

## CHAPTER 2 SOCIAL SERVICES AND INFRASTRUCTURE IN LUSAKA AND UNPLANNED URBAN SETTLEMENTS

### 2.1 Population of Eight Unplanned Urban Settlements

The population of the eight unplanned urban settlements in the Study Area has not been accurately investigated and studied, though the Study Team investigated the socioeconomic conditions of the eight unplanned urban settlements through direct interview from field officers of LCC and the RDC chairperson, as well as the social survey subcontracted to a local consultant. The results are summarized below.

**Current Population of Unplanned Urban Settlement (1999)**

	<b>Current Population</b>
1.Bauleni	45,000
2.Chainda	17,000
3.Chazanga	29,000
4.Chibolya	25,000
5.Freedom	9,000
6.Kalikiliki	8,000
7.Ng'ombe	30,000
8.Old Kanyama	57,000

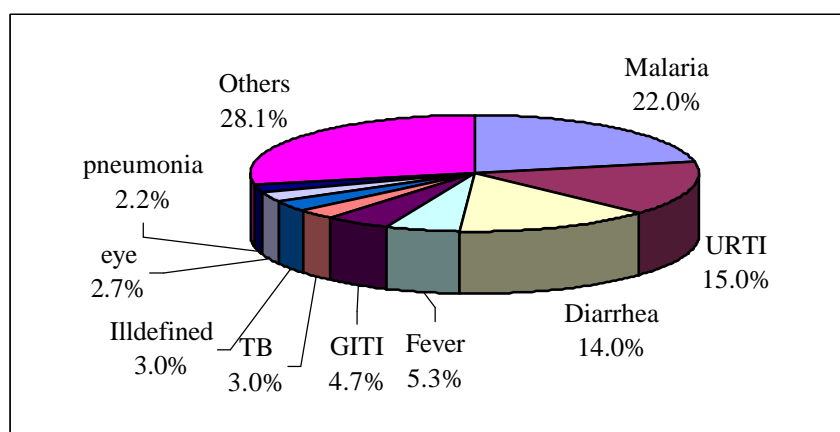
Source: Interview from LCC officers and social survey in May 1999

### 2.2 Health/ Public Health

#### 2.2.1 Health/Public Health Situation in Lusaka and Unplanned Urban Settlements

The Lusaka District, one of the fastest growing cities in the southern region of Zambia, has 75% of its populations living in the peri-urban areas where there is poor sanitation and water supply. According to the 1997 annual report of Lusaka District Health Management Team (LDHMT), 80% of patients seen in government clinics suffer from preventable diseases related to poor sanitation and lack of access to safe water. Many factors may be responsible for the situation: poor implementation of environmental health programs, increased demand, inadequate resources and poor community participation in environmental health programs.

In 1997, of the total patients attending the out-patient department (OPD) for the first time, 22% were treated for malaria, 15% for upper respiratory infections and 14% for diarrhea in all Lusaka (Figure 2.2.1).



URT I: Upper Respiratory Tract Infections  
 GIT I : Gastrointestinal Tract Infections  
 TB : Tuberculosis

Source: LDHMT Annual Report 1997

**Figure 2.2.1 Top 10 Diseases for Lusaka District in 1997**

The top three diseases occurring in the eight unplanned settlements are malaria, diarrhea and upper respiratory infections (URT I) (pneumonia and non-pneumonia) as shown in the following table.

**Major Public Health Problems diagnosed at OPD First Attendance in Study Area  
 (Four Health Centers) during 1999 1<sup>st</sup> Quarter**

Area	Chainda	Ng'ombe	Kanyama	Bauleni
Malaria	1	1	1	1
Diarrhea	3	2	3	3
URT I	2	3	2	2

Source: DHMT quarterly report on each health institution

For the eight settlements studied, the diseases the community views as common in their areas are diarrhea and malaria, which accounts for 58% of the total.

**2.2.2 Public Health Department (PHD) of LCC**

**(1) Public Health Services**

In 1994, at the time of Health Reform, curative service was separated from the Public Health Department (PHD) of LCC to the Central Board of Health (CBH), leaving only preventive services to the LCC. The services provided by PHD are as follows:

- Residential spraying, distraction of mosquito breeding grounds;
- Encouragement of use of treated bed nets through the Neighborhood Health Committee;
- Health Education after post cholera outbreak; and

- Solid waste collection from primary collection point (only in selected areas).

## (2) Financial Resources

PHD has limited financial resources to adequately carry out preventive services. One such example is its inability to purchase chemicals like icon for mosquito and cockroach spraying and chlorine for chlorinating shallow wells dotted in most shanty settlements. Often Lusaka District Health Management Team (LDHMT) has assisted PHD in the purchase of chemicals.

## (3) Human Resource

According to the WHO recommendation, for every 50,000 people, there should be one health inspector and for every 25,000 people, one Environmental Health Technician (EHT). However, in reality, the LCC has only five health inspectors and no EHTs. There are, however, eight EHTs in Lusaka who were seconded from LCC to Ministry of Health (MOH) in March 1998. Each EHT covers one catchment area which includes approximately eight settlements. The majority of environmental health staff is unmotivated due to poor conditions of services. Continuous reshuffling of personnel has dampened the morale of health workers who now feel that they have lost direction, as they don't know what to expect next. This kind of environment is very detrimental to the provision of public health services.

## (4) Factors Affecting Poor Services

Our study team findings revealed that the implementation of environmental health programs by the LCC is very poor, and for a long time, the LCC has been increasingly failing to deliver an acceptable level of service for both urban and peri-urban communities. There are a number of factors affecting its poor implementation:

- a) Lack of decentralized funding (resources) and government support;
- b) Policy exists, but no enforcement mechanisms to appropriately handle the situation due to political interference;
- c) Lack of capacity building for staff to improve professional status of department;
- d) Delayed prosecution (long court procedures);
- e) Shortages of specialized human resources in collaboration with District Health Management Team (DHMT) and other NGOs;
- f) Logistics problem. LCC-PHD has very few vehicles.

### 2.2.3 Lusaka District Health Management Team (LDHMT)

The Government has three health sectors, the Ministry of Health, Central Board of Health, and Lusaka District Health Management Team (LDHMT) under the

Ministry of Health. The role of each health sector after the reform is depicted as follows.

#### Role of Each Health Sector

Ministry of Health	Central Board of Health(CBH)	Lusaka District Health Management Team
1. Policy formulation for the health sector 2. Development of health legislation 3. Resource mobilization 4. Budget and finance for the system 5. External relations with bilateral and multilateral partners in health 6. Strategic planning for health sector	1. Service delivery 2. Interpretation of the policies and legislation	1. Technical executive 2. Health system development 3. Monitoring and evaluation 4. Promotion of public health

Source: MOH National Health Strategic Plan (1998-2000)

LDHMT offers not only curative but also preventative health services in its 23 Health Centers due to lack of capacity of PHD. These centers run by the LDHMT are administratively divided into eight zones, with an upgraded Health Center and further divided into four Administrative First Referral areas. Four of the upgraded facilities have been ear marked for first referral level of care.

Health Centers for the eight unplanned urban settlements and their characteristics are summarized as below:

#### Characteristics of Health Centers in/near Study Area

	HC for the Community	Type of HC	Services	Active Community Health Organization	Needs felt by clinic(human resources not included)
Old Kanyama	Kanyama	1 <sup>st</sup> referral 24h	MCH, OPD, IP, Lab, Maternity	PE, TAB, NHC	Drugs
Chibolya	Kanyama			NHC	Drugs
Chazanga	Chipata Mandebu	Large,24h Small, 10.5h	MCH, OPD, IP, MCH, OPD, Lab	CHW (Mandebu)	Health Post
Chainda	Chainda	Medium, 10.5h	MCH, OPD No Maternity	Few CHW, NHC	Renov. Maternity room
Bauleni	Bauleni	Small,8.5h	MCH, OPD No Maternity	NHC	Maternity Water(clinic)
Kalikiliki	Mutendere	Medium,8.5h	MHC, IP(OPD for under5) ,Lab	PE (Mutendere)	Health Post
Ng'ombe	Ng'ombe	Medium,10.5 h	MCH, OPD No Maternity	CHW, NHC	Lab Lecture room
Freedom	Mt.Makulu Chilanga	Small, 10.5h Large, 24h	MCH, OPD IP, Lab, Maternity		Health Post

Source: interview with managerial staff at each health center

### (1) Service Activities in 23 Health Center

Maternity delivery services are offered only in 9 clinics out of 23 in all Lusaka. They are Chawama, Chelstone, Chilenje, Chipata, George, Kanyama, Mutendere, Matero Ref. and Kalingalinga. Laboratory services are offered only in 9 clinics out of 23 in all Lusaka. They are at Chawama, Chilenje, Chelstone, George Kayama, Matero Main, Mutendere, Matero Ref. and Chipata Health Centers. Youth friendly health services are offered in Chilenje, Chawama, Kalingalinga and Kanyama, Matero Ref. and Bauleni. Ambulance services are offered for both maternity and general cases. However, this service is inadequate considering the number of ambulances the DHMT has in relation to the demands for the service. School health services are offered by all health centers. However its frequencies vary among health centers. It is part of health center outreach programs. Surveillance of the health status of school children was done and immunization for prevention of communicable diseases was also done. Most schools were used as polio immunization posts during National Immunization Days. The school health services are not very consistent in some clinics but 80% of the clinics visit the schools in their catchment area at least once each school term, four times/year.

### (2) Financial Issues

Despite reforms undertaken by the government to improve health services, inadequacies are still not being resolved. For instance, the poor still do not benefit from health services now based on the cost-recovery system.

Health Centers receive user-fees on a monthly basis as follows: Kwacha 1,000,000 for first referral designate health centers, Kwacha 500,000 for large and medium, and Kwacha 250,000 for small health centers.

The district's sources of funding are:

- GRZ Grants: Received on Monthly basis;
- Donor Grants: Received on Quarterly basis; and
- Medical Fees: Raised through prepayment scheme and user fees.

The donor grant is from the basket funding that donor countries contribute to centrally. DANIDA, UNICEF, WHO, Dfid, SIDA, USAID are the main contributors to the basket fund system. As for medical fees, they are raised through prepayment schemes and users fees charged to patients in the 21 Health Centers in Lusaka District.

The district is also privileged to be receiving direct support to specific programs like:

- Upgrading of Eight Health Centers: Dfid;
- Training of family planning providers and logistic support: SEATS; and
- Training of health workers in Integrated Management of Childhood Illness: BASICS (Basic Support for Institutionalized Child Survival).

### (3) Logistics Matters

DHMT has a total of 25 vehicles, of which 14 are running. The fleet includes 6 ambulances, with the rest being utility vehicles. The vehicles are old and unreliable. Doctors are picked up for work; they usually arrive late, as they have to share the vehicles.

The fleet of ambulances is not enough considering that the clinics are far apart and the state of roads is poor.

### (4) Human Resource Working in Community

#### Environmental health technician (EHT)

There are only eight EHTs covering the whole Lusaka area. They are stationed at 1<sup>st</sup> referral clinics and cover seven to eight settlements. The study revealed that the majority of EHTs are not very satisfied with their work due to poor resources availability. They also raised problems commonly faced no transportation fee given by MOH to cover their catchment area, political interference, and poor conditions of services. The majority of EHTs said they are collaborating neither with health care workers nor with community organizations such as Neighborhood Health Committees (NHC), Community Health Workers (CHW) and Health Committee of Resident Development Committee (RDC-HC). Those EHTs employed by MOH and attached to LCC-PHD also claim they have been neglected and showed interest in working at the health facility.

