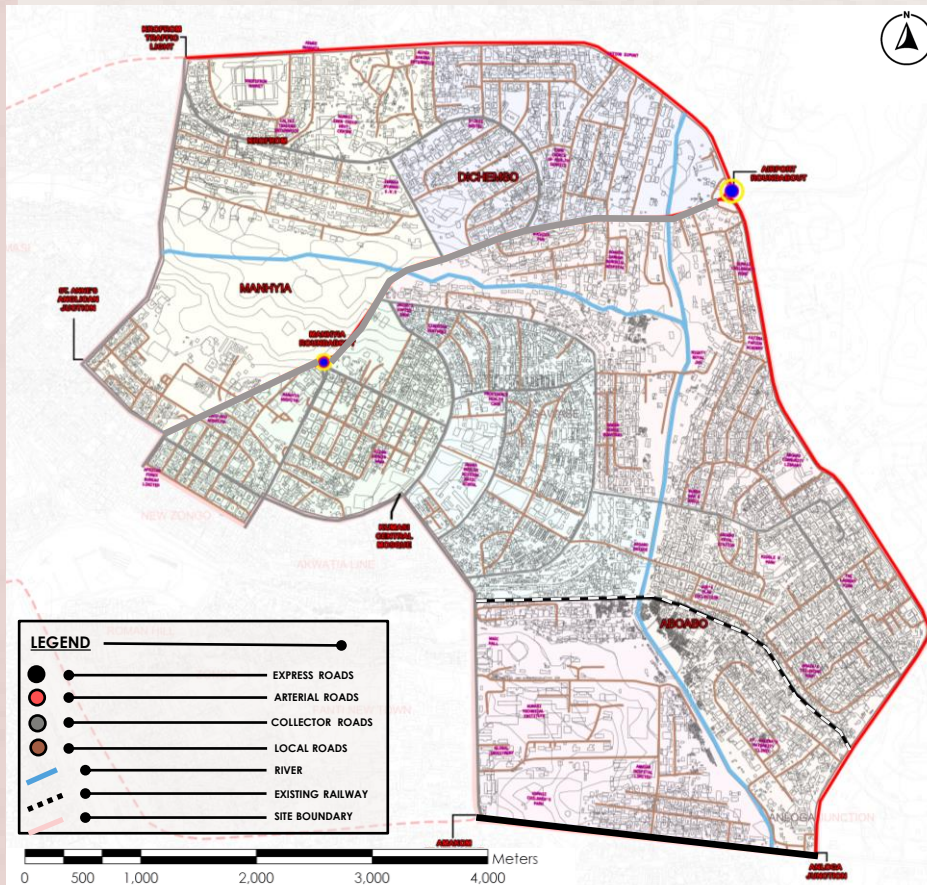


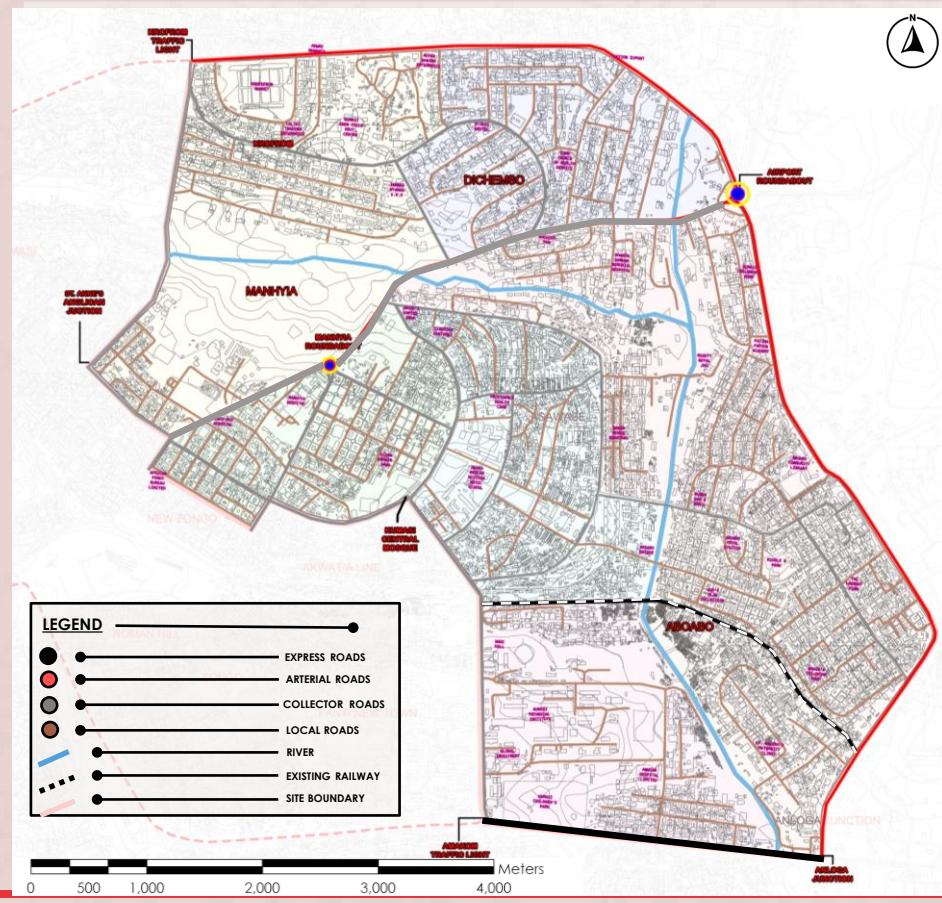
ROADS INCLUDED IN THE FIELD SURVEY



Criteria for Road Classification

- **ARTERIAL ROADS** are high-capacity urban road that sits below freeways or motorways on the road hierarchy in terms of traffic flow and speed.
- **COLLECTOR ROADS** are major and minor roads that connect local roads and streets with arterials.
- **LOCAL ROADS** are largely the neighbourhood street system. These roads are relatively free of traffic and mostly handle local traffic.





NATIONAL ROUTES in Ghana are a class of roads and highways that form the trunk routes between major urban centres. **N6, N8** and **N10** passes through Kumasi

INTER-REGIONAL ROUTES, designated with the prefix **IR**, connect major settlements and regional capitals across regional borders. They include Express and Arterial roads. **IR4** connects Kumasi (Ashanti Region) to Chambuligu (Northern Region)

REGIONAL ROUTES are a mix of primary and secondary routes that link major settlements and serve as feeder roads to the National route network. **Major regional routes** are designated with the letter **R**.

CRITERIA FOR ROAD CLASSIFICATION

A05

TRANSPORTATION AND TRAFFIC CONSIDERATION

Road Classification		Right of Way (m)	Carriage Way (m)	Median (m)	Shoulder (m)	Layby (m)	Walkway / Bicycle (m)	Tarred width (m)	Max incline (%)	Remarks
Highways	Motorway/ Expressway	90	7.3 x 2	5 – 10	3.0 X 2	-	-	7.3 X 2	6	Ditch, buffer and utility considered
	National roads	60	3.65 x 2	-	2.5 X 2	3.5 x 2	-	7.5	8	End of fill, buffer and utility considered
	Inter-regional /regional roads	55	3.5 x 2	-	2.5 X 2	3.5 x 2	-	7.0	8	End of fill, buffer and utility considered
Urban Roads	Major arterial	90	11.0 x 2 (3 lane)	2.0 x 2	-	3.5 x 2	6.0 x 2	11.0 x 2	6	Drain, Service lane, Separator, buffer and utility considered
	Minor arterial	40-60	7.3 x 2	2.0 x 2	-	-	5.0 x 2	7.3 x 2	8	Drain and Service lane, buffer and utility considered
	Collectors	20-45	3.65 x 2	-	-	3.5 x 2	5.0 x 2	3.65 x 2	8	Drain, buffer and utility considered
	Local road	18-30	3.65 x 2	-	-	3.5 x 2	-	-	10	Drain, buffer and utility considered
	Cul-de-sac	12	3.0 x 2	-	-	-	-	-	12.5	
	T-head for cul-sac	24								
	Foot paths	6.00								
Feeder Roads	District/ Sub-district	30	3.0 x 2	-	-	-	-	-	10	Drain, buffer and utility considered
	Community road	15	2.5 x 2	-	-	-	-	-	12.5	Drain and utility considered

Ministry of Environment, Science and Technology, Town and Country Planning Department. Zoning Guidelines and Planning Standards, November 2011

SURVEY 2023

ROADS TYPES (ZONE 1)

A06

Name of Street	Street Hierarchy	RIGHT OF WAY(approx. m)	Distance Covered(approx. km)	Road Linkages	Curb Crossing	Surface Finish
ANTOA STREET	Collector	15.0	2.90	Airport Roundabout – N8 (Kejefia Roundabout)	Yes	Asphalt
DICHEMSO STREET	Collector	12.0	0.9	Ohene Nana K. Oppong Avenue – Serwaa Nyarko Girls SHS Street	No	Asphalt
DICHEMSO STREET DOWN	Local	8.0	0.87	Dichemso Street – Serwaa Nyarko Girls SHS Street	No	Asphalt
DICHEMSO STREET UP	Collector	8.0	0.76	Dichemso Street – Ohene Nana K. Oppong Avenue	No	Asphalt
SERWAA NYARKO GIRLS STREET	Collector	10.0	0.38	Dichemso Extension – Antoa Road	No	Asphalt
DICHEMSO (EXT) EXTENSION	Collector	12.0	1.73	Antoa Road – Ohene Nana K. Oppong	Yes	Asphalt
P.V.OBENG BYPASS	Arterial	25.0	3.45	Suame Roundabout – Airport Roundabout	Yes	Asphalt
KROFROM MARKET STREET	Local	10.0	0.62	P.V Obeng Bypass	Yes	Untarred
(AGYA OPPONG KYEKYEKU) MANHYIA SOUTH WEST.	Collector	12.0	0.43	Antoa Road – Ohene Nana K. Oppong Avenue	Yes	Asphalt
KOTOKO ROAD	Collector	10.0	1.0	Yaa Asantewaa Road – Antoa Road	Yes	Asphalt
OHENE NANA OPPONG AVE.	Collector	10.0	1.4	P.V. Obeng Bypass – Ashanti New Road	Yes	Asphalt
YAA AGOE	Local	8.0	0.63	Ohene Nana K. Oppong Avenue – Ashanti New Road	No	Asphalt

TRANSPORTATION AND TRAFFIC CONSIDERATION

SURVEY 2023



ROADS TYPES (ZONE 2)

A07

TRANSPORTATION AND TRAFFIC CONSIDERATION

Name of Street	Street Hierarchy	RIGHT OF WAY(approx. m)	Distance Covered(approx. km)	Road Linkages	Curb Crossing	Surface Finish
ABU BANDA STREET	Local	12.0	0.9	Ohene Nana K. Oppong Avenue – Serwaa Nyarko Girls SHS Street	No	Asphalt
BOAKYE TUFFOUR ROAD	Local	8.0	0.87	Dichemso Street – Serwaa Nyarko Girls SHS Street	No	Asphalt
YAA ASANTEWAA	Collector	8.0	0.94	Antoa Road – Burma Road	Yes	Asphalt
MANHYIA STREET	Local	10.0	0.10	Boakye Tuffour Road	No	Asphalt
MALLAM FUSEINI	Local	7.0	0.29	Alhaji Nabure	No	Asphalt
ADONTEN/ ZONGO RD	Collector	12.0	0.36	Suame Roundabout – Airport Roundabout	Yes	Asphalt
ABDULAI FONFONA	Local	8.0	0.30	P.V Obeng Bypass, Zongo RD	Yes	Untarred
ALHAJI NABURI	Collector	12.0	0.45	Manhyia Roundabout – Burma Road	No	Asphalt
BURMA ROAD	Collector	10.0	1.0	Keneanko Road – Zongo Road	Yes	Asphalt
SAEED HASSAN	Local street	8.0	0.55	Alhaji Nabure Road – Zongo Road/Adonten	No	Asphalt
SALIFU ZINSUUR	Collector	8.0	0.19	Ohene Nana K. Oppong Avenue – Ashanti New Road	No	Asphalt

SURVEY 2023

Name of Street	Street Hierarchy	RIGHT OF WAY(approx. m)	Distance Covered(approx. km)	Road Linkages	Curb Crossing	Surface Finish
KENEAKO ROAD/BOSOMTWI FRIMPONG ROAD	Collector	12.0	1.88	Antoa Road – Zongo Road	Yes	Asphalt
APPRA KUBI ROAD	Local	7.0	0.20	Ohene Nana K. Oppong Avenue – Serwaa Nyarko Girls SHS Street	No	Asphalt
ABOABO ROAD	Collector	10.5	0.21	Dichemso Street – Serwaa Nyarko Girls SHS Street	Yes	Asphalt
SAMUEL OBIRI ASARE ROAD	Local	8.0	0.33	Keneanko Road – Owusu Prempeh Apease Road	No	Asphalt
ASARE DRIVE	Local	8.0	0.19	Keneanko Road – Owusu Prempeh Apease Road	No	Asphalt
OWUSU PREMPEH APEASE RD	Collector	9.0	0.61	Yaa Asantewaa Road – Asare Drive – Samuel Obiri Asare Road	Yes	Asphalt



ROAD TYPES (ZONE 4)

A09

TRANSPORTATION AND TRAFFIC CONSIDERATION

Name of Street	Street Hierarchy	RIGHT OF WAY(approx. m)	Distance Covered(approx. km)	Road Linkages	Curb Crossing	Surface Finish
NEW OXFORD STREET	Collector	10.0	0.65	Yaa Asantewaa Road – Dr. Gabriel Boakye Avenue	Yes	Asphalt
KUMASI-EJISU ROAD (N6)	Trunk Road/ Highway	25.0	-	Yaa Asantewaa, Eastern Bypass	Yes	Asphalt
AFFUL NKWANTA STREET	Local	9.0	0.11	Dr. Gabriel Boakye Avenue	No	Untarred
CHERIMOYA LANE (LN)	Local	7.0	0.54	Dr. Gabriel Boakye Avenue	No	Asphalt
YAA ASANTEWAA	Collector	8.0	2.12	Anfoa Road – Burma Road – Kumasi-Ejisu (N6)	Yes	Asphalt
DR. GABRIEL BOAKYE	Collector	12.0	1.17	Yaa Asantewaa Road – Dr. Gabriel Boakye Avenue	No	Asphalt

SURVEY 2023

ROAD TYPES (ZONE 5)

Name of Street	Street Hierarchy	RIGHT OF WAY(approx. m)	Distance Covered(approx. km)	Road Linkages	Curb Crossing	Surface Finish
ABOABO ROAD	Collector	15.0	0.97	Keneanko Road – Eastern Bypass	Yes	Asphalt
EASTERN BYPASS	Arterial	25.0	2.56	Airport Roundabout – Kumasi – Ejisu Road	Yes	Asphalt
KUMASI –EJISU ROAD (N6)	Trunk / Highway	25.0	-	Eastern Bypass	Yes	Asphalt
UNNAMED STREET	Collector	12.0	0.66	Aboabo Road - Eastern Bypass	No	Asphalt
UNNAMED STREET	Local	9.0	0.50	Aboabo Road	No	Asphalt
UNNAMED STREET	Local	9.0	0.37	Aboabo Road	No	Asphalt

ROAD TYPES (ZONE 6)

A11

TRANSPORTATION AND TRAFFIC CONSIDERATION

Name of Street	Street Hierarchy	RIGHT OF WAY(approx. m)	Distance Covered(approx. km)	Road Linkages	Curb Crossing	Surface Finish
MANHYIA STREET	Collector	12.0	0.43	Antoa Road – PV Obeng Bypass	No	Untarred
UNNAMED	Local	9.0	0.16	Hannah A. Afriyie Avenue – Manhyia Road	No	Partly Asphalted and Untarred
ARJUNAS STREET	Local	9.0	0.24	Manhyia Street	No	Asphalt
HANNAH A AFRIYIE AVENUE	Collector	10.0	0.60	PV Obeng Bypass – Antoa Road	No	Asphalt
SARIKI ABDLE ALI STREET	Local	10.0	0.15	Dichemso Extension – Hannah A. Afriyie Avenue	No	Asphalt
ALICE AFRIYIE STREET	Local	9.0	0.32	Sanwoansan I Drive	No	Asphalt
SANWOANSAN 1 DRIVE	Local	9.0	3.45	Alice Afriyie Street	No	Asphalt
UNNAMED STREET	Collector	12.0	0.24	P.V Obeng Bypass – Dichemson Extension	No	Gravel
(KWAME AFRIYIE LANE	Local	10.0	0.14	Alice Afriyie Street – Dichemso Extension Street	No	Asphalt
BLOCK A STREET	Local	9.0	0.43	Dichemso Extension Street – Serwaa Nyarko Girls Street	No	Asphalt
AKUA KYENII DRIVE	Local	10.0	0.19	Alice Afriyie Street – Dichemso Extension	Yes	Asphalt
CERES STREET	Local	9.0	0.40	Dichemso Extension – Antoa Road	No	Asphalt

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ROAD TYPES (ZONE 7)

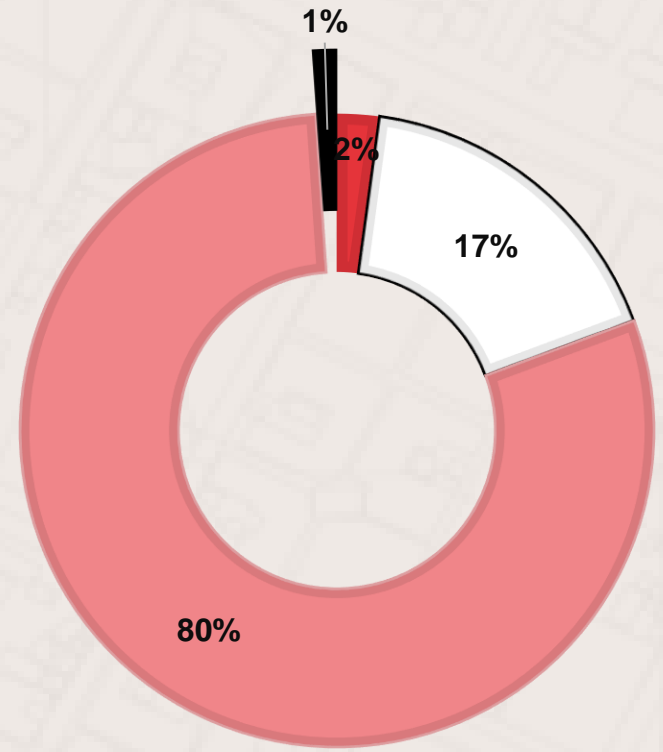
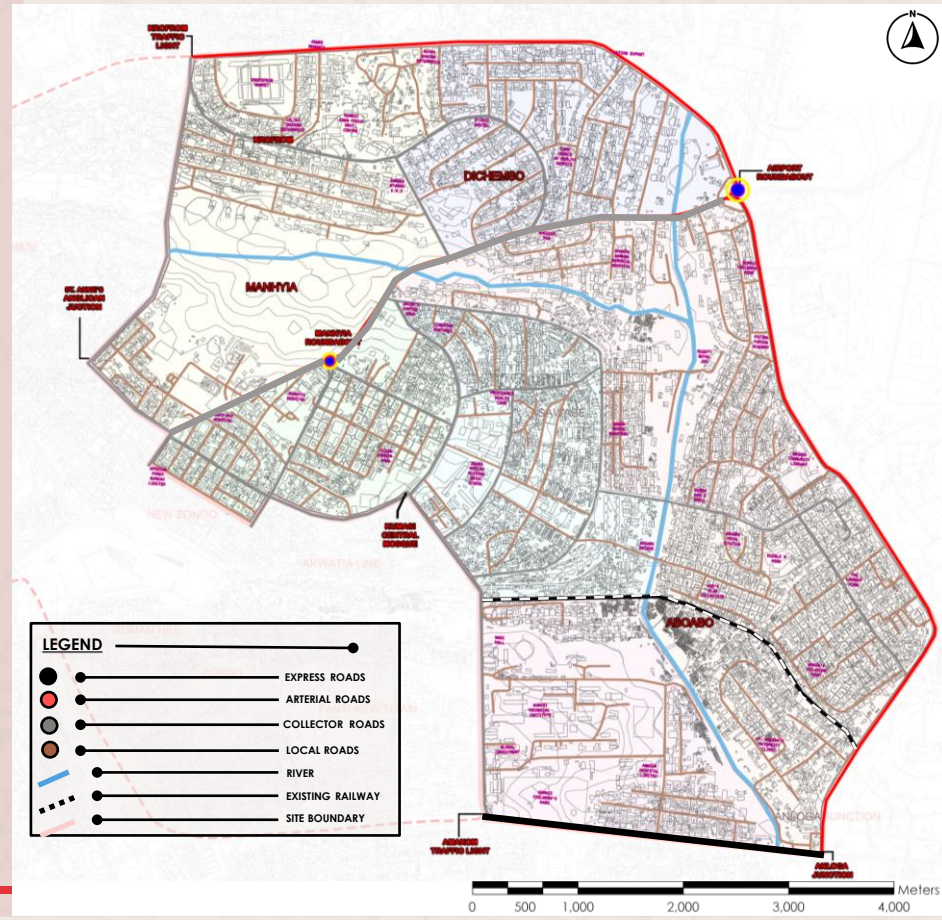
A12

TRANSPORTATION AND TRAFFIC CONSIDERATION

Name of Street	Street Hierarchy	RIGHT OF WAY(approx. m)	Distance Covered(approx. km)	Road Linkages	Curb Crossing	Surface Finish
MANHYIA STREET	Collector	12.0	0.43	Antoa Road – PV Obeng Bypass	No	Untarred
UNNAMED	Local	9.0	0.16	Hannah A. Afriyie Avenue – Manhyia Road	No	Partly Asphalted and Untarred
ARJUNAS STREET	Local	9.0	0.24	Manhyia Street	No	Asphalt
HANNAH A AFRIYIE AVENUE	Collector	10.0	0.60	PV Obeng Bypass – Antoa Road	No	Asphalt
SARIKI ABDLE ALI STREET	Local	10.0	0.15	Dichemso Extension – Hannah A. Afriyie Avenue	No	Asphalt
ALICE AFRIYIE STREET	Local	9.0	0.32	Sanwoansan I Drive	No	Asphalt
SANWOANSAN 1 DRIVE	Local	9.0	3.45	Alice Afriyie Street	No	Asphalt
UNNAMED STREET	Collector	12.0	0.24	P.V Obeng Bypass – Dichemson Extension	No	Untarred
(KWAME AFRIYIE LANE	Local	10.0	0.14	Alice Afriyie Street – Dichemso Extension Street	No	Asphalt
BLOCK A STREET	Local	9.0	0.43	Dichemso Street – Serwaa Nyarko Girls Street	No	Asphalt
AKUA KYENII DRIVE	Local	10.0	0.19	Alice Afriyie Street – Dichemso Extension	Yes	Asphalt
CERES STREET	Local	9.0	0.40	Dichemso Extension – Antoa Road	No	Asphalt

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ROAD TYPES PERCENTAGES



■ EXPRESS ROADS ■ ARTERIAL □ COLLECTOR ■ LOCAL

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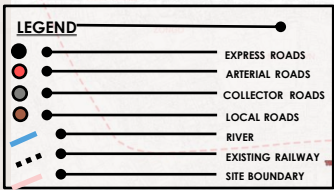
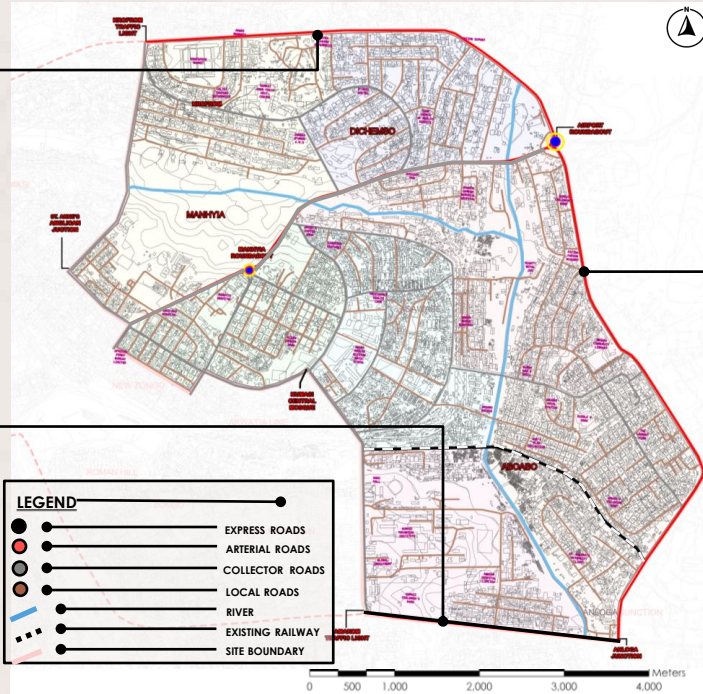
P.V. OBENG BYPASS ROAD

- Road Width: **25m**
- Distance Covered: **3.54km**
- Road Carriage: **Double Carriage**
- Surface Finish: **Asphalt**



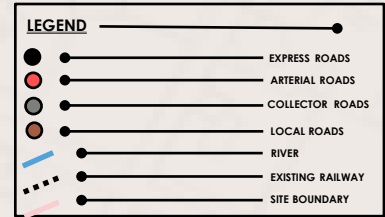
KUMASI-EJISU ROAD

- Road Width: **25m**
- Distance Covered:
- Road Carriage: **Double carriage**
- Surface Finish: **Asphalt**



EASTERN BYPASS ROAD

- Road Width: **25m**
- Distance Covered:
- Road Carriage: **Double carriage**
- Surface Finish: **Asphalt**



COLLECTOR ROADS



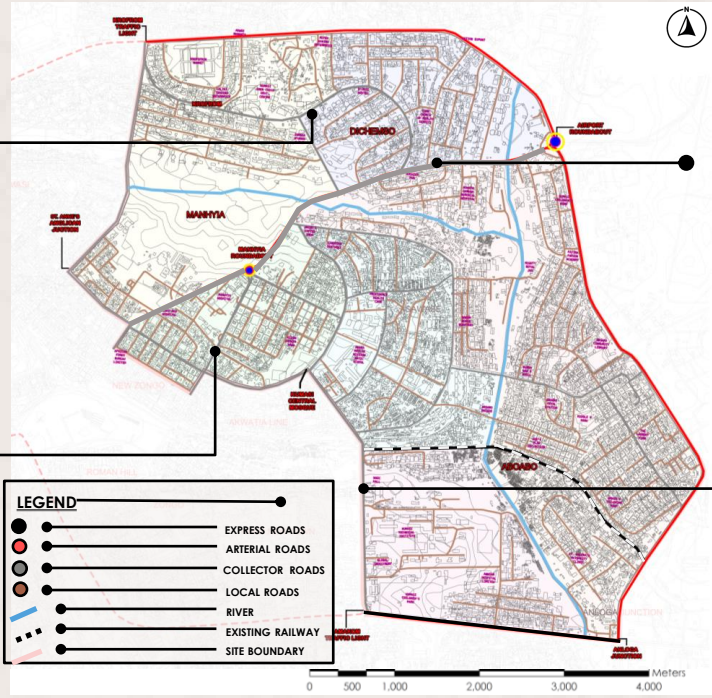
OHENE NANA K. OPPONG AVENUE

- Road Width: **10m**
- Distance Covered: **1.4km**
- Road Carriage: **Single Carriage**
- Surface Finish: **Asphalt**



ZONGO ROAD

- Road Width: **12m**
- Distance Covered: **0.36km**
- Road Carriage: **Single carriage**
- Surface Finish: **Asphalt**



ANTOA ROAD

- Road Width: **16m**
- Distance Covered: **2.90km**
- Road Carriage: **Single carriage**
- Surface Finish: **Asphalt**



YAA ASETEWAA ROAD

- Road Width: **8m**
- Distance Covered: **0.94km**
- Road Carriage: **Single carriage**
- Surface Finish: **Asphalt**



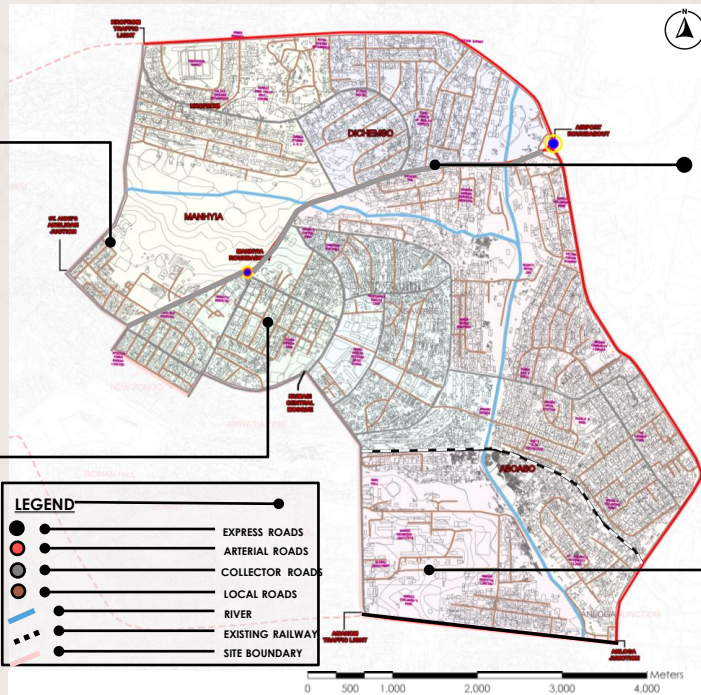
KROFOM MARKET STREET

- ❑ Road Width: **10m**
- ❑ Distance Covered: **0.62km**
- ❑ Road Carriage: **Single Carriage**
- ❑ Surface Finish: **Untarred**



ABDULAI FONFONA STREET

- ❑ Road Width: **8m**
- ❑ Distance Covered: **0.3km**
- ❑ Road Carriage: **Single carriage**
- ❑ Surface Finish: **Asphalt**



ABOABO ACCESS STREET

- ❑ Road Width: **8m**
- ❑ Distance Covered: **0.45km**
- ❑ Road Carriage: **Single carriage**
- ❑ Surface Finish: **Asphalt**

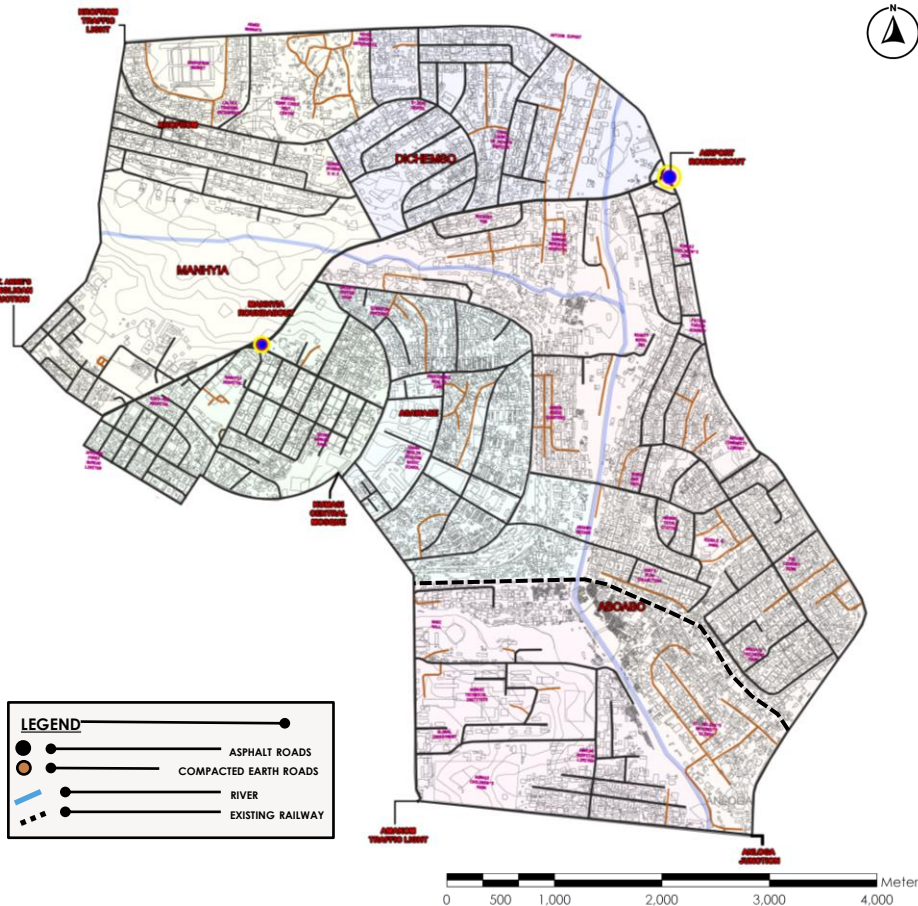


NEW OXFORD STREET

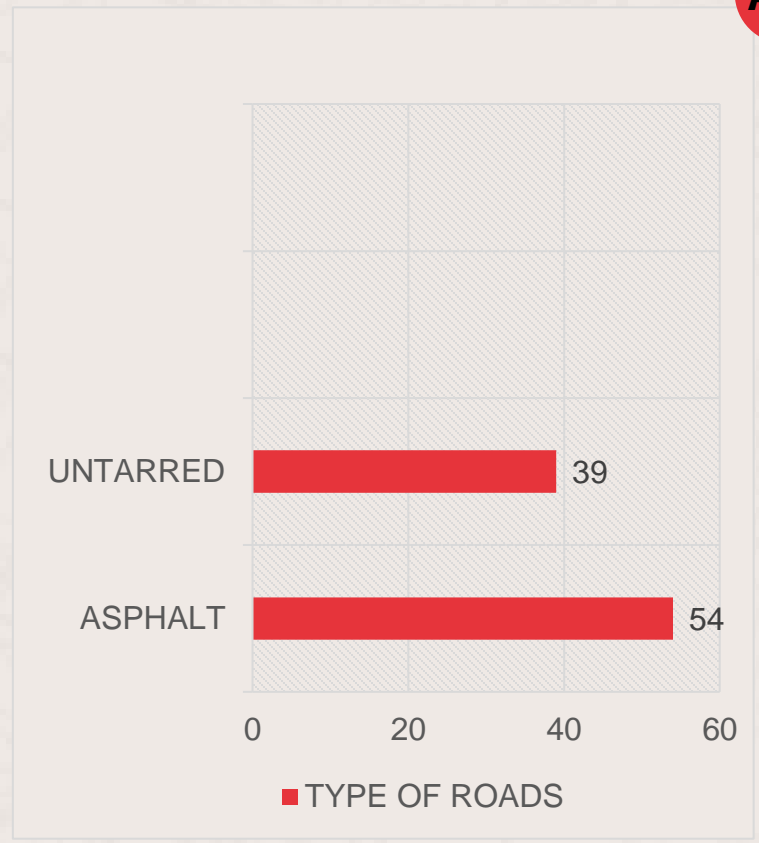
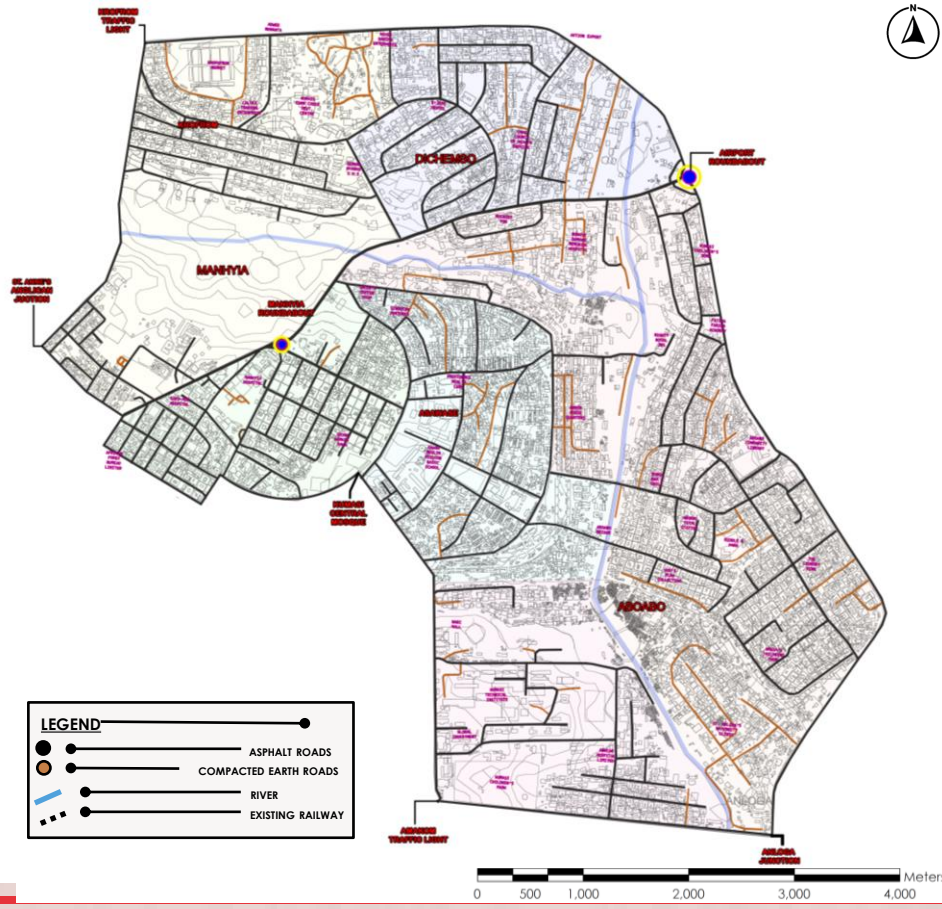
- ❑ Road Width: **8m**
- ❑ Distance Covered: **0.38km**
- ❑ Road Carriage: **Single carriage**
- ❑ Surface Finish: **Asphalt**

Material Finishes Utilised

- **ASPHALT ROAD** is a mixture of bitumen with coarse and fine aggregates, used as a road surface
- **GRAVEL ROAD** is a type of unpaved road surfaced with gravel that has been brought to the site from a quarry or stream bed.
- **COMPACTED EARTH ROAD** are uncompleted roads that only have compacted laterite with no finish materials