#### Neighborhood Health Committees (NHC)

NHCs were initiated by the MOH in collaboration with the DHMT between 1994 and 1995 as part of the Zambia Health Reform Program which endeavors to improve the health status of the people by providing equity of access to quality, cost-effective health care as close to the family as possible. The basic objective of the NHC is to play an advocacy role in disease prevention and control through increased community participation in health care management and delivery system.

#### Community Health Workers (CHW)

In Ng'ombe, one of our study target areas, twenty five CHWs were trained by a Japanese NGO, SCDP (Sustainable Community Development Program) in 1999.

The roles of NHC and its activities are not much different from that of NHC or RDC-HC. They are supervised under the Ng'ombe clinic.

Health Committee of RDC (RDC-HC)

It oversees all health issues in the settlement. It organizes health education and awareness campaigns. This is the committee that is also in charge of garbage collection and all matters related to health and sanitation.

In some of the unplanned urban settlements where there are clinics, there also exist Neighborhood Health Committees (NHC). These committees have been in existence since 1995, and they are not under the RDC even though they have similar roles as the RDC-HC. In some places when a new RDC comes into office, the NHC are dissolved to pave way for a newly elected committee under the RDC. However, this is not always accepted by some incumbents, in which case they carry on as before and the new RDC has to form its own Health Committee.

**2.3 Education**

2.3.1 Lusaka City

As mentioned earlier in Section 1-5, the government put the emphasis on the development of basic education in the National Policy. However, due to the rapid population growth and the decrease of education investment caused by the shortfalls of the government revenues, the enrollment rate of primary education in the country is currently 82%, and of secondary school, only 14.2%. In Lusaka City, the enrollment rates of basic education account for only 54.4%, which is far below the average of the country. And only 27% out of total applicants can be admitted to primary schools at the age of 7 in Lusaka City, and 47,000 children lose the chances of access to basic education every year. One of the main reasons for this problem is that there are not enough school facilities to meet all the needs in Lusaka City. According to the National Policy on Education (1996), lower and middle basic schools in Lusaka have room for less than two-thirds of the eligible children. The following table shows the number of primary and secondary schools in Lusaka district.

**Total Number of Basic Schools in Lusaka District**

Primary (G1-7)	Full Basic (G1-9)	Basic and Secondary	APU Class*	Private Primary	Private Secondary	Teacher's College	CE*
52	30	12	14	42	18	1	40

\*APU :Academic Production Unit, CE: Continuing Education

Source: The Ministry of Education, cited in the preparatory study report presented by JICA (1997)

The cost of schooling is also a main factor that hampers the increase of the enrollment rates particularly among children in poor families. According to the schoolmaster in Chibolya middle school, out-of-pocket costs that must be incurred by families to send their children to school are estimated at Kwacha 55,000 per student per year. These costs, which include items such as school fees, textbooks, stationery, school uniforms, maintenance costs, and PTA fund are often prohibitive for poor families who have few economic resources.

Besides basic schools by the government, community schools in non-formal education run by NGOs, churches and communities support and complement to primary education. Generally, community schools play an important role in giving more learning opportunities with affordable cost of schooling. In Lusaka district, 83 community schools are registered by the ZCSS (Zambian Community School Secretariat) and authorized under the agreement between the Ministry of Education and the ZCSS. Since the government encourages communities to participate in establishing schools if they wish, community schools are expected to accelerate primary enrollments particularly in the poor urban communities.

### 2.3.2 Situation in the Eight Unplanned Urban Settlements

In the unplanned urban settlements surveyed, access to basic education (particularly lower and middle level) is not satisfactory to those school-aged children. As shown in the following table, there are only three settlements that have government basic schools in the communities. Despite the plans to establish additional basic schools in Ng'ombe and Bauleni by Japanese Grant Aid Scheme, there are still serious problems facing concerning the absolute lack of school facilities. Most of the settlements have community schools but their size and capacity to accommodate children are too small to meet all the needs in the communities.

The survey also revealed that illiteracy among school-aged children and youth are very evident in comparison with upper middle or senior adults. This illustrates how the lack of access to school education greatly affects the country's human development in the future.



### School Allocation of Formal and Non-formal in the Eight Compounds

Name of Settlement	Formal School	Non Formal School
Old Kanyama	New Kanyama (G1-9)	New Kanyama open community school (ZOCS) Kanyama Corps community School (Salvation Army) Kanyama Rocs (ROCS) Kanyama Community School (LCC)
Chibolya	Chibolya Middle (G1-7) New Kanyama (G1-9)	HUZA Pre-school Chibolya Community school (ZOCS) Chibolya Community school (Wisdom Apostolic Faith) Chibolya Community school (Freemind Literacy Club)
Chazanga	None	Chazanga community school (RODF) Chazanga Tambalala (Chazanga Lusaka)
Chainda	Chelston * JICA is constructing a basic school	Chainda community school (World Vision) Chainda open community school (CARE) Chelston open community school (ROCS)
Bauleni	Bauleni Middle (G1-7) * JICA is constructing a basic school	Bauleni open community school (ZOCS) (ZOCS)
Ng'ombe	None at the moment, * JICA is constructing a basic school	Community school (CCF) Pre-school (HUZA) Ng'ombe community school (Rudolf) Ng'ombe open community school (ZOCS) Ng'ombe community school (YOCAS)
Kalikiliki	Kalingalinga Middle (G1-9)	N/A
Freedom	None	Freedom community school (Mimosa Chilanga HBC)

The following are the summaries of the present conditions in the eight settlements.

#### (1) Bauleni

The Bauleni Basic School currently has 1,992 pupils from Grade 1-9. However, as this school cannot meet the needs for the majority of children, a new basic school (G1-9) is being constructed by the JICA Grant Aid Scheme. According to a record from the RDC, 858 males and 756 females completed primary schools in the settlement, and 17 males and 14 females completed secondary. There is no reliable data about the enrollment rates of basic education and literacy rates.

#### (2) Chainda

There is no government basic school in Chainda. A few children go to Chelstone, Chakunkula, Kapilyomba or Silverset Government schools in the catchment area, but those are too distant, requiring the children to walk 3-10 kilometers every day. There is no data available about the enrollment and literacy rates in the

settlements. The World Vision is now planning to establish a community school. During the survey, community identified the school establishment as a top priority.

(3) Chazanga

There is no government basic school in the area, and some children go to Kabanana primary school in the catchment area. Since there is no RDC organized, no data or information is available with regard to enrollment and literacy rates in the community.

(4) Chibolya

Chibolya Middle School (Grade 1-7) has 1,958 pupils. According to the school headmaster, 97 % of pupils in this school are from the Chibolya settlement. However, it is estimated that there are about 3,000 out-of-school children only in the Chibolya settlement. There are several NGOs running community schools but no details are given by the RDC. There is no data about the enrollment and literacy rates.

(5) Freedom

There is no government basic school but one non-formal community school in the area. (no details are explained) Some children go to Musamba School in Chilanga at 3 Km away from the community. There is no data about the enrollment and literacy rates.

(6) Kalikiliki

There is no school of both formal and non-formal in the area, but a few children go to the Chibelo primary school in Kabulonga. According to the RDC members interviewed, 45% of males and 50% of females completed primary schools, and 35% of males and 20% of females completed secondary schools. Adult literacy rates are very low according to the RDC, and reported to be only 35% of males and 20% of females.

(7) Ng'ombe

Since there are no government basic school, a full basic school (G1-9) was constructed by the JICA Grant Aid Scheme, and opened in January 2001. On the other hand, non-formal education is very active in the area, and several community schools and pre-school are operated by NGOs, such as ZOCS, CCF, HUZA, Rudolf and YOCAS.

There is no reliable data about the enrollment and literacy rates. The RDC indicated that 25% of males and 30% of females completed basic education, and 10% of males and 8% of females completed secondary school.

(8) Old Kanyama

New Kanyama basic school has 1,885 pupils from Grade 1-9. Although there are no reliable data about the enrollment and literacy rates, the RDC members reported that 18,623 males and 16,191 females achieved primary education, and 11,427 males and 7,842 females completed secondary schools (total population is 64,240 as of the year 1999). Besides the basic school by the government, there are four community schools in the area. (No details are identified.) The LCC is also operating a community school and presently accept 29 pupils but it is not so active due to the small capacities in finance and human resources.

## **2.4 Economic Situation and Income Generating Activities**

### **2.4.1 Urban Economy, Employment and Poverty**

The economic stagnation in the country has brought devastating effect on all urban dwellers. The peri-urban areas have always been regarded as temporary places to live for seasonal and manual labours, while the central urban areas are the places for employees with higher incomes in the formal sector and are provided better social services. The better living standard in the central city attracts the poor to work in order to gain economic benefits. Consequently, more and more poor have migrated from rural areas and built houses in illegal settlements on the outskirts of the town. The government provided very few public services in the settlements simply because of illegality. Limited services and infrastructure have created a negative impact on the potential growth of the urban economy and the productivity as a whole. Also there was no policy to increase human capital or foster entrepreneurship to activate urban economy.

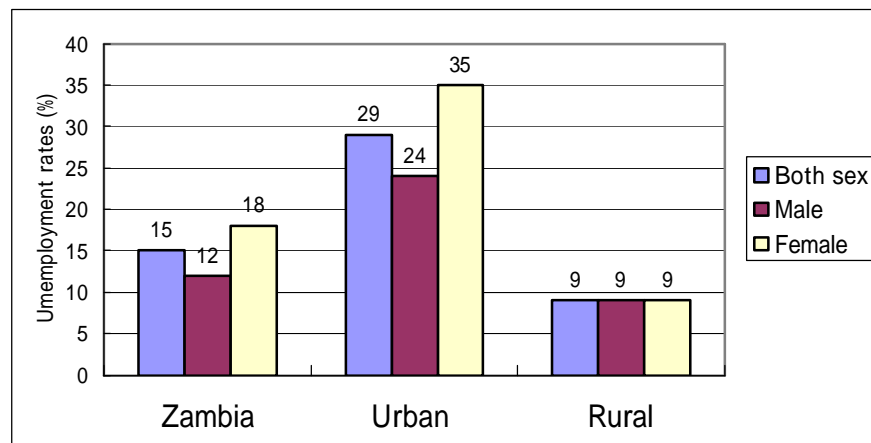
Much worse, even formal sector employment has been decreasing, and more labors are now engaged in informal small-scale activities. According to Lim (1996)<sup>1</sup>, participation rate of women in the informal sector is about 72%. Declining formal sector means that a great number of women have to work in informal sector with very little income to sustain their family. It is usually women

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<sup>1</sup> Lim, L.L., 1996. More and better jobs for women, an action guide, ILO, Geneva

within low-income households who take on extra work and responsibilities when income falls or price rises.

Another problem lying in the urban city is that unemployment rates are relatively higher than those of rural areas. This is closely associated with the Structural Adjustment Program and the transition from controlled/centralized economy to open market economy in the country. Figure 2.4.1 shows the comparison in urban, rural areas, and Zambian averages.



Source: National Bureau of Statistics 'Census of Living Condition' (1995)

**Figure 2.4.1 Unemployment Rates among Persons over 12 Years Old by Sex, Urban/Rural, and Zambia (1996)**

#### 2.4.2 Informal Sector

The informal sector is defined as employment where workers are not entitled to paid leave, pension, bonus and social security in workplaces with 5 or less workers.

The informal sector is diverse. It is reported that 44.7% of those in the informal sector are in the retail business, and 36.7% are in the farming, fishing and hunting business in Zambia.

In the settlements, most inhabitants live on petty trading, selling charcoal, blacksmithing, brewing beer, carpentry, knitting/tailoring, crushing stones and so on. The informal sector, i.e. small-scale economic activity is a potential for urban poor to increase the level of income and to upgrade their living condition.

However, there are several constraints to promote economic activities for the urban poor. First, the poor's asset base is very weak. The quality and potential of their human capital are often affected by poor health and nutrition and limited access to proper education. Also many people are not entitled to have access to

land. Secondly, returns to assets are very low due to little access to good infrastructure and transportation services, institutional and regulatory frameworks make the cost of operating business prohibitively high.

### 2.4.3 Economic Situation in the Settlements Surveyed

In the settlements surveyed, major economic activities for females are petty trading, brewing and selling, tailoring, food making and selling, maid, and males are engaged in carpentry, petty trading, bricklaying, welding, blacksmith, plumbing, mechanic, security guard and driver. There are only a small handful of people who are involved in the formal sector.

The following table provides an estimate of average monthly income from the RDC members interviewed in eight settlements. There is a question about the validity of this table simply because of very few samples and figures from only a handful of community representatives. Yet, there are slight differences among settlements though all settlements earn less than Kwacha 100,000/household/month.

**Average Monthly Income in Eight Unplanned Urban Settlements**

Unit: Kwacha

Bauleni	Chainda	Chazanga	Chibolya	Freedom	Kalikiliki	Ng'ombe	Old Kanyama
75,000	100,000	(No RDC)	70,000	100,000	50,000	95,000	70,000

Source: Hearing from the RDC members, JST, July 1999

Also, a survey funded by the Irish Aid provides used data to figure out the range of monthly income in the settlements as shown in the following table.

**Household Head Monthly Incomes**

Unit: Kwacha

Amount and range	Frequency	Percentage
K5,000 - K50,000	204	42.3%
K51,000 - K100,000	201	41.7%
K101,000 - K150,000	36	7.5%
K151,000 - K200,000	20	4.2%
K201,000 - K250,000	3	0.6%
K251,000 - K300,000	7	1.5%
K301,000 - K350,000	1	0.2%
K351,000 - K400,000	1	0.2%
K401,000 - K450,000	1	0.2%
K451,000 - K500,000	6	1.2%
Over K500,000	2	0.4%
Total	482	100.0%

Source: Lusaka City Council Community Profiling Survey of Nine Unplanned Settlements, Irish Aid (1997)

Based on this information and data, it may be concluded that the average monthly income of most of inhabitants (80-90%) in the settlements ranges from Kwacha 5,000 to 100,000. These findings verify that the income level in the settlements are far below the poverty line (Kwacha 186,000) in the country.

#### 2.4.4 Micro Credit Program

Micro credit and other anti-poverty programs are safety net instruments for the poor population. The governments, many NGOs and donor agencies, private companies currently implement the micro credit projects for the purpose of fostering the small scale enterprise, increasing incomes, empowering the poor, and mobilizing community participation by group formation. CARE PROSPECT and PULSE play a leading role in this sector, and meet with success in terms of its impact and sustainability. There are more than 10 organizations and groups that operate the micro credit programs in Lusaka City (Refer to Table 2.4.1).

## 2.5 Infrastructures in Lusaka City

### 2.5.1 Road and Drainage

#### (1) Road Classification in Lusaka City

Roads inside Lusaka City are classified into the national roads and the municipal roads administered by the Road Department of Ministry of Works and Supply and the Road Department of Lusaka City Council, respectively.

#### (2) Roads and Drainage Condition of the National Roads and Municipal Roads

The national roads in the city have 2 to 6-lane carriageway with bituminous pavement. Periodic maintenance work has been undertaken such as pothole patching.

Drainage system is facilitated either with open ditches with sodding or open ditches with stone pitching. Periodic maintenance works including cleaning of ditches have been undertaken along the national roads.

An urgent rehabilitation project of the national roads inside the City was completed already, with the Japanese grant-in-aid funds spanning 1997 and 1998 (see Figure 2.5.1). The number of rehabilitated national roads was 22 and total length came up to almost 65km. The Project was implemented in the following 2 phases:

1st Phase Work: Rehabilitation of 12 Roads linking to Compounds  
(total length: 30.8km)

2nd Phase Work: Widening of Lumumba Road (7.2km) to 4-lane  
carriageway, and rehabilitation of 10 major trunk roads  
inside the City  
(total length: 34.4km)

(3) Roads and Drainage Condition of the Municipal Roads

1) Roads inside Unplanned Urban Settlement

In some UUSs, most of the roads are bituminous pavement, but in other UUS, almost roads are unpaved and their surfaces have been heavily deteriorated. Even the bituminous-paved roads have a lot of pot-holes due to insufficient maintenance work, and the surfaces have been deteriorated severely as well.

In some road sections inside UUS, side-ditches were not installed.

2) Other municipal roads

Almost all municipal roads have dual carriageway with bituminous pavement and side-ditches.

### 2.5.2 Water Supply

The Lusaka Water and Sewerage Company (LWSC) under LCC manages the water supply system in the City. The average daily supply is estimated at 190,000 m<sup>3</sup>/d based on the activities of LWSC in 1998. The water sources consist of approximately 47 % groundwater sources equivalent to 90,000 m<sup>3</sup>/d and 53 % surface water sources equivalent to 100,000 m<sup>3</sup>/d.

The surface water is collected by the Iolanda intake located in the Kafue River, 55 km from the City as shown in Figure 2.5.2. The surface water is treated by the rapid filtration method with coagulation sedimentation and disinfection by chlorine as shown in Figure 2.5.3. The treated water is transferred to the City from the Iolanda pumping station through the Chilanga pumping station and water is supplied by the Lusaka waterworks treatment plant and pumping station. Direct production cost is estimated about Kwacha 305/m<sup>3</sup>.

The groundwater in the City is controlled and developed by LWSC. Pumped-up groundwater is distributed to the City from boreholes spread over the City as shown in Figure 2.5.4. LWSC has 54 production boreholes listed and 52

boreholes are operating at the present. Direct production cost is estimated at approximately Kwacha 60/m<sup>3</sup> on average.

There are two water supply systems in the city: i) the network system supplying water to the urban areas of the city from the main reservoirs located in the City and ii) the satellite system supplying water independently at each area from boreholes with elevated tanks. The service area of the network system is only 30% of the total area of the city. The satellite system is established at the newly developed residential areas in the peri-urban settlements such as George, Chainda, Freedom, and Bauleni settlements.

The existing water supply connection has two types of connections: i) the individual house connection in the urban areas with the network system and ii) the public tap connection in the areas with high population density supplied mainly by the satellite system. The existing water usage of LWSC is summarized below:

**Existing Water Usage of LWSC**

	Number of Subscribers	Water Volume Consumed (%)
Industrial and Commercial	1,761	6
Domestic	27,237	62
Public tap at Compound	-	8
Institutional	508	24
Total	29,506	100

The quality of water from the existing boreholes satisfies the potable water quality standard of Zambia as shown in Table 2.5.1.

Water meters are set up only at water mains and individual connections of large consumers. LWSC collects a water charge from original users in the form of a fixed fee which is unconnected with the volume of water consumed. It is estimated that water charge collection ratio is only 40%, public use is 16% and UFW (unaccounted for water) is 44% including 11% of freely supplied users at high-density areas. Therefore, establishment of water meters and meter reading system are necessary to improve the billing accuracy and revenue collection ratio.

### 2.5.3 Sewerage System

The wastewater collection and treatment is managed by LWSC. Storm water and wastewater are collected separately. Storm water is collected by open channel managed by the road department of LCC. Wastewater is collected by the sewer system as shown in Figure 2.5.5.



The existing sewerage network system covers only 30% of the whole area of the city. Trunk sewers with a diameter greater than 225 mm extend about 130 km and lateral sewers with a diameter less than 225 mm extend about 230 km. The existing sewer system is in poor condition and raw wastewater overflows frequently. Treatment area is divided into 7 zones with sewerage pump stations. The trickling filter method is used to treat wastewater for Manchinchi and western sewage zones. Digester and maturation ponds are used to treat wastewater for the other zones. However, these treatment plants stop functioning properly because of the outdated and aged facilities. Not only the treatment facilities but also the existing sewerage network system shall be rehabilitated, upgraded and expanded in order to minimize health and environment risks.

An on-site system, such as Pit latrines and septic tanks, is adopted for treating night soil at the area without sewer network, especially at the peri-urban settlements. An inadequate on-site system has a risk of contamination of both surface water and groundwater.

It is necessary for a sewerage master plan to be formulated for the whole Lusaka and development of sewerage system shall be undertaken as soon as possible so as to secure the safety of water source and improve the living environment.

#### 2.5.4 Solid Waste Management

The Department of Public Health under LCC is responsible for collection and final disposal of solid waste in Lusaka City. The collection area served is shown in Figure 2.5.6. A large amount of solid waste is left on several street corners even in the urban area, which means necessary collection operations are not being performed by LCC.

The Cleaning Section of the Department has about 500 staffs and some vehicles and equipment (3 tractors, 1 trailer, 1 mobile compactor, 1 tip packed track, 2 loaders, 1 track wheel loaders) for solid waste management. However, these manpower, vehicles and equipment are insufficient for management. Almost all the waste is illegally collected and dumped without any treatment by scavengers along the streets and the rivers in the city.

In terms of collection services of solid waste, they cover only 8 to 10% of all the areas of Lusaka City, mainly the Central Business District (CBD) and the areas along the trunk roads. At present the collection charges are free for domestic waste generated from residents in the service area, and Kwacha 10,000/time for industrial and commercial areas.

Domestic and commercial waste is formally collected by LCC only for the CBD, hospitals, markets, hotels, offices and factories. This collection service depends on the availability of vehicles and frequency of collection varies vastly from month to month. In most of the city including the CBD, only sporadic services are provided. Almost all of the peri-urban is out of the official service and then domestic waste is simply dumped in a communal area. The medical waste generated in hospitals and clinics is either incinerated or buried in pits at each hospital/clinic.

The final disposal is made without adequate incineration and discrimination, and then filling at the open dumping site which is situated at Libara as shown in Figure 2.5.6. Even at Libara solid waste dumping site and surrounding area, illegal dumping has been seen there due to lack of management systems such as facilities and regulations. On 31 December 2000, the Libara solid waste dumping site was closed by the Environmental Council of Zambia due to deterioration of the living environment and pollution of groundwater. At the present, LCC is temporarily using a Chunga dumping site located at Chunga compound in the City. LCC has a plan to construct a newly final disposal site at Kabwe located in Chibombo District, 2 km northward from the City. The new site shall adopt the sanitary landfill method.

Although LCC has been encouraged to not only purchase the necessary vehicles and equipment but also to develop the human resources and regulations, those realizations are too difficult mainly because of a shortage in LCC's budget.