ROAD MATERIAL FINISHES



ROAD MATERIAL FINISHES



Krofofrom Market Loop Street



Road close to Agyeo Barma Enterprise



Roads Round CHAG Church of Health Service



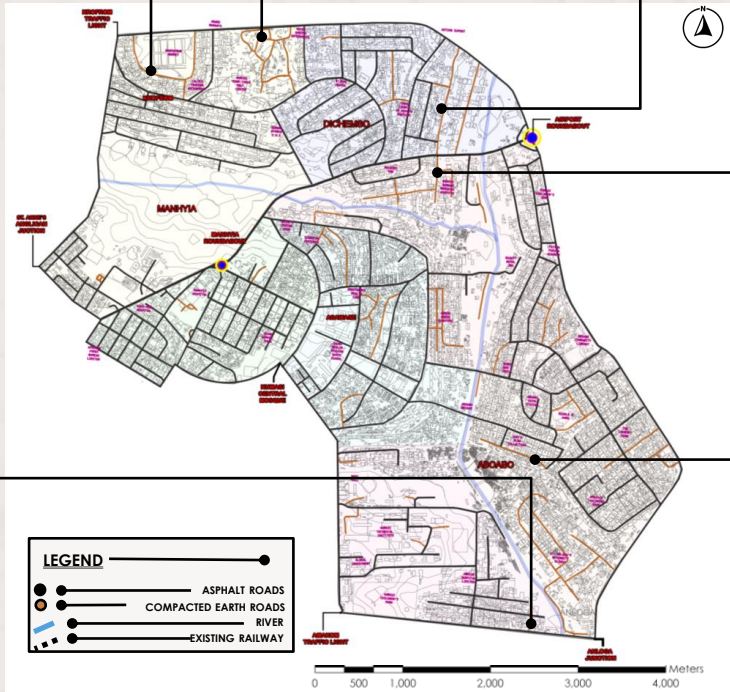
Road close to Anloga Junction

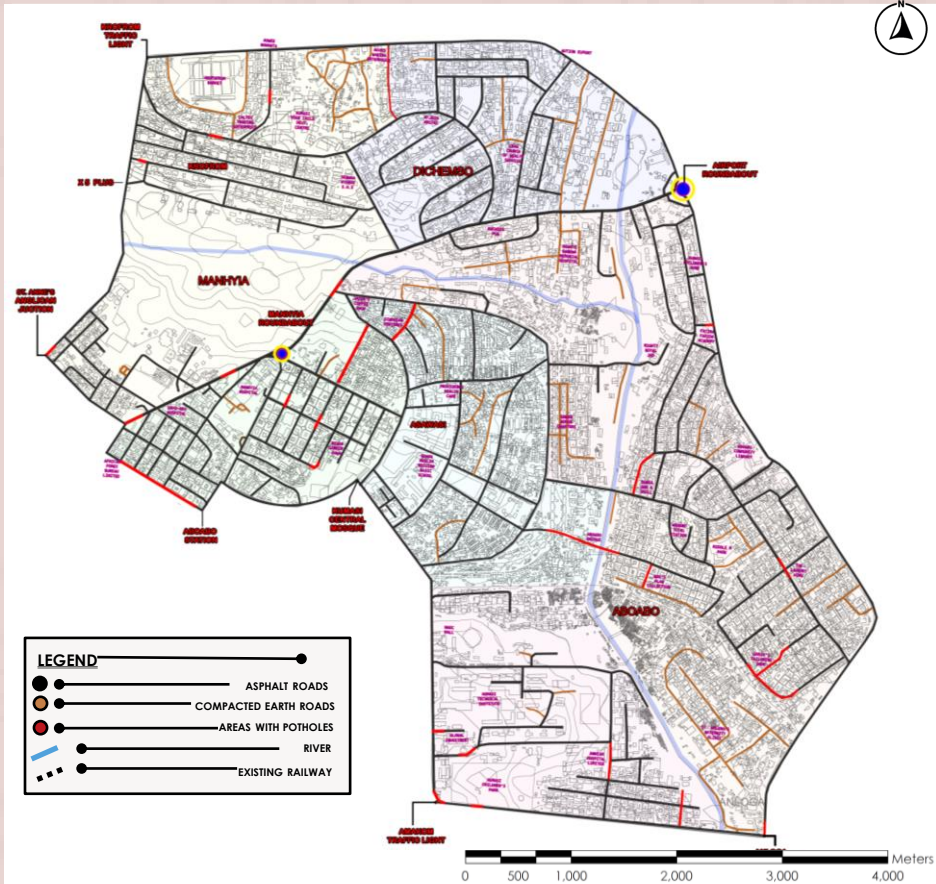


Roads Round Boakye Dankwa Memorial Hospital



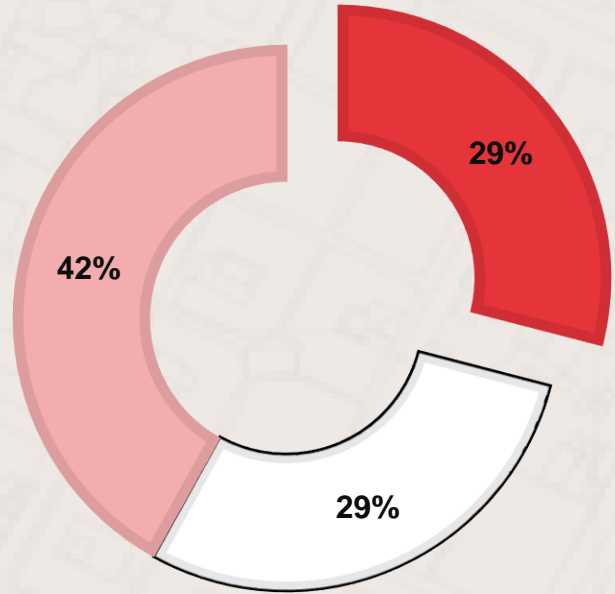
Road in front of God's Plan Collections





Deteriorated Roads

TRANSPORTATION AND TRAFFIC CONSIDERATION



■ ROADS WITH POTHOLES □ ROADS WITHOUT POTHOLES ■ UNTURRED ROADS

SURVEY 2023

LOCATION OF POTHOLES

ROADS WITH POTHOLES	COORDINATES	
	LATITUDE	LONGITUDE
Ohene Nana K. Opong ave.	6°42'9.72"N,	1°37'15.16"W
Krofrom Market Loop Road	6°42'40.33"N	1°36'52.51"W
Krofrom Market Loop Road	6°42'44.49"N	1°36'43.34"W
Antoa Road	6°42'11.94"N	1°36'49.39"W
Antoa Road	6°42'6.73"N	1°37'0.38"W
Antoa Road	6°42'21.36"N	1°36'36.75"W
Saeed Hasan Street	6°42'1.71"N	1°36'38.40"W
Abdullahi Fonfona Street	6°42'6.94"N	1°36'38.10"W
Abdullahi Fonfona Street	6°42'12.55"N	1°36'35.12"W
Mallam Fusein Street	6°42'8.75"N	1°36'41.93"W
Unknown Street	6°42'0.36"N	1°36'58.52"W
Unknown Street	6°42'18.19"N	1°36'28.04"W
Aboabo Market Road (Bridge)	6°41'59.19"N	1°36'4.92"W

ROADS WITH POTHOLES	COORDINATES	
	LATITUDE	LONGITUDE
Aboabo Market Loop Road	6°41'59.98"N	1°36'1.56"W
Eastern-Bypass	6°42'17.91"N	1°35'52.73"W
Amakom Traffic Light	6°41'23.00"N	1°36'25.42"W
Kumasi – Ejisu Road	6°41'22.86"N	1°36'21.43"W
Beige Capital Road	6°41'21.23"N	1°35'56.64"W
Dr. Gabriel Boakye RD	6°41'26.82"N	1°36'4.68"W
New Oxford Street	6°41'29.10"N	1°36'20.60"W
Anloga Junction	6°41'19.07"N	1°35'46.60"W
Aboabo RD (Ghaza's Tailoring shop)	6°41'36.59"N	1°35'46.57"W
The Laundry King RD	6°41'50.34"N	1°35'44.07"W
Unknown Aboabo RD	6°41'48.87"N	1°36'0.40"W

Traffic Consideration

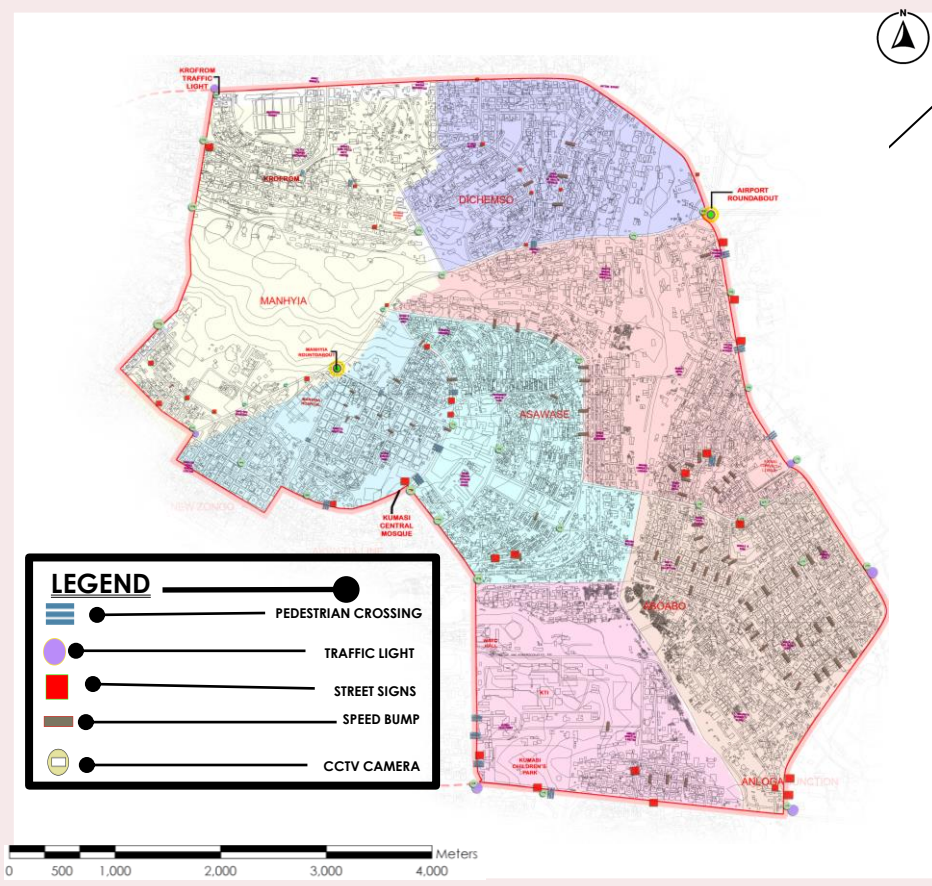
Road transport is a type of transport using roads which can be roughly grouped into the transportation of goods and the transportation of people between two destinations - **The Economic Times, 2015.**



- EMMANUEL OPOKU
- MICHAEL MAWUENA BACCAH

Traffic Control System Utilized

- **TRAFFIC LIGHT** are signaling devices positioned at road intersections, pedestrian crossings, and other locations in order to control flows of traffic
- **CLOSED-CIRCUIT TELEVISION (CCTV)** is the use of video cameras to transmit a signal to a specific place, on a limited set of monitors
- **SPEED BUMPS** are a class of traffic calming devices that use vertical deflection to slow motor-vehicle traffic in order to improve safety conditions.
- **PEDESTRIAN CROSSING** is a place designated for pedestrians to cross a road, street or avenue.



TRAFFIC CONTROL SYSTEM UTILIZED



P.V. OBENG BYPASS ROAD



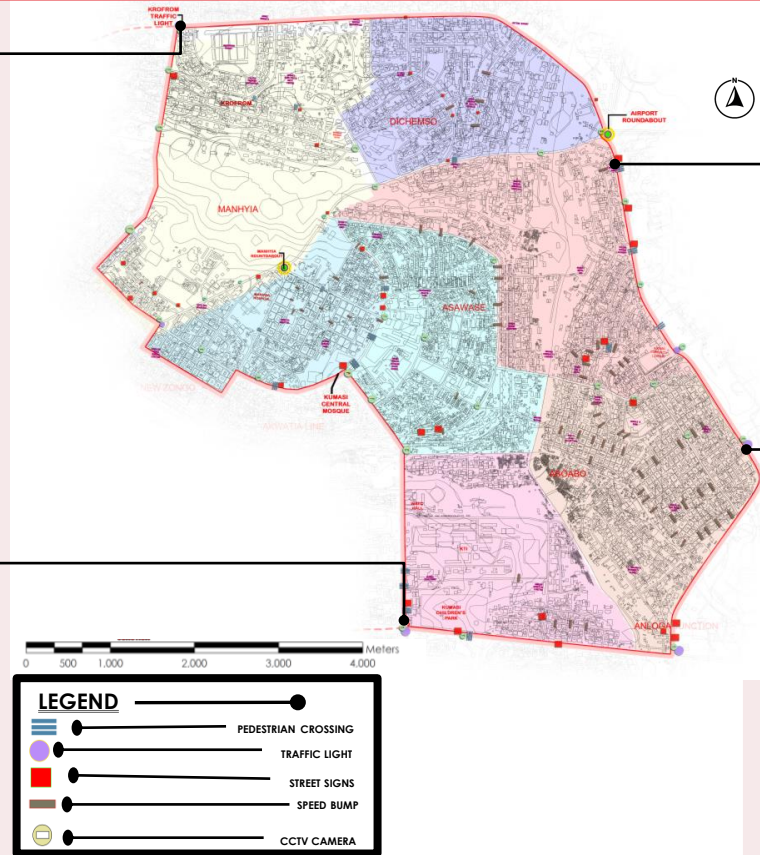
KUMASI-EJISU ROAD



EASTERN BYPASS ROAD



EASTERN BYPASS ROAD



TRAFFIC CONTROL SYSTEM UTILIZED



DICHEMSO ROAD



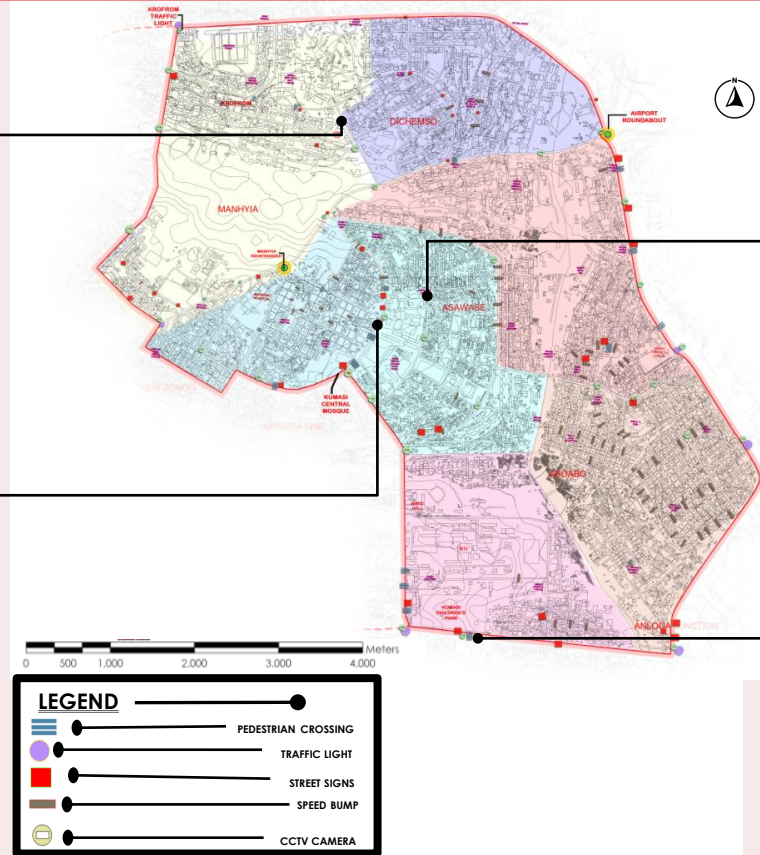
ZONGO ROAD



BURMA ROAD



KUMASI - EJISU ROAD



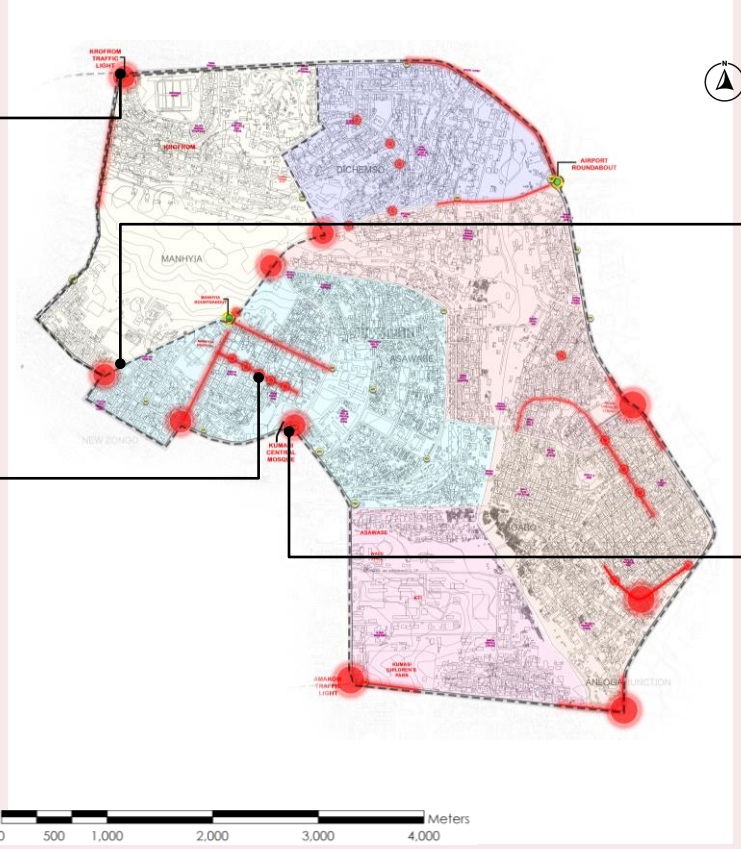
TRAFFIC CONFLICT



P.V. OBENG BYPASS ROAD



ZONGO ROAD



ANTOA ROAD

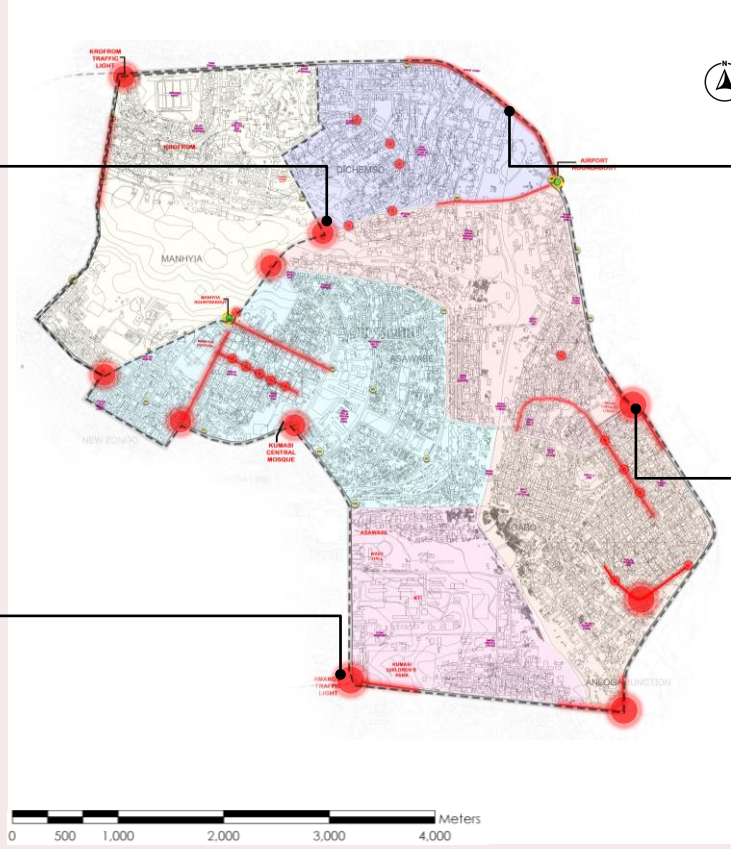


SAEED HASSAN STREET

TRAFFIC CONFLICT



ANTOA ROAD



EASTERN BY-PASS ROAD



KUMASI - EJISU ROAD



EASTERN BY-PASS ROAD

- **ROAD TYPE** – Most of the roads in the study area are the local streets (access roads) that lead to the various residential areas which make up most of the settlement.
- **MATERIAL FINISH** – Material finish predominantly used is the asphalt finish showing how developed some of the settlements in the study area are.
- **ROAD CONDITIONS** – It was noticed that most of the potholes on the various roads are located at the various junctions due to the poor management of traffic congestion leading to vehicular traffic at the various junctions which proves the ineffectiveness of the CCTV cameras which were mostly used instead of utilizing them as a support measure for the traffic lights.
- **TRAFFIC CONTROL SYSTEMS** – Instead of traffic lighting at the various junctions, the mostly utilized traffic control systems on the arterial and collector roads is the CCTV camera which is not proving to be most effective. The most control measure used on the local streets are the speed bumps which positioned at reasonable intervals making the residential roads safer for pedestrian use especially in the Zongo regions.





Physical Infrastructure

Pedestrian/Vehicular

Traffic Volume

~~B~~

VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

Field survey- 2023



Pedestrian/ Vehicular Traffic Volume

Can be described as the number of vehicles and or pedestrians passing at a point on a road or lane segment during a specific given time. It as well covers all that influences pedestrian and vehicular life on the streets.

Table Of Content

Existing Maps

- General Maps
 - Zonal Maps
-

Road and Street Design

- Road/ Street Character
 - Traffic Flow
-

Traffic Variables

- Traffic Density
 - Traffic Volume
 - Times of Highest Volumes
 - Times of Lowest Volumes
-

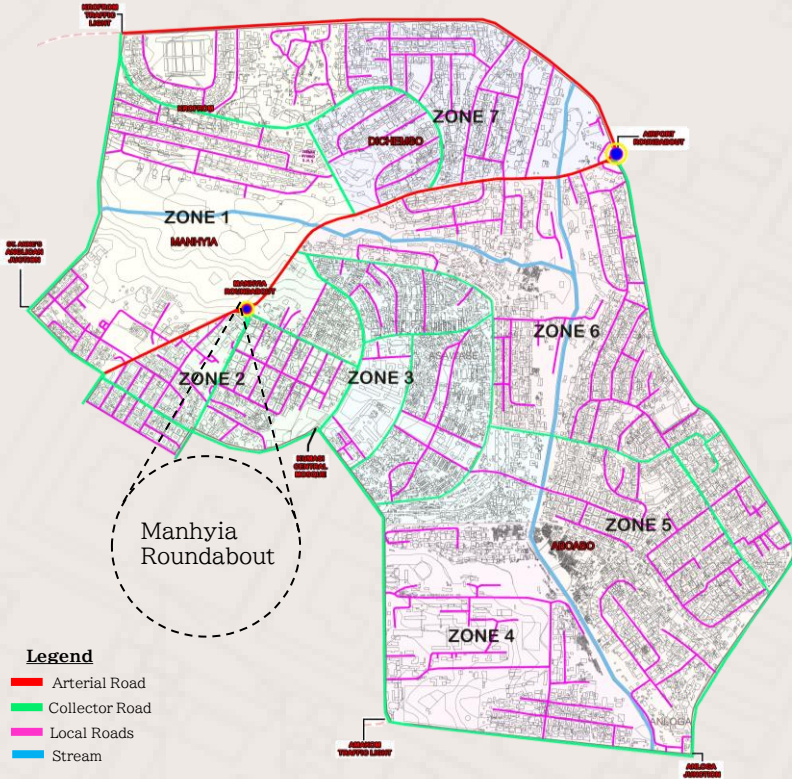
Circulation Pattern

- Existing Road Network
 - Vehicular Movements and Patterns
-

EXISTING MAPS

GENERAL MAPS

Existing Roads



Existing Railway Lines



VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

ROAD/STREET DESIGN

01

ROAD/STREET CHARACTER

B6



VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

Field survey- 2023

Road Types

ARTERIAL ROADS

The Antoa Road

6°42'17.6"N 1°36'39.2"W



B7

VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

COLLECTOR ROADS

Yaa Asantewaa Road

6°41'58.7"N 1°36'34.9"W



LOCAL ROADS

Abdullahi Fonfona

6°42'10.6"N 1°36'36.1"W



Field survey 2023

General Data - Similar Characteristics Present with Exiting Streets



Speed Bumps



Pedestrian Crossing



Drain Covers



Bollards



Signage



Street Lights



Security Cameras

General Issues - Similar Problems Present with Exiting Streets



Uncovered Drains



Protruding Objects on sidewalks



Undefined walkways and streets



Absence of Side parking

Incomplete bollards



Sanitation Issues



Poor Maintenance

General Issues - Similar Characteristics Present with Exiting Streets

VEHICULAR / PEDESTRIAN TRAFFIC VOLUME



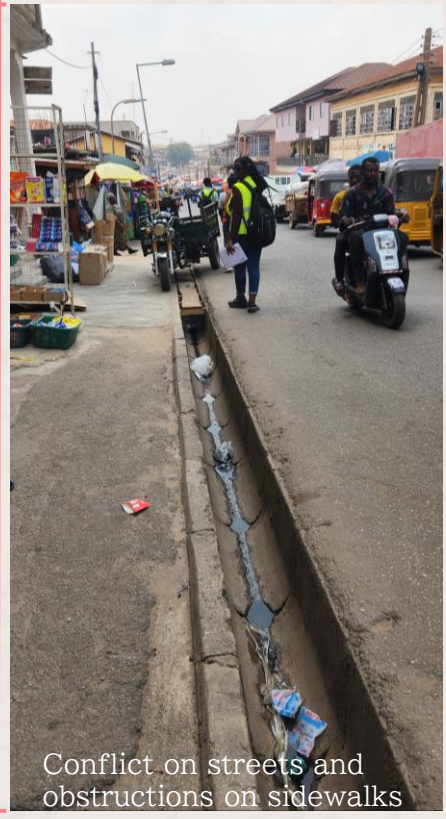
Inadequate greenery



Exposed Cables across streets



Undefined sidewalks



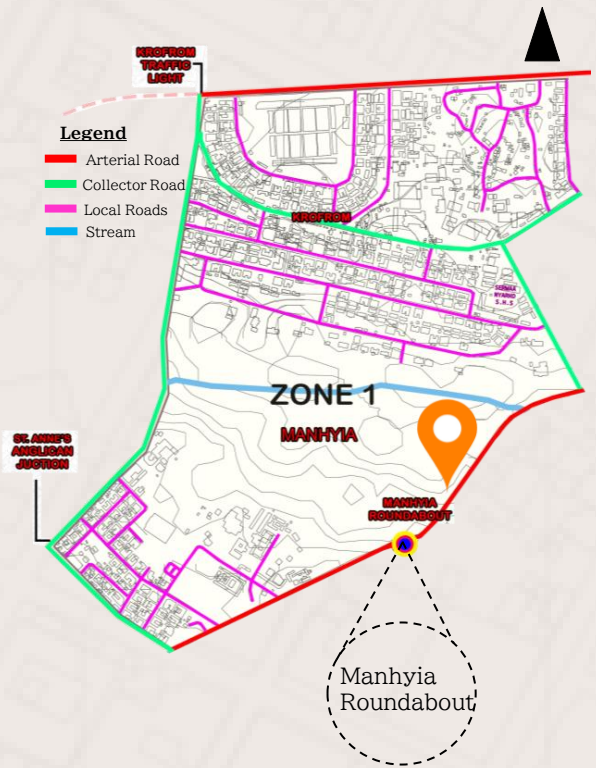
Conflict on streets and obstructions on sidewalks

ZONE 1 – Arterial Roads

The Antoa Road Description



- A Single carriage way
- A part-time pedestrian street with pedestrian precincts.



VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

Assessment of Physical Features

Existing Features	Current State	Adequacy/ Completeness
Sidewalk	Poor	Incomplete
Street Buffer	Good	Incomplete
Street lights and cameras	Good	Incomplete
Pedestrian crossing	Good	Incomplete
Drain	Poor	Complete
Drain covers	Rare	Incomplete
Greenery	Rare	Inadequate
Road Marking	Rare	Inadequate
Adjourning Buildings	Good and friendly	Adequate



No Speed Bumps



Unavailable Ramps for wheel chair users



No cyclist lanes

Connectivity
Roundabouts
Junctions

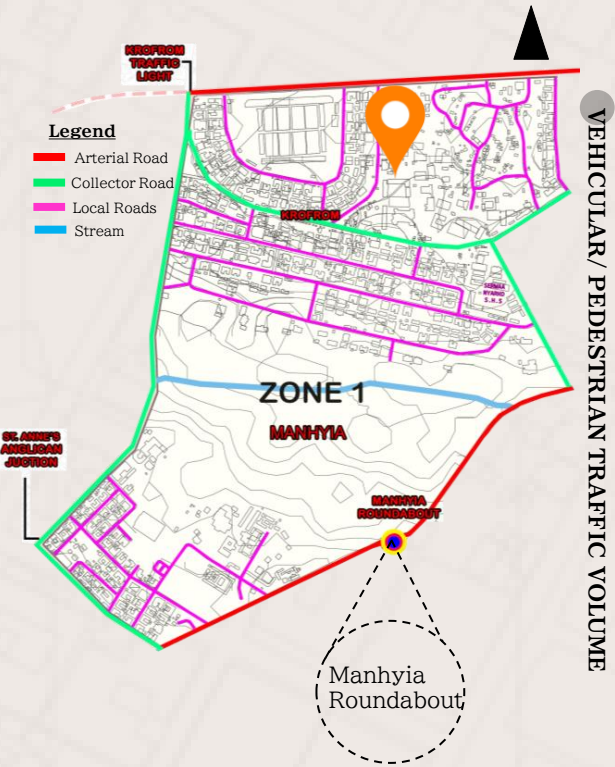
Other related Issues
Protruding Objects
Tripping Hazards
Conflict between users

ZONE 1 – Collector Roads

A Typical Collector Road Description



- A Single carriage way
- A vehicle only street with pedestrian precincts



Field survey- 2023

Assessment of Physical Features

Existing Features	Current State	Adequacy/ Completeness
Sidewalk	Poor	Incomplete
Street lights and cameras	Good	Incomplete
Signage	Good	Inadequate
Drain	Poor	Complete
Drain covers	Rare	Incomplete
Greenery	Rare	Inadequate
Road Marking	Rare	Inadequate
Adjourning Buildings	Good and friendly	Adequate
Side Parking	Poor	Inadequate



No Speed Bumps



Unavailable Ramps for wheel chair users



No cyclist lanes

Other related Issues

Protruding Objects

Tripping Hazards

Conflict between users

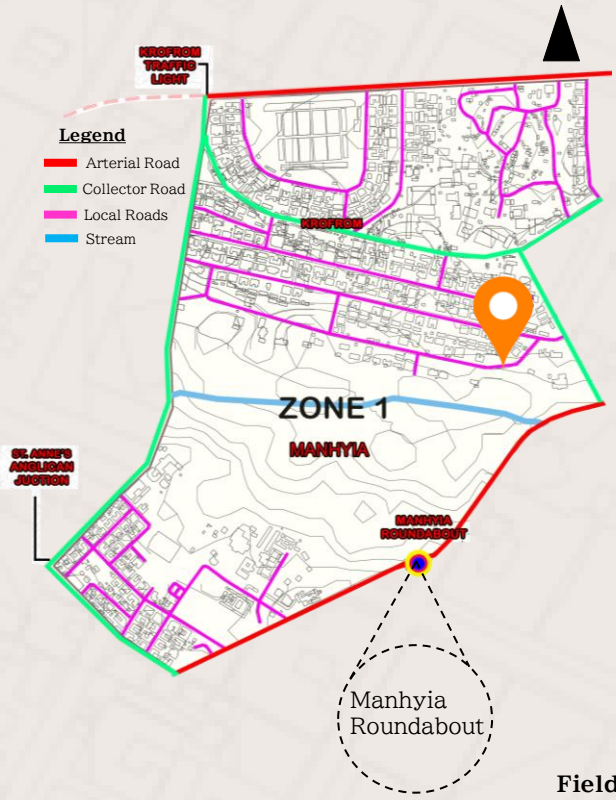
Connectivity

Junctions

ZONE 1 – Local Roads

Dichemso House Road Description

- A Single carriage way
- A part-time pedestrian street



VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

Field survey- 2023

Assessment of Physical Features

Existing Features	Current State	Adequacy/ Completeness
Sidewalk	Poor	Incomplete
Street lights and cameras	Good	Incomplete
Drain	Poor	Complete
Drain covers	Rare	Incomplete
Greenery	Rare	Inadequate
Road Marking	Good	Undefined
Adjourning Buildings	Good and friendly	Adequate
Side Parking	Poor	Inadequate

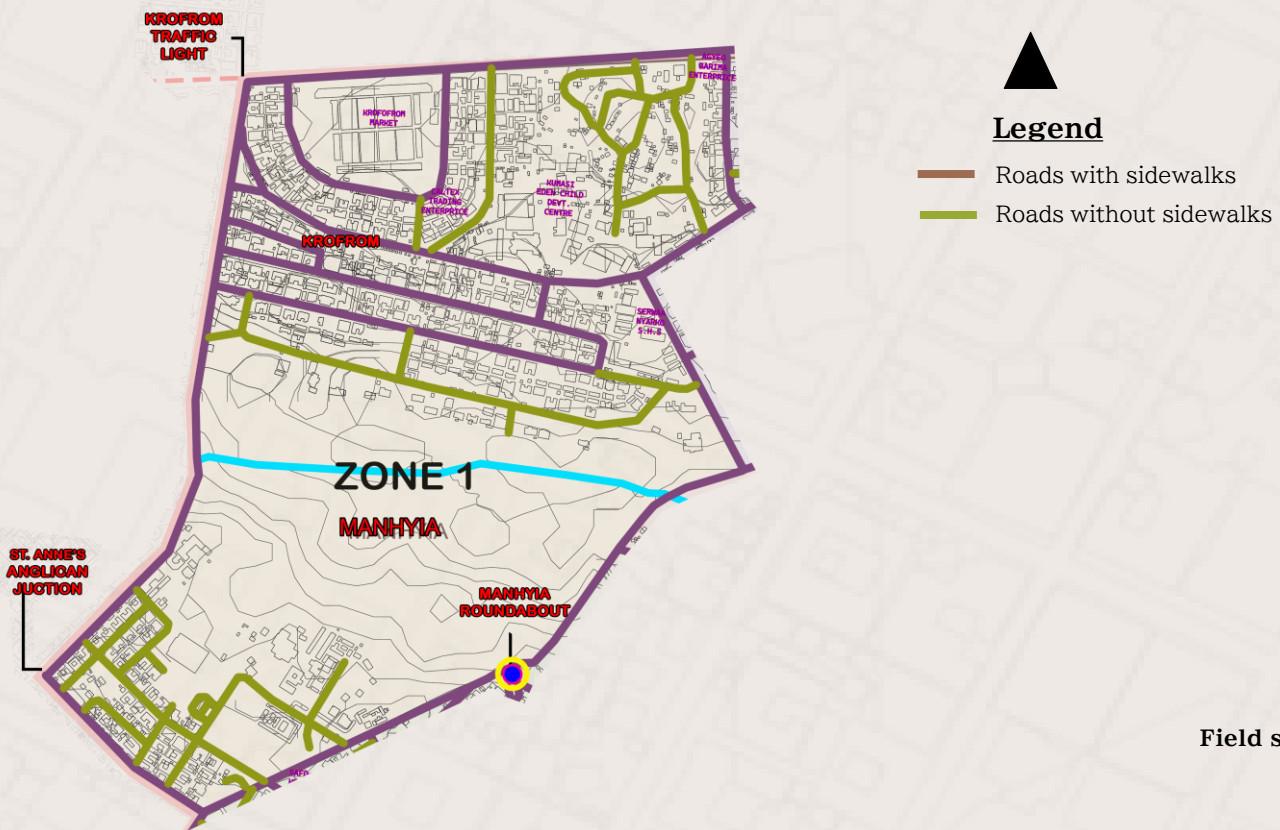


Dichemso House Road

Other related Issues
Protruding Objects
Tripping Hazards
Conflict between users

Connectivity
Junctions

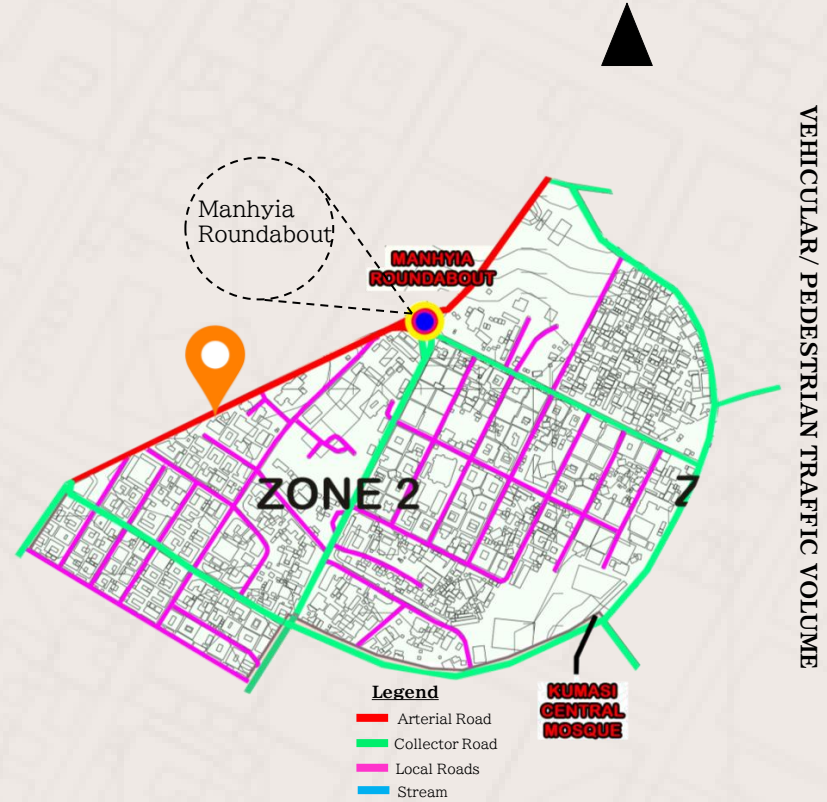
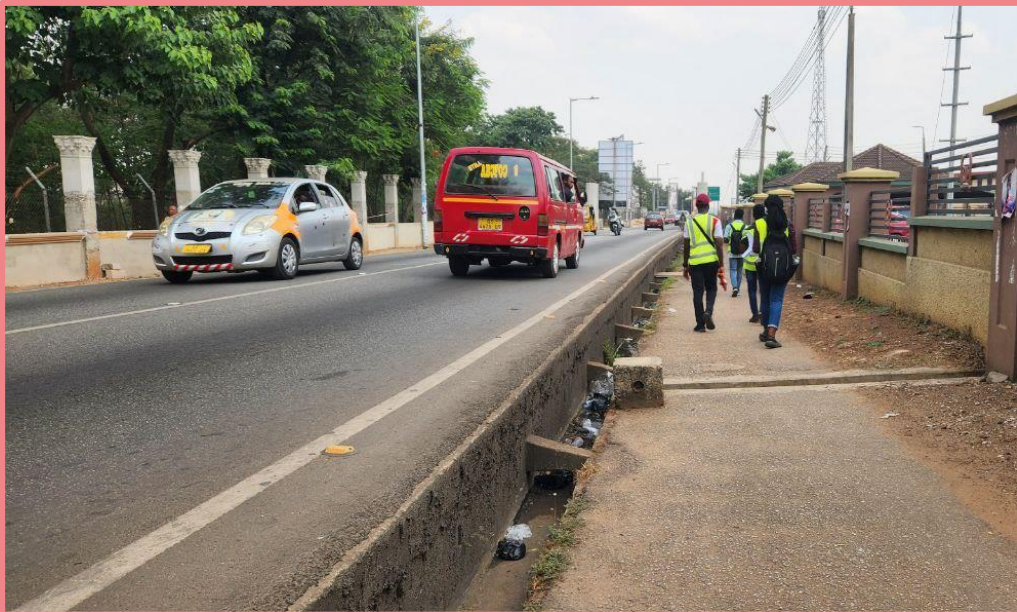
Maps of Roads With and Without Sidewalks in zone one



ZONE 2 – Arterial Roads

The Antoa Road Description

- A Single carriage way
- A part-time pedestrian street.

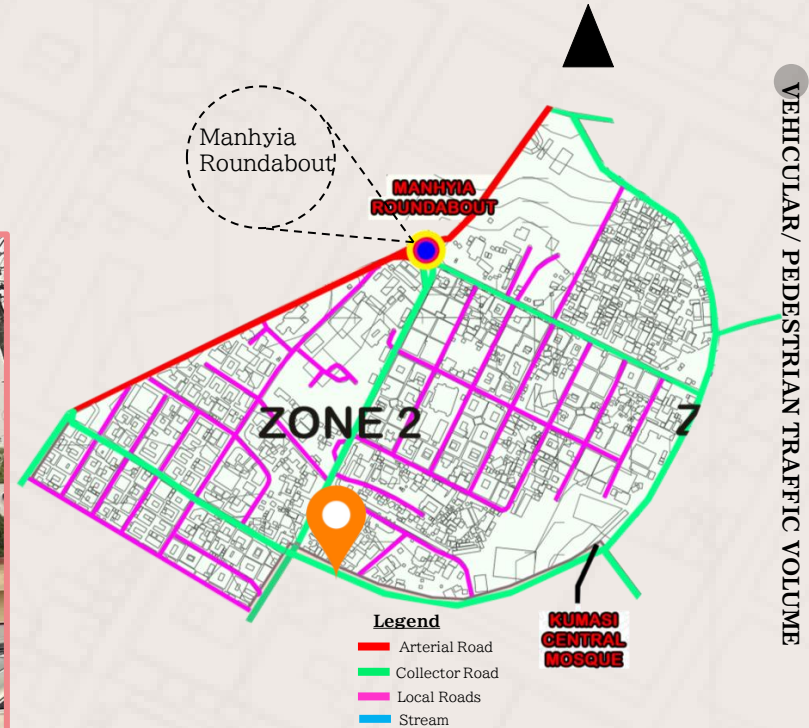


Field survey- 2023

ZONE 2 – Collector Roads

Yaa Asantewaa Road Description

- A Single carriage way
- A part time pedestrian street



Field survey- 2023

Assessment of Physical Features

Existing Features	Current State	Adequacy/ Completeness
Sidewalk	Poor	Incomplete
Street lights and cameras	Good	Incomplete
Signage	Good	Inadequate
Drain	Poor	Complete
Drain covers	Rare	Incomplete
Greenery	Rare	Inadequate
Road Marking	Rare	Inadequate
Adjourning Buildings	Good and friendly	Adequate
Side Parking	Poor	Inadequate



Yaa Asantewaa Road

Other related Issues
Protruding Objects
Tripping Hazards
Conflict between users

Connectivity
Junctions

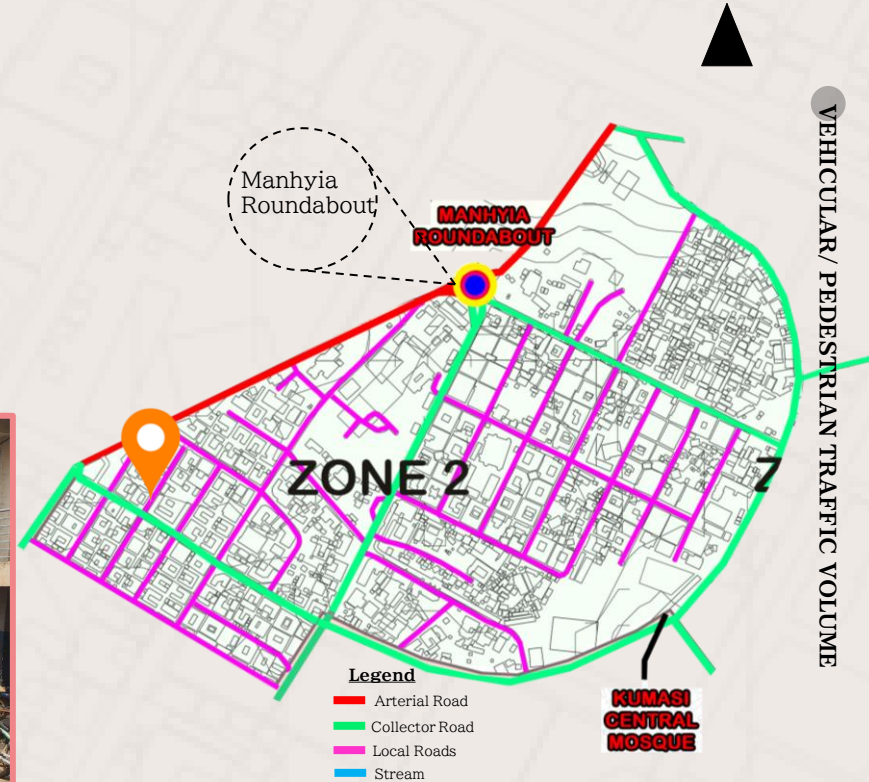
ZONE 2 – Local Roads

Albert Adomako Road



Description

- A Single carriage way
- A part-time pedestrian street with pedestrian precincts.



Field survey- 2023



Assessment of Physical Features

Existing Features	Current State	Adequacy/ Completeness
Sidewalk	Poor	Incomplete
Street lights and cameras	Good	Incomplete
Signage	Good	Inadequate
Drain	Poor	Complete
Drain covers	Rare	Incomplete
Greenery	Rare	Inadequate
Road Marking	Rare	Inadequate
Adjourning Buildings	Good and friendly	Adequate
Side Parking	Poor	Inadequate



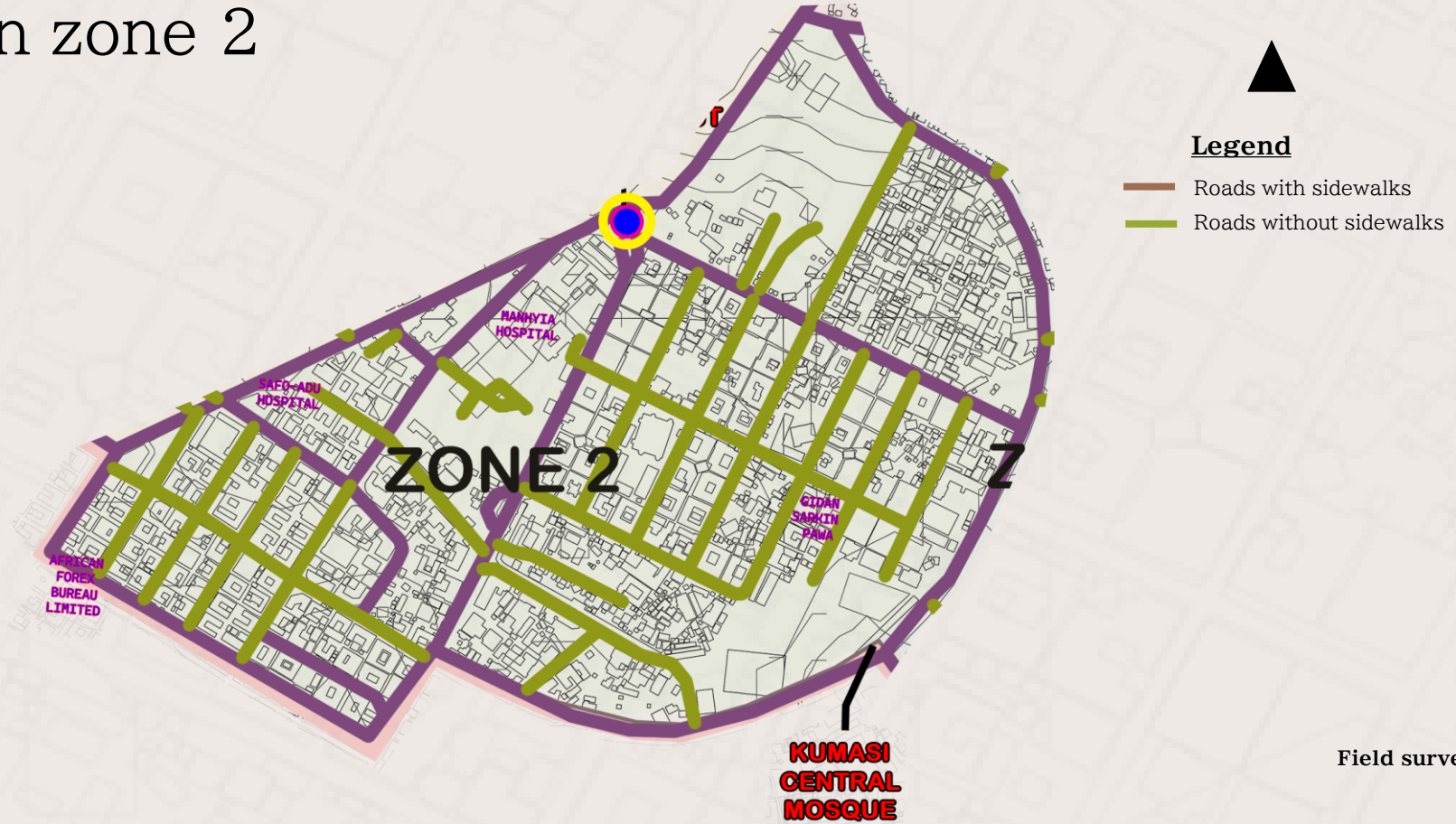
Albert Adomako Road

VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

Other related Issues
Protruding Objects
Tripping Hazards
Conflict between users

Connectivity
Junctions

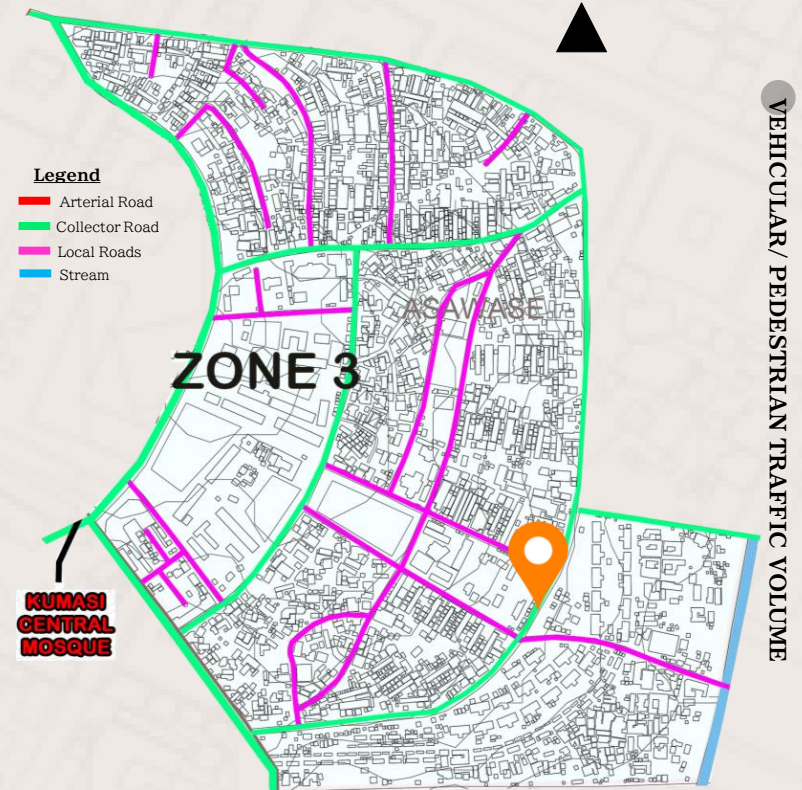
Maps of Roads With and Without Sidewalks in zone 2



ZONE 3 – Collector Roads

The Kaneanko Road Description

- A Single carriage way
- A Part time pedestrian street



Field survey · 2023

Assessment of Physical Features

Existing Features	Current State	Adequacy/Completeness
Sidewalk	Poor	Incomplete
Street lights and cameras	Good	Incomplete
Signage	Good	Inadequate
Drain	Poor	Complete
Drain covers	Rare	Incomplete
Greenery	Rare	Inadequate
Road Marking	Rare	Inadequate
Adjourning Buildings	Good and friendly	Adequate
Side Parking	Poor	Inadequate



VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

The Kaneanko Road

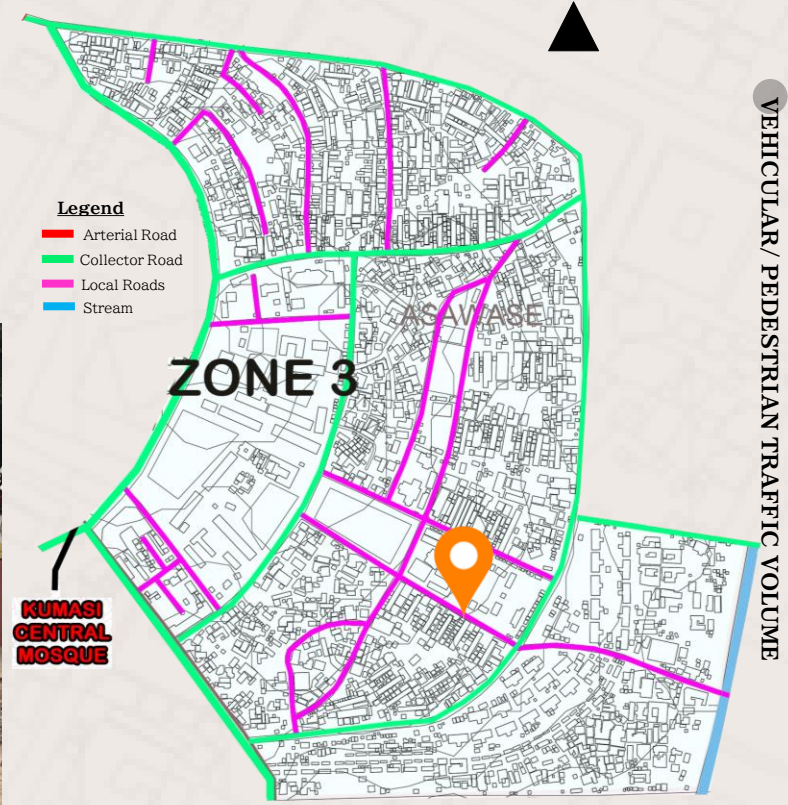
Other related Issues
Protruding Objects
Tripping Hazards
Conflict between users

Connectivity
Junctions

ZONE 3 – Local Roads

The Samuel Obiri Asare Description

- A Single Carriage Way
- A Vehicle Only Street



Field survey, 2023

Assessment of Physical Features

Existing Features	Current State	Adequacy/ Completeness
Sidewalk	Poor	Incomplete
Street lights and cameras	Rare	Incomplete
Drain	Good	Complete
Drain covers	Rare	Incomplete
Greenery	Rare	Inadequate
Adjourning Buildings	Good and friendly	Adequate
Side Parking	Poor	Inadequate



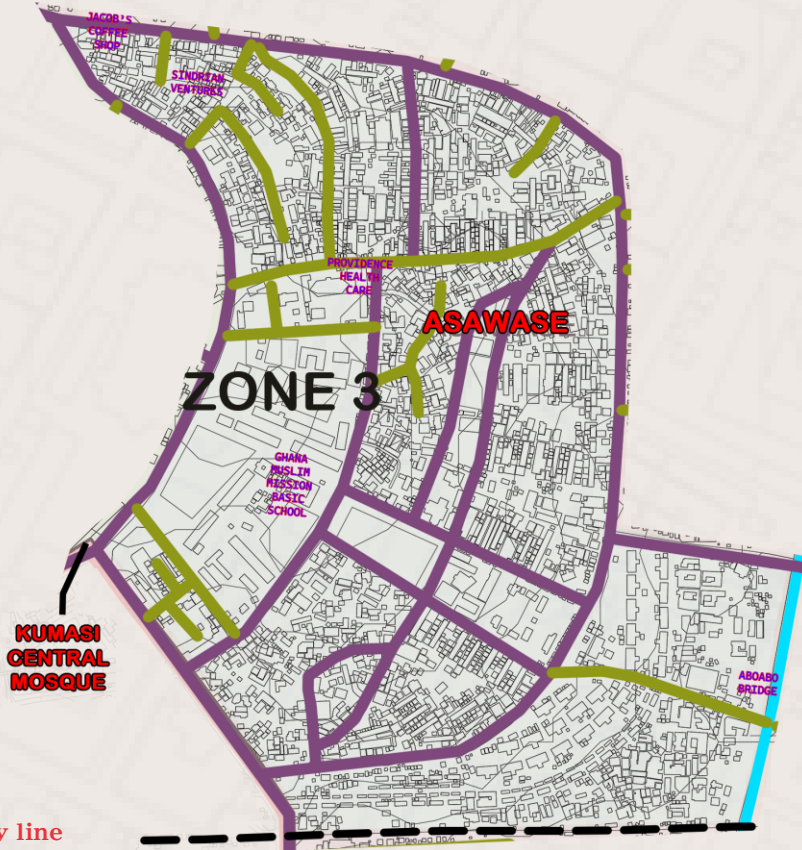
VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

Other related Issues
Protruding Objects
Tripping Hazards
Conflict between users

Connectivity
Junctions

The Samuel Obiri Asare Road

Maps of Roads With and Without Sidewalks in zone 3



Legend

- Roads with sidewalks
- Roads without sidewalks
- Railway Line

KUMASI CENTRAL MOSQUE

Railway line

Field survey- 2023

ZONE 4 – Collector Roads

Kumasi-Ejisu Road



Description

- A Double carriage way
- A Part Time Pedestrian Street with pedestrian precincts



Field survey- 2023

Assessment of Physical Features

Existing Features	Current State	Adequacy/Completeness
Sidewalk	Poor	Incomplete
Street lights and cameras	Good	Inadequate
Signage	Poor	Inadequate
Drain	Poor	Complete
Drain covers	Poor	Incomplete
Greenery	Good	Inadequate
Adjoining Buildings	Good and friendly	Adequate
Side Parking	Rare	Inadequate
Bus stops	Poor	Inadequate
Tree Canopies	Good	Inadequate

Other related Issues
Protruding Objects
Tripping Hazards
Conflict between users
Exposed Electric Cables

Connectivity
Junctions



Kumasi-Ejisu Road

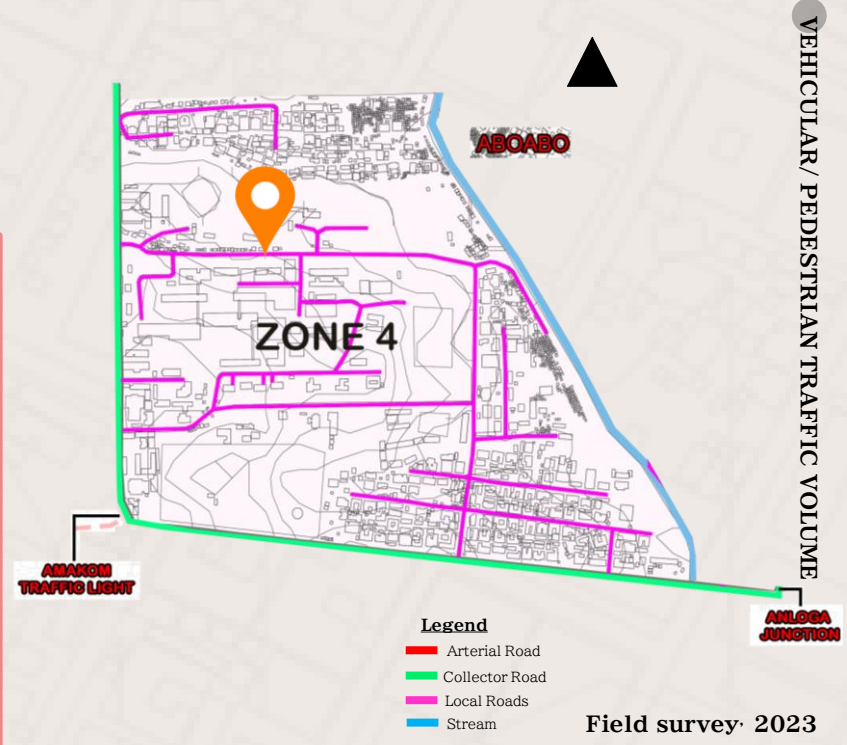
VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

ZONE 4 – Local Roads

Mallam-Bla Street

Description

- A Single carriage way
- A Vehicular only street with undefined shops



Assessment of Physical Features

B 32

Existing Features	Current State	Adequacy/ Completeness
Street lights and cameras	Good	Incomplete
Tree Canopies	Good	Inadequate
Drain	Poor	Incomplete
Drain covers	Rare	Incomplete
Greenery	Good	Inadequate
Shops	Undefined	Undefined
Adjourning Buildings	Good and friendly	Adequate

Other related Issues

- Conflict between users
- Exposed Electric Cables

Connectivity

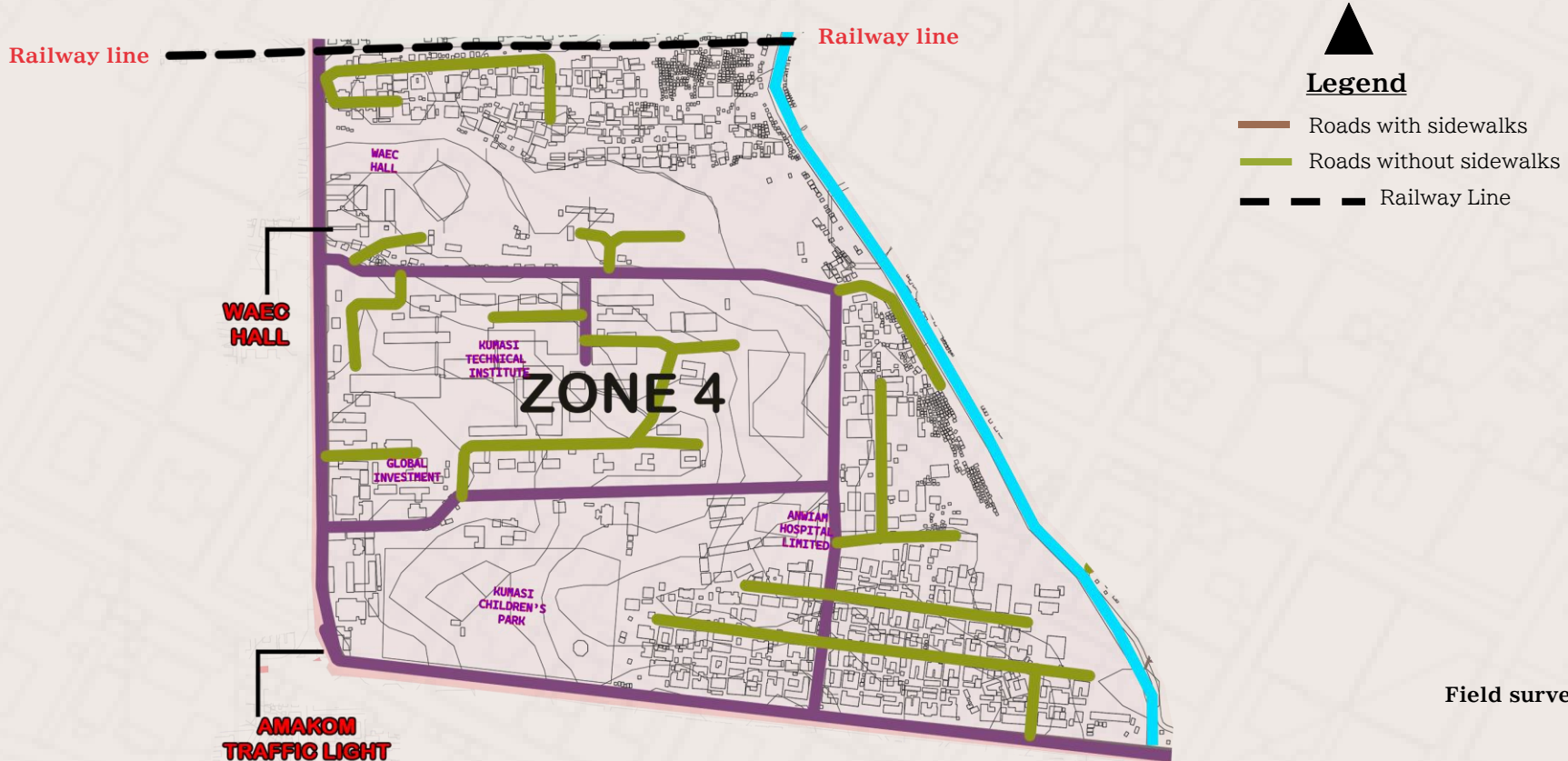
Junctions



VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

Mallam-Bla Street

Maps of Roads With and Without Sidewalks in zone 4



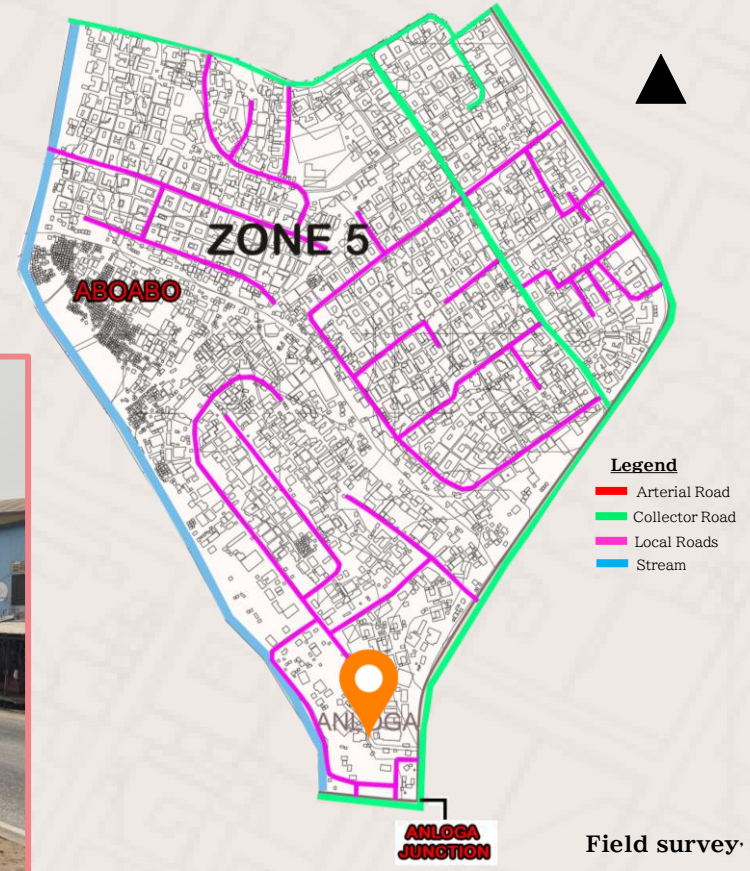
Field survey- 2023

ZONE 5 – Collector Roads

Eastern By Pass Description



- A Double carriage way
- A Part-time pedestrian street



VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

Assessment of Physical Features

Existing Features	Current State	Adequacy/ Completeness
Sidewalk	Undefined	Incomplete
Street lights and cameras	Good	Incomplete
Signage	Good	Inadequate
Drain	Poor	Complete
Drain covers	Rare	Incomplete
Greenery	Rare	Inadequate
Road Marking	Rare	Inadequate
Adjourning Buildings	Good and friendly	Adequate
Side Parking	Poor	Inadequate



VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

Eastern By Pass

Other related Issues
Protruding Objects
Tripping Hazards
Conflict between users

Connectivity
Junctions

ZONE 5 – Local Roads

Typical Local Road Description

- A Single carriage way
- A part-time pedestrian street with pedestrian precincts.



Field survey 2023

Assessment of Physical Features

Existing Features	Current State	Adequacy/Completeness
Street lights and cameras	Poor	Incomplete
Greenery	Rare	Inadequate
Adjoining Buildings	Good and friendly	Adequate

Other related Issues
Undefine Road
Protruding Objects
Tripping Hazards
Conflict between users
Air pollution

Connectivity
Junctions



VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

Typical Local Road

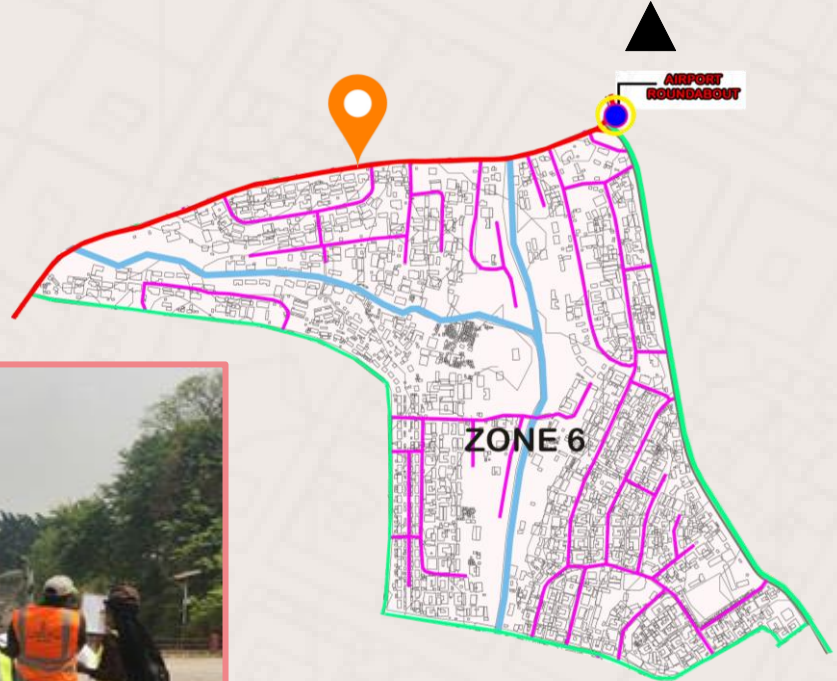
Maps of Roads With and Without Sidewalks in Zone 5



ZONE 6 – Arterial Roads

The Antoa Road Description

- A Single carriage way
- A part-time pedestrian street with pedestrian precincts.



- Legend**
- Arterial Road
 - Collector Road
 - Local Roads
 - Stream

Field survey- 2023

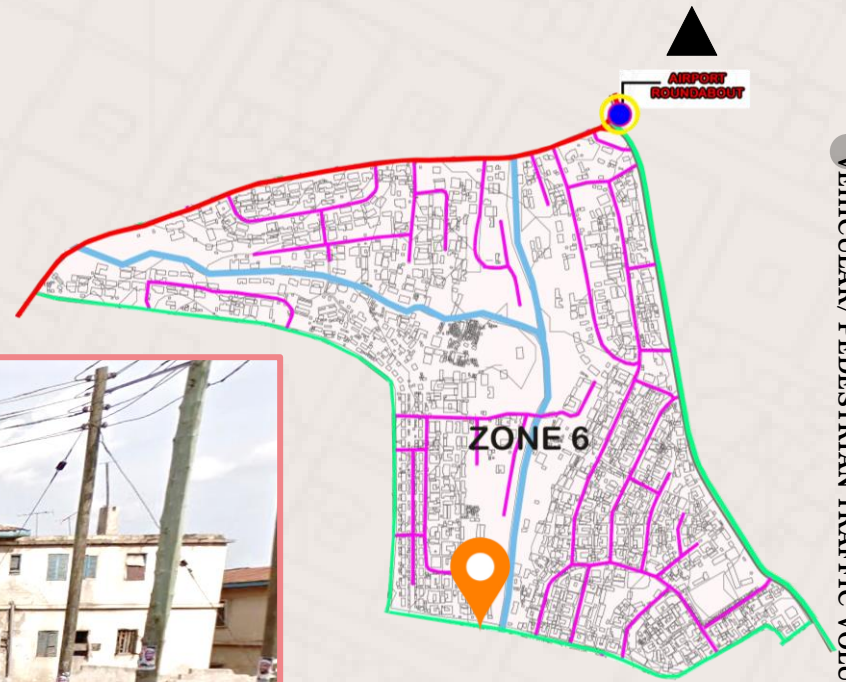


ZONE 6 – Collector Roads

The Aboabo Road Description



- A Single carriage way
- A Part time Pedestrian street



VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

- Legend**
- Arterial Road
 - Collector Road
 - Local Roads
 - Stream

Field survey- 2023

Assessment of Physical Features

B 41

Existing Features	Current State	Adequacy/ Completeness
Sidewalk	Poor	Incomplete
Street lights and cameras	Good	Incomplete
Signage	Good	Inadequate
Drain	Poor	Complete
Drain covers	Rare	Incomplete
Greenery	Rare	Inadequate
Road Marking	Rare	Inadequate
Adjourning Buildings	Good and friendly	Adequate
Side Parking	Poor	Inadequate



VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

Other related Issues
Protruding Objects
Tripping Hazards
Conflict between users

Connectivity
Junctions

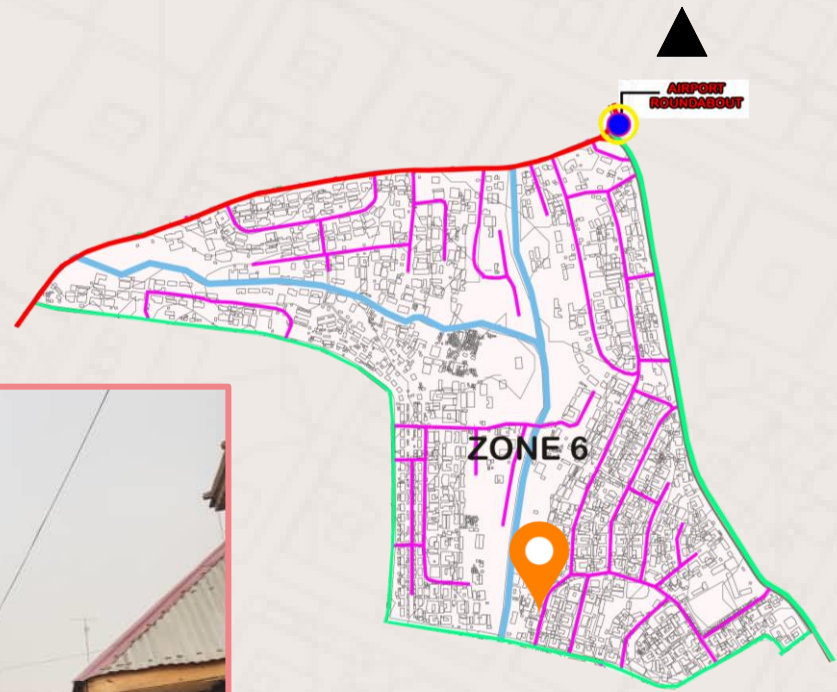
The Aboabo Road

Field survey- 2023

ZONE 6 – Local Roads

Typical Local Road Description

- A Single Carriage Way
- A Vehicle Only Street



VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

- Legend**
- Red line: Arterial Road
 - Green line: Collector Road
 - Magenta line: Local Roads
 - Blue line: Stream

Field survey- 2023



Assessment of Physical Features

Existing Features	Current State	Adequacy/Completeness
Sidewalk	Poor	Incomplete
Street lights and cameras	Good	Incomplete
Signage	Good	Inadequate
Drain	Poor	Complete
Drain covers	Rare	Incomplete
Greenery	Rare	Inadequate
Road Marking	Rare	Inadequate
Adjourning Buildings	Good and friendly	Adequate
Side Parking	Poor	Inadequate



VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

Typical Local Road

Other related Issues
Protruding Objects
Tripping Hazards
Conflict between users

Connectivity
Junctions

Maps of Roads With and Without Sidewalks



Legend

- Roads with sidewalks
- Roads without sidewalks
- Railway Line



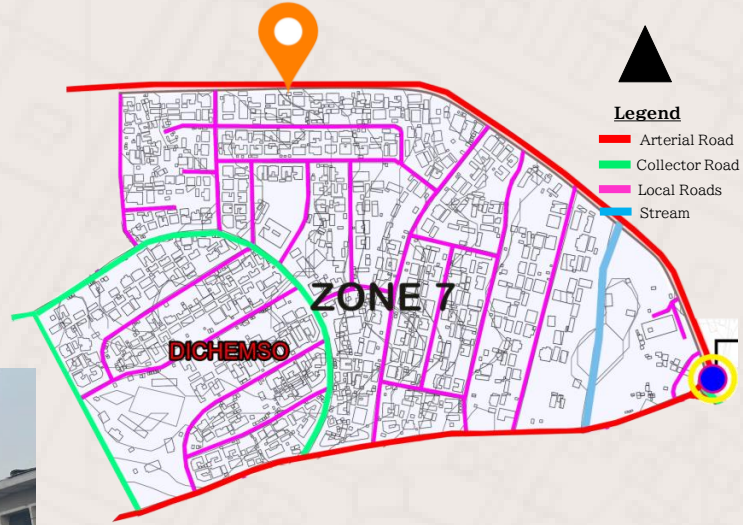
VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

ZONE 7 – Arterial Roads

P.V Obeng By Pass Description



- A double carriage way
- A Part-time pedestrian street with shared zone



VEHICULAR / PEDESTRIAN TRAFFIC VOLUME



Assessment of Physical Features

Existing Features	Current State	Adequacy/ Completeness
Sidewalk	Poor	Incomplete
Street lights and cameras	Good	Incomplete
Signage	Good	Inadequate
Drain	Poor	Complete
Drain covers	Rare	Incomplete
Greenery	Rare	Inadequate
Road Marking	Rare	Inadequate
Adjourning Buildings	Good and friendly	Adequate
Side Parking	Poor	Inadequate



VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

P.V Obeng By Pass

Other related Issues
Protruding Objects
Tripping Hazards
Conflict between users

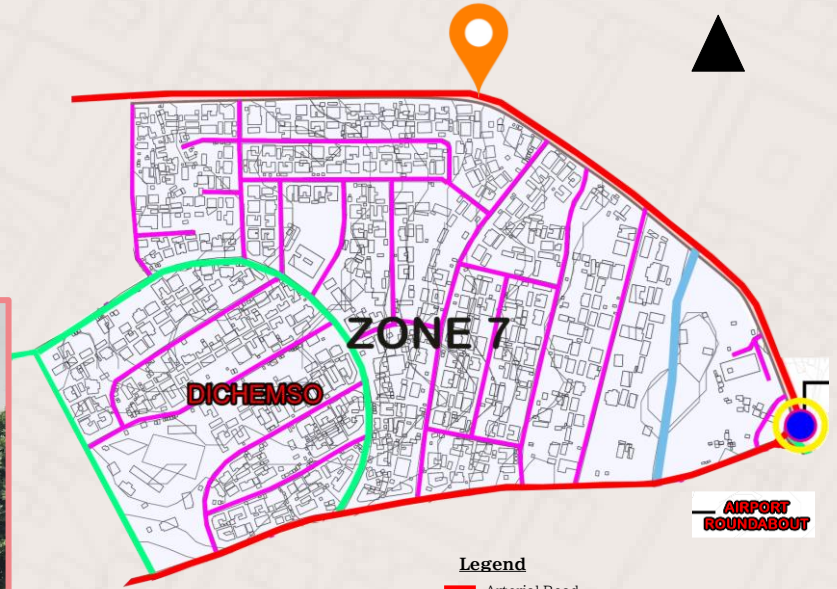
Connectivity
Junctions

ZONE 7 – Collector Roads

The Airport Road Description



- A Double carriage way
- A Part-time Pedestrian street



- Legend**
- Arterial Road
 - Collector Road
 - Local Roads
 - Stream

Assessment of Physical Features

Existing Features	Current State	Adequacy/ Completeness
Sidewalk	Poor	Incomplete
Street lights and cameras	Good	Incomplete
Signage	Good	Inadequate
Drain	Poor	Complete
Drain covers	Rare	Incomplete
Greenery	Rare	Inadequate
Road Marking	Rare	Inadequate
Adjourning Buildings	Good and friendly	Adequate
Side Parking	Poor	Inadequate



VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

The Airport Road

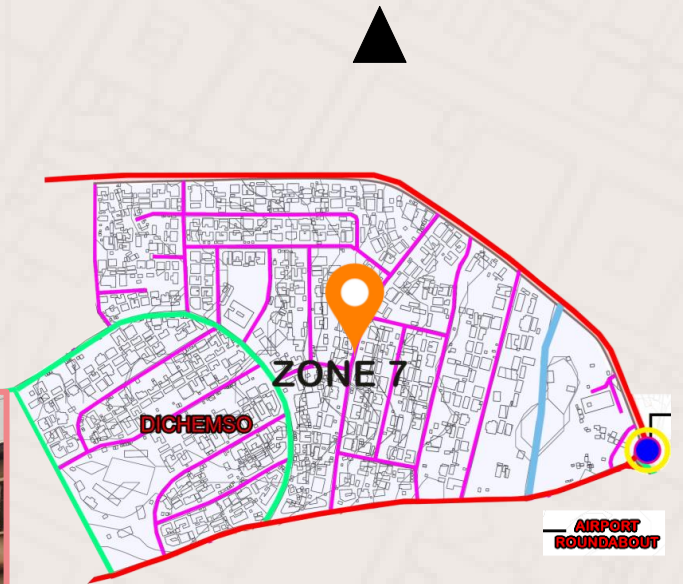
Other related Issues
Protruding Objects
Tripping Hazards
Conflict between users

Connectivity
Junctions

ZONE 7 – Local Roads

The Ceres Road Description

- A Single carriage way
- A part-time pedestrian street with pedestrian precincts.