Under these circumstances, private companies such as Schweizer Limited, Clean First, and Galis Men at Work, provide the collection services of solid waste and refuse/garbage according to contracts with clients. A collection fee per trip ranges between Kwacha 7,000 and 10,000. However, their services are far from the means of solving solid waste management.

This present situation has a harmful influence upon the living environment, and causes serious outbreaks of cholera and dysentery in Lusaka City. Therefore, it is urgent to establish a comprehensive management system for solid waste.

## **2.6 Infrastructure in Unplanned Urban Settlements**

The existing infrastructures in the eight unplanned urban settlements are indicated in Figures 2.6.1 to 2.6.8, respectively, and the present conditions of infrastructures are summarized in Table 2.6.1. From the result of the existing condition survey,

it is clear that the service level of infrastructures in the eight unplanned urban settlements is awfully poor as described in the following.

### 2.6.1 Roads and Drainage

#### (1) Cross-section

Almost all roads are of 5 to 9m in width, of single- or dual carriageway, and without side-ditches installed.

#### (2) Characteristic of Traffic

The primary roads in UUS linking to the national trunk roads, have a small volume of traffic (below 50 pcu/day<sup>2</sup>) comprising mini-bus, goods vehicles to the markets and so forth. The secondary and tertiary roads in UUS seldom have passing vehicles, except for pedestrians.

#### (3) Roads and Drainage Condition

The secondary/tertiary roads in UUS consist mostly of earth roads without side-ditches, which are affected by the submergence during the rainy season, leading to the destruction of road surfaces. Part of the secondary/tertiary roads has been improved into gravel roads with open ditches; however, provided open drainage systems are not functioning by the accumulated sand/earth/rubbish due to lack of maintenance work.

Some of the primary roads linking to the national trunk roads, have been paved with surface dressing treatment. Even in such the sections, road surfaces have been heavily deteriorated and vehicles face difficulties in running. This is because 1) coarse particles are used in aggregates for base course. 2) there is no side-ditch provision, and 3) no maintenance work has been undertaken.

#### (4) Drainage Outlet

Except for the road sections where the Programme Urban Self Help (PUSH) have provided side-ditches, there exists no drainage system up to an outlet. In some area side-ditches can be found, but these were excavated by the residents so as to prevent water from intruding to each homestead.

In Chibolya UUS and Old Kanyama UUS, there is no drainage outlet within UUS. Extension of drainage system up to an outlet requires, 450m in Chibolya UUS and 700m in Old Kanyama UUS, respectively. It is foreseen that the outlet connection will be costly, due to a long distance extension in the flat topography, even if a

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<sup>2</sup> pcu: passenger car unit

gentle-slope drainage system is applied. Accordingly, a drainage plan covering not only the objective UUS but also all of the surrounding environs will be required.

With regard to Ng'ombe, Bauleni, Kalikiliki and Chazanga, the drainage system might be provided up to an outlet, since there exists an outlet nearby.

The following issues are, however, observed in Ng'ombe:

A natural water course is located in the central part of Ng'ombe, which is filled-up with drifting timber and rubbish and, in turn, affects road surface and resident housings by overflowed water during the rainy season. According to an interview with a resident, the maximum submergence ranges around 1.2m. Cleaning work in the natural watercourse as a drainage outlet, will upgrade the flow capacity and will solve the adverse problems in the upstream and surrounding areas. The scheduled work of the Sustainable Lusaka Project (SLP), in which the accumulated rubbish is to be removed, is expected.

(5) Precedents of Road/Drainage Improvement with Local Resident Participation

(a) Ng'ombe

In November 1998, the road section of approximately 300m in front of a clinic was improved with open-ditched installed both side, by PUSH. However, side-ditches have already been buried in earth and sand. Unevenness is seen at parts of the improved road section. It is foreseen that the road surface will be submerged under rain water leading to their destruction, unless no earth/sand removal are undertaken prior to the rainy season.

(b) Chainta

Almost all UUS roads have been improved by PUSH, from October 1998 onward, with open-ditches installed both side. Maintenance situation is favorable: periodic maintenance work has been undertaken for the side-ditches, and rubbish/sand/earth are not observed. Nevertheless, roads might be submerged in the overflowed water from the ditches in case of heavy rainfall in the rainy season, because no adequate drainage extension up to an outlet is developed.

(c) Bauleni

Part of UUS roads have been improved by PUSH, with open-ditches installed both side. Drainage system does not extend up to an outlet.

(d) Kalikiliki

Part of UUS roads have been improved by PUSH, with open-ditches installed both side. Drainage system does not extend up to an outlet. Side-ditches have already been buried in earth/sand/rubbish, and the road surface is heavily deteriorated.

## 2.6.2 Water Supply

LWSC supplies water to Bauleni, Chainda, Freedom and Ng'ombe by means of the satellite system, and to Chibolya and Kalikiliki with the network system but its service cannot cover the whole area of each settlement due to lack of water sources' capacity as shown in Table 2.6.1. LWSC charges households a fixed amount for water supply using tap attendants. Chainda has been expanding the water supply system in cooperation with the World Vision and LWSC. HUZA also set up water supply for the training center and the communal school in Bauleni.

In Chazanga there are only 3 communal deep wells with hand pumps for public use and dug wells for private use and since these wells run dry during dry season the public are compelled to get drinking water from surrounding water sources, such as water vendor and farm wells. Old Kanyama has one borehole with a pump and an elevated tank under assistance of HUZA and there are 16 public taps servicing 10% of the total area. Tap attendants, who are selected by the water committee, collect a water charge from users.

The existing conditions of water supply at each settlement are summarized in the following:

### Existing Conditions of Water Supply at Each Settlement

UUS	Water Demand (m <sup>3</sup> /d)	Served/Total Area (ha)	Existing Conditions
Bauleni	900	76/128	- Supplied by LWSC - 2 boreholes for public & 1 well for school - 11 public taps and individual connections - Low quantity (unit consumption: 9.6 lpcd) - Low pressure and large leakage - Hill area of eastern part is not supplied
Chainda	340	63/63	- Supplied by LWSC - 2 boreholes & 1 well with hand pump - 39 public taps (436 persons/tap) - Unit consumption: 18 lpcd
Chazanga	580	2/30	- 3 communal well with hand pump - A few dug wells - Wells run dry during dry season - Potential of underground water is low
Chibolya	700	12/46	- Supplied by LWSC (net work) - 12 public taps and illegal connections - Western part is not supplied
Freedom	180	13/43	- Supplied by LWSC - 1 borehole & 6 public taps (2 breakdown taps) - Low quantity (unit consumption: 9.3 lpcd) - Eastern part is not supplied
Kalilikiki	160	12/61	- Supplied by LWSC (net work) - 1 public tap and 7 individual taps - 4 hand pumps is out of order - Northern part is not supplied
Ng'ombe	600	27/91	- Supplied by LWSC - 1 borehole & 13 public taps, 4 communal hand pumps - Low quantity (unit consumption: 1.2 lpcd) - Eastern part is not supplied
Old Kanyama	1,140	50/500	- Supplied by HUZA - 1 borehole and 16 public taps - Northern part is not supplied

The following projects were identified as ongoing or in planning:

- (a) According to the public school construction projects under JICA, the water supply for the school in Bauleni and Ng'ombe was established in 2000 and in Chainda will be established in 2001.
- (b) Water supply systems for Chazanga, Chibolya and Old Kanyama are planned to be fully provided by CARE PROSPECT program within a couple of years.
- (c) Bauleni got a donation for construction of a borehole from an influential person but the borehole is out of order due to an inadequate method of construction. Zones 9, 10, 11 and 12 in Bauleni will supply water under the assistance of PoCMUS within a couple of years.
- (d) Chainda is constructing an additional water supply system including a borehole and expanding the pipeline under the assistance of the World Vision.

(e) In Chazanga, water supply facilities with a borehole for a clinic are under construction in cooperation with the community fund.

### 2.6.3 Sewerage and Sanitation Facilities

Eight settlements have no sewerage network system for domestic wastewater. Almost all of the residents have their own private toilet, a pit latrine type, in order to treat their night soil. Gray water generated from households is discharged to their own plots or roads and rivers near their houses.

Public toilets for market is provided at three settlements: Bauleni, Chibolya and Old Kanyama. Public schools that have toilets with a septic tank were newly constructed at Bauleni and Ng'ombe in 2000, and at Chainda school is planned for construction 2001. In Chazanga and Chibolya, a communal school has a toilet with a pit latrine.

The existing conditions including estimated night soil generation and recommendations for sanitation facilities are summarized below:

**Existing Conditions of Sanitation Facilities**

	Existing Facilities	Night Soil (m <sup>3</sup> /d)	Recommendations
Bauleni	Pit Latrines for residents, market & training center	68	Upgrade from pit to VIP, soak
Chainda	Pit Latrines for residents	26	Upgrade from pit to VIP, soak Construction of public toilet
Chazanga	Pit Latrines for residents & school	44	Upgrade from pit to VIP, soak Construction of public toilet
Chibolya	Pit Latrines for resident & market	53	Upgrade from pit to VIP, soak
Freedom	Pit Latrines for resident	14	Upgrade from pit to VIP, soak Construction of public toilet
Kalikiliki	Pit Latrines for resident	12	Upgrade from pit to VIP, soak Construction of public toilet
Ng'ombe	Pit Latrines for residents, school & market	45	Upgrade from pit to VIP, soak
Old Kanyama	Pit Latrines for resident & market	86	Upgrade from pit to VIP, soak

Construction method and location for sanitation units and soak-away should be carefully determined in order to minimize the risk of surface water and groundwater pollution. The pollution is caused by inadequate pit latrines in the area with high population density where a drainage system is not developed and the groundwater table is very high with a depth of less than 5 m from the surface, or in areas of steep slopes where a permeable layer of topsoil covers an impermeable layer with shallow depth, such as Chibolya, Old Kanyama and Ng'ombe.

## 2.6.4 Solid Waste

All settlements don't get public service for waste collection since collection service capacity of LCC is low. Almost all the garbage and refuse generated from residents in settlements are illegally dumped at the public areas, rivers and roads adjacent to their houses. A few households have a garbage pit on their plot. LCC, in conjunction with NGOs and other organization, is currently in the process of initiating a strategy to educate people in the peri-urban and develop an effective garbage collection system with community participation.

The existing conditions in connection with solid waste collection and generation are identified at each settlement below:

**Existing Condition of Solid Waste**

	Generation (kg/d)	Container (Midden Box)	Disposal	Remarks
Bauleni	13,500	No	Illegal dumping	Unsanitary at a market especially
Chainda	5,100	No	Private pit/Illegal	Hygienic education/campaign is introduced under World Vision
Chazanga	8,700	No	Private Pit/Illegal dumping	Hygienic education/campaign is not introduced yet
Chibolya	10,500	No	Illegal dumping	Dumped on the roads and bad living condition during rain
Freedom	2,700	No	Illegal dumping	Dumping on the roads
Kalikiliki	2,400	Yes	Illegal dumping	Not collected & disposed due to no willingness to pay
Ng'ombe	9,000	Yes (for market)	Illegal/Communal collection	Acting under SLP
Old Kanyama	17,100	Yes	Illegal/ Communal collection	Not collected & disposed due to no willingness to pay and bad living condition during rain

Kalikiliki, Ng'ombe, and Old Kanyama once established a solid waste collection system and set up communal containers within the settlement under the Care program. However, it is obvious that the collection system stopped functioning properly after completion of the Care program owing to lack of solvency, understanding of sanitation and hygienic education.

Ng'ombe restarted to improve its sanitation and garbage collection system under SLP from 1999. Activities of SLP in Ng'ombe are summarized as follows:



- i) An improvement program for solid waste management was started and a committee for solid waste management under RDC was organized in 1999.
- ii) In 2000, several workshops were held for the sake of hygienic education, introduction of a method for solid waste management and business and community participation. An interview survey also was conducted for grasping the socio-economic condition and the residents' willingness to pay for solid waste management.
- iii) The area was divided into 2 management zones. A collection fee was determined at Kwacha 2,000/household/month.
- iv) A campaign and tentative operation for garbage collection were carried out on October 2000. 150 households registered in the committee. Workers were employed for garbage collection inside of the area.
- v) Equipment for garbage collection (wheel barrows, shovels, gloves, etc.) were purchased with a budget of Kwacha 2.2 million from SLP and a regular operation was commenced on December 2000.
- vi) 2 midden boxes are to be constructed by the community within 2001 after materials are supplied from SLP.

At present, collected garbage in Ng'ombe is illegally dumped at the place where the midden boxes are constructed since LCC is not able to collect and transport it to the final disposal site. At the same time, the collection fee of private sectors is too expensive for the committee to use the private collectors instead of public service. As a result, it makes clear that reinforcement of LCC's collection system including private sectors is the most urgent.

CARE PROSPECT intends to take action for improvement of garbage collection in Chazanga, Chibolya and Old Kanyama. A basic strategy is provided and main components are summarized as follows.

- i) Education and campaign concerning with the solid waste management
- ii) Establishment of a committee and a levy system
- iii) Supply of collection equipment and construction of midden boxes
- iv) Preparation of a manual book for the solid waste management

A detailed program is not disclosed yet and no actions have been taken by CARE PROSPECT. For success of developing the solid waste management at settlements, solid waste management capacity of LCC shall be strengthened.

Chainda has been conducting a hygienic education/campaign as well as a water supply system in cooperation with World Vision. Some residents dispose domestic waste at individual pits and others dump the waste illegally at open spaces outside the compound. There is no proper garbage collection system at Chainda.

At Chazanga, Chibolya, Ng'ombe and Old Kanyama settlements, garbage collection and hygienic conditions will be insignificant and improved by CARE in the near future under the condition that the solid waste management system of LCC is improved. At other settlements, illegal dumping is performed routinely since they have no public services, improvement programs and facilities for garbage collection.

It is most important and urgent to improve the solid waste management of LCC since a fundamental problem is the limited capacity of LCC's present garbage collection and disposal system. It is also necessary to strengthen hygienic education and campaign, to establish a garbage collection system and first to confirm a willingness to pay a solid waste collection fee at settlements.

#### 2.6.5 Problems and Constraints under Present Conditions

The following problems and constraints under present conditions are clarified:

- (a) Despite the side-ditch provision, the drainage systems hardly reach an outlet. During the rainy season, the roads will be submerged in heavy rainwater, leading to destruction of the road surface. An appropriate drainage design is required.
- (b) It is imperative to undertake the periodic removal of earth/sand/rubbish accumulated in the side-ditches. At least before the start of the rainy season, it has to be completed every year.
- (c) The existing public capacities of the water supply, sewerage system and solid waste collection system in the City are inadequate not only for the urban area but also for unplanned settlements.
- (d) Therefore, the required infrastructure improvement in the 8 settlements should be planned independently.
- (e) Improvement of water supply is ranked as the first priority scheme in the settlements excepting Chainda according to the people's desire and consciousness.
- (f) Daily water consumption per capita in the settlements is very low with a value of less than 10 lpcd, excepting Chainda and Ng'ombe.
- (g) Service area of water supply is terribly small in the settlements excepting

Bauleni and Chainda. The lowest covering ratio is less than 5 % in Chazanga and less than 10 % in Old Kanyama, 20 % in Kalikiliki, 25 % in Chibolya and 30 % in Ng'ombe.

- (h) Although almost all households have their own toilet, the level of sanitary facilities is very low. Gray water is discharged into the neighboring drainage, rivers, and land untreated. Inadequate sanitary facilities have the risk of both surface water and groundwater pollution.
- (i) Household refuse is dumped directly into public areas, even to rivers and roads, due chiefly to the limited capacity of LCC's present collection system.
- (j) LCC has problems at present of where to dispose solid waste collected around the City due to compulsory closing of Libara tipping site. A final disposal site with sanitary landfilling shall be newly constructed as soon as possible.
- (k) From a viewpoint of sustainable and sound development for settlements, it is necessary to strengthen hygienic education and campaign and confirm people's willingness to pay a service charge.
- (l) Pollution of living environment worsens proportionally to the increase in population density of the settlements.
- (m) As a result, the existing infrastructures are unable to function as social overhead capital and hygiene sustaining facility.

**Table 2.4.1 Micro Credit Activities/Projects in Unplanned Urban Settlements in Lusaka City**

Organisation	Target Areas	Target Members & Number	Credit & Business Training	Range of Loan Amount	Interest Rate/yr	Savings or Other Fund	Repayment Period	Repayment Rate
CARE PULSE	Kanyama, Mutendere, Chawama, Chilenje	Mainly women, men & Youths 4,908 members	8 weeks business & management training	1. K50,000-500,000 2. K300,000-1,000,000 3. K800,000-1,500,000	N/A	Loan Insurance Fund; 10% of credit & savings	1. 25weeks 2&3.50weeks	95%
HUZA	Chawama, Ng'ombe,	Women 80% in 2004 membs, but no group formatin	No training is provided to members	K50,000-1,000,000	1 <sup>st</sup> Loan: no interest 2 <sup>nd</sup> Loan: 25%	No saving system	6 months	N/A
World Vision	Chainda	163 members 112 women, 51 men (6groups)	8 weeks training program	K250,000 -1,000,000	60% per annum	No saving system	6 months	50%
AMDA	George	60 Women	Business training (12times)	US\$100-300	25% per annum	Membership Fee K5,000	8 months	N/A
OXFAM	Mufulira (MPUDF: CBO)	Anybody approved by CBO 60 members	Training by CBO management committee	No credit program but only soft loans K5,000-25,000	2-4% per annum	Membership Fee 1,000/year	2 months	100%
Irish Aid (now pulled out, hand over to comm.)	Kamanga	Memb.s, screened by RDS&Project staff, 200membs	Credit planning & management course: 4weeks	Maximum K300,000	4% per annum	Membership Fee 10,000/year	6 months	85%
Women Finance Trust	N/A	Low-income Women 820 members	N/A	K200,000-K500,000	50% per annum	K2,500 M/F K5,000 Savings K2,500 Subscri.	6 months to 1 year	90-98%
Donor Working Group on Micro-finance	Lusaka city	To disseminate experience on different Micro-finance projects currently executed by different donor agencies, such as PAP, USAID, GTZ, SIDA, MBT, JICA, EU, ILO, ECA, the Royal Netherlands Embassy.						
Micro Bankers Trust (by GOZ & EU)	N/A	Channel funds for agencies or NGOs	N/A	N/A	24% per annum	N/A	1 year	N/A
Poverty Alleviation Project (PAP)	Implemented under the supervision of the Ministry of Finance. Main fund is from the African Development Bank(AfDB), & Swedish Govt. The volume of funding is estimated US\$4million, and 10% out of this is used for administrated costs. (No details for operation are identified)							
Progress Finance(Private Company)	Lusaka, Muanza, Mazabuka	Focus on women in business, 576 members	N/A	N/A	60% per annum 60% service charge/year	10% deposit of the credit	2, 6, 12 months, 2 years	96%

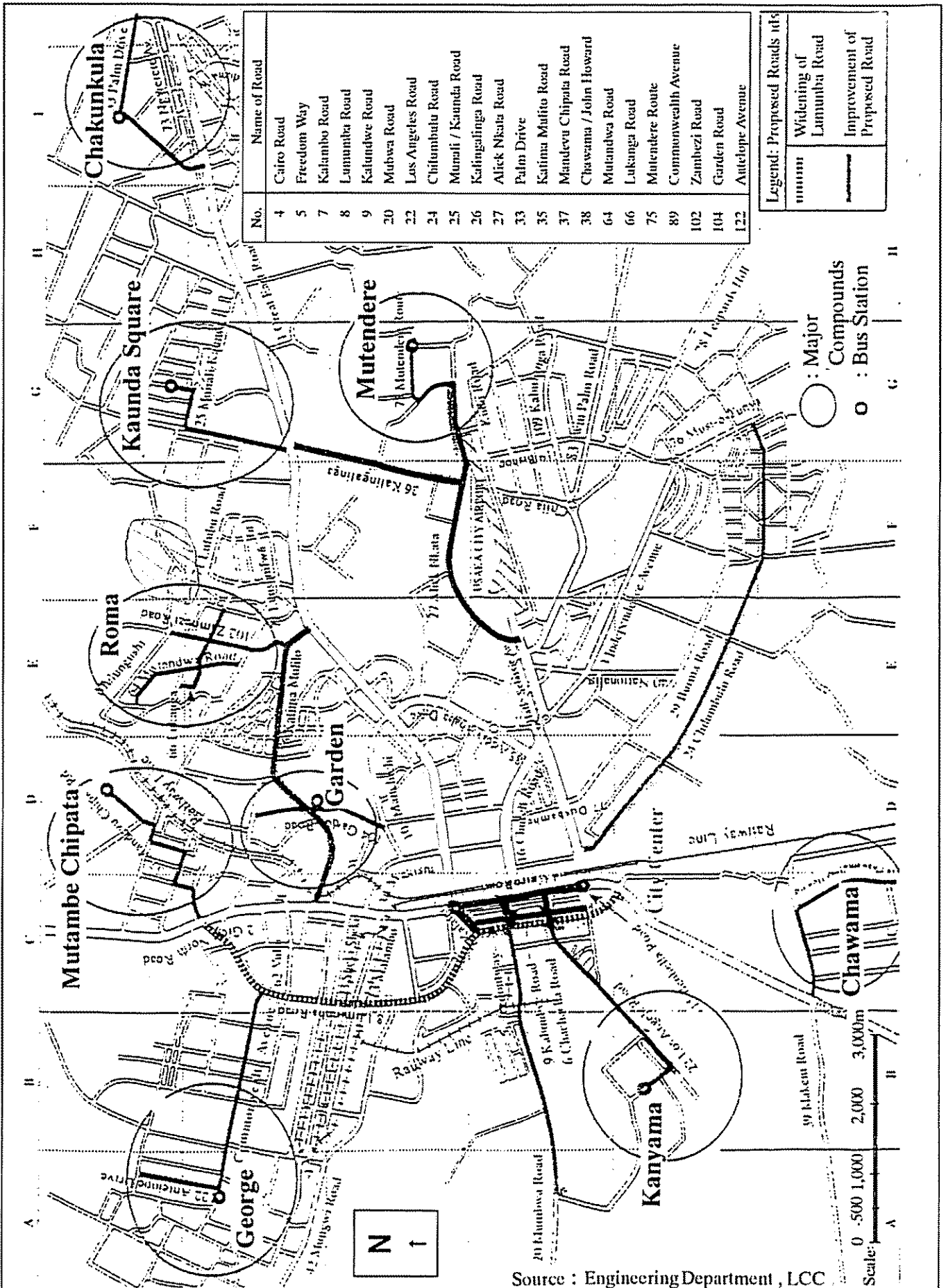
**Table 2.5.1 Water Quality Standard of Zambia (WHO) and Japan**