- Legend**
- Arterial Road
 - Collector Road
 - Local Roads
 - Stream

VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

Assessment of Physical Features

B 50

Existing Features	Current State	Adequacy/ Completeness
Sidewalk	Good	Incomplete
Street lights and cameras	Poor	Incomplete
Drain	Poor	Complete
Drain covers	Rare	Incomplete
Greenery	Rare	Inadequate
Road Marking	Good	Inadequate
Adjourning Buildings	Good and friendly	Adequate
Side Parking	Poor	Inadequate



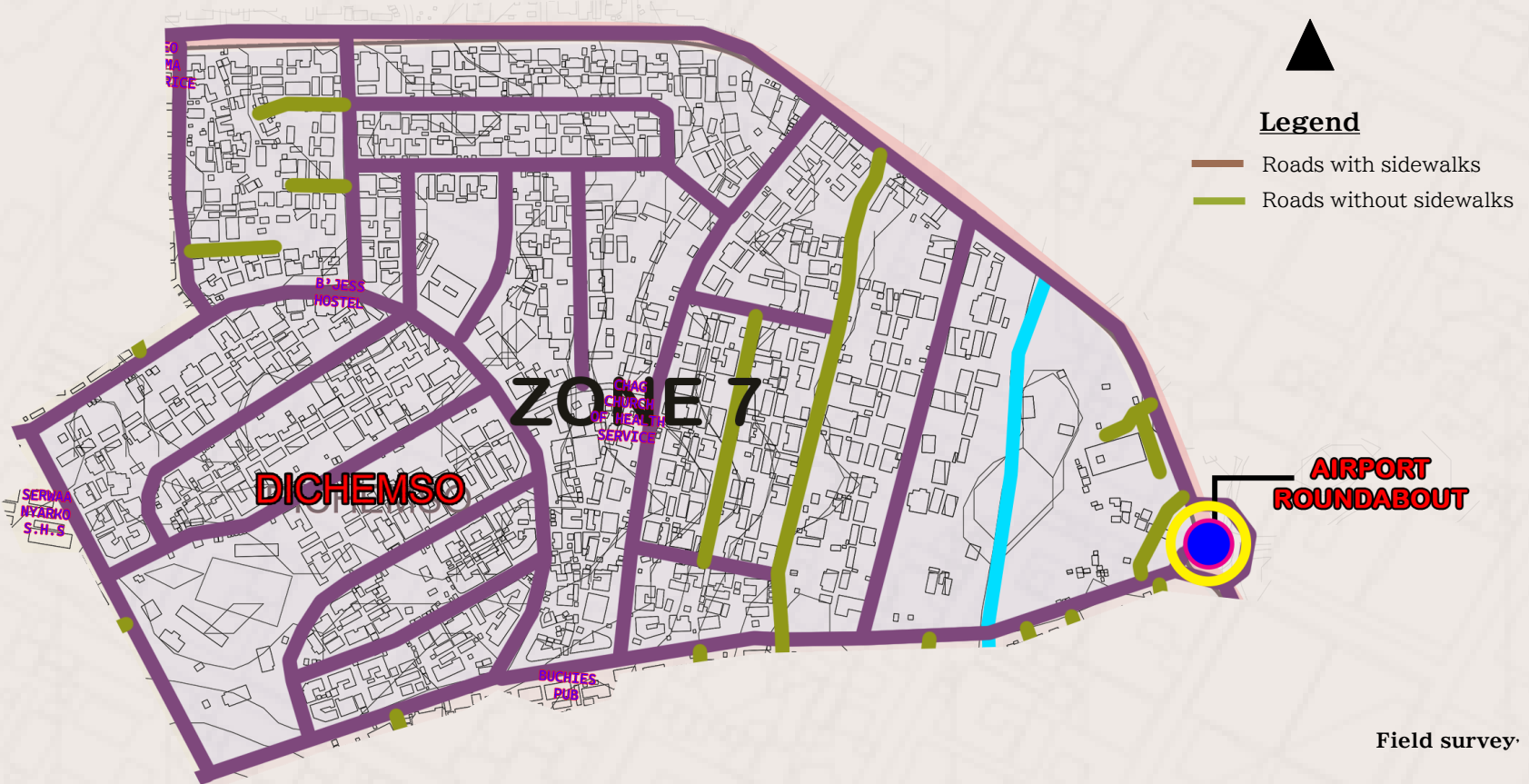
VEHICULAR / PEDESTRIAN TRAFFIC VOLUME

The Ceres Road

Other related Issues
Protruding Objects
Tripping Hazards
Conflict between users
No side Parking
No cyclist path

Connectivity
Junctions

Maps of Roads With and Without Sidewalks



General Map of Roads – With and Without Sidewalks



▲
Legend

- Roads with sidewalks
- Roads without sidewalks
- - - Railway Line

GENERAL SURVEY GUIDE

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VEHICULAR/ PEDESTRIAN TRAFFIC VOLUME

Thematic Areas	Data Required	Variables	Sources	Types of Survey	Data collection Instrument.
Pedestrian and vehicular traffic	Existing transportation maps	Road Map Map of Railway lines	Ghana Railway Authority. Ministry of Railways Development.	Institutional survey Map updating	Interview guide Questionnaire Photographs Introduction letter
	Road/ Street Systems Road / Street Design	Traffic Flow Road/Street Character	Field Survey	Empirical Study	Observation checklist Pictures sketches
	Traffic Variables	Traffic Density. Traffic Volume. Times of Highest and Lowest Volume. Causes.	Field Survey	Map updating, Site inventory	Videos Observation Checklist
	Circulation Patterns	Existing road network. Vehicular movements and patterns.	Department of urban roads, Transport operators, Municipal assembly, MMTU,DVLA, Pedestrians, Drivers	Map updating site inventory	Maps Photographs Observation

Field survey ,2023





Parking Spaces



PARKING SPACES

Contents

Methodology	Key study areas and data collection instruments
Introduction	A brief introduction into what parking spaces are.
Overview Maps	Overview map and map of various study zones
Statistical Data	Tally distribution, pie charts and bar charts
Data Findings	Summary of data results

MAP SCHEDULE

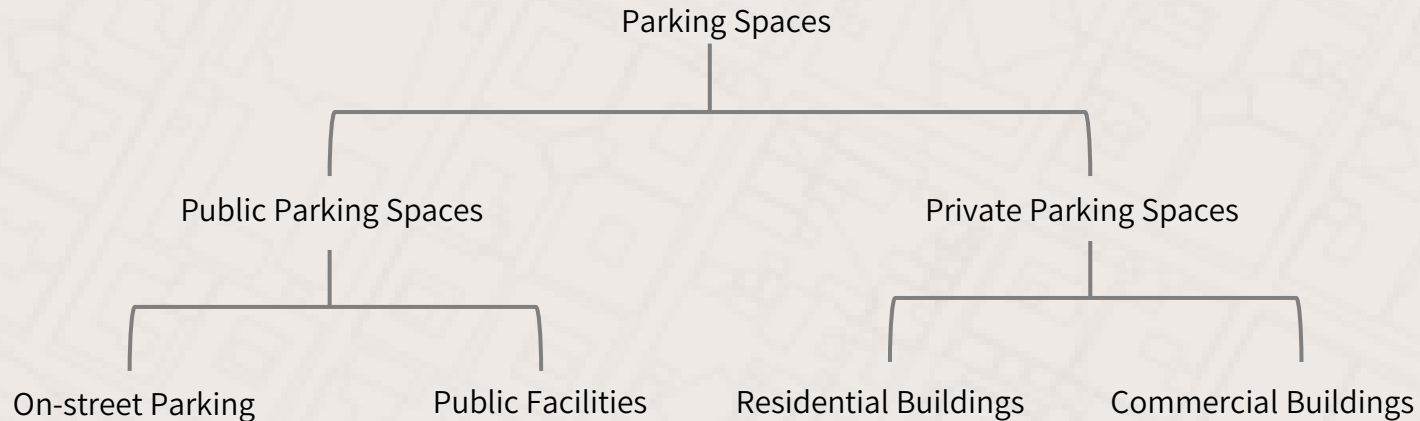
Map description	Pages
Private parking spaces in the enclave	C003
Public parking spaces in the enclave	C008
On-street parking in the enclave	C013
On-street parking prevention measures	C019

WHAT IS A PARKING SPACE?

A parking space, parking place or parking spot is a location that is designated for parking, either paved or unpaved. It can be in a parking garage, in a parking lot or on a city street. The space may be delineated by road surface markings.

(Collins English Dictionary, 2020)

TYPES OF PARKING SPACES



PARKING SPACES – Private Parking



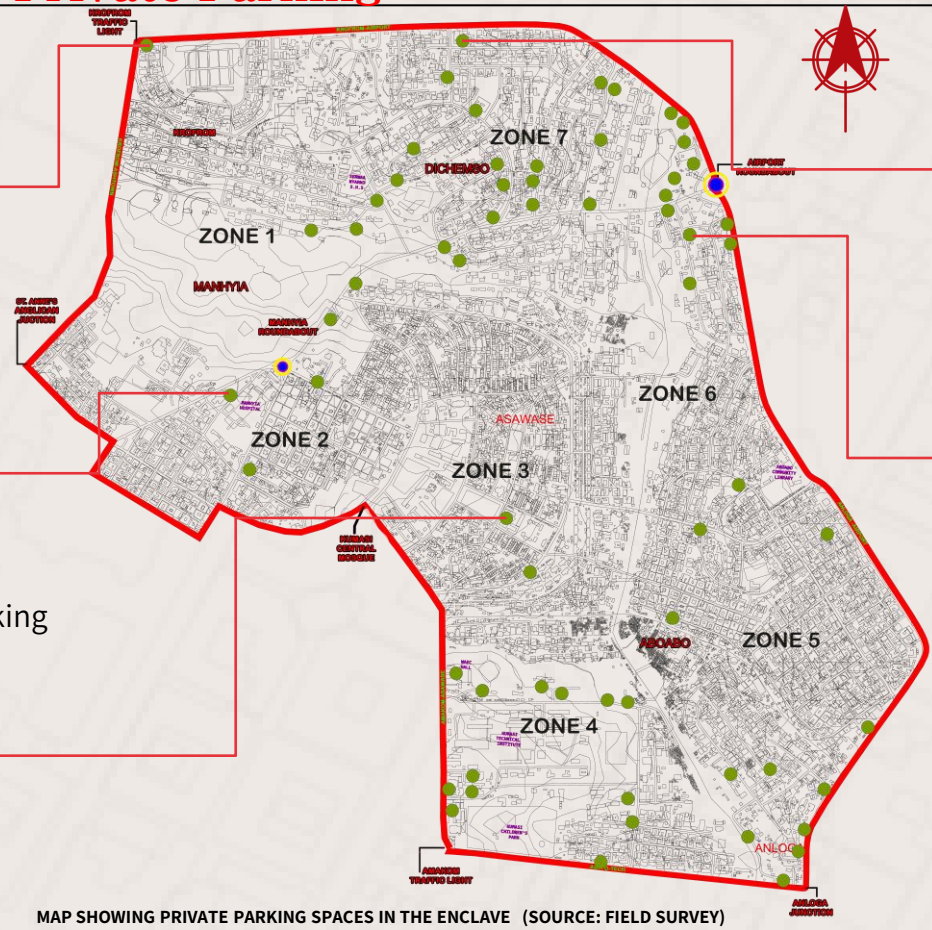
• Hotel de Santos



• Manhya Hospital Staff Parking



• Private Residence



• Nicolizzy Hotel



• Alhaj Naira Mosque



• Anwiam Hospital Annex
SURVEY 2023

PARKING SPACES – Private Parking

Private Parking Spaces

C
004

Private Parking Spaces

Parking Space	Zone	Location	Parking Angle	Surface Material
Hotel de Santos	1	6°42'45.71"N 1°36'57.33"W	90°	Pavement
Serwaa Nyarko Girls' SHS	1	6°42'31.65"N 1°36'31.94"W	Undefined	Coal tar
Manhya Melcom	2	6°42'18.00"N 1°36'38.20"W	90°	Coal tar
Manhya Hospital Staff Car Park	2	6°42'12.94"N 1°36'44.72"W	90°	Pavement
Nurul Ameen Islamic SHS	3	6°41'58.62"N 1°36'18.15"W	Undefined	None
Veterinary Hospital	4	6°41'40.31"N 1°36'21.47"W	90°	None
GRA Customs Office	4	6°41'29.40"N 1°36'22.27"W	90°	Pavement
Noble Dream Bank	5	6°41'29.62"N 1°35'44.93"W	90°	Pavement
Christian Academy	5	6°41'22.37"N 1°35'47.25"W	90°	Pavement
Alhaj Naira Mosque	6	6°42'01.79"N 1°35'53.97"W	Undefined	Pavement
Nicolizzy Hotel	7	6°42'45.61"N 1°36'24.59"W	90°	Pavement
Jofel Catering Services	7	6°42'34.74"N 1°35'57.62"W	60° and 90°	Pavement

SURVEY 2023





Private parking spaces constitute 28% of total parking spaces



Private parking spaces were located close to or in front of residential and commercial buildings



Access to private parking is restricted to users of the facility it serves



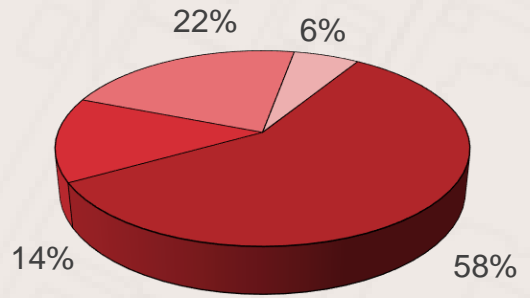
Average packing capacity is 11-15 cars for 5-8 hours

SURVEY 2023



PARKING ANGLES

- 90°
- 60°
- 45°
- Undefined

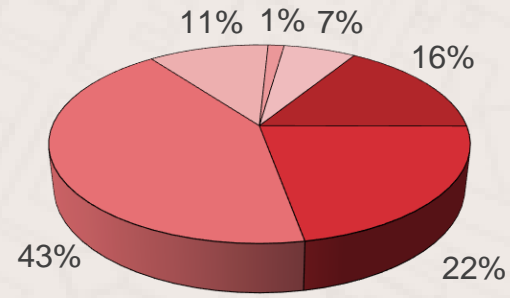


58% of parking spaces have a 90° angle design, 6% have undefined parking while the remaining 22% and 14% have a 45° angle and a 60° angle respectively



MATERIAL FINISHES

- Coal tar
- Pavement blocks
- Terrazo
- Cement screed
- Gravel
- Tiles

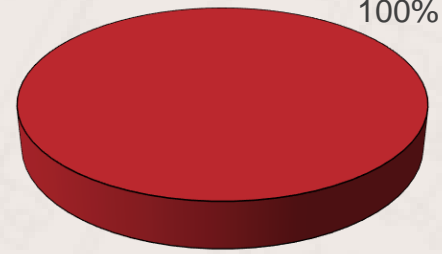


38% of the parking spaces are finished with pavement blocks, 26% with coal tar, 19% with cement, 10% with gravel, 6% with floor ties and 1% with terrazzo



COST

- Free



All the private parking spaces offered free services, with restricted access to all or some users of the facility that they were attached to



National House of Chiefs

Location: 6.703337, -1.613253

Material Finish: Pavement

Parking Angle: Mainly 90°

Vehicles: Cars

Cost: Free

Description: The car park is restricted to people who are going to the National House of Chiefs.

The facility is walled, and there is a security guard who only restricts access into the space.

The parking area consists of open air parking slots, as well as canopied slots which are reserved for particular people.

The area is large and can accommodate a maximum of **55 to 70 cars**. However, it is rarely filled to maximum capacity, and has an average capacity of **25 to 30 cars**.

SURVEY 2023

PARKING SPACES – Public Parking



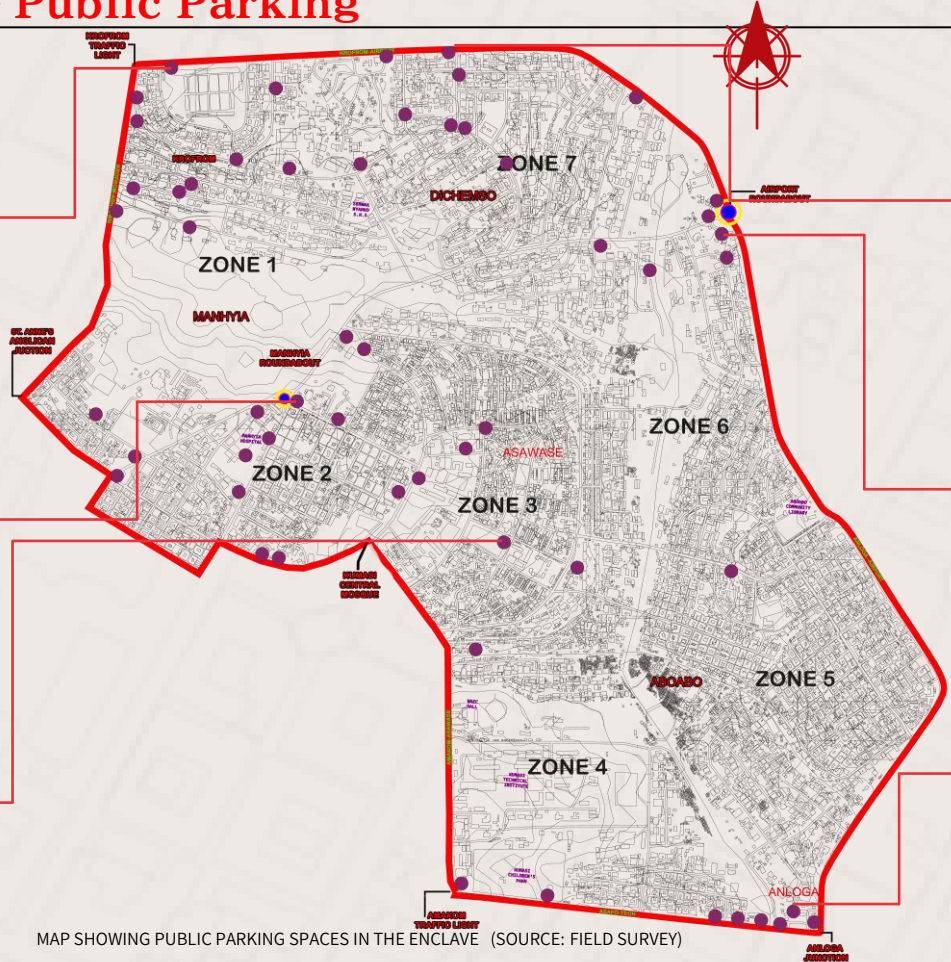
• Motor Park Taxi Rank



• Manhya Hospital Parking



• Dogo Moro Park



MAP SHOWING PUBLIC PARKING SPACES IN THE ENCLAVE (SOURCE: FIELD SURVEY)



• Instrumentals Shop



• Mechanic Yard



• Anloga Washing Bay
SURVEY 2023

PARKING SPACES – Public Parking

Public Parking Spaces

C
009
Public Parking Spaces

Parking Space	Zone	Location	Parking Angle	Surface Material
Motor Park Taxi Station	1	6°42'49.10"N 1°36'53.62"W	90°	Coal tar
Bolga Station	1	6°42'44.27"N 1°36'57.80"W	Undefined	Earth
Manhya Hospital Parking	2	6°42'08.72"N 1°36'46.65"W	90°	Earth
Access Bank Parking	2	6°42'07.20"N 1°36'58.43"W	90°	Pavement
Dogo Moro Park	3	6°41'59.52"N 1°36'19.36"W	90°	Earth
Shell Fuel Station	4	6°41'23.89"N 1°36'24.79"W	Undefined	Concrete
Jehovah Witness Carpark	4	6°41'20.23"N 1°35'54.93"W	90°	Earth
Total Energies Fuel Station	5	6°41'20.14"N 1°35'48.48"W	Undefined	Concrete
Aboabo Total Fuel Station	5	6°41'55.96"N 1°35'55.64"W	90° and 45°	Concrete
Total Fuel Station Airport R/N	6	6°42'31.92"N 1°35'57.19"W	Undefined	Concrete
Shell Fuel Station	7	6°42'34.88"N 1°35'57.54"W	Undefined	Concrete
Dr. Mensah Taxi Rank	7	6°42'48.14"N 1°36'23.73"W	90°	Coal tar

SURVEY 2023





Public parking spaces constitute 72% of total parking spaces



Private parking spaces were located close to or in front of public buildings



Access to private parking is open to the general public



Average packing capacity is 20-40 cars for 2-5 hours

SURVEY 2023



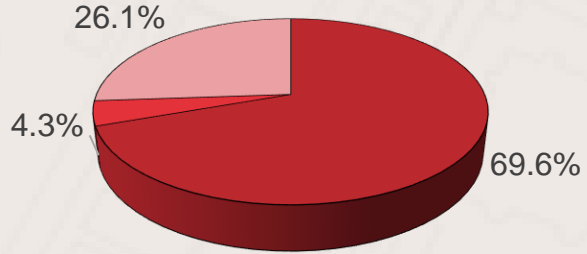
PARKING SPACES – Public Parking

Overview of Public Parking Spaces



PARKING ANGLES

■ 90° ■ 60° □ Undefined

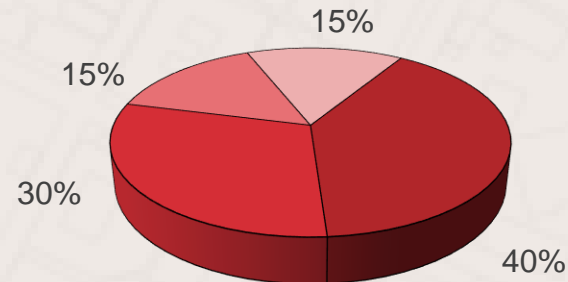


69.6% of parking spaces have a 90° angle design, 26.1% have undefined parking while the remaining 4.3% have a 60° angle



MATERIAL FINISHES

■ Coal tar ■ Cement screed
■ Pavement blocks □ No finish

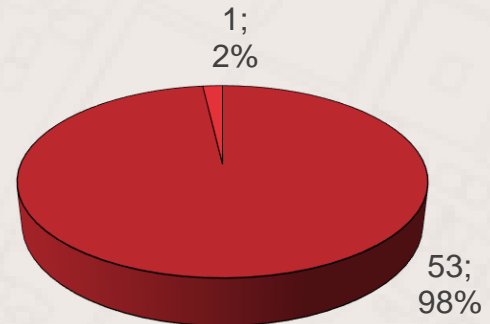


40% of the parking spaces are finished with coal tar, 30% with cement screed, and 15% each with earth and pavement blocks.



COST

■ Free ■ Paid



Out of the 54 public parking spaces, only one offers paid services, which includes security surveillance.



Manhyia Public Parking

Location: 6.702382, -1.616288, Adjacent the Manhyia Palace

Material Finish: Laterite and gravel

Parking Angle: Mainly 90°

Vehicles: Cars, motorcycles, small trucks

Cost: GH¢3 per day

Description: The facility offers secure parking for vehicles at a fixed cost of GH¢3 for the whole day.

The facility is walled, and there is a security guard/caretaker who routinely patrols the area.

There is also a washroom, which the users can use for free.

The car park is also used as a space for events such as funerals and other large gatherings. In such cases, the cars have to be parked on the road, and the users have to pay a fee of GH¢1 to use the washrooms.

Generally, the patronage of the space is high with a capacity of **70 to 90 cars a day**.

SURVEY 2023

PARKING SPACES - On-Street Parking



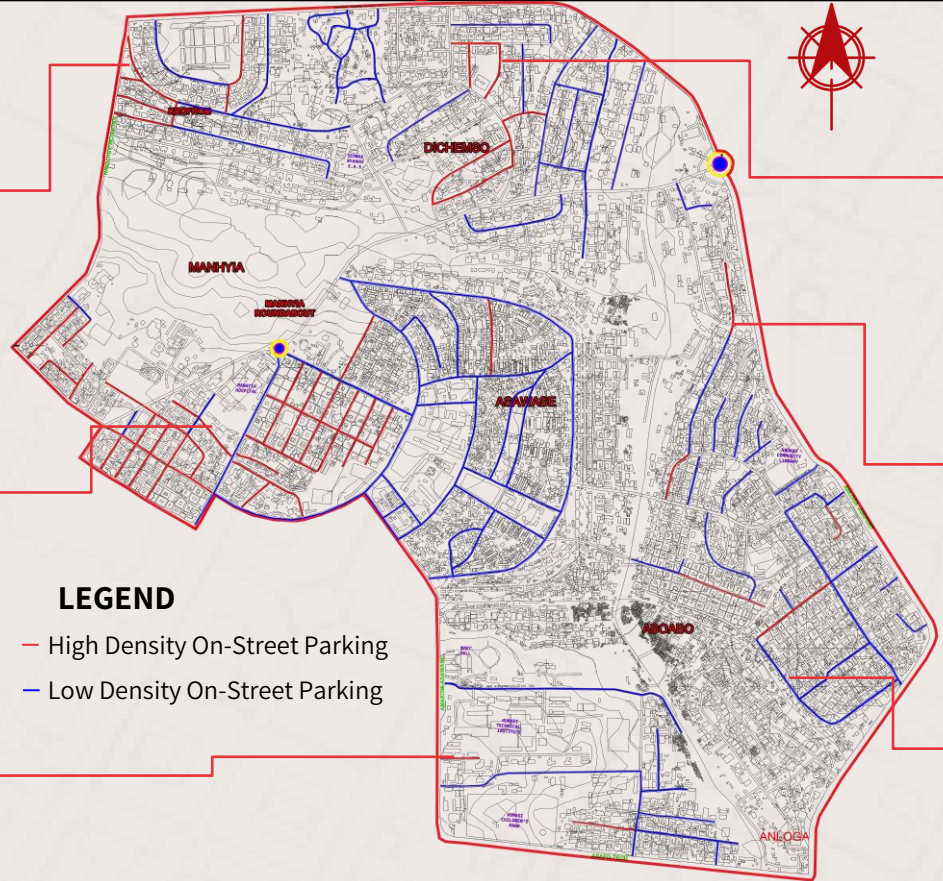
• Bolga Station Street



• Manhya Palace Street



• GNAT Hall Street



LEGEND

- High Density On-Street Parking
- Low Density On-Street Parking



• Airport Residential Street



• Random



• Aboabo Islamic Street
SURVEY 2023

MAP SHOWING ON-STREET PARKING IN THE ENCLAVE (SOURCE: FIELD SURVEY)



Some Low Density On-Street Parking Spaces

Parking Space	Zone	Location	Parking Angle	Surface Material
Bretuo Street	1	6°42'39.03"N 1°36'47.96"W	-	Coal tar
Boakye Tuffour Road	2	6°42'05.95"N 1°36'51.37"W	-	Coal tar
Keneako Street	3	6°42'14.93"N 1°36'23.59"W	-	Asphalt
Keneako Crescent	3	6°41'56.27"N 1°36'17.69"W	-	Asphalt
Amma Serwaa Street	4	6°41'38.59"N 1°36'08.57"W	-	Coal tar
Eastern By-pass	5	6°41'45.62"N 1°35'42.08"W	-	Asphalt
Antoa Road	6	6°42'28.54"N 1°35'59.53"W	-	Coal tar
P.V Obeng By-pass	7	6°42'48.27"N 1°36'22.23"W	-	Coal tar
Manhyia Road	7	6°42'32.39"N 1°36'15.09"W	-	Asphalt



Some High Density On-Street Parking Spaces

Parking Space	Zone	Location	Parking Angle	Surface Material
Manhya Road	1	6°42'09.87"N 1°36'58.71"W	-	Coal tar
Yaa Asantewaa Road	2	6°42'04.74"N 1°36'54.88"W	-	Coal tar
Chocolatefruit Lane	4	6°41'24.07"N 1°36'07.43"W	-	Coal tar
Bilberry Lane	5	6°41'46.46"N 1°35'51.20"W	-	Asphalt
Eastern By-pass	6	6°42'19.42"N 1°35'54.95"W	-	Coal tar



High-Density On-Street Parking

Caused by inadequate parking spaces in public areas and want of convenience by road users when accessing public places



Cars are parked on both sides of the road with very little space in-between ($\leq 1\text{m}$)



Usually temporary parking (≤ 1.5 hours)



Locations are usually on streets in commercial areas (markets, mechanic yards)



Constitutes **41%** of total on-street parking



Low-Density On-Street Parking

Caused by lack of or inadequate parking spaces for homes and businesses
Buildings are put up right next to the road

Cars are parked either side of the road and more spaced out. ($>1\text{m}$)

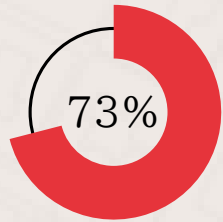
Usually permanent parking (≥ 1.5 hours)

Locations are usually on streets in residential areas (private residences, small shops)

Constitutes **59%** of total on-street parking

SURVEY 2023





On-street parking constitutes 73% of public parking spaces. (52.56%) of total parking spaces



On-street parking was observed mainly on streets in front of commercial facilities and in public areas



Density of street parking characterized by number of cars along a stretch of road



On-street parking can be temporary (≤ 1.5 hours) or permanent (≥ 1.5 hours)
SURVEY 2023





Manhya Street Parking

Location: 6.702665, -1.615228, By the Manhya Palace Durbar Grounds

Material Finish: Pavement

Parking Angle: Mainly 60°

Vehicles: Cars, motorcycles

Cost: Free

Description: This is a high-density on-street parking space which occurs on the sidewalk beside the durbar grounds. This parking situation forces pedestrians to either walk on the road or manoeuvre their way between the cars.

This street parking is caused by a spill over of cars from the parking space inside the durbar grounds or cars that do not have access to the allocated parking space, as well as people parking to buy souvenirs from the surrounding shops.

On average, about **40 to 60 cars** park on the **173m** stretch, which is intersected by trees.

The average parking time is **4 hours**, which makes it a permanent on-street parking space.

SURVEY 2023



PARKING SPACES -On-Street Parking Prevention



• Stones



• Signposts



• Bamboo/Sticks



• Car tyres



• Wooden boards



• Boullards

MAP SHOWING ON-STREET PARKING PREVENTION MEASURES IN THE ENCLAVE (SOURCE: FIELD SURVEY)

SURVEY 2023



These measures are used in 11% of parking spaces, both on and off-street to restrict access



Materials used include poles, bamboo, stones, car tyres, benches, signposts, wooden boards, restrictive tape and bollards or a combination of the listed materials



They are mostly used in front of shops to prevent cars from parking and blocking the view into the space

SURVEY 2023



PARKING SPACES – Data Collection Methodology

Key Stakeholders

	○ Households	○ Institutions	○ Industries	○ Commercial facilities
Thematic Area	Data Required	Sources	Type Of Survey	Data Collection Instruments
Parking spaces	Types of parking spaces	Department of urban roads	Institutional survey	Interview Guides
	Existing parking spaces (Locations)	<ul style="list-style-type: none"> • Municipal assembly • General public 	<ul style="list-style-type: none"> • Institutional survey • Map updating • Visual survey 	Observational chart
	Parking capacity	Parking space operators	Occupancy survey	<ul style="list-style-type: none"> • Observational chart • Parking turnover • Parking occupancy count • Photographs • Sketches • Measured drawings
	Parking design	Road users	Visual surveys	Photographs
	Materials		Visual survey	Parking turnovers
	<ul style="list-style-type: none"> • Parking duration and requirements 	<ul style="list-style-type: none"> • Parking space operators • Road users 	Occupancy	

SURVEY 2023



DISTRIBUTION OF ACTIVITIES

PHYSICAL INFRASTRUCTURE

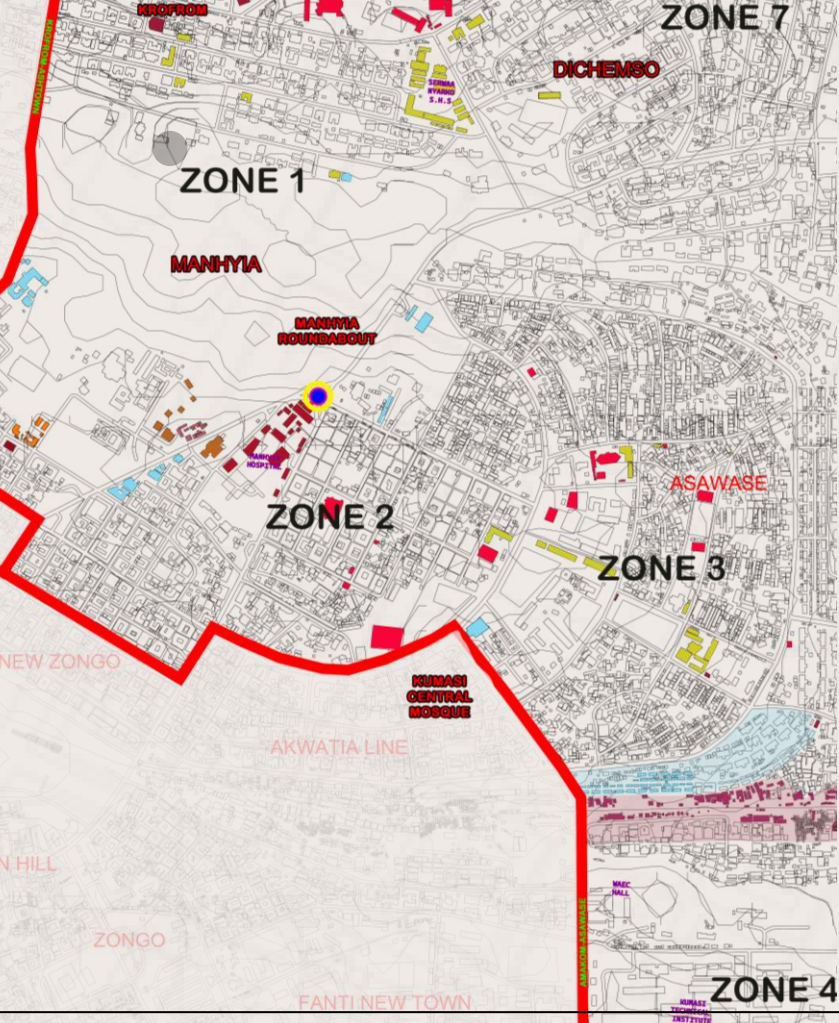
© Survey "23



What is the distribution of activities?

“Urban land use reflects the location and level of spatial accumulation of activities such as retailing, management, manufacturing, or residence”.

-Dr. Jean-Paul Rodrigue



DISTRIBUTION OF ACTIVITIES

TABLE OF CONTENTS

Introduction	Definition and the various types of activities
Thematic areas	Keyholders and Thematic areas of the study (data instruments,source of data,etc)
Research background	Research significance of the visual study
Overview map	Overview study map of the zones
Statistical data	Tally distribution and graphs
Data Findings	Conclusions



DISTRIBUTION OF ACTIVITIES

MAP SCHEDULE

Map Description	Page number
Land use Map	D08
Building use map	D09



CLASSIFICATION OF ACTIVITIES



Commerce

Markets, Filling stations, private media, mixed use spaces, etc.



Civil

Government facilities, local authority (palace), etc.



Healthcare

Hospitals, diagnostic centres, clinics, pharmacies, etc.



Religious

Churches, mosques, prayer camps, etc.



Educational

Day cares, basic schools, senior high schools, universities, etc.

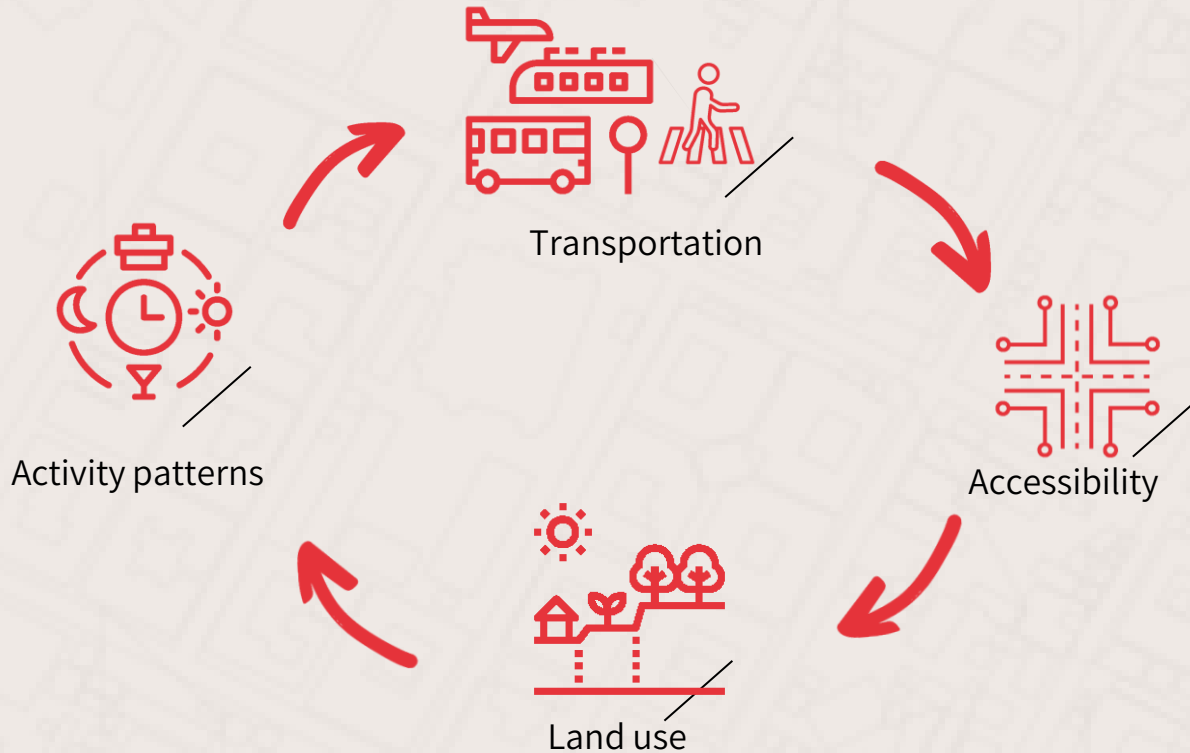


Industry

Food processing, construction, etc.