Parameter	Unit	Zambia (WHO)	Japan
EC	uS/cm	2,000	-
pH		7.0-8.5	5.8-8.6
Fe	mg/l	0.3	0.3
NO2-N	mg/l	-	
NO3-N	mg/l	40-80	10
NH4-N	mg/l	0.5	-
F	mg/l	1.0-1.5	0.8
Hardness (Ca)	mg/l		
Total Hardness	mg/l	100-500	300
Cl	mg/l	200-400	200
Coliform Group	ea/ml	Negative	Negative
Bacteria Group	ea/ml	-	100

**Table 2.6.1 Existing Conditions of Infrastructures at Settlements**

	<b>Water Supply</b>	<b>Sanitation</b>	<b>Solid Waste</b>	<b>Road/ Drainage</b>
<b>Bauleni</b>	* LWSC (9.6 lpcd, Individual connection & 11 Public Taps) Served area: 60% of area	O Pit Latrine Public Latrine School Toilet	X illegal dumping Private pit	*
<b>Chainda</b>	O LWSC(18.4 lpcd) 2 Borehole, 1 Hund pump & 39 public taps Served area: 100% of area	O Pit Latrine	X illegal dumping Private pit	O
<b>Chazanga</b>	X 3 Hand Pumps & Dug Wells 1 Borehole for Clinic (under construction) Served area: less than 5%	O Pit Latrine School Toilet	X illegal dumping Private pit	X
<b>Chibolya</b>	* LWSC (12 public taps including 3 breakdown taps) Served area: 25% of area	O Pit Latrine Public Latrine	X illegal dumping	*
<b>Freedom</b>	* LWSC (9.3 lpcd, 6 public taps including 2 breakdown taps) Served area: 30% of area	O Pit Latrine	X illegal dumping Private pit	X
<b>Kalikiliki</b>	* LWSC (7 Individual Taps & 1 Public Tap) 4 Hand Pumps: out of order Served area: 20% of area	O Pit Latrine	* Communal Container illegal dumping	O
<b>N'gombe</b>	* LWSC (1.2 lpcd, 13 public taps) 4 Hand Pumps Served area: 30% of area	O Pit Latrine Public Latrine School Toilet	* Communal Container Private pit illegal dumping	*
<b>Old Kanyama</b>	* HUZA (1 Borehole) & 16 public taps Served area: less than 10%	O Pit Latrine Public Latrine	* Communal Container illegal dumping	*

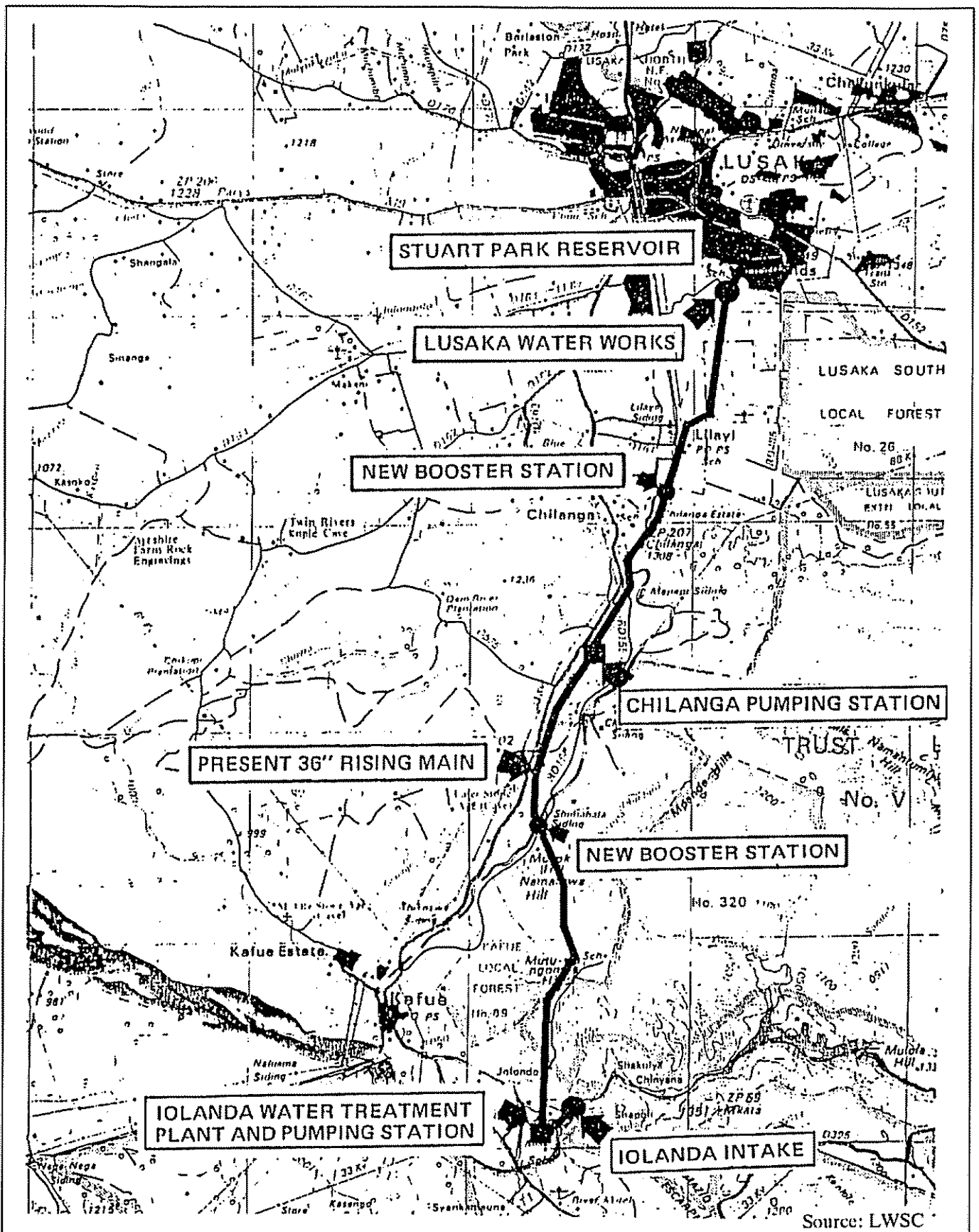
O Good  
\* Partially served  
X Poor



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Figure 2.5.1  
Proposed City Roads for Development



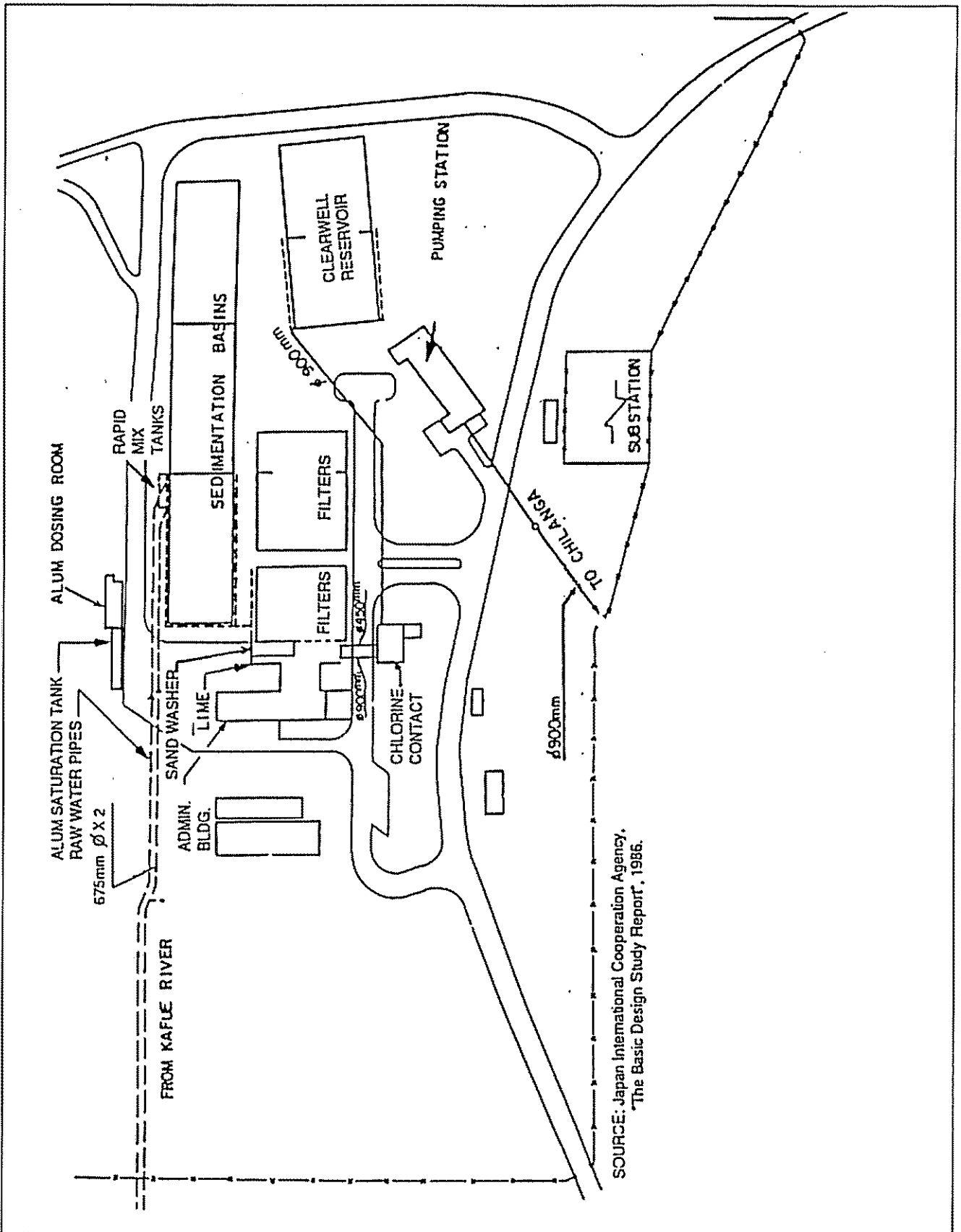
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Figure 2.5.2

Additional Booster Stations on Present Rising Main (Kafue River Water Supply)

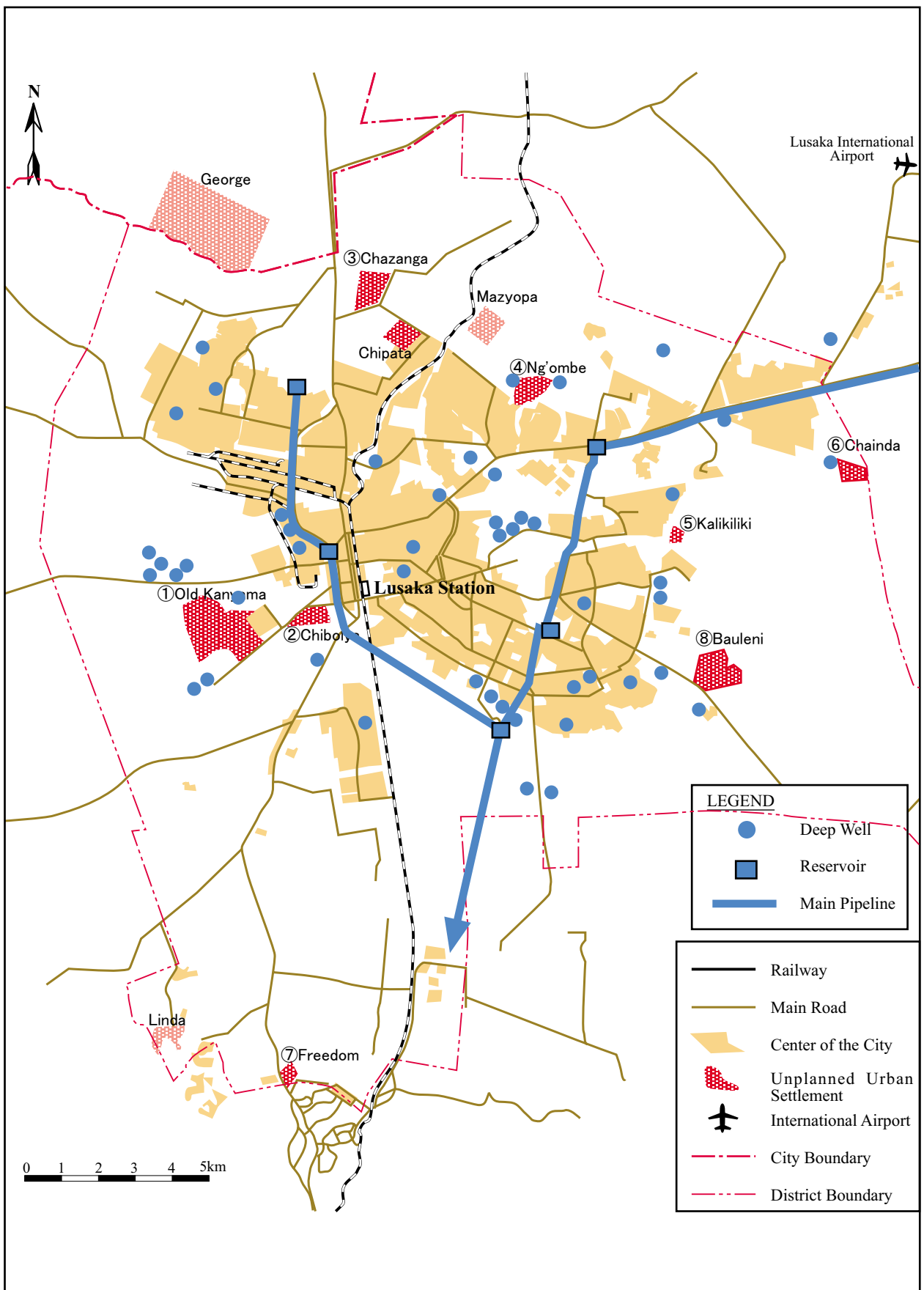




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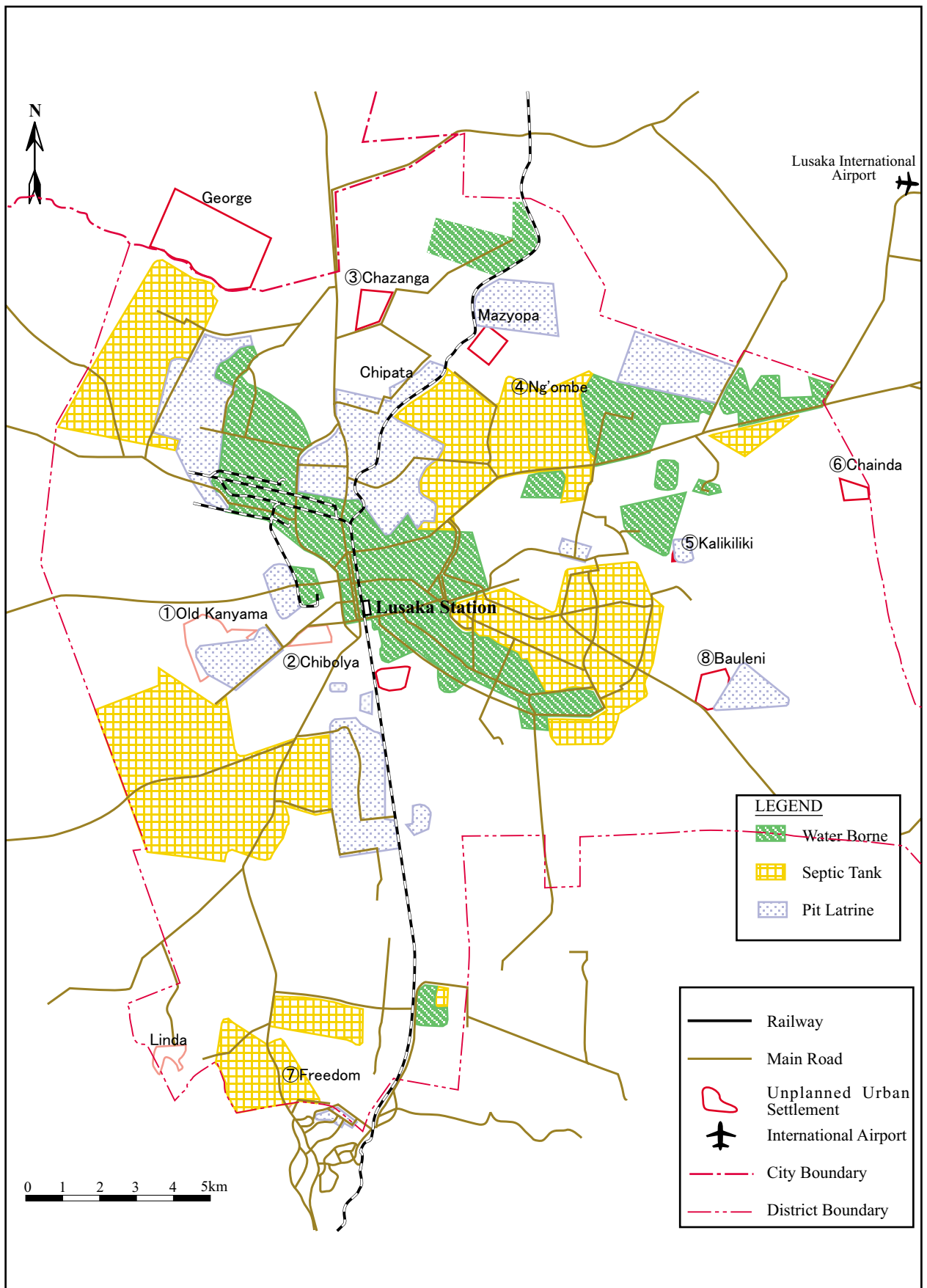
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Figure 2.5.3  
Existing Iolanda Water Treatment Plant Site Plan (For Kafue River Water Supply)



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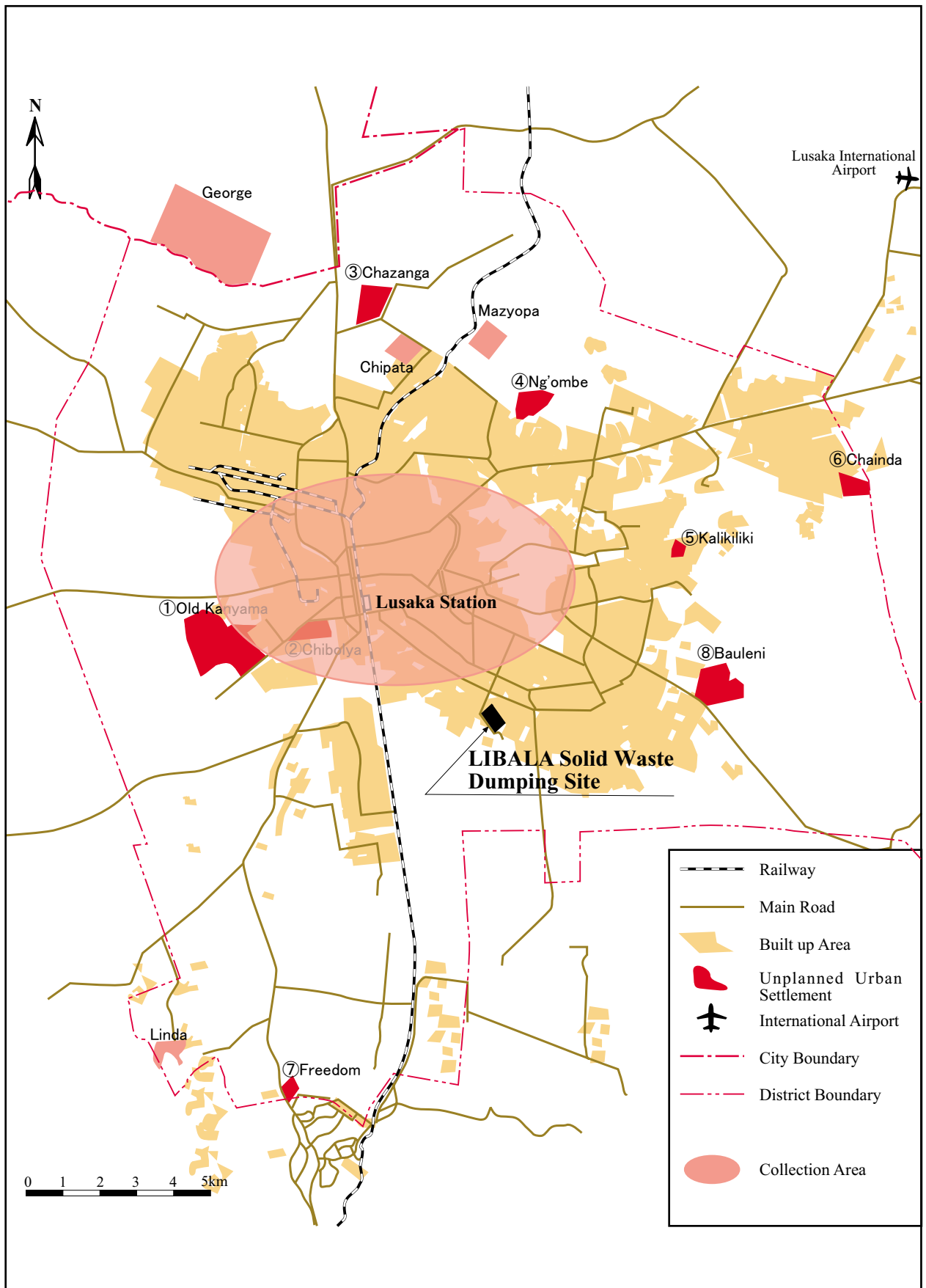
**Figure 2.5.4**  
**Water Supply System**  
**in Lusaka City**