Research background



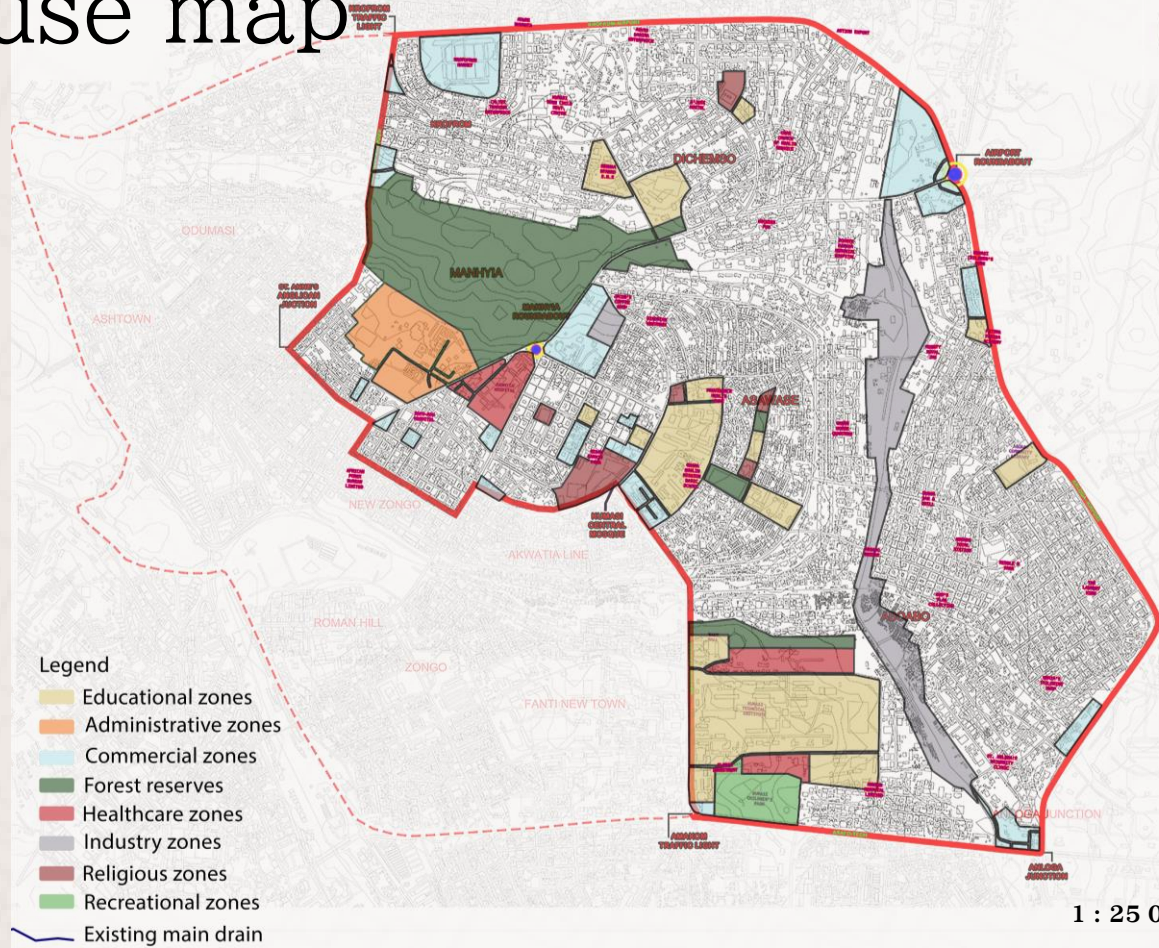
Rodrigue, J-P (2013)

“Urban Transportation and Land Use”

The diagram explains a research done by Rodrigue(2013), which explains that the activity patterns (due to specific needs or lifestyle) in an area has a direct effect on infrastructure in terms of transport and land use.

Land use map

D07



1 : 25 000

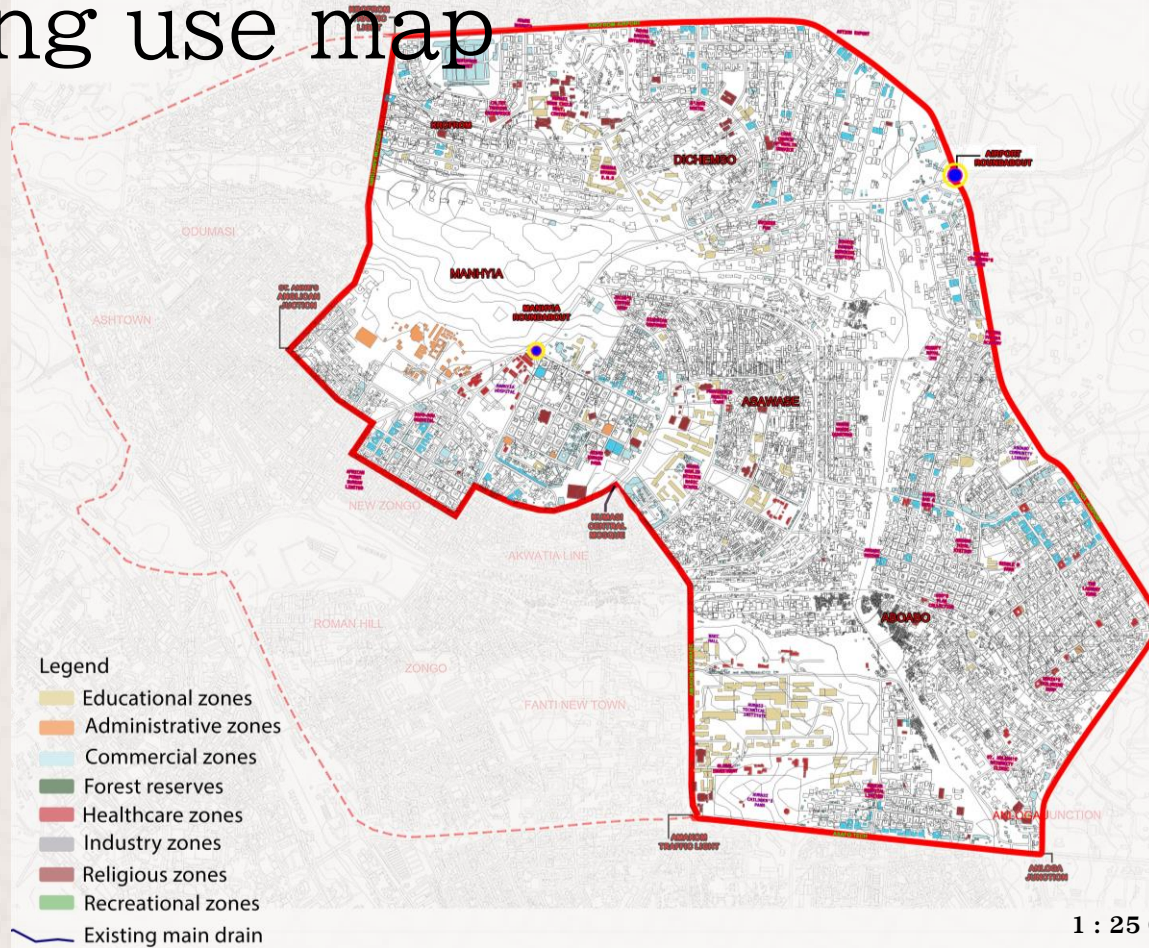
© Survey '23



Building use map



D08



© Survey "23



OVERALL TALLY DISTRIBUTION

FACILITIES	ZONES							TOTAL
	1	2	3	4	5	6	7	
Industry	1	-	-	-	-	-	-	1
Education	9	3	5	7	6	6	4	40
Commerce	5	2	10	22	40	38	20	137
Civil	2	1	1	1	0	1	0	6
Religious	6	14	22	11	16	2	4	75
Healthcare	9	9	2	2	1	1	1	25

Summary

- Activities are concentrated along the main roads.
- Zone 3,5 and 6 ,in descending order, have religious-charactered streets.
- Zone 4 and 5 ,in descending order has the largest educational area.
- The activities pulled public transport (e.g tricycle) along the catchment areas in the zones.
- However, some activity zones experience poor connectivity to adjacent activity zones (e.g Zone 4; poor road connection).



THEMATIC AREAS

Thematic areas	Data required	Source	Type of survey	Data collection instruments
Distribution of activities	Locations of the facilities holding the various activities	<ul style="list-style-type: none"> • Author's Survey • Development Planning Committee 	<ul style="list-style-type: none"> • Visual Survey • Map updating 	<ul style="list-style-type: none"> • Photographs • Maps • GPS coordinates

PART 2

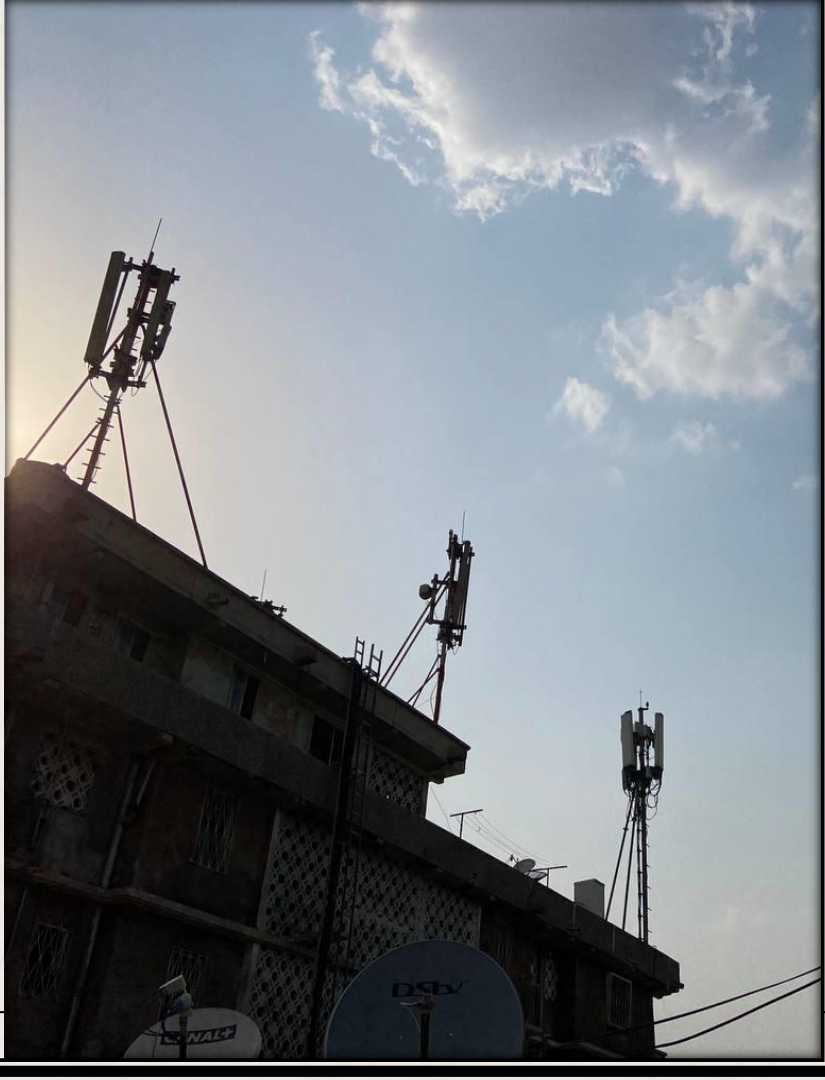
Utilities and Services

- Telecommunication
(E)
- Waste Management
(F)
- Drainage systems
(G)
- Stormwater Drainage
(G)
- Energy Supply and Demand
(J)
- Water Supply and Demand
(K)



TELECOMMUNICATION

Telecommunication is the transmission of information by various types of technologies over a wire, radio, optical or other electromagnetic systems. This means communication over a distance by cable, telegraph, telephone or broadcasting.



Telecommunication

Table Of Contents

Introduction	Definition and overview of telecommunication facilities
Thematic Areas	Key study areas and data collection instruments
Research Background	Significance of study
Overview Map	Overview map and map of various study zones
Statistical Data	Tally distribution, pie charts and bar charts
Data Findings	Summary of data results



MAP SCHEDULE

E03

MAPS	PAGE NUMBER
Map showing the various Public Address System.	E06
Map showing the location of all the Public Address Systems.	E08
Map showing the location of all the Public Address Systems.	E09
Map showing the various Telecommunication Masts and Radio Stations.	E11
Map showing the location of all the Telecommunication Masts.	E13
Map showing the location of all the Radio Stations.	E14
Map showing the location of all the Post Offices	E16

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The various telecommunication facilities include the following;



Post Offices



Service Providers/Radio/TV
Masts



Radio Stations



Network Providers



TV Stations



Public Address System



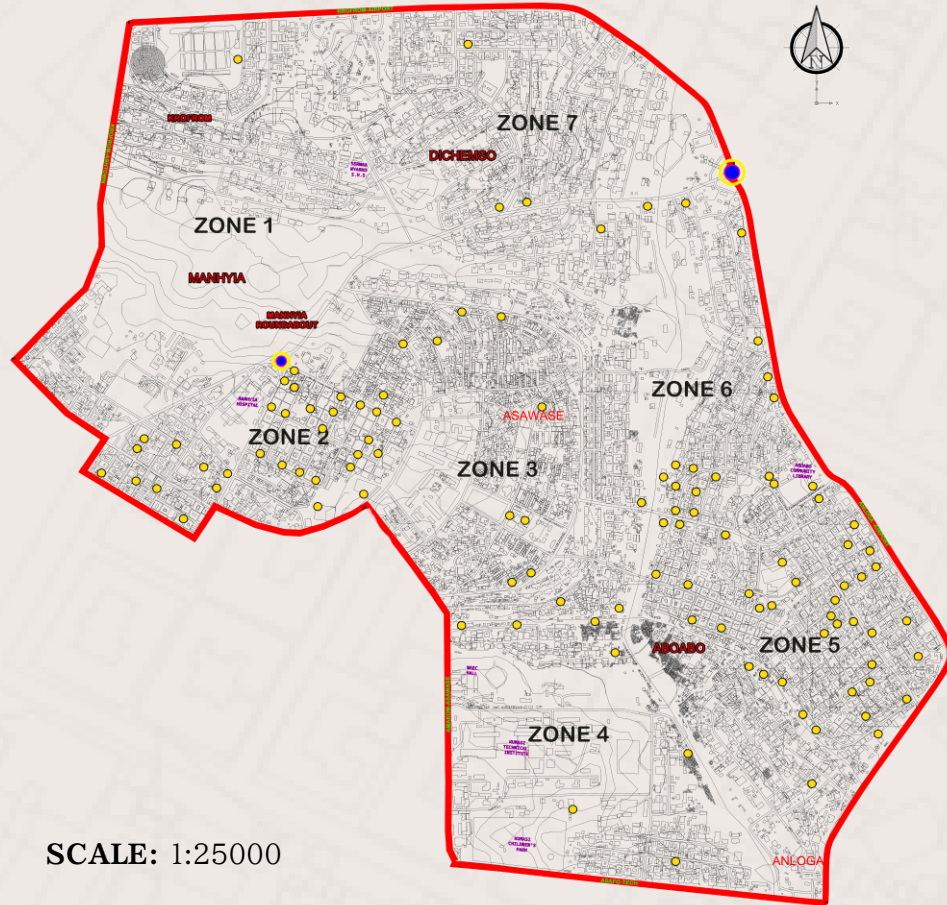
Information Center



PUBLIC ADDRESS SYSTEMS



MAP SHOWING THE VARIOUS PUBLIC ADDRESS SYSTEM



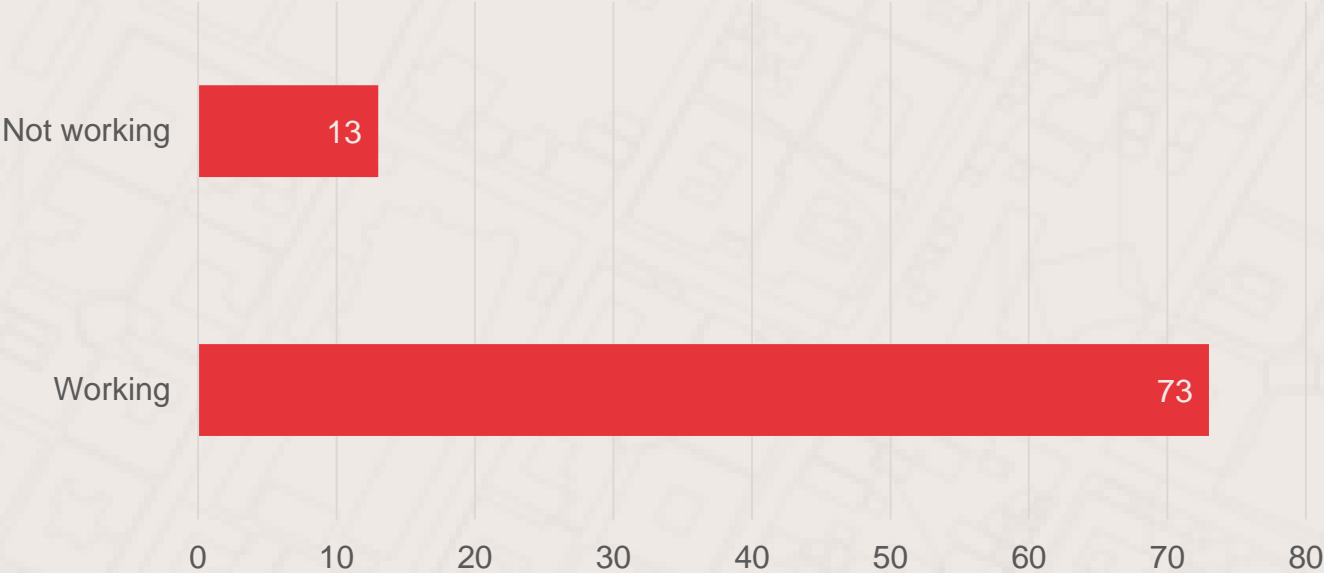
SCALE: 1:25000

- A total of 86 public address systems were found in the area of study.
- Zone 5 recorded the highest number of public address systems. This Zone was dominated by Muslims, hence all of their mosques had public address systems. This was followed by Zone 2 which was also dominated by Muslims.
- It was discovered that the public address system located in Zone 1 had been faulty for some years.

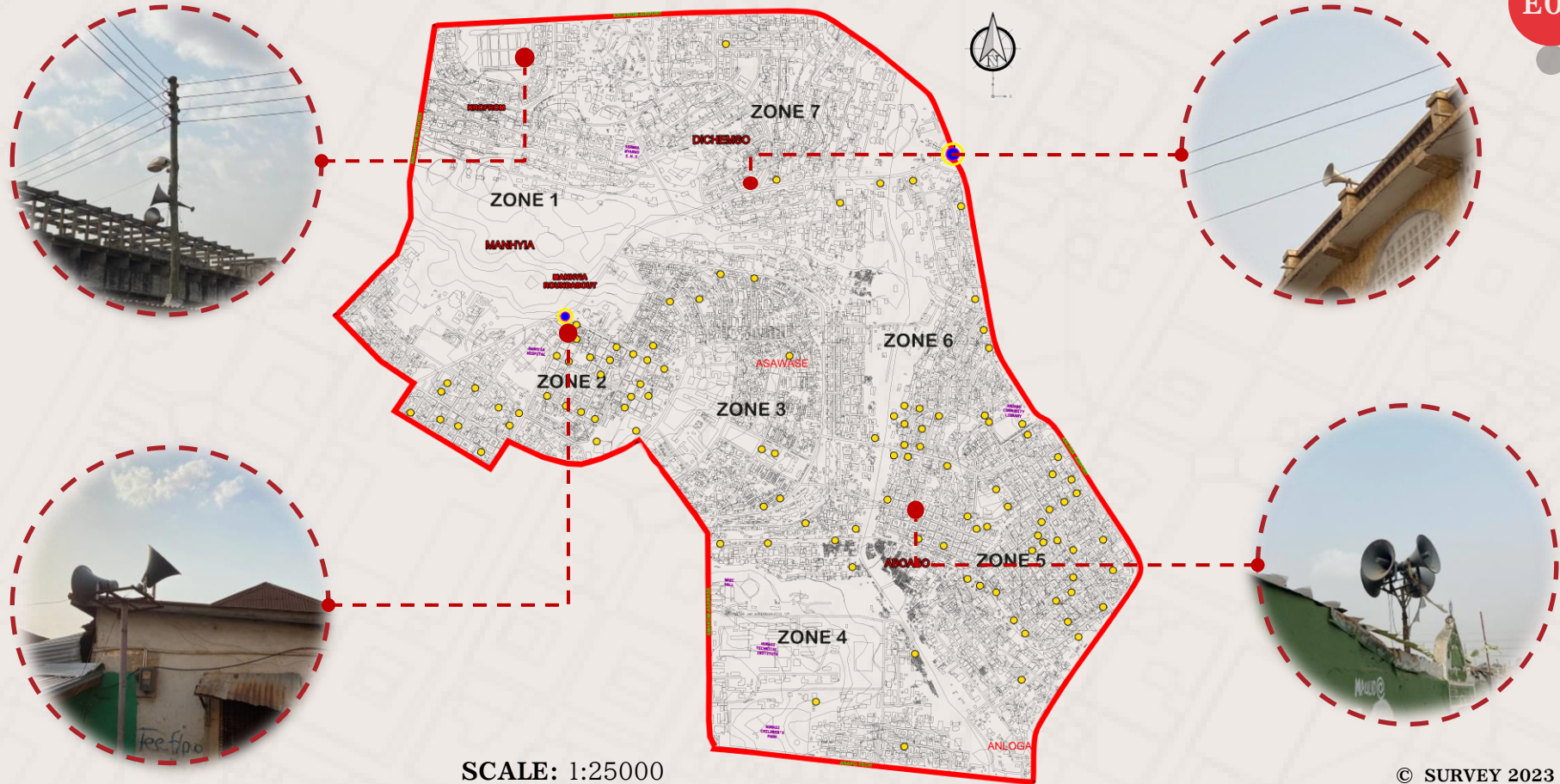
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CHART DISTRIBUTION OF WORKING AND FAULTY PUBLIC ADDRESS SYSTEMS



MAP SHOWING THE LOCATION OF ALL THE PUBLIC ADDRESS SYSTEMS



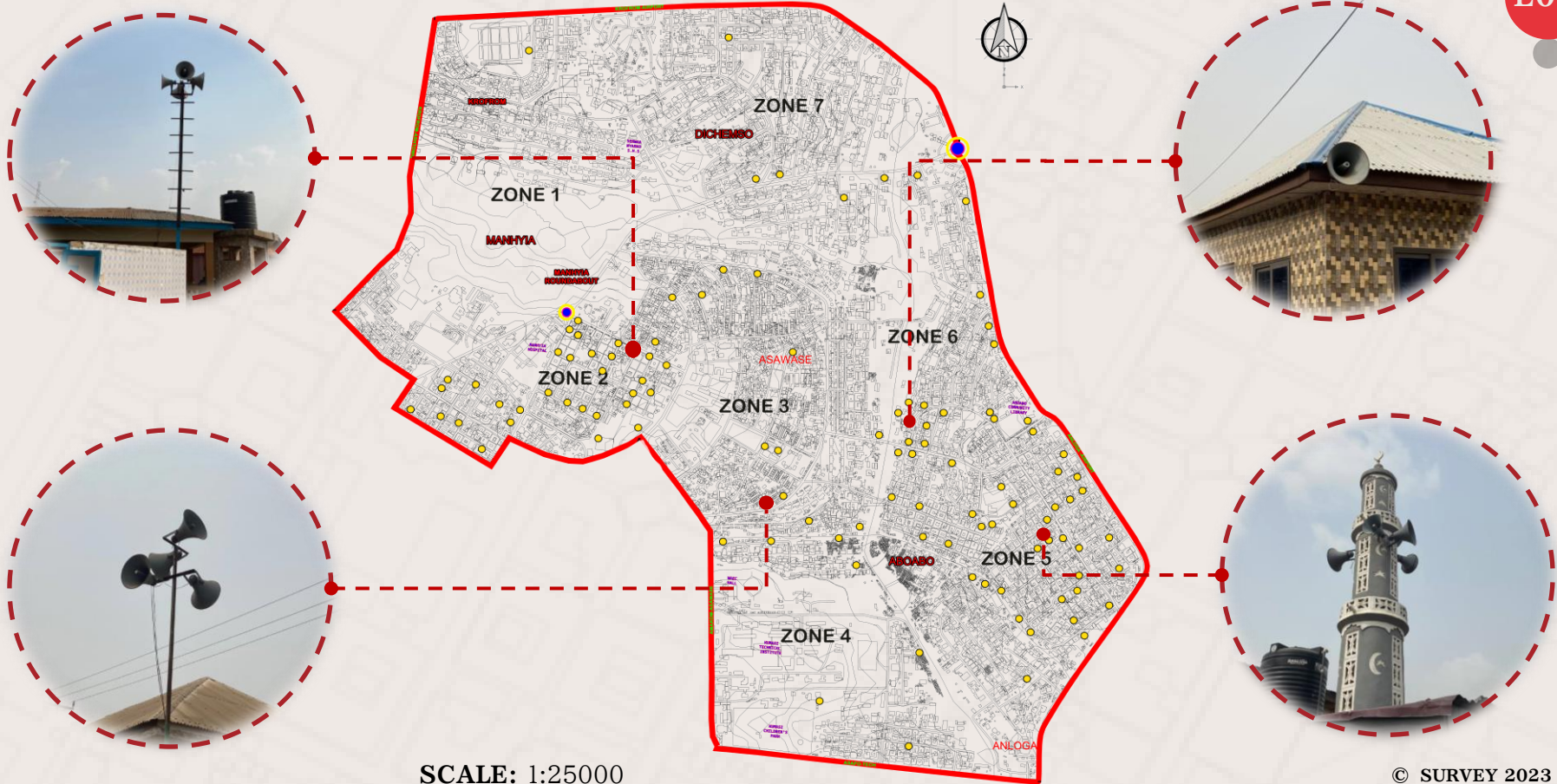
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MAP SHOWING THE LOCATION OF ALL THE PUBLIC ADDRESS SYSTEMS

E09

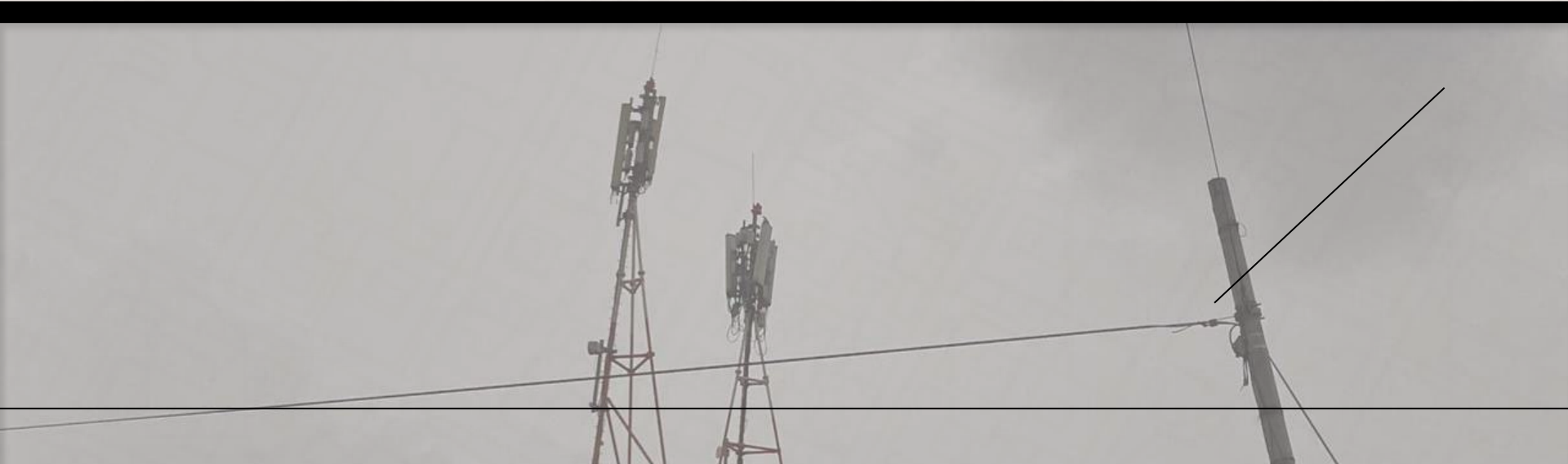


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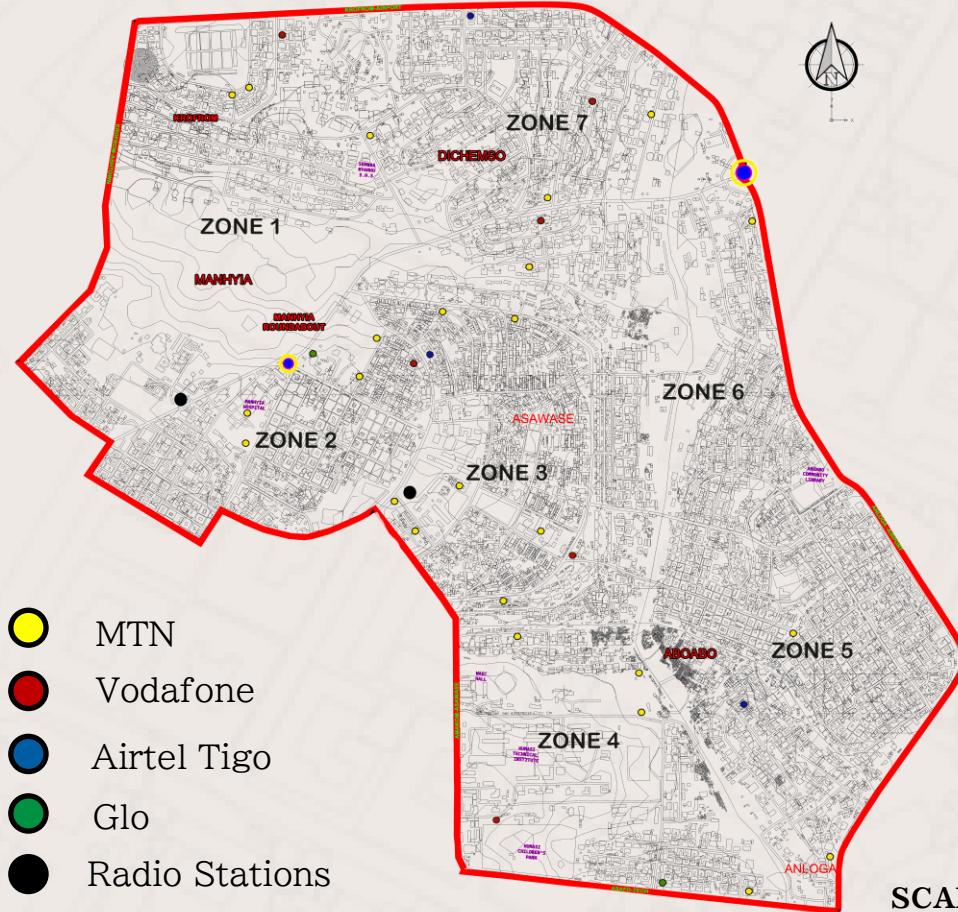


TELECOMMUNICATION MASTS



MAP SHOWING THE VARIOUS TELECOMMUNICATION MASTS AND RADIO STATIONS

E11



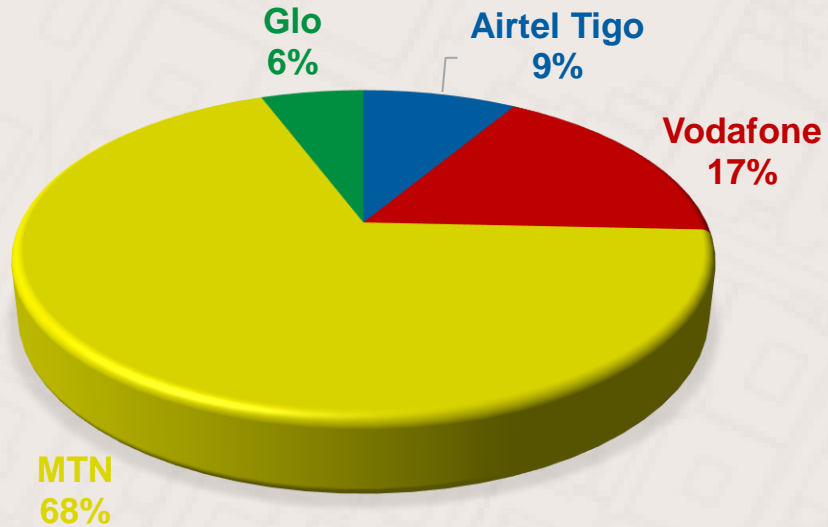
- A total of 39 telecommunication masts were found in the area of study.
- MTN recorded the highest number of telecommunication masts while Glo recorded the lowest.
- Two radio masts were also discovered in the area of study.
- Three radio stations were also found in the area of study.

SCALE: 1:25000

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PERCENTAGE USAGE OF TELECOMMUNICATION NETWORKS



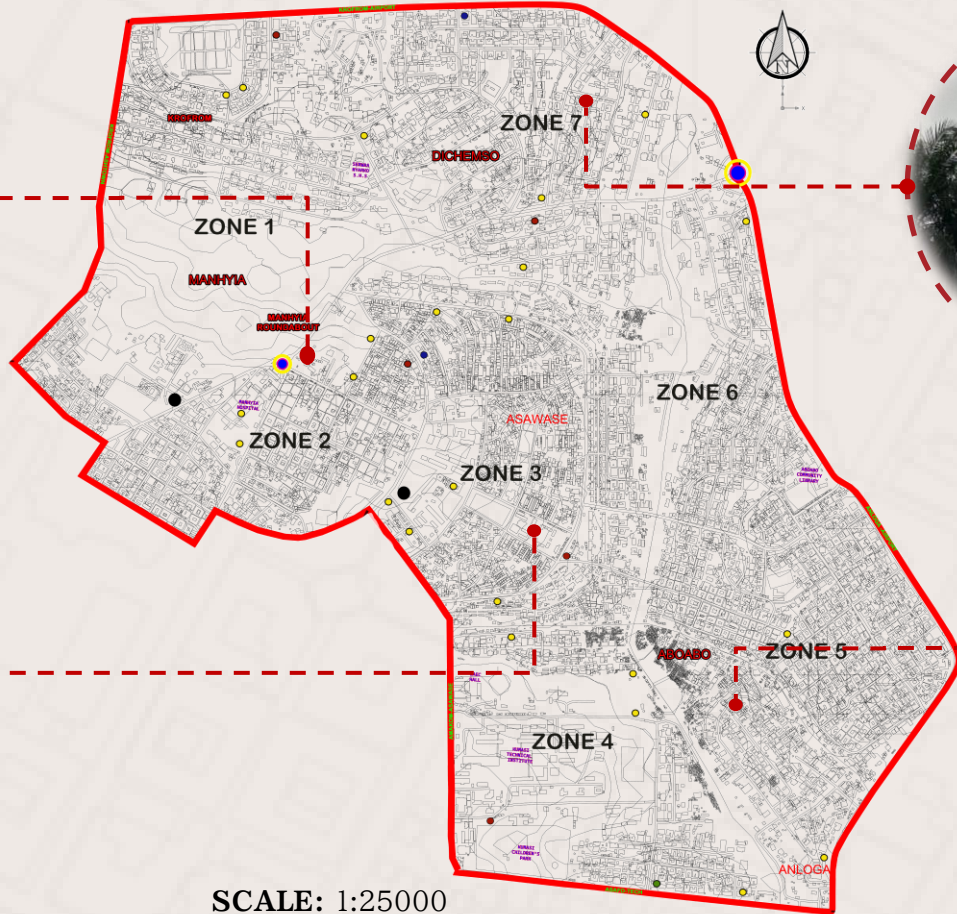
- It was discovered that a greater percentage of the residents of the vicinity used the MTN network.
- 17% of the residents used Vodafone while 9% of them used AirtelTigo.
- Only 6% of the residents were recorded using the Glo network.

Pie chart showing the distribution of telecommunication networks

MAP SHOWING THE LOCATION OF ALL THE TELECOMMUNICATION MASTS



Glo Mast



SCALE: 1:25000



Vodafone Mast



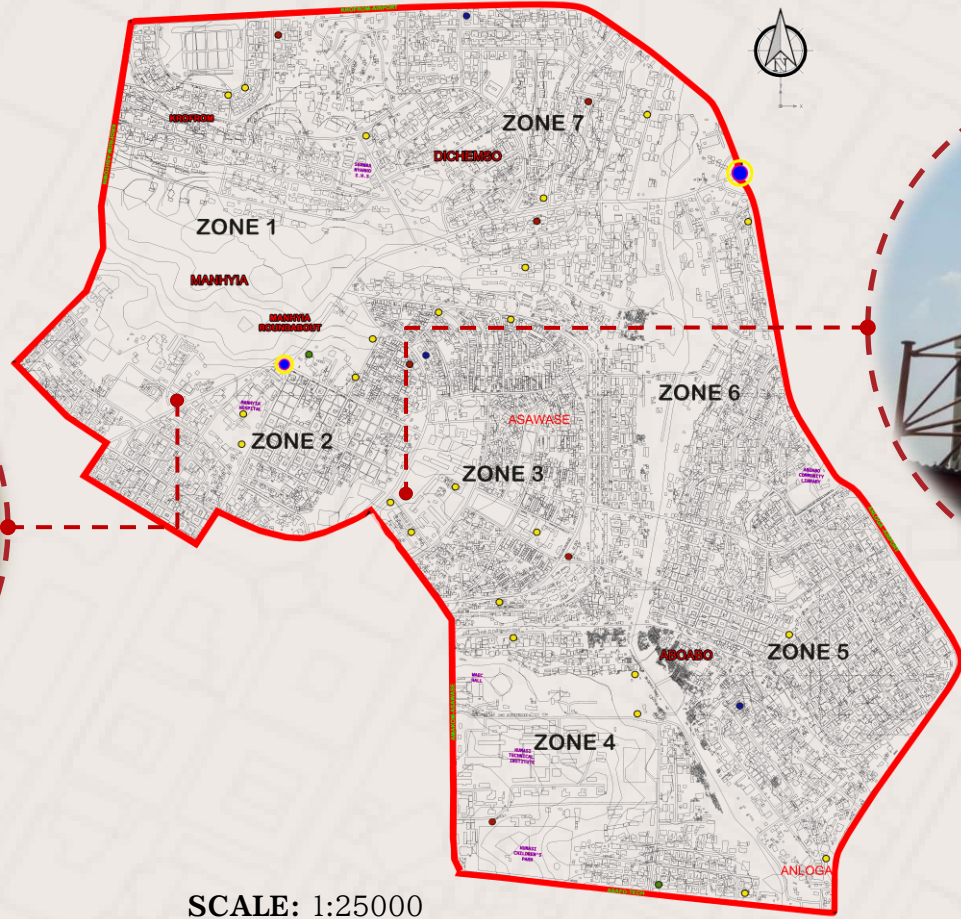
MTN Mast



Airtel Tigo Mast

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MAP SHOWING THE LOCATION OF ALL THE RADIO STATIONS



Sika FM



Haske FM

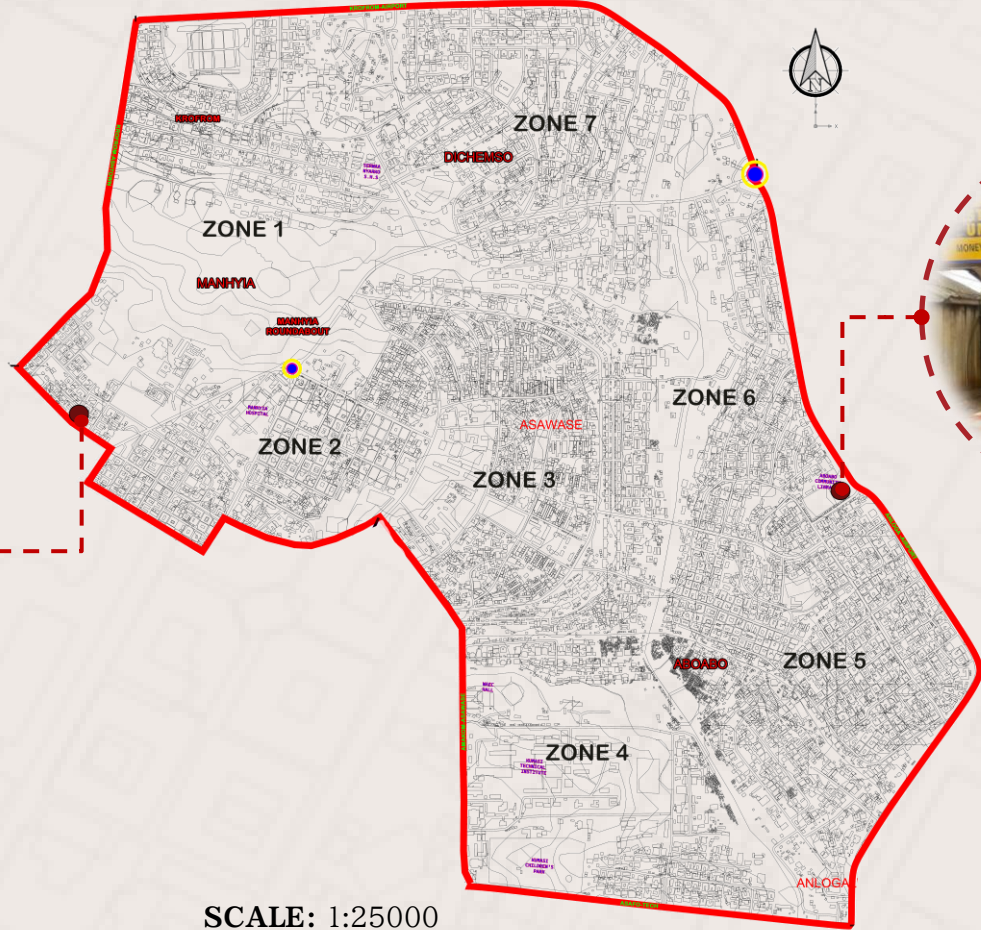
SCALE: 1:25000

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POST OFFICES



MAP SHOWING THE LOCATION OF ALL THE POST OFFICES



Post Office located in Manhyia



Post Office located at Aboabo

SCALE: 1:25000

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KEY STAKEHOLDERS:

Residents

Service Providers

THEMATIC AREAS	DATA REQUIRED	SOURCES	TYPE OF SURVEY	DATA COLLECTION INSTRUMENTS
Telecommunication	Network providers in the locality	Municipal Assembly	Institutional survey	Interview Guide
	Connectivity, proximity to credit and data	Stakeholders	Site Inventory	Structured Questionnaire
	Bandwidth/network coverage in the area	Residents	Map Updating	Photographs
	Radio/Tv stations	Maps	Questionnaire	Maps

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Waste Management

COURSE: **A R C 557/558: URBAN
STUDIES AND DESIGN**

STUDIO STAFF: **PROF. EDWARD AYE BENG
BOTCHWAY (YEAR MASTER), DR. ING.
ALEXANDER BOAKYE MARFUL,
DR. ALEXANDER EDUFUL**

TEACHING ASSISTANTS: **MISS RHANDA
MELISSA YANKEY, MISS NAA DZORMO
COFIE**

DATE: **FEBRUARY, 2023**



Table of Content

- 01** **Households**
- Household Population
 - Type of waste generated
 - Waste disposal

- 02** **Health facilities**
- Type of waste generated
 - Waste disposal

- 03** **Educational Facilities**
- Type of waste generated
 - Waste disposal

- 04** **Commercial Facilities**
- Type of waste generated
 - Waste disposal

- 05** **Industrial facilities**
- Type of waste generated
 - Waste disposal

- 06** **Waste Management Institutions**
- Services and Control
 - Chain of operations
 - Solid and Liquid Waste Management

- 07** **Refuse Dumpsites**
- Sanitary sites location

- 08** **Stormwater Drainage**
- Location, sizes and condition
 - Construction material of drains



MAP SCHEDULE

MAPS	PAGE NUMBER
Map showing areas visited	F01
Map showing Dikyemso M\A basic in zone 7	F09
Map showing Manhya district hospital in zone 2	F10
Map showing Cornmill industry in zone 3	F11
Map showing Aluminium processing factory in zone 5	F14
Map showing plastic processing site in zone 6	F15
Map showing first class public toilet in zone 6	F20
Map showing Manhya dumpsite in zone 2	F21
Map showing Otec dumpsite in zone 2	F23

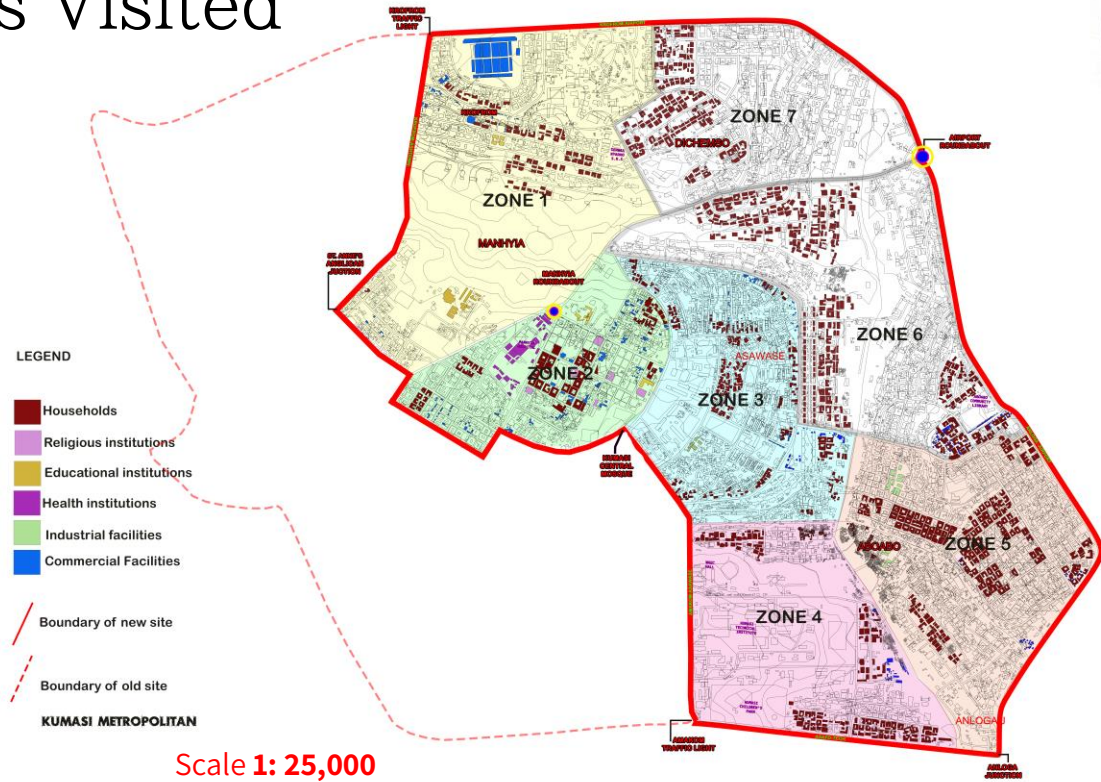


Map showing Areas Visited

Using a sample size calculator,

- A population of **80,632** houses
- A confidence level of **95%**
- The margin error of **+/-5**
- Population proportion of **50%**
- Sample size of this study is **383**

houses be surveyed across the study zone.



MAP SHOWING AREAS VISITED.(SOURCE: FIELD SURVEY)

Household Waste Management

1. How many people are currently living in the house?

NUMBER	FREQUENCY
1-4	29
5-10	98
10+	256
TOTAL	383

2. What type of solid waste is generated in this house?
(One or more answer)

TYPE OF SOLID WASTE	FREQUENCY
Plastic	113
Food waste	113
Tins/cans	120
Glass	50
Other	45

Source: Author's Construct, 2023

Household Waste Management

3. How often is the waste container emptied?

NUMBER OF TIMES	FREQUENCY
Once a day	208
Every 2 days	73
Once a week	54
When it gets full	48
Randomly	0
TOTAL	383

4. Where do you usually put away collected waste?

MODE	FREQUENCY
Zoomlion	15
Tricycle (Aboboyaa)	295
Incineration	45
Open dumping	23
Open pit	3
Others	2
TOTAL	383

Source: Author's Construct, 2023



Household Waste Management

6. Is there a public bin near you?

OPTION	FREQUENCY
Yes	74
No	309
TOTAL	383

7. Is the waste disposal method a problem in your neighbourhood?

OPTION	FREQUENCY
Yes	347
No	36
TOTAL	383

8. How do you evaluate the state of solid waste collection in your neighbourhood?

STATE	FREQUENCY
Good	208
Average	73
Not good	54
Not sure	48
TOTAL	383

Source: Author's Construct, 2023



Household Waste Management

9. Have you ever heard about waste recycling?

OPTION	FREQUENCY
Yes	327
No	56
TOTAL	383

10. Are you interested in waste recycling?

OPTION	FREQUENCY
Yes	357
No	24
TOTAL	383

11. How much do you currently pay for waste collection in your locality per month?

AMOUNT	FREQUENCY
Below 5gh	6
5-10gh	26
10-20gh	16
20-50gh	310
Above 50gh	25
TOTAL	383

Source: Author's Construct, 2023

Household Waste Management

12. How do you usually pay for waste collection?

MODE OF PAYMENT	FREQUENCY
Mobile money	26
Cash point	357
Automatic reduction	0
TOTAL	383

13. How convenient would you say your waste disposal system is?

OPTION	FREQUENCY
Very Convenient	183
Moderate	158
Not so convenient	42
TOTAL	383

Source: Author's Construct, 2023

Household Waste Management

14. How do you dispose of grey water/ foul water?

MODE OF DISPOSAL	FREQUENCY
Soak away	83
Gutter	158
Septic tank	42
Bare Ground	76
Others	24
TOTAL	383

15. What method of defecation do you use?

METHOD	FREQUENCY
Private toilet	186
Public /community	125
Open pit	0
KVIP	28
Dumpsite	43
TOTAL	383

Source: Author's Construct, 2023

Household Waste Management

F07

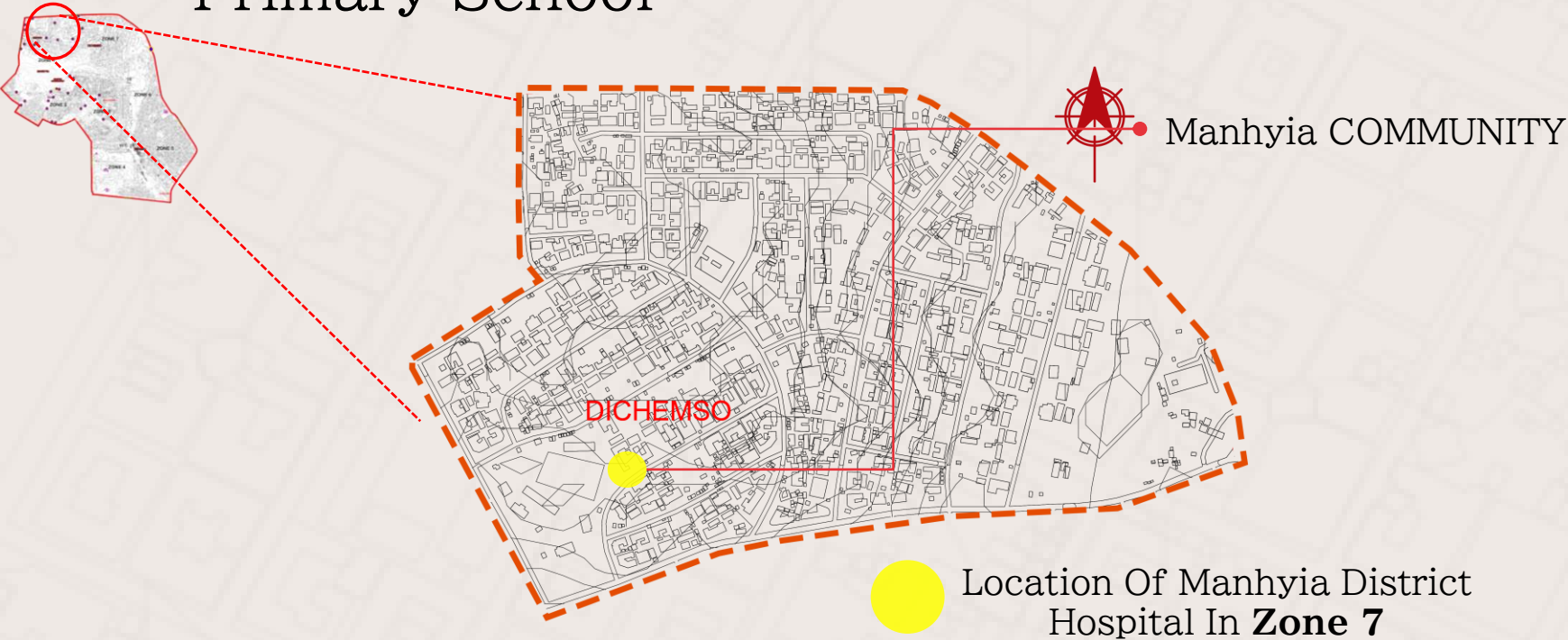
16. For private toilets, how do you store/ dispose of sewage?

OPTION	FREQUENCY
Municipal sewage lines	26
Septic tank	357
TOTAL	383

Source: Author's Construct, 2023



Educational Institution-Dichemso M/A Primary School



Scale 1: 10,000

MAP SHOWING EDUCATIONAL INSTITUTION IN ZONE 7 (SOURCE: FIELD SURVEY)

Waste Management In The School

F09



Source: Field Survey, 2023

- ❑ The school is government owned
- ❑ They pay 120gh monthly and it is expensive so they burn their solid waste behind their ICT lab.
- ❑ They have a public toilet which is shared with the community since they need money for its maintenance.
- ❑ Liquid waste from the toilet is collected in a septic tank.
- ❑ New toilet facility under construction which uses a biodigester but uncompleted due to lack of funds



- ❑ The school toilet being shared the public



- ❑ Burning of solid waste behind their ICT lab whiles school is session.



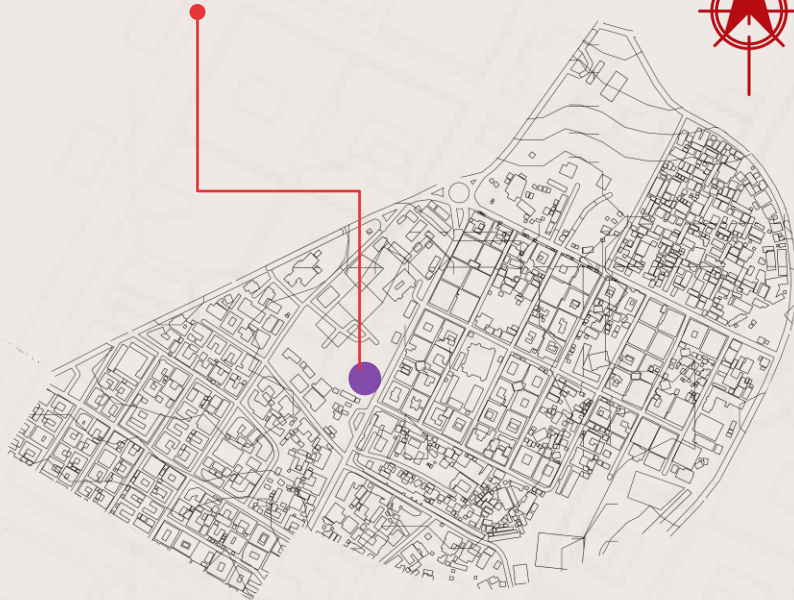
Source: Field Survey, 2023

- ❑ New biodegradable toilet facility unfinished due to lack of funds.

Health Institution-Manhyia District Hospital

F10

Manhyia COMMUNITY



Location Of Manhyia District Hospital In **Zone 2**

- General waste generated is burned using an incinerator.
- Human body parts after surgery and after birth waste is deposited in a pit.
- Waste deposit is done three times a day.

Method of Waste disposal

- General waste
- Infectious waste
- Chemical waste
- Medical waste



Incinerators



Pit

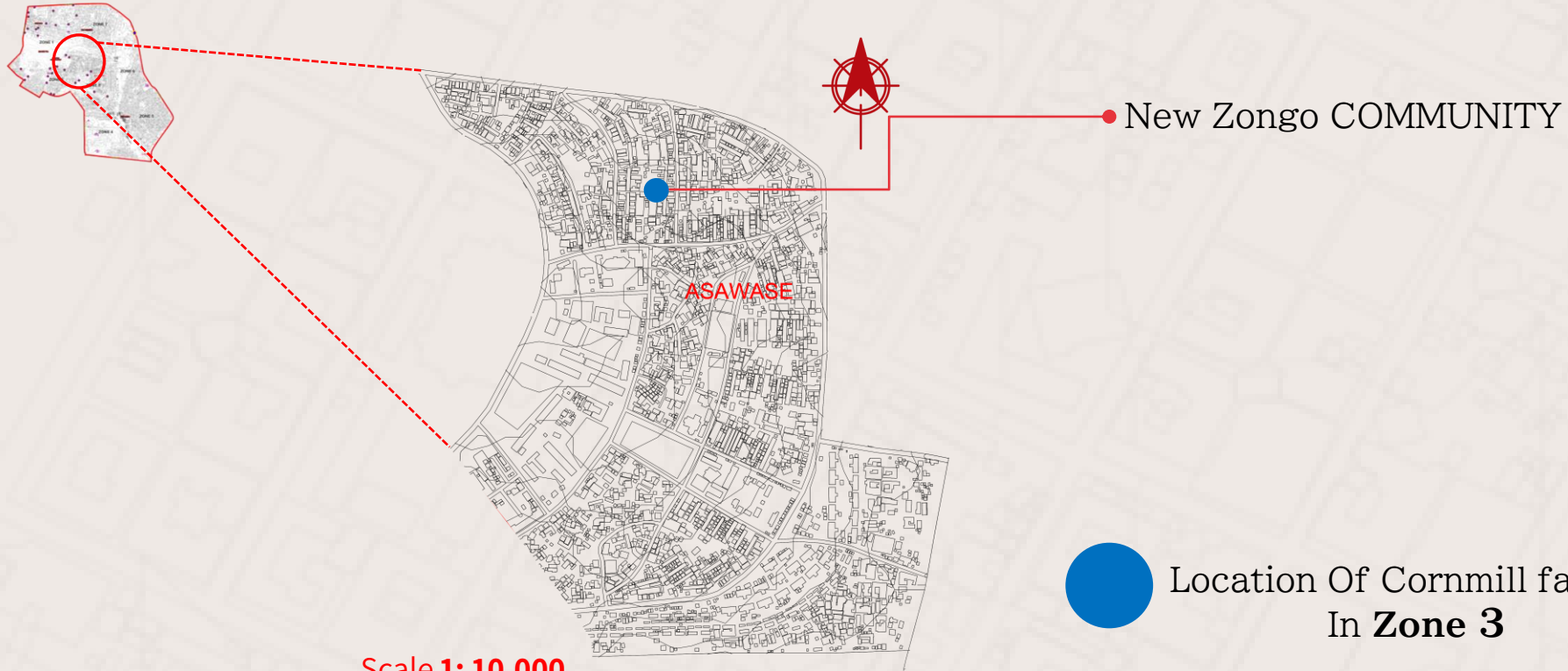


Zoomlion

Source: Field Survey, 2023

Industrial Facility-Cornmill Factory, New Zongo

F11



Scale 1: 10,000

Location Of Cornmill factory
In **Zone 3**

MAP SHOWING INDUSTRIAL FACILITY IN ZONE 3 (SOURCE: FIELD SURVEY)

Industrial Activity-Cornmill Factory, New Zongo

F12



Source: Field Survey, 2023

- Cornmill production is one of the main industrial activities in the Zongo communities in the study area.
- The end product is used to prepare tuo zaafi.
- They produce 20 sacks of waste per day from milling.

- During the process of separating the chaff, there is a lot of particle deposited into the atmosphere.
- This causes air pollution into the environment and makes it unsafe.

Method of Waste disposal



Source: Field Survey, 2023

- Chaff is stored in sacks and sold as poultry feed.
- Waste water is channelled through the gutters.
- Collected and disposed of by tricycle.

PRODUCTION PROCESS

STAGE 1



- Raw material is bought from Tricycle vendors usually known as 'condemn'

STAGE 2



- Waste is melted in hot coal to Remove dust

STAGE 3



- The liquid metal is kept in a frame to get the shape and to cool

STAGE 4



- Cooled metal is and moulded to make cooking pots for large scale food vendors

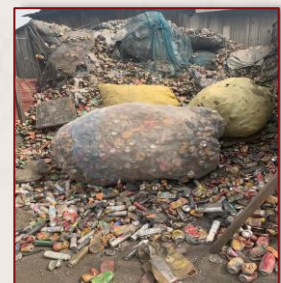
Image Source: Field Survey, 2023



- Aluminium waste to make Aluminium roofing sheets and sold to retail and wholesale firms



Cans and Tin waste is molded to cooking pots and sold to large scale food vendors



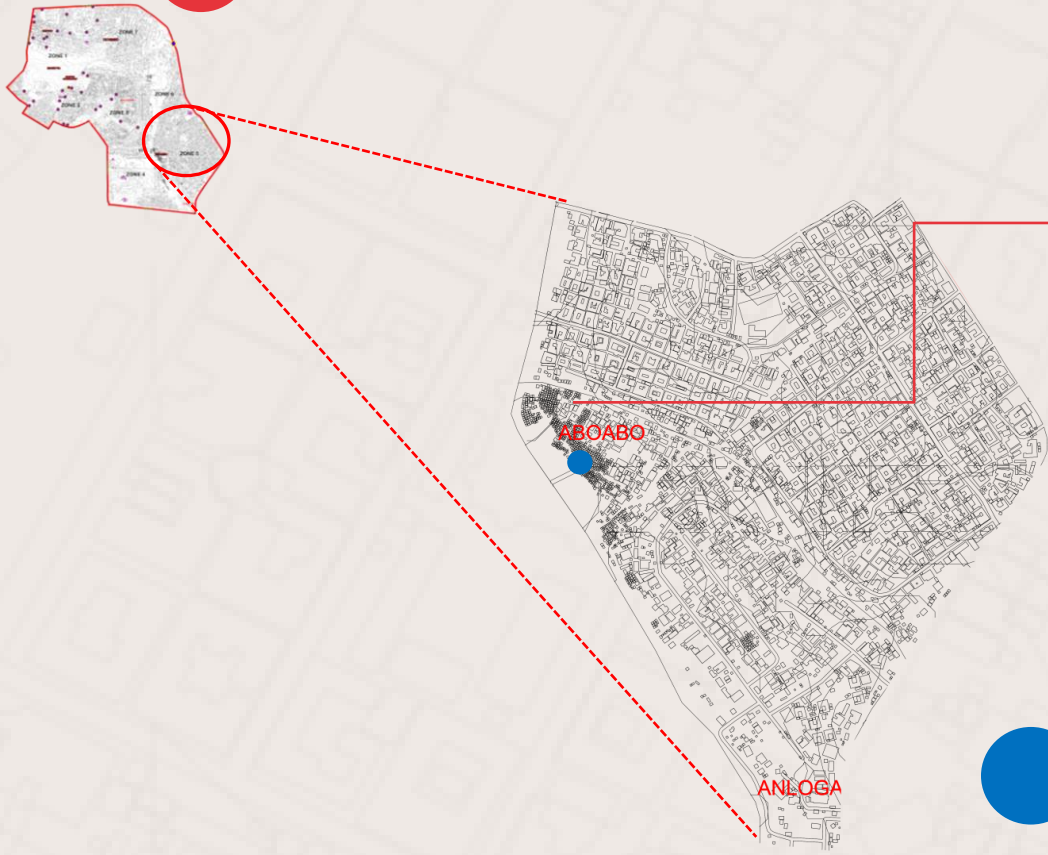
Source: Field Survey, 2023

Waste from car Spare parts is used to make Iron rods and sold to construction firms.



- 1.Noise pollution
2. Air pollution
3. Most of them had respiratory disease

Aluminium Processing Factory, Aboabo.



ABOABO COMMUNITY

Location Of Aluminium processing factory In **Zone 5**

MAP SHOWING INDUSTRIAL FACILITY IN ZONE 5 (SOURCE: FIELD SURVEY)

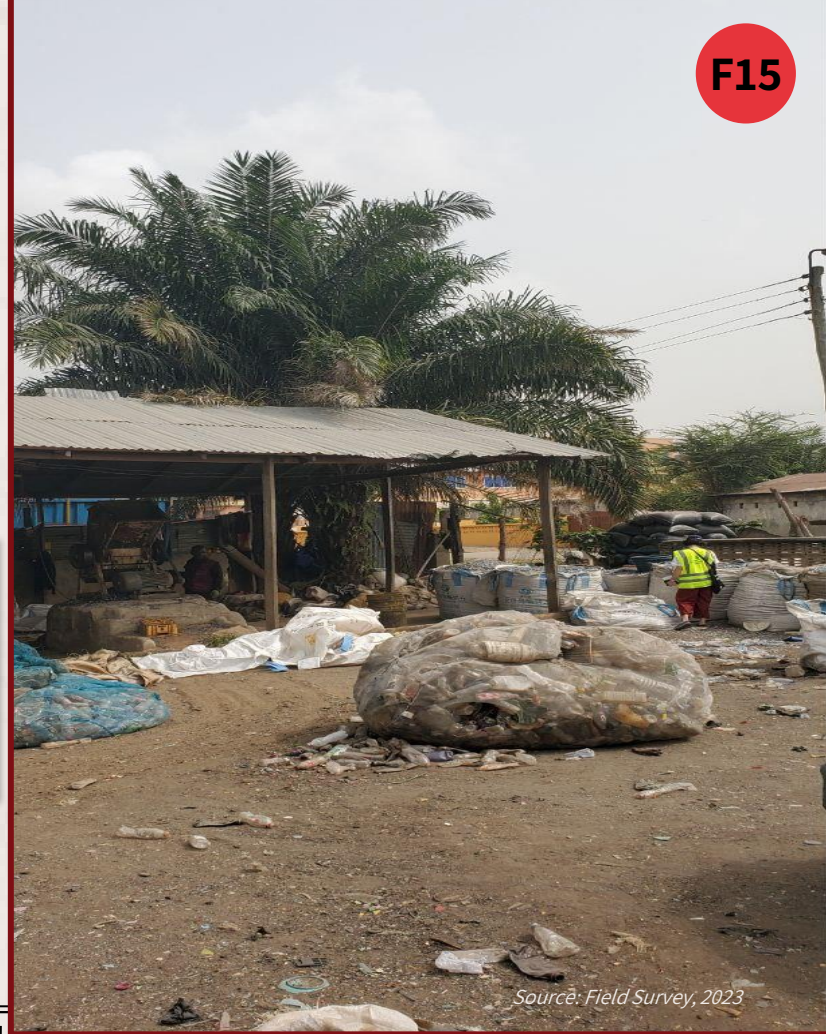
PLASTIC PROCESSING FACILITY

- Located at Airport roundabout
- Has no name and not registered too
- They have contract with tricycles to bring the plastic waste.
- Plastic is sorted out at the factory .
- It is then processed into pellets or plastic shreds.



- Pellets are transported to Tema to be processed into plastic products like plastic buckets and bags.
- Some of the shreds are exported to China for further recycling.

Source: Field Survey, 2023

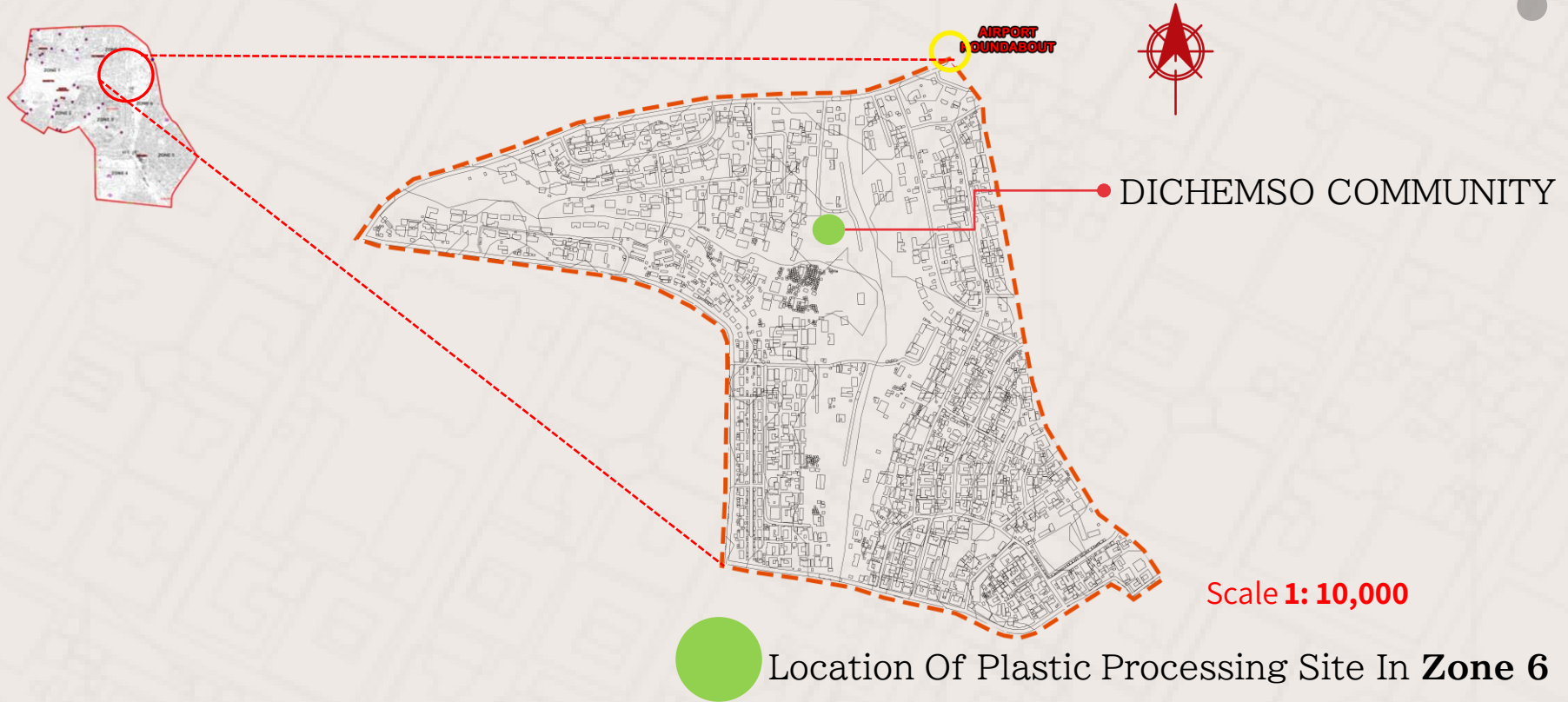


Source: Field Survey, 2023



PLASTIC PROCESSING FACILITY LOCATION

F16



MAP SHOWING PLASTIC PROCESSING SITE IN ZONE 6 (SOURCE: FIELD SURVEY)



WASTE MANAGEMENT INSTITUTION

Kumasi Metropolitan Assembly

- Kumasi Metropolitan Assembly (KMA) is located in Adum.
- The **Waste Department** under KMA is responsible for collecting waste of towns under KMA of which Manhyia, Asawase.
- Waste Department under KMA has the following provcess
 - ✓ **WASTE GENERATION POINTS**
 - ✓ **WASTE COLLECTION POINTS**
 - ✓ **WASTE DISPOSAL POINTS**

Waste is generated from Beneficiaries



Households



Educational



Health

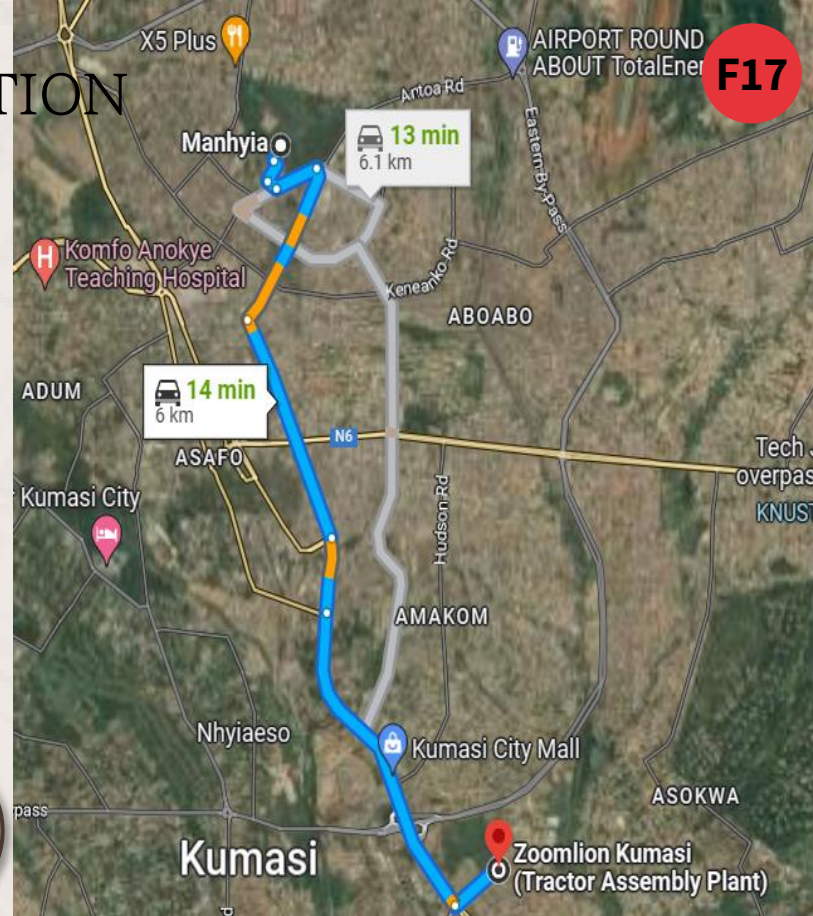


Industries



Commercial

Source: Field Survey, 2023



Source: google earth

F17

© 2022



WASTE COLLECTION POINTS

WASTE DESTINATION POINTS

- KMA has contract with other waste management institution to collect the waste.
- 400 Tricycles registered colour coded orange under the KMA are responsible for collecting the waste from households in the community.



Source: Field Survey, 2023

- Zoomlion
- Asadu Waste limited
- Tricycle contract
- Kumasi Waste limited

- KMA transport waste from site to Kumasi Compost and recycling center (kcarp).
- Both solid and liquid waste carried by these Trucks are transported straight for recycling.

Driving schedule

- Tafo – Manhia 3 times a week from 6am – 4pm Once a day

SOLID WASTE



Recycle



Source: Field Survey, 2023



Treated



Source: Field Survey, 2023

- Organic waste is recycled to compost for fertilizing plants.
- Liquid is treated and then disposed to drains when no longer harmful to the environment.

PUBLIC LATRINE

FIRST CLASS TOILET (ABOABO COMMUNITY)

- PERIOD OF OPERATION
3am – 12 am
Private owned.
- CAPACITY
24 Females
12 Males
- PAYMENT
1gh – Adults
0.50pws - Children



- Paper waste is gathered and burnt



- There is a septic Tank to collect toilet waste



- Waste water from wash hand basin is laid to the floor.

Source: Field Survey, 2023



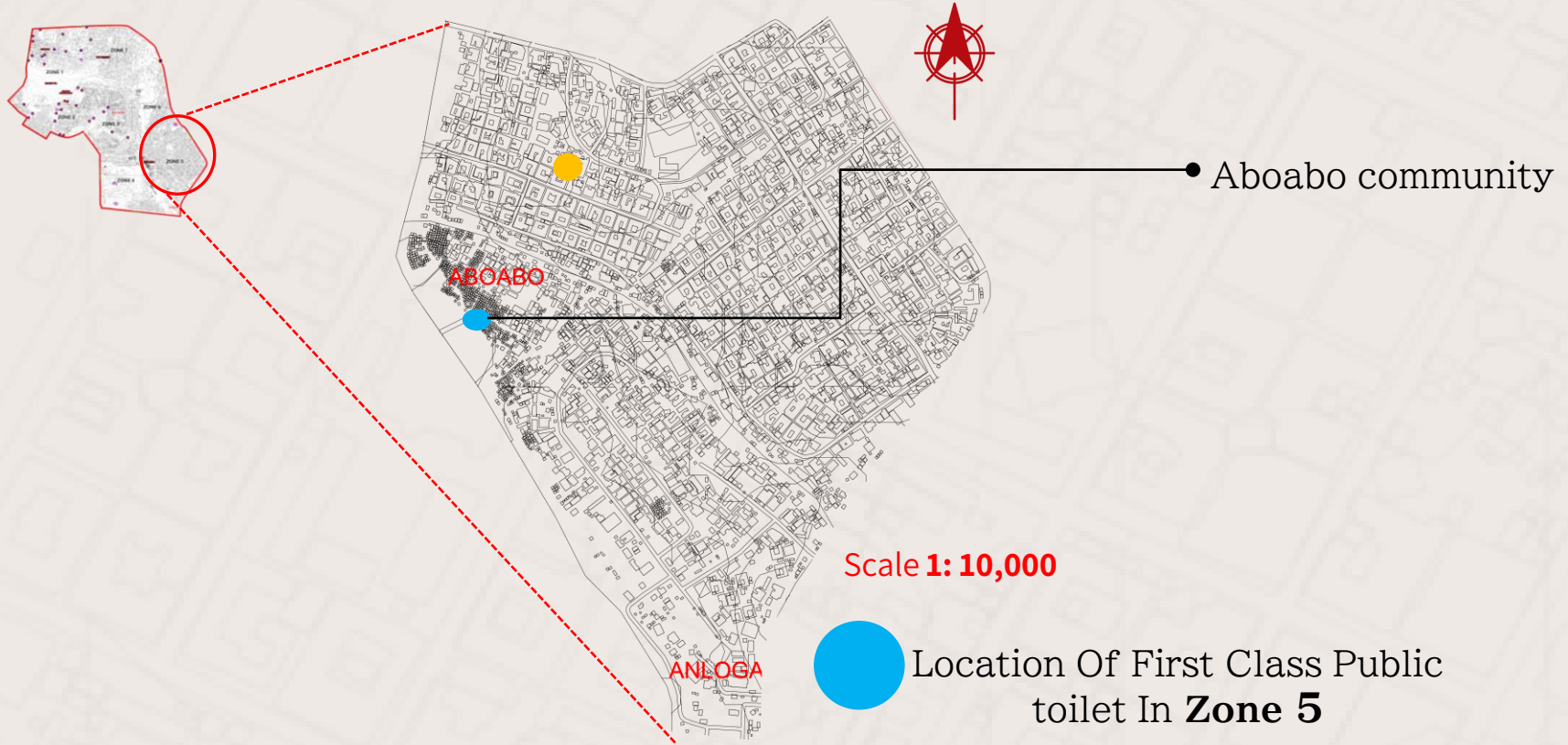
F19

Source: Field Survey, 2023



FIRST CLASS PUBLIC TOILET

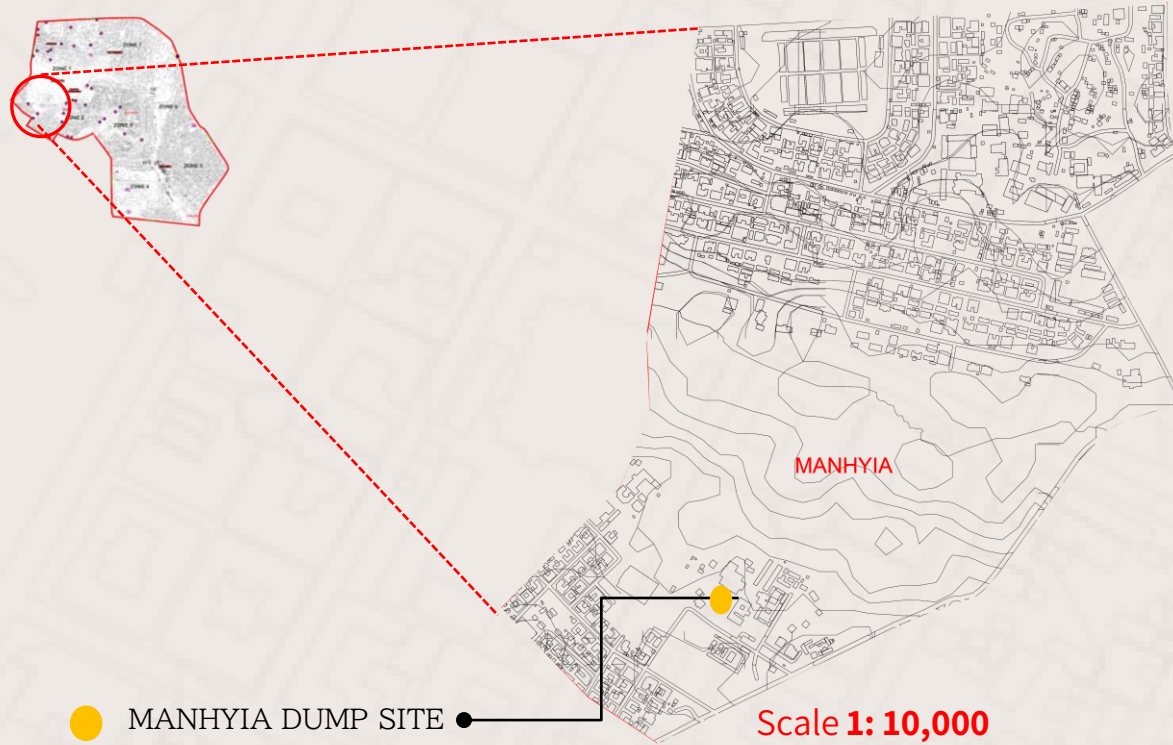
F20



MAP SHOWING FIRST CLASS PUBLIC TOILET IN ZONE 6 (SOURCE: FIELD SURVEY)



DUMP SITE LOCATION



● MANHYIA DUMP SITE

Scale 1: 10,000

Location Of Manhya Dump Site In **Zone 2**

MAP SHOWING MANHYIA DUMPSITE IN ZONE 2 (SOURCE: FIELD SURVEY)

DUMP SITES

F22

❑ OTEC DUMP SITE



Source: Field Survey, 2023

- The dump site has existed for more than 20 years
- The place has been turned into a media school (OTEC)
- The native still dump refuse there and it is burnt. The place is used for open defecation by the natives

❑ MANHYIA REFUSE DUMP



Source: Field Survey, 2023

- The skip container was taken for emptying,
- there was a heap of refuse scattered on the ground and some packed in sacks waiting for emptying.

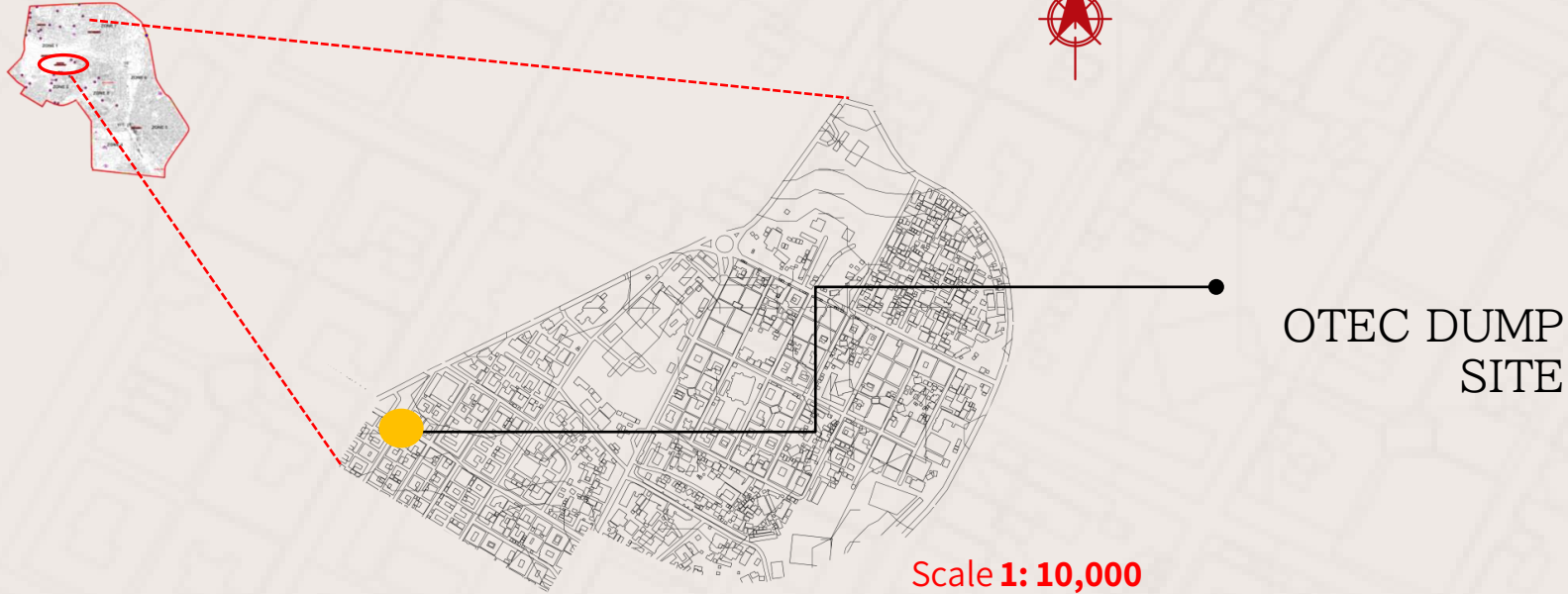


Source: Field Survey, 2023

- Aboabo Station sanitary no toilet facility,
- Two roll-on/off containers were on the site
- The containers were full and refuse scattered on the ground;
- Segregation of waste was practiced.

DUMP SITE LOCATION

F23



● Location Of Otec Dump Site In **Zone 2**

MAP SHOWING OTEC DUMPSITE IN ZONE 2 (SOURCE: FIELD SURVEY)



Street Drainage

Physical Infrastructure

Street Drainage

TABLE OF CONTENTS

Introduction	A brief introduction into what street drains are.
Maps	Maps showing the types of street drains in the municipalities
Major Drains	Map , pictures and analysis of some of the major drains in the municipality
Minor Drains	Map , pictures and analysis of some of the minor drains in the municipality



Street Drainage

Infrastructure designed to drain excess rain and ground water from impervious surfaces such as paved streets, car parks, parking lots, footpaths, and sidewalks.

They are essential in managing puddle buildup around roads and walkways

Street Drainage (All municipalities surveyed)



Map showing all major and minor drains in the municipalities

- Brown**
Minor drains,
predominantly on local
streets
- Orange**
Major drains,
predominantly on collector
and arterial roads
- Blue**
Rivers and streams.
Minor and major drains
flow into these water
bodies

SURVEY 203



Street Drainage

(All municipalities surveyed)

Characteristics of Major Drains



Images showing some major street drains for all the zones

SURVEY 203



Street Drainage

(All municipalities surveyed)

Characteristics of Major Drains



Materials

All of the drains observed were made of concrete



Cover

The drains were open in almost all areas. Coverings were provided for pedestrian and vehicular paths only. Covering materials are either concrete or steel



Condition

Most of the drains were in good condition.



Waterflow

Waterflow was blocked by rubbish in most drains, choking most of the drains observed.



Street Drainage

(All municipalities surveyed)

Characteristics of Minor Drains



Images showing some minor street drains for all the zones



Street Drainage

(All municipalities surveyed)

Characteristics of Minor Drains



Materials

Most minor drains were made of concrete, and a few were holes created by the side of streets or created by erosion



Cover

The drains were open in almost all areas. Coverings were provided for pedestrian and vehicular paths only. Covering materials are either wood, concrete or steel



Condition

Most of the concrete drains were in good condition. The ones not made of concrete pose a risk of choking and overflow



Waterflow

Waterflow was blocked by rubbish in most drains, choking most of the drains observed.



Street Drainage

(All municipalities surveyed)

Inference from Observation of Street Drains

01

Treatment of Drain Water

Wastewater from households, industries and facilities flows directly into the river without any form of treatment.

02

Choking

The drains observed were choked in most places, resulting in a lot of the drains being choked or having restricted water flow





Stormwater Management

The practice of managing the runoff from rainfall and other precipitation to prevent flooding, erosion, and water pollution.



Stormwater Management

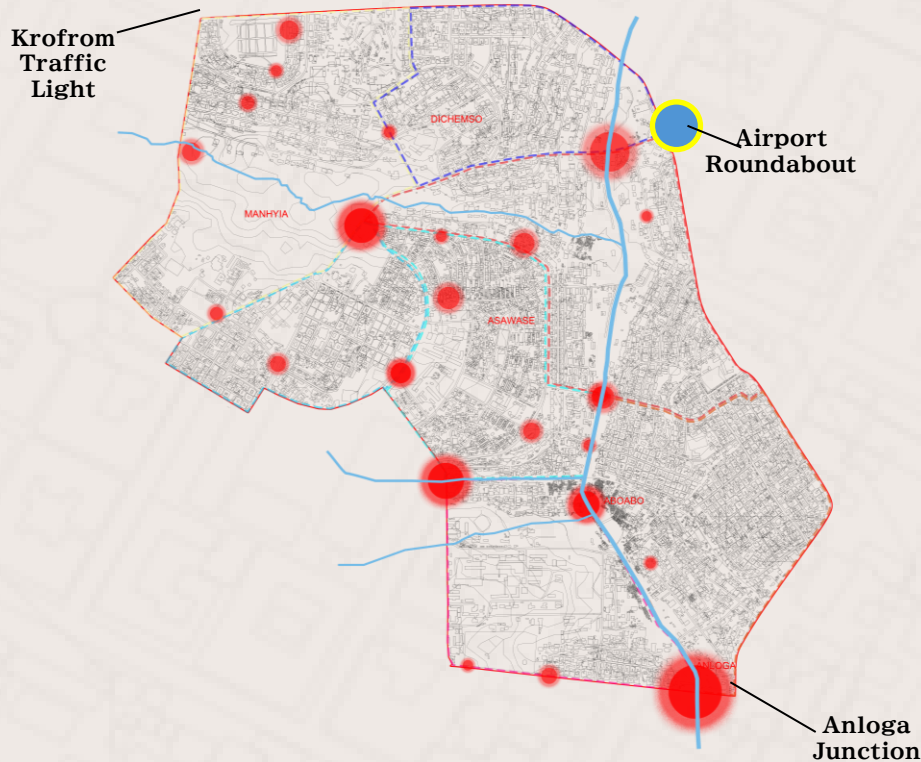
TABLE OF CONTENTS

Stormwater Management for	Zones 1, 2, 3, 4, 5, 6 and 7.
Materials	The materials used for the construction of the stormwater drains
Location	The coordinates of the stormwater drains studied for the survey
Condition	The conditions of the stormwater drains studied for the survey
Leakages	Observation into whether or not water was seeping through/from the drains studies



STORMWATER DRAINS

(Whole Enclave)



Red

The Red dots on the map show the major stormwater drains in the enclave. Larger dots represent larger stormwater drains

SURVEY 2023



Drain Summary (Drain)



Materials

- Concrete body (mostly observed), or sandy banks
- Concrete slab and metal grille covers are the major drain covering materials



Condition

Most of the drains were observed to be choked with rubbish, which restricted water flow through the drains



Leakages

Water leakage and spillovers were rarely observed
Most drains had foul smell from the choked rubbish



STORMWATER DRAINS

(Whole Enclave)



— Blue

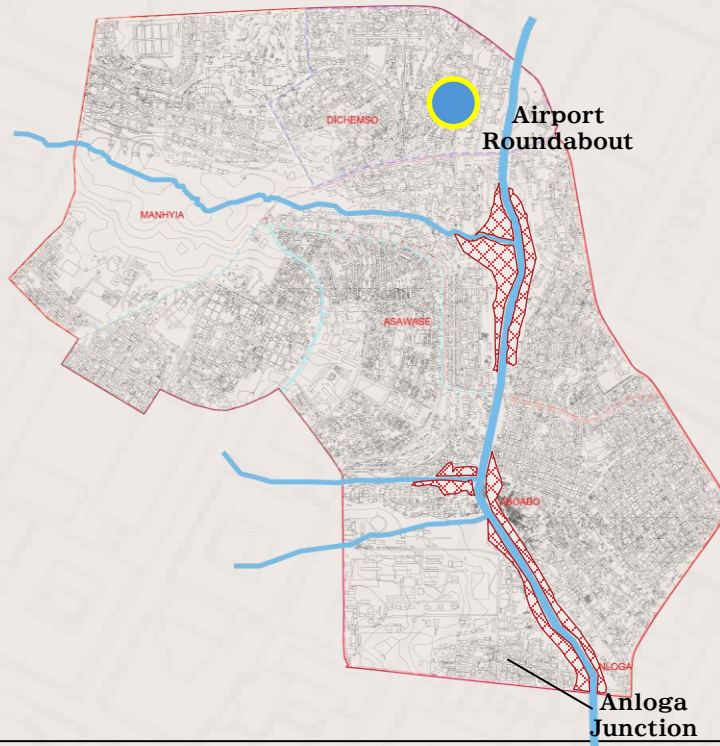
The blue areas on the map show all the major end stormwater drains in the enclave. Water from all the drains and gutters flows into streams which then flow into the river

SURVEY 2023



State Of The Stormwater Drains (Whole Enclave)

Krofrom
Traffic
Light



Observation

Most of the stormwater drains are heavily choked due to dumping of rubbish, restricting flow of water, and resulting in frequent flooding

 Red

The red patterned areas on the map show all the flood prone areas

SURVEY 2023



ENERGY SUPPLY AND DEMAND

○ **KARIKARI KUSI DANIEL**

○ **OFORI SOLOMON PEPPRAH**

SURVEY 2023



ENERGY DEMAND AND SUPPLY

TABLE OF CONTENT

Introduction	Definition of terms
Thematic area	Keyholders and thematic areas of the study (data instruments, source etc)
Statistical data	Tally distribution and graphs
Institutional maps analysis	Analysis of maps obtained from ECG
Data Findings	Conclusions

ENERGY DEMAND AND SUPPLY

TABLE OF MAPS

Map showing the location of the Ashanti Regional ECG HeadquartersJ09

Map showing the electricity feeders at the enclave J10

Map showing the power lines and electricity poles J11

Map showing the type of meter (pre-paid or credit)J12

Map showing ECG vending points at the study areaJ13

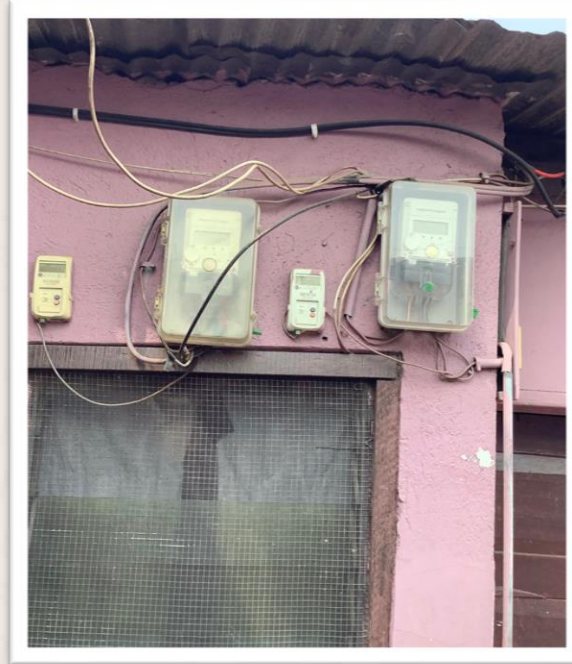
DOMESTIC (ZONE 1-7)

ENERGY SUPPLY

- ❖ Energy supply is the quantity of energy available that suppliers can provide to end users (Laveet Kumar, 2020).

ENERGY DEMAND

- ❖ Energy demand is the term used to describe the consumption of energy by human activity (CREDS, 2023).

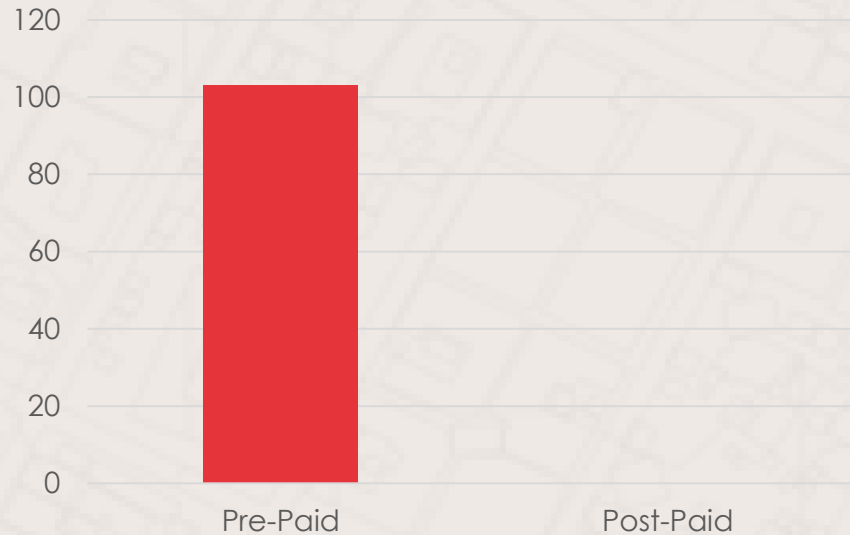


- ❖ The Electricity Company of Ghana (ECG) supplies majority of the electricity used in the zones under study.
- ❖ The types of meters provided are
 - Pre-paid
 - Post-paid

DOMESTIC (ZONE 1-7)

Type of meter used by households

Meter	Tally	Total
Pre-paid	103	103
Post-paid	0	0
Total	103	103



All the households (n=103) that were surveyed across all 7 zones use the pre-paid system where they first have to buy power before they can have electricity.

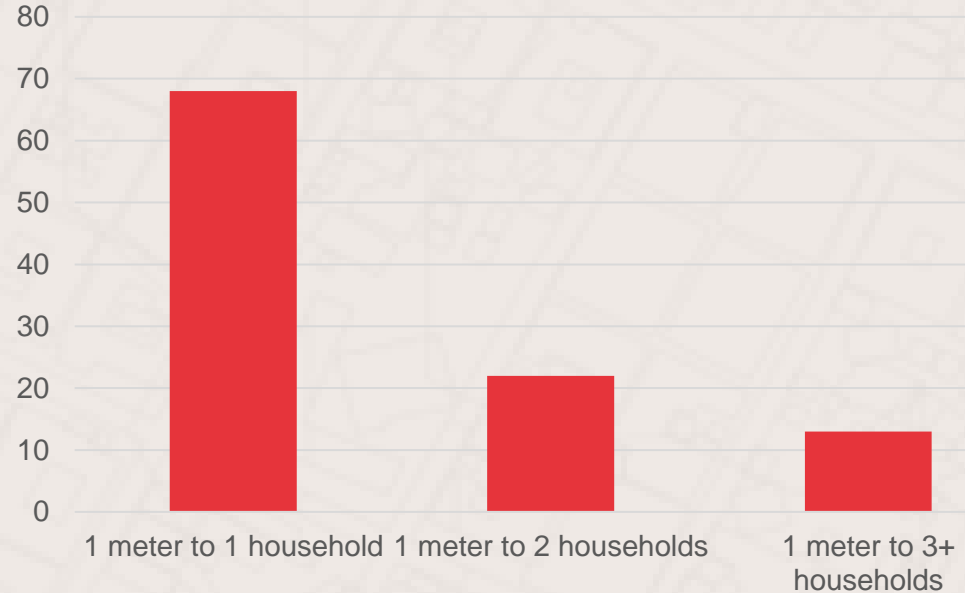
From the data, It can be established that the pre-paid meter is the mostly used type of meter in houses in the various zones.

ELECTRICITY SUPPLY

DOMESTIC (ZONE 1-7)

Meter	Tally	Total
1 meter to 1 household	68	67
1 meter to 2 households	22	23
1 meter to 3+ households	13	13
Total	103	103

Number of households and meter assigned



Most of the individual households have been assigned one meter.

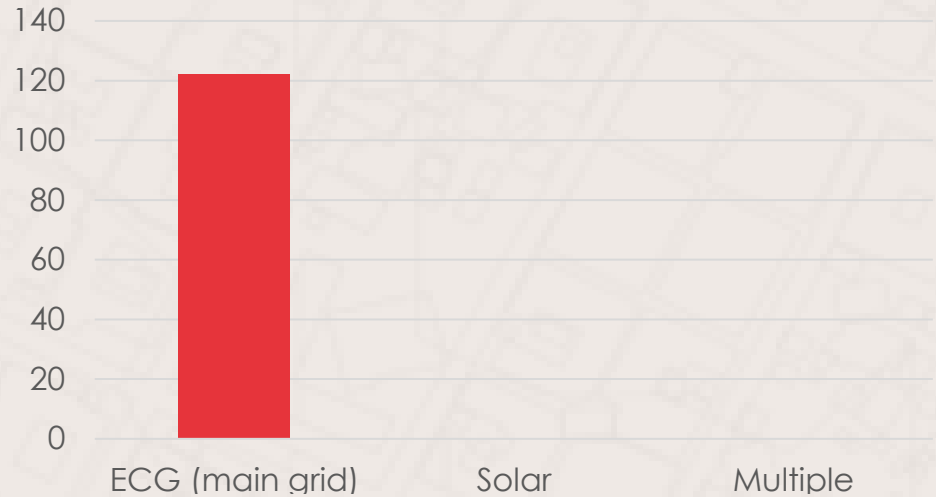
There are also 2 households that have been assigned to a meter and they constitute 21% of the 103 households surveyed.

The smallest percentage is (13%) where 3 or more households have been assigned to a meter.

DOMESTIC (ZONE 1-7)

Source of Electricity

Source of electricity	Tally	Total
ECG (Main grid)	103	103
Solar	0	0
Multiple(solar + main grid)	0	0
Total	103	103



All the households (n=103) that were surveyed in the various zones have their source of power or electricity from the national grid (ECG).

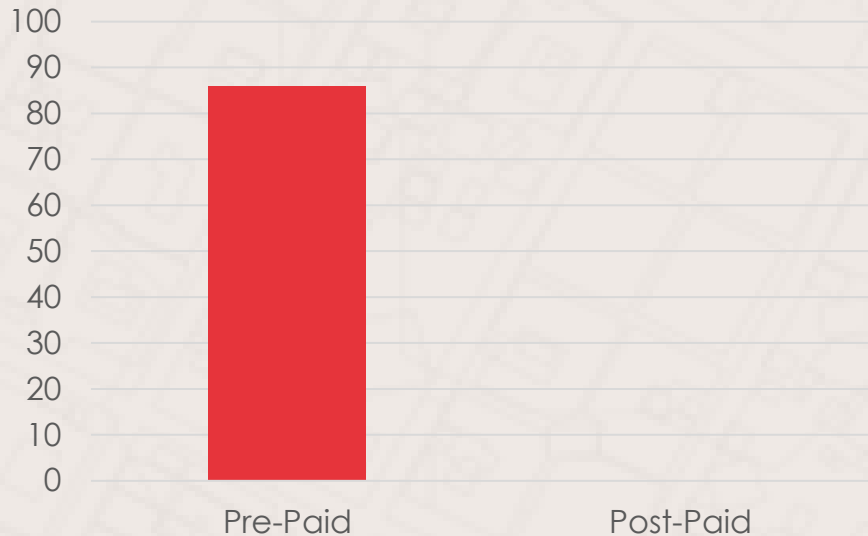
Adopting an alternative sources like solar would be expensive considering the economic character of the various zones under study.



COMMERCIAL (ZONE 1-7)

Type of meter used in commercial facility

Meter	Tally	Total
Pre-paid	86	86
Post-paid	0	0
Total	86	86



The dominant type of ECG meter used in commercial setups is the pre-paid meter.

It can be established that the pre-paid meter is the mostly used type of meter in commercial setups within the various zones.

COMMERCIAL (ZONE 1-7)

SOLAR ENERGY

- ❖ Solar was also used as a source of energy in some commercial setups within the study area.



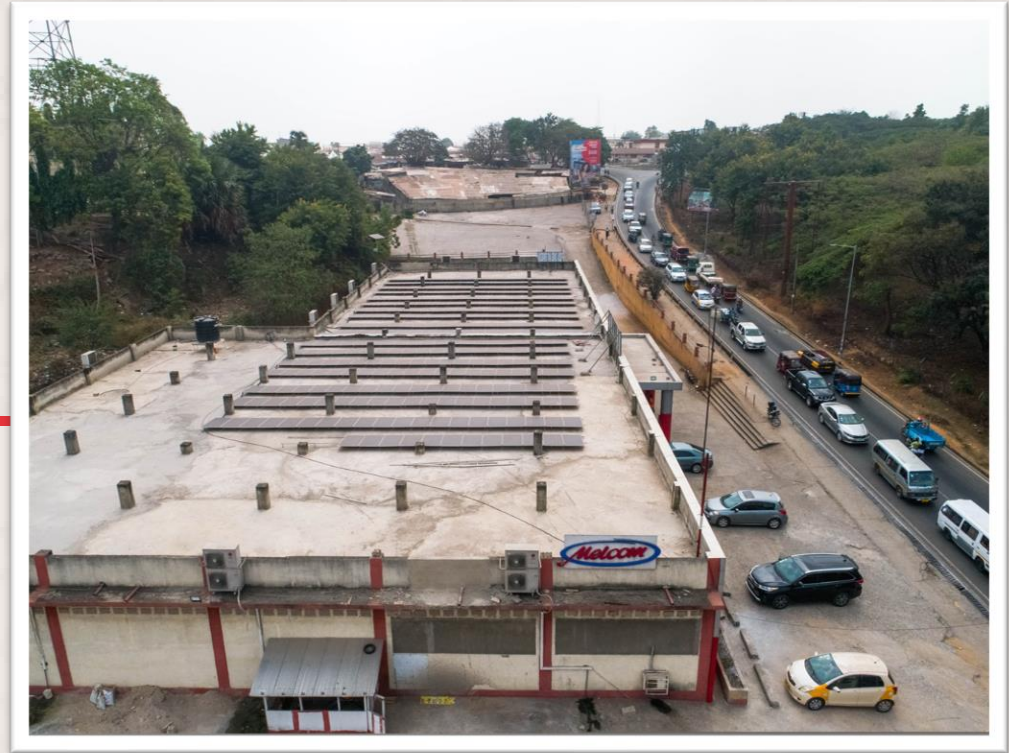
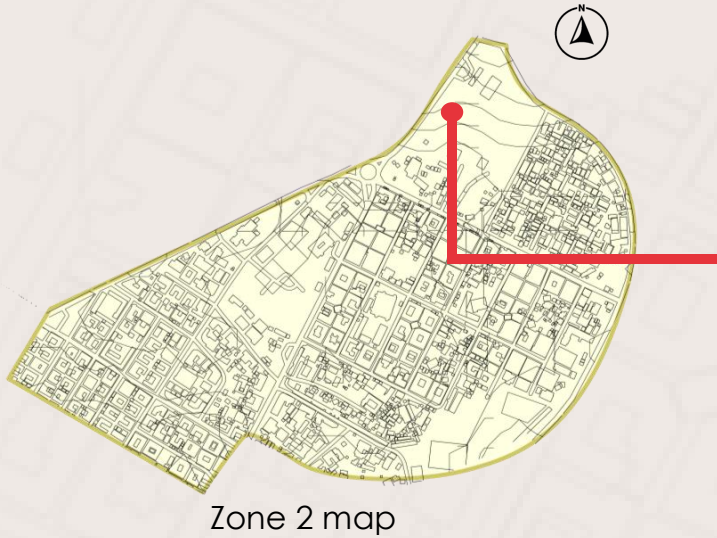
Zone 2 map



Solar system at shell fuel station near the Kumasi central mosque.

COMMERCIAL (ZONE 1-7)

SOLAR ENERGY



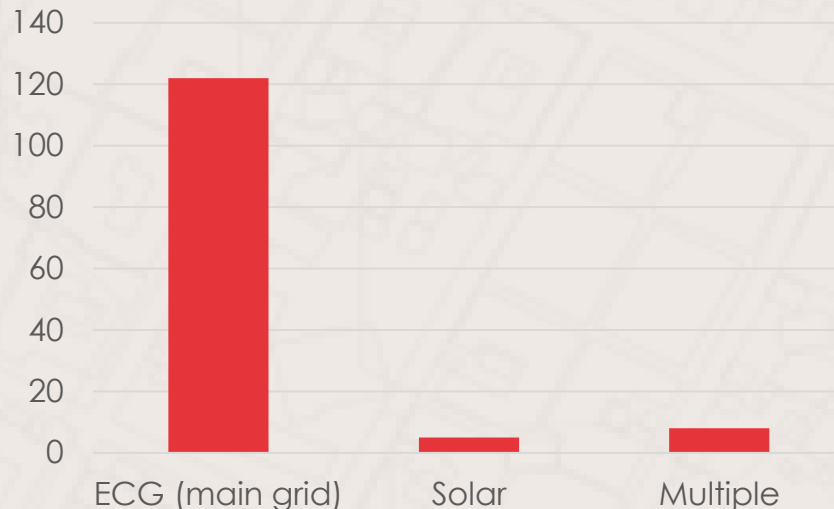
Solar panels installed on the roof Melcom at Manhyia



COMMERCIAL (ZONE 1-7)

Source of electricity	Tally	Total
ECG (Main grid)	122	122
Solar	5	5
Multiple(solar + main grid)	8	8
Total	135	135

Source of Electricity

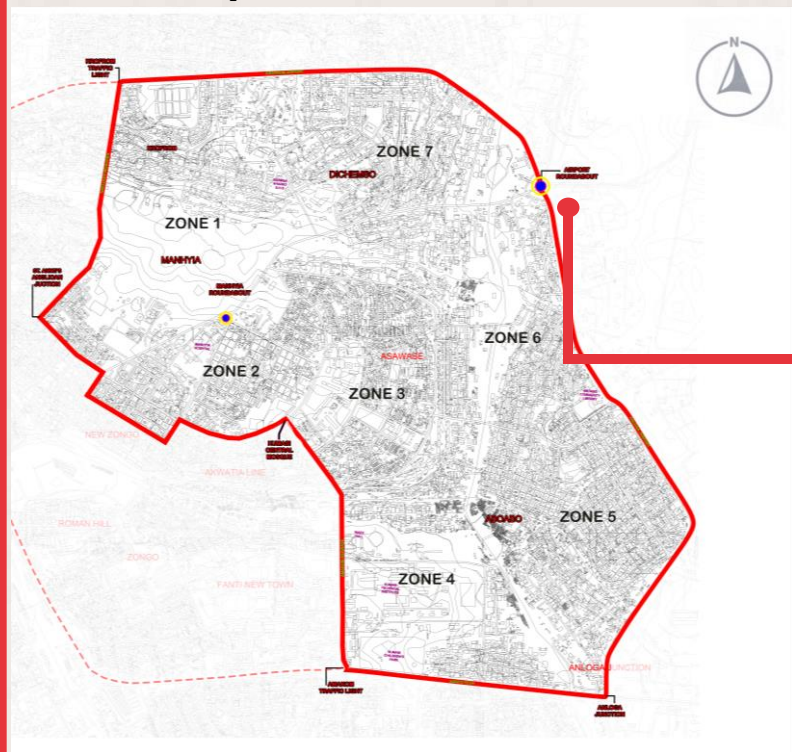


The greatest percentage (90%) of the commercial setups use the nation grid or ECG as their source of electricity.

4% implement solar and 6% implement solar in addition to power from the national grid or ECG as well as other secondary sources such as power plants or generators.



INSTITUTIONAL DATA (ELECTRICITY COMPANY OF GHANA)



Ashanti Regional SBU Headquarters located at airport roundabout, Kumasi



GPS coordinates :

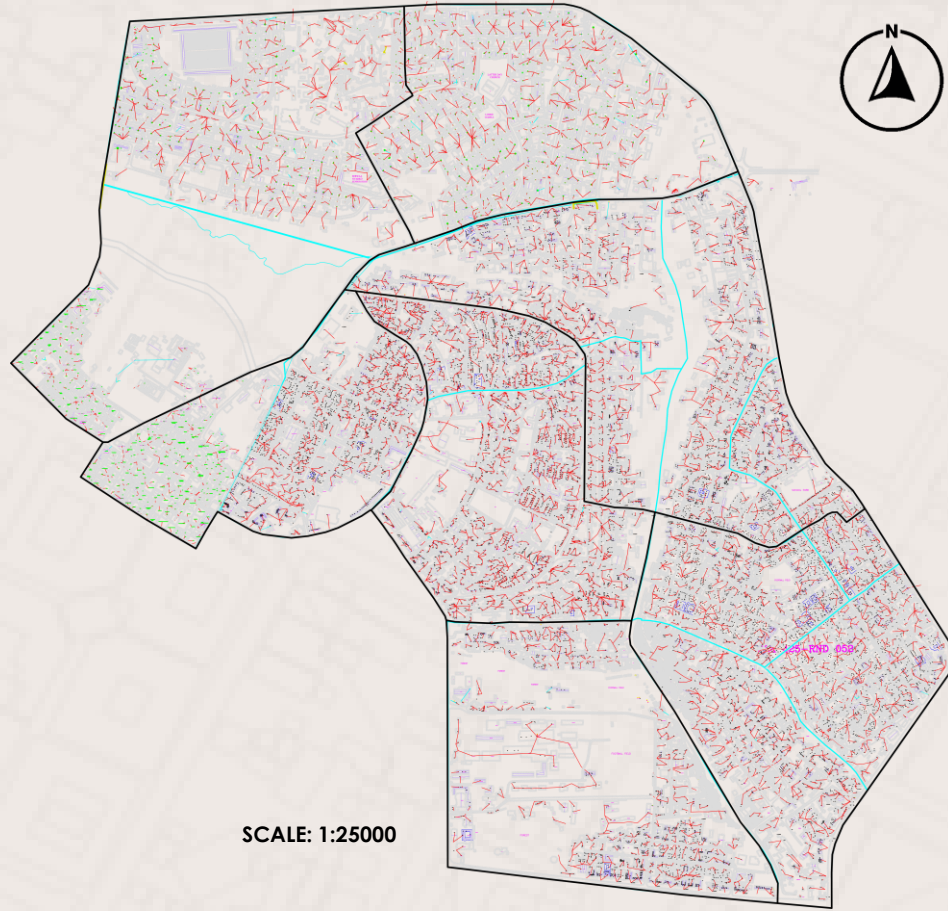
INSTITUTIONAL DATA (ECG)

Map of the enclave showing the electricity feeder lines

■ Electricity feeder lines

SCALE: 1:25000

Electricity supply map Source;
Electricity Company of Ghana, 2021



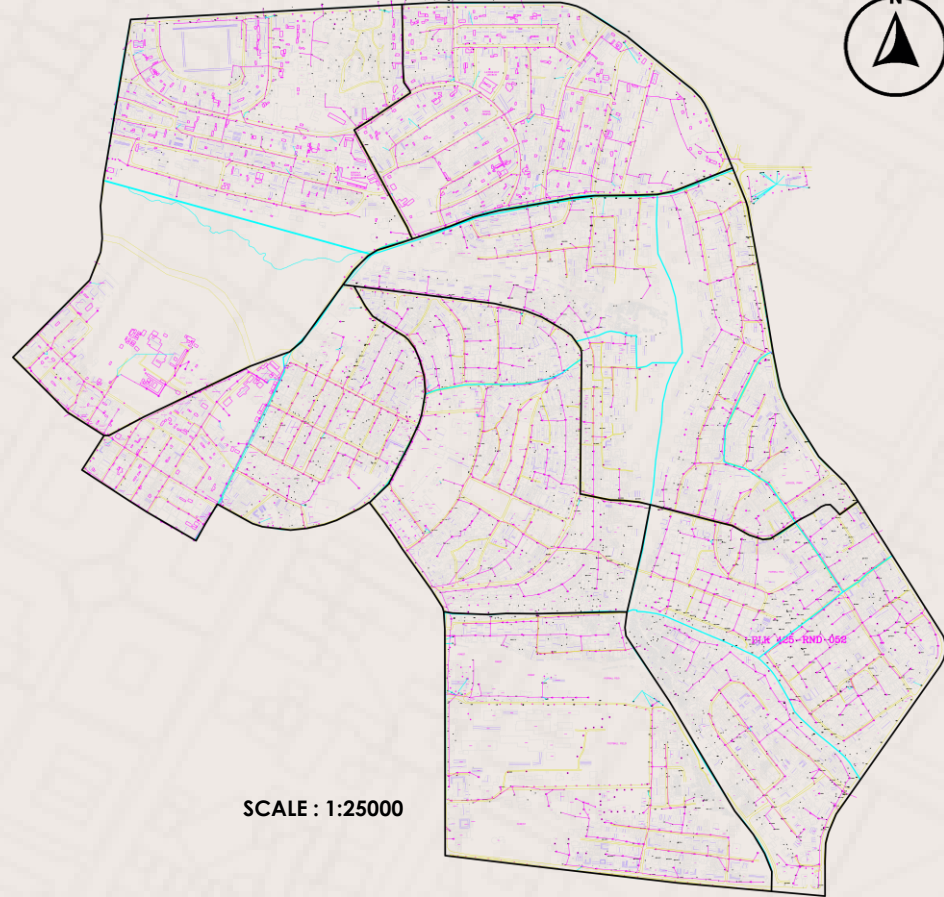
INSTITUTIONAL DATA (ECG)

Map of the enclave showing the electricity lines and poles

- ① Pole with 1 bulb
- ② Pole with 2 bulbs
- Power lines

SCALE : 1:25000

Electricity supply map Source;
Electricity Company of Ghana, 2021

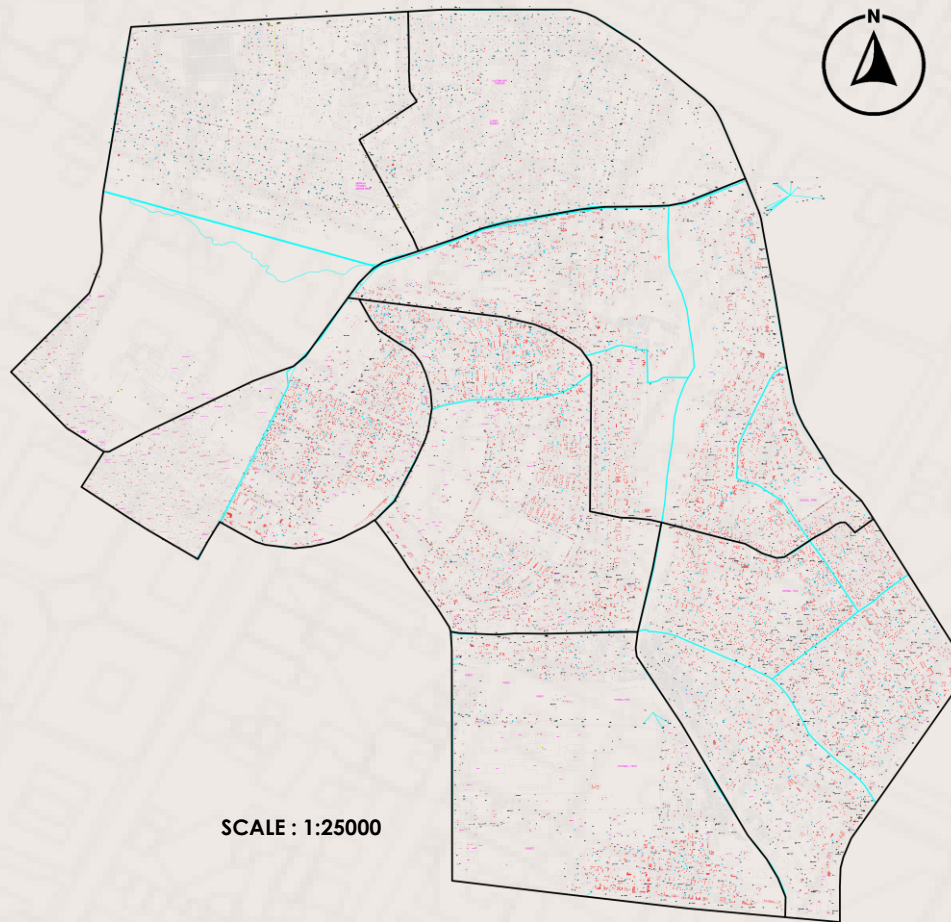


INSTITUTIONAL DATA (ECG)

Map of the study area showing the types of meters (pre-paid and credit meters)

★ Pre-paid meter

▲ Credit meter



SCALE : 1:25000

Electricity supply map Source;
Electricity Company of Ghana, 2021



INSTITUTIONAL DATA (ECG)

LEGEND



ASHANTI SBU HEADQUARTERS

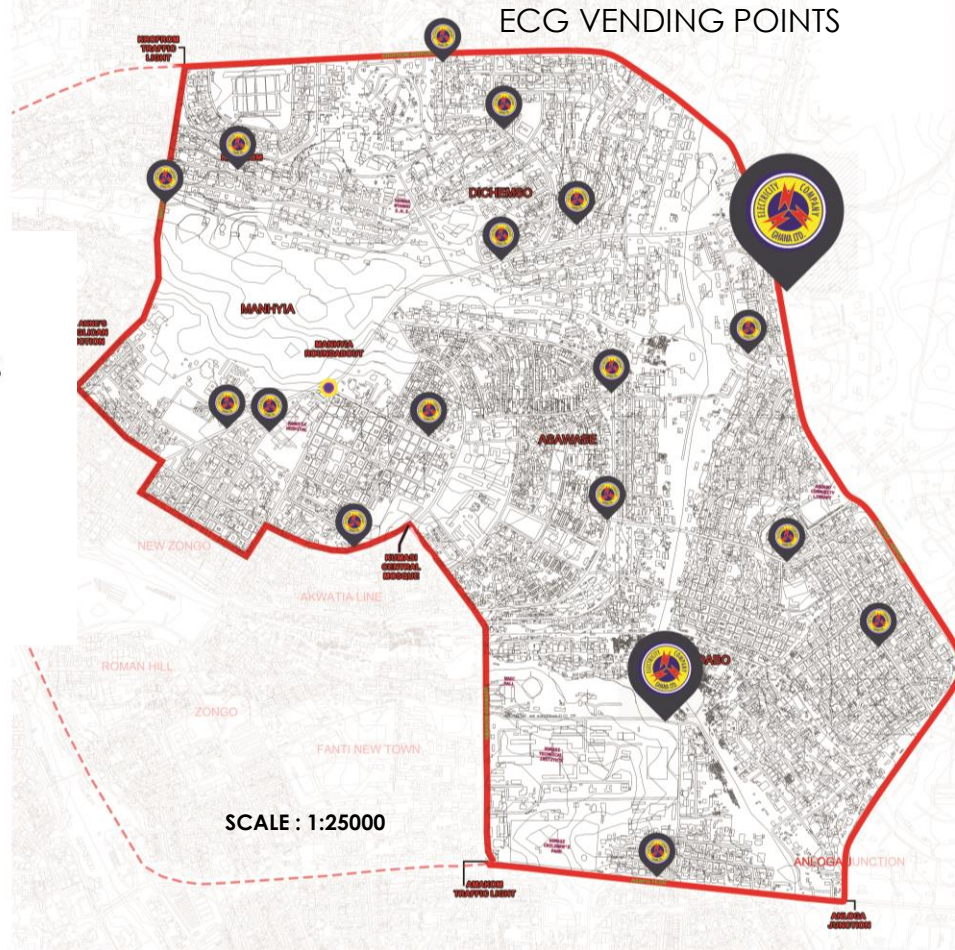


ECG SUB-STATION



ECG VENDING POINTS

Electricity supply map Source;
Electricity Company of Ghana, 2021



WATER SUPPLY

Physical Infrastructure

Water supply

Table of content

Sources of water	Rain, water bodies, well, borehole, national grid (Ghana Water Company Limited, GWCL).
Water storage facilities	Permanent water storage facilities (water tanks), temporary water storage facilities (barrels, buckets).
Water treatment	Filtration and sedimentation.
Water demand pressure zones	High pressure zones, low pressure zones.



Water supply

Map schedule

K2

Maps	Page number
Map showing water storage facility (zone 1)	K8
Map showing water storage facility (zone 2)	K9
Map showing water storage facility (zone 3)	K9
Map showing water storage facility (zone 4)	K10
Map showing water storage facility (zone 5)	K10
Map showing water storage facility (zone 6)	K11
Map showing water storage facility (zone 7)	K11

Water supply

Map schedule

K3

Maps	Page number
Map showing water treatment method (zone 1)	K13
Map showing water treatment method (zone 2)	K14
Map showing water treatment method (zone 3)	K14
Map showing water treatment method (zone 4)	K15
Map showing water treatment method (zone 5)	K15
Map showing water treatment method (zone 6)	K16
Map showing water treatment method (zone 7)	K16



Water sources

The main sources of water in the study area are;

- The national grid (GWCL)
- Borehole
- Well

People sometimes depend on rainwater as an alternative when there's water scarcity.

SOURCES OF WATER	TALLY	TOTAL
Rain	-	-
River	-	-
National grid GWCL	8,30,36,25,15,30,32	176
Borehole	30,15,8,15,28,15,12	123
Both National grid and Borehole	10,5,2,5,2,-,4	28
Well	2,-,4,5,5,5,2	23

Author's construct, 2023.



Rainwater



River



National grid GWCL



Borehole



Well

zone 1

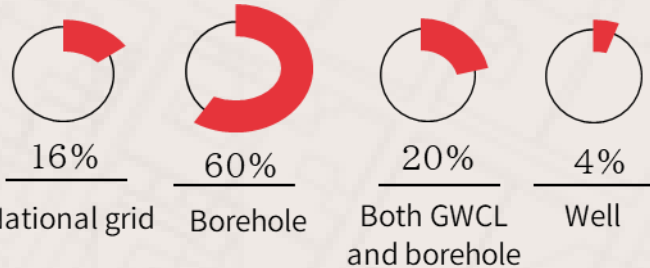
K4

The main sources of water in zone one are;

- The national grid (GWCL), Borehole and Well.

50 stakeholders were interviewed in zone one. Out of the 50;

- 30 were households
- 10 were institutions
- 5 were commercial facilities
- 5 were industries.



Water sources, zone 2&3

K5

The main sources of water in zone two are;

- The national grid (GWCL) and borehole

The main sources of water in zone three are;

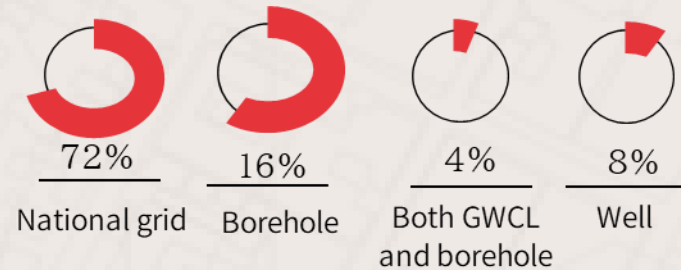
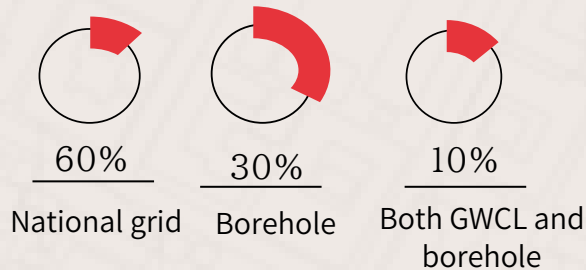
- The national grid (GWCL), Borehole and Well.

50 stakeholders were interviewed in zone one. Out of the 50;

- 15 were households
- 15 were institutions
- 10 were commercial facilities
- 10 were industries.

50 stakeholders were interviewed in zone one. Out of the 50;

- 20 were households
- 10 were institutions
- 10 were commercial facilities
- 10 were industries.



Water sources, zone 4&5

K6

The main sources of water in zone four are;

- The national grid (GWCL), Borehole and Well.

The main sources of water in zone five are;

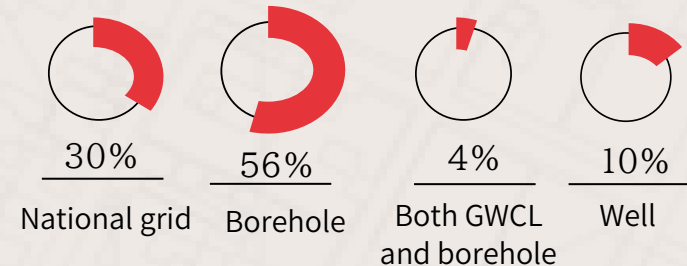
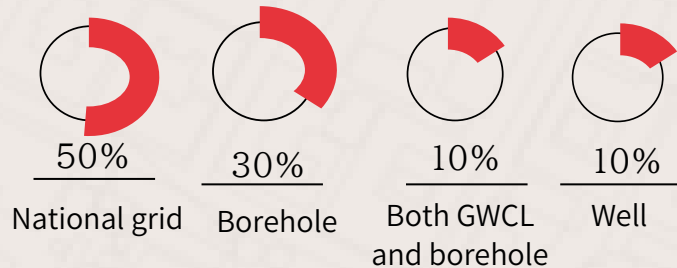
- The national grid (GWCL), Borehole and Well.

50 stakeholders were interviewed in zone one. Out of the 50;

- 35 were households
- 10 were institutions
- 5 were commercial facilities

50 stakeholders were interviewed in zone one. Out of the 50;

- 40 were households
- 3 were institutions
- 5 were commercial facilities
- 2 were industries.



Water sources, zone 6&7

The main sources of water in zone six are;

- The national grid (GWCL), Borehole and Well.

The main sources of water in zone seven are;

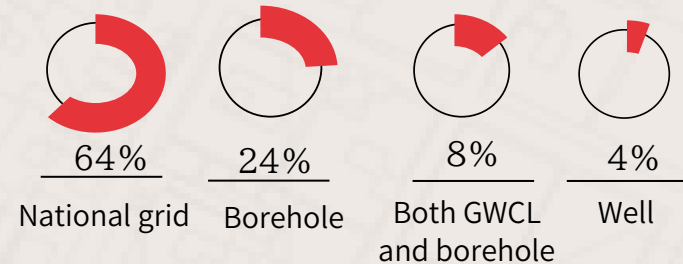
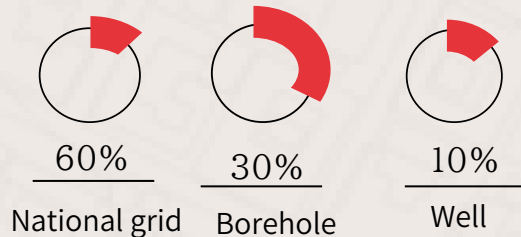
- The national grid (GWCL), Borehole and Well.

50 stakeholders were interviewed in zone one. Out of the 50;

- 40 were households
- 5 were institutions
- 5 were commercial facilities
- 1 was an industry.

50 stakeholders were interviewed in zone one. Out of the 50;

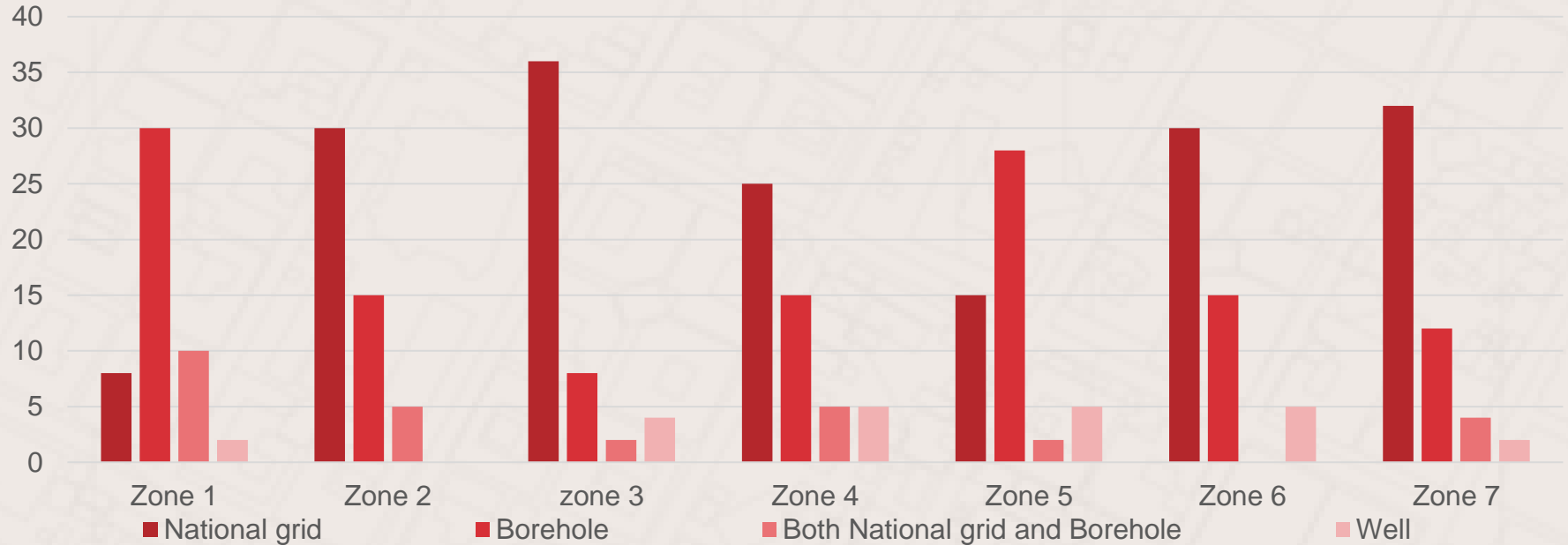
- 41 were households
- 4 were institutions
- 5 were commercial facilities



Water sources

K8

Main water sources



Water storage

The main water storage facilities in the study area are;

- Water tanks
- Barrels
- Basins
- Buckets

The various storage options available in zones have been categorized into permanent and temporary storage facilities.

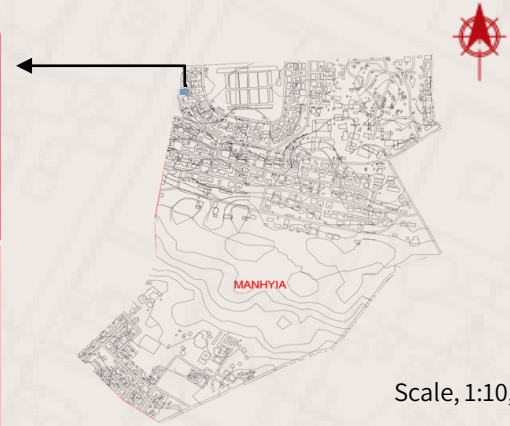
zone 1

K9

The main water storage facility in zone one is the permanent water storage.

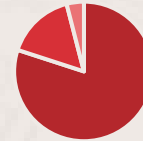


Santos hotel at Krofuom uses temporary water storage facilities



Scale, 1:10,000

Water storage

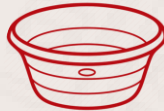


■ Permanent ■ Temporary ■ None

WATER STORAGE FACILITIES	TALLY	TOTAL
Permanent water storage	40,30,10,22,30,17,16	165
Temporary water storage	8,15,35,10,12,14,13	107
None	2,5,5,18,8,19,21	78



Permanent water storage



Temporary water storage



Water storage, zone 2&3

Stakeholders in zone two mainly use the permanent water storage even though several stakeholders store water temporarily.



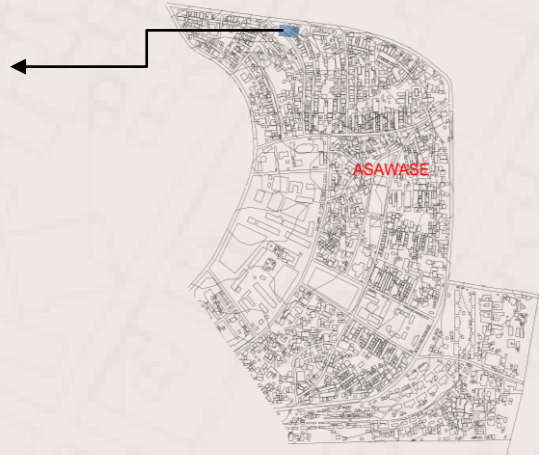
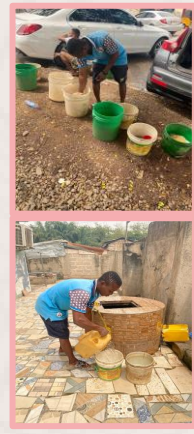
Scale, 1:10,000

Water storage



■ Permanent ■ Temporary ■ None

The main water storage facility in zone three is the temporary water storage.



Scale, 1:10,000

Water storage



■ Permanent ■ Temporary ■ None ■

Corn mill, close to the Manhya District hospital makes use of temporary water storage facility.

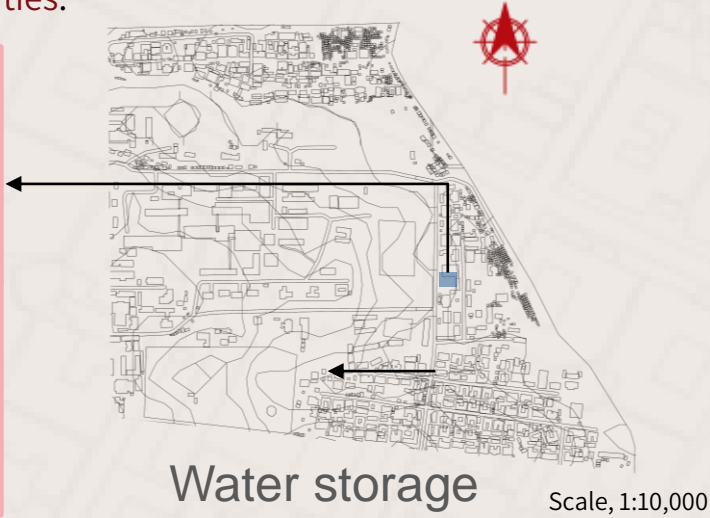
Carwash in zone three relies on temporary water storage.

Water storage, zone 4&5

K11

Stakeholders in zone four mainly use the permanent water storage even though several stakeholders do not have storage facilities.

The main water storage facility in zone five is the permanent water storage.



New Oxford Int. school uses permanent water storage facilities.



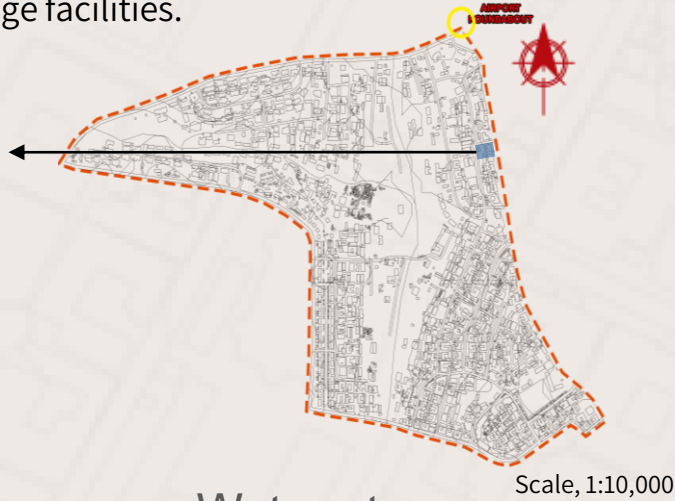
Household in Aboabo uses permanent water storage facility.

Water storage, zone 6&7

K12

Stakeholders in zone six mostly do not have storage facilities even though several stakeholders use both permanent and temporary storage facilities.

Stakeholders in zone four mainly use the permanent water storage even though several stakeholders do not have storage facilities.



Water storage

Scale, 1:10,000



■ Permanent ■ Temporary ■ None

Fatima Farida Academy, an institution in zone 6 uses permanent water storage facilities.



Water storage

Scale, 1:10,000

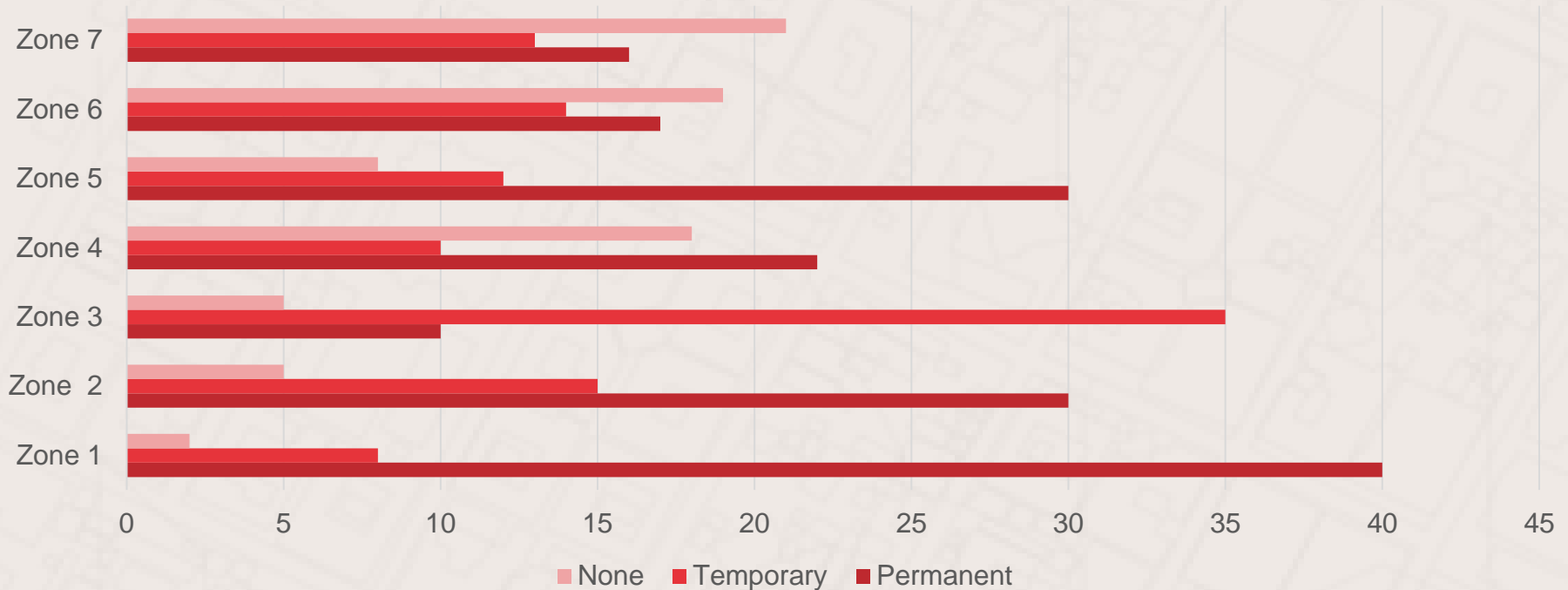


■ Permanent ■ Temporary ■ None

Stem Int. school in zone seven relies on permanent water storage facility.

Water storage

Water storage facilities



Water treatment

zone 1

K14

The main methods used for water treatment are;

- Filtration and sedimentation

People who do not use any of the above-mentioned water treatment methods do not treat water before use.

Water treatment

00 05 10 15 20 25 30 35 40 45 50



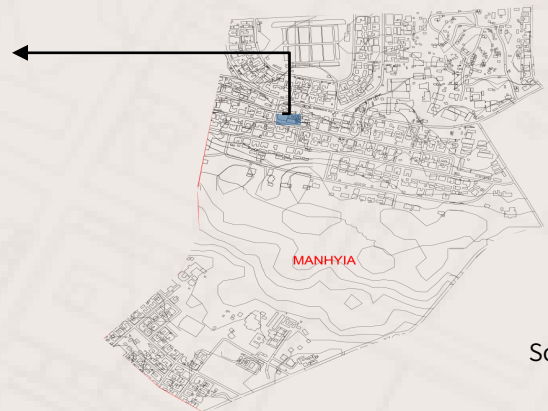
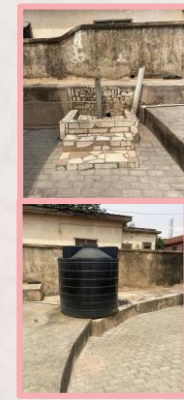
WATER TREATMENT	TALLY	TOTAL
Filtration	17,10,12,20,22,15,8	104
None	33,40,38,30,28,35,42	246



Sources of water with filters



Sources of water without filters



Scale, 1:10,000

Central Baptist Church/School sources water from both GWCL and a borehole and none of these sources are treated before use.



Water treatment, zone 2&3

K15

Water treatment

Water treatment

00 05 10 15 20 25 30 35 40 45 50

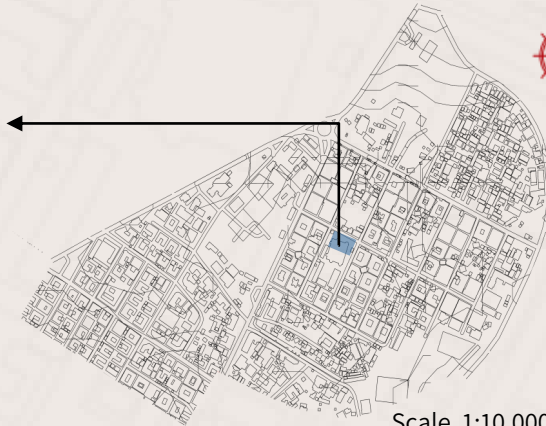
00 05 10 15 20 25 30 35 40 45 50

Filtered

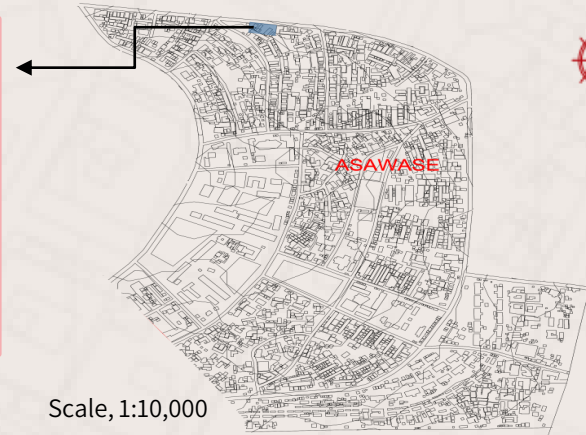
Filtered

None

None



Scale, 1:10,000



Scale, 1:10,000

A community water distribution point, close to the Manhya District hospital uses filters as its treatment method

A carwash which sources its water from a well does not use any water treatment method.

Water treatment, zone 4&5

K16

Water treatment

Water treatment

00 05 10 15 20 25 30 35 40 45 50

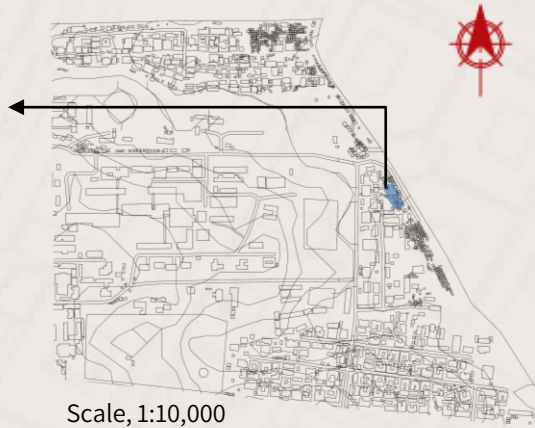
00 05 10 15 20 25 30 35 40 45 50

Filtered

Filtered

None

None



Scale, 1:10,000

A mosque in zone four, uses filters as a method of water treatment.



Scale, 1:10,000

A household water source in zone five does not use any water treatment method.

Water treatment, zone 6&7

Water treatment

Water treatment

00 05 10 15 20 25 30 35 40 45 50

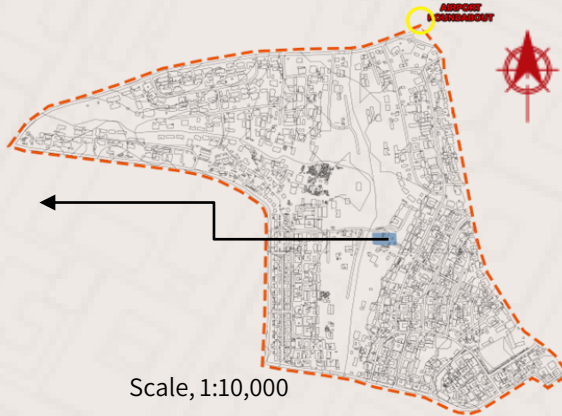
00 05 10 15 20 25 30 35 40 45 50

Filtered

Filtered

None

None

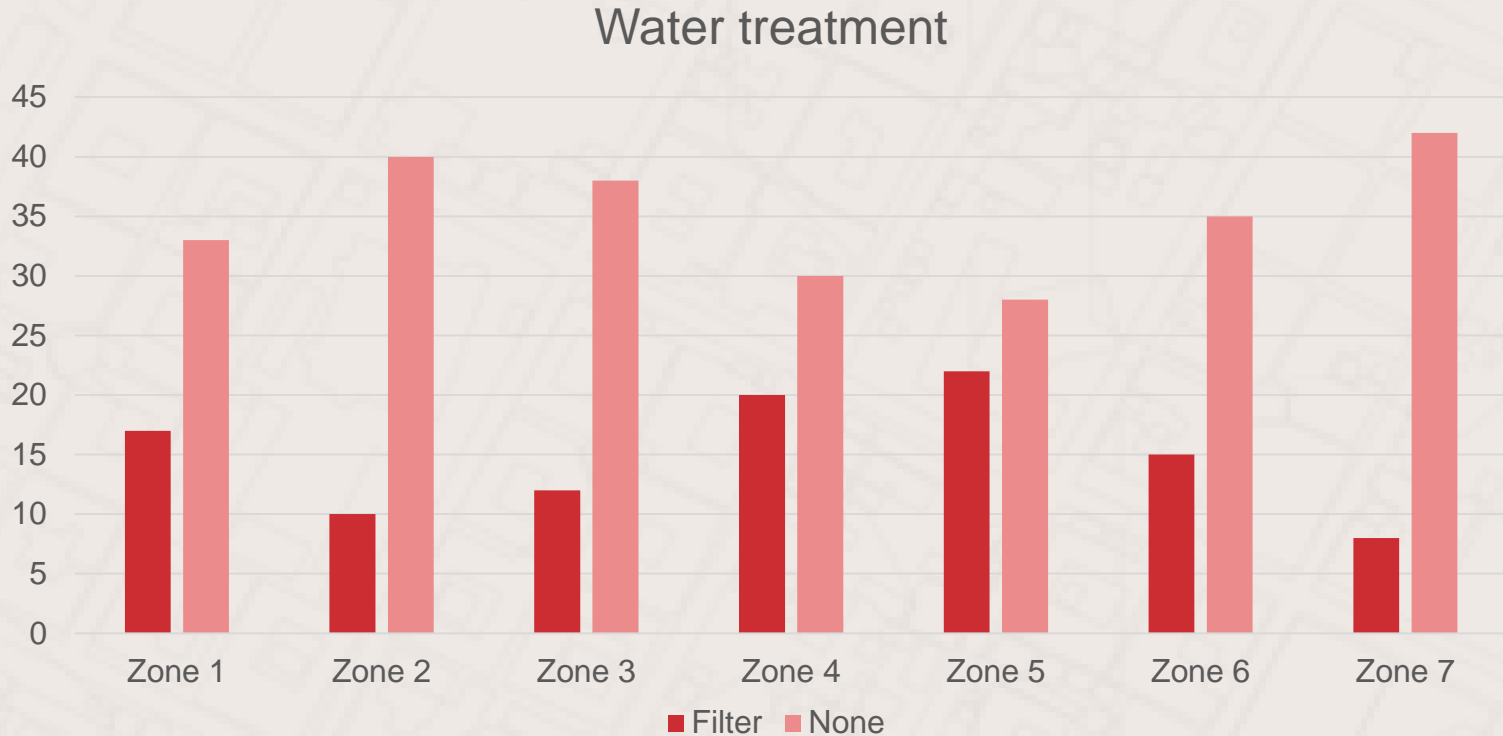


A public water distribution point uses filtration as its method of treatment.

A household in zone seven does not use any water treatment method.



Water treatment



1. Are there problems with water demand and supply in the area of study?

- Non-payment of bills by consumers
- Inadequate capital
- Supply of water is less than 50% of demand capacity of water

2. Are there leakages in water supply lines? Yes

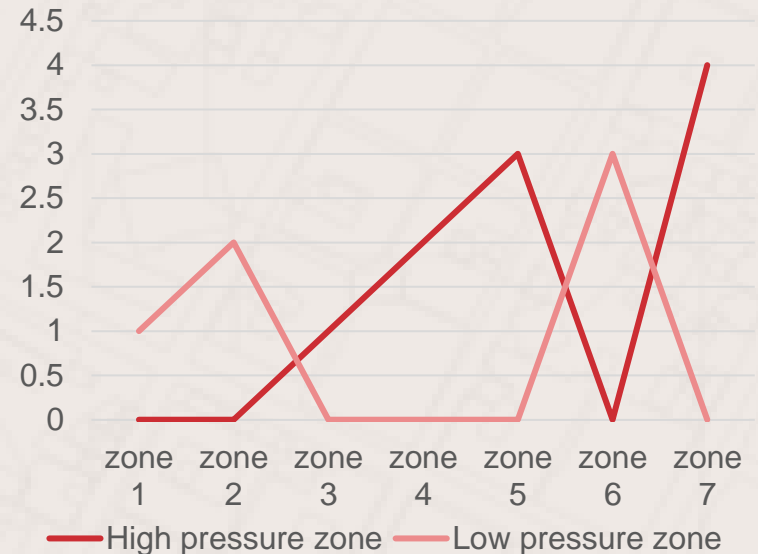
Leakages are caused by

- Aged and weak pipes
- Poor workmanship

2. What are the mode of payment for water?

- Electronic payment
- District offices
- Banks

Demand pressure zones



Reference: Ghana Water Company Limited, Reg, distribution officer (2023).



Water supply summary.

K20

Water sources

- The main sources of water in the study area is the national grid (GWCL). However, People tend to depend more on these mechanized boreholes because there's water shortage problems with the national grid.

Water storage

- Water is mostly stored in permanent water storage facilities. This helps to store higher volumes of water against water shortage days. However, several people who depend on the national grid do not have water storage facilities.

Water treatment

- Even though some people use filters as a method of water treatment, majority of the people do not treat water before use. People who depend on the national grid have their water treated before it is distributed to its outlet.

Water usage

- From the study, it can be concluded that water usage is at its highest level, storage tanks for institutions, industries and commercial facilities are refilled every other day. This increases the cost and demand of water supply.



Thank
You!