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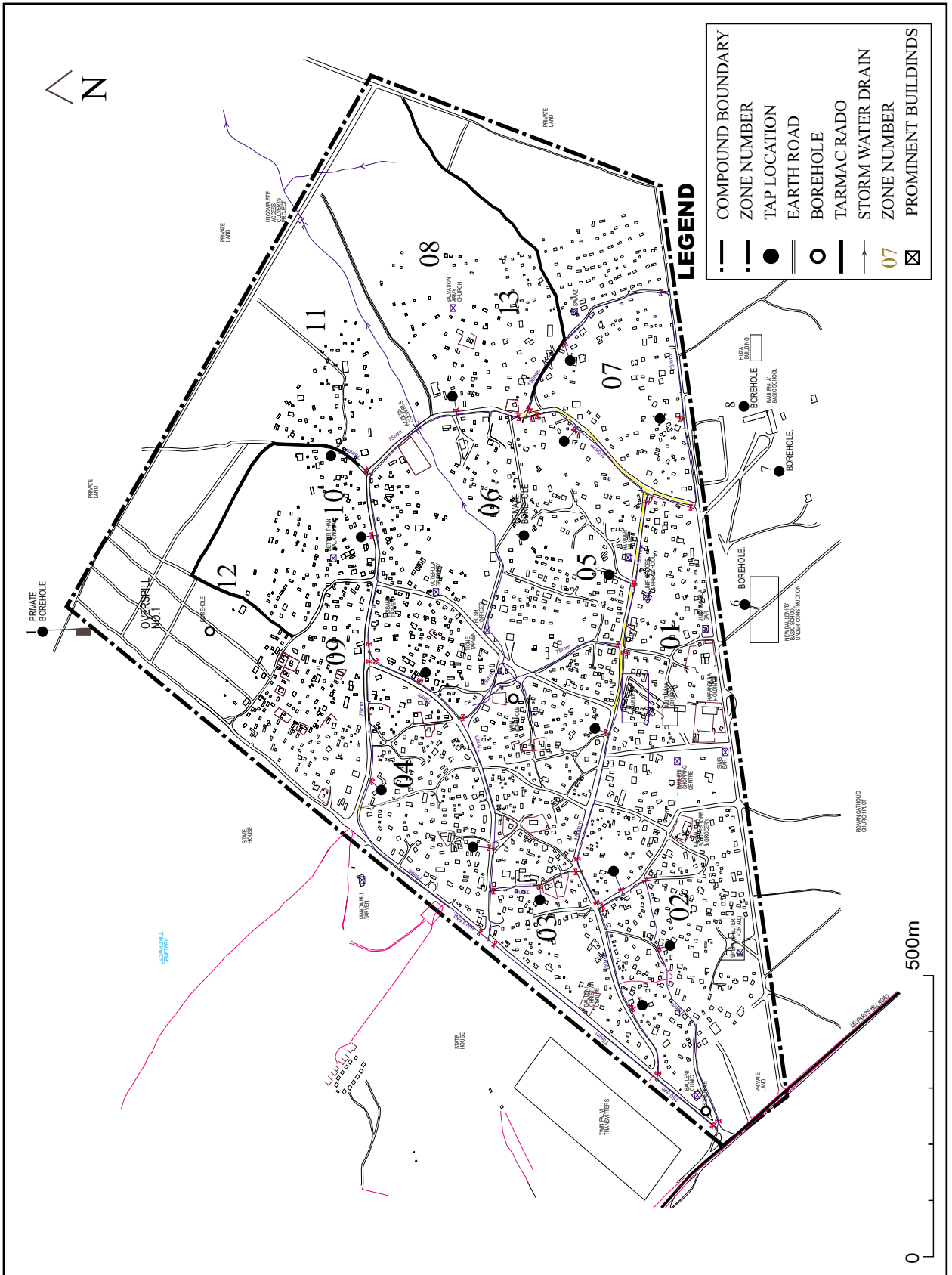
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**Figure 2.5.5**  
**Sewerage System in Lusaka City**



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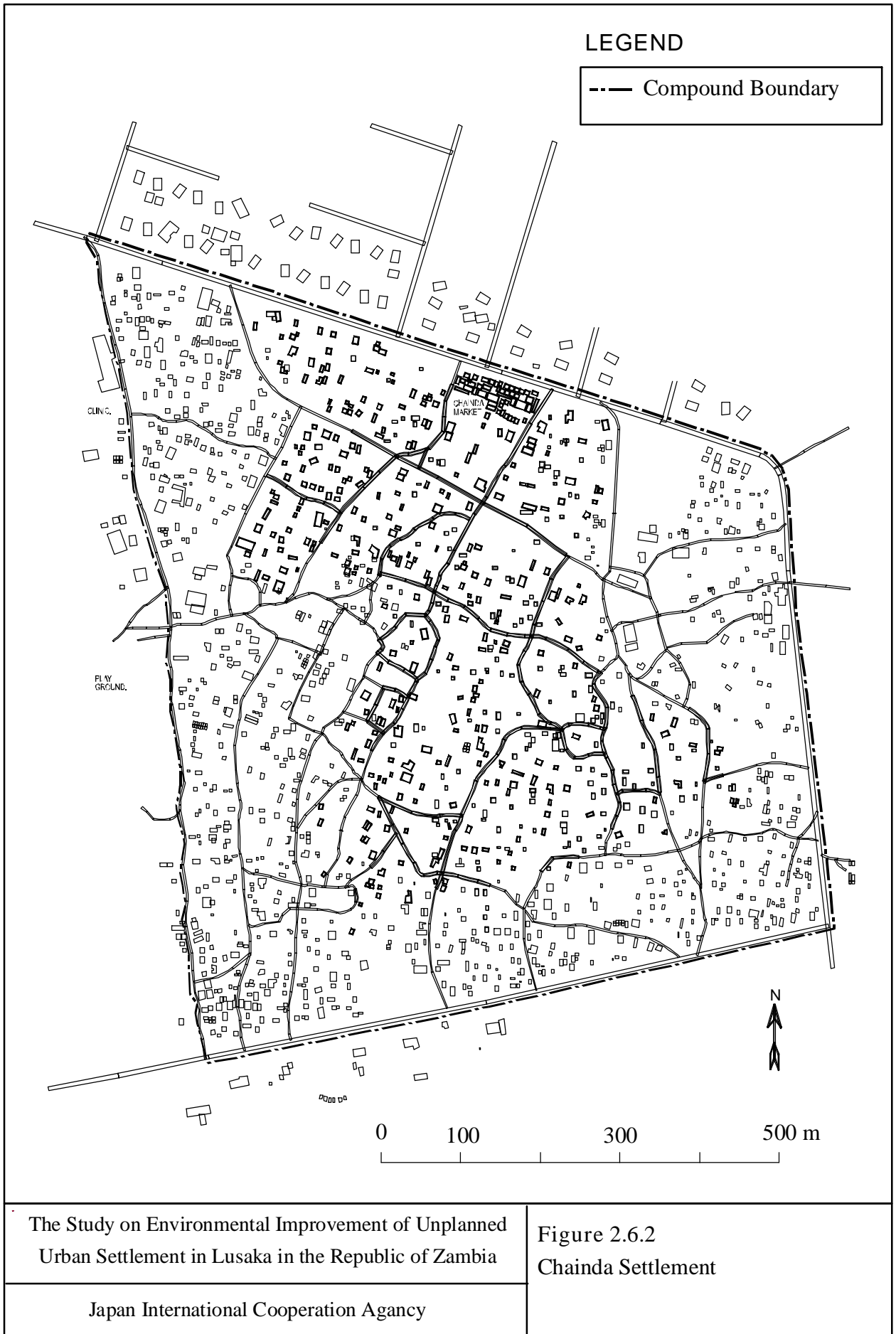
**Figure 2.5.6**  
**Solid Waste Collection Area**  
**by LCC**



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Figure 2.6.1  
Bauleni Settlement





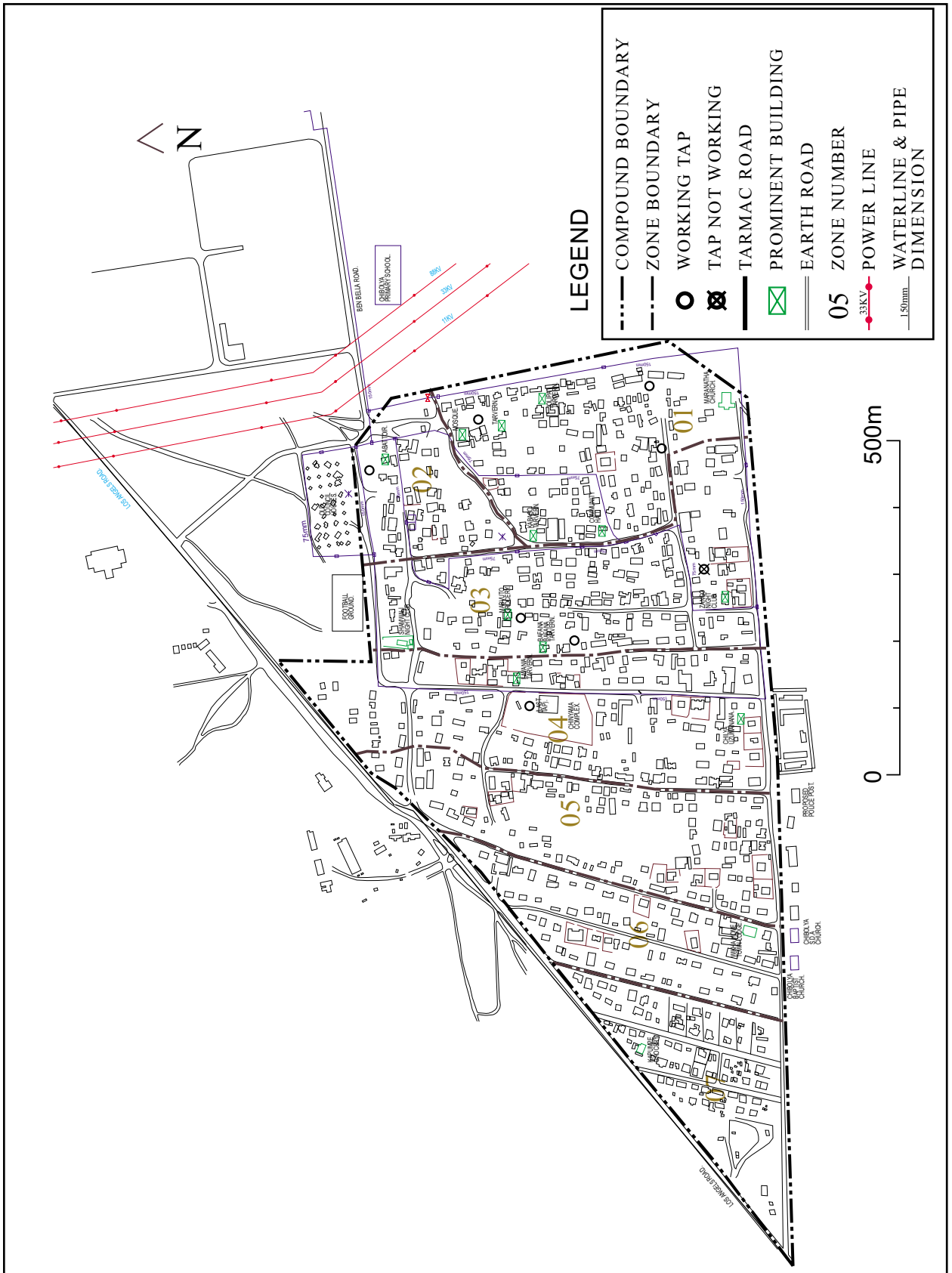
**LEGEND**

--- Compound Boundary

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Figure 2.6.3  
Chazanga Settlement

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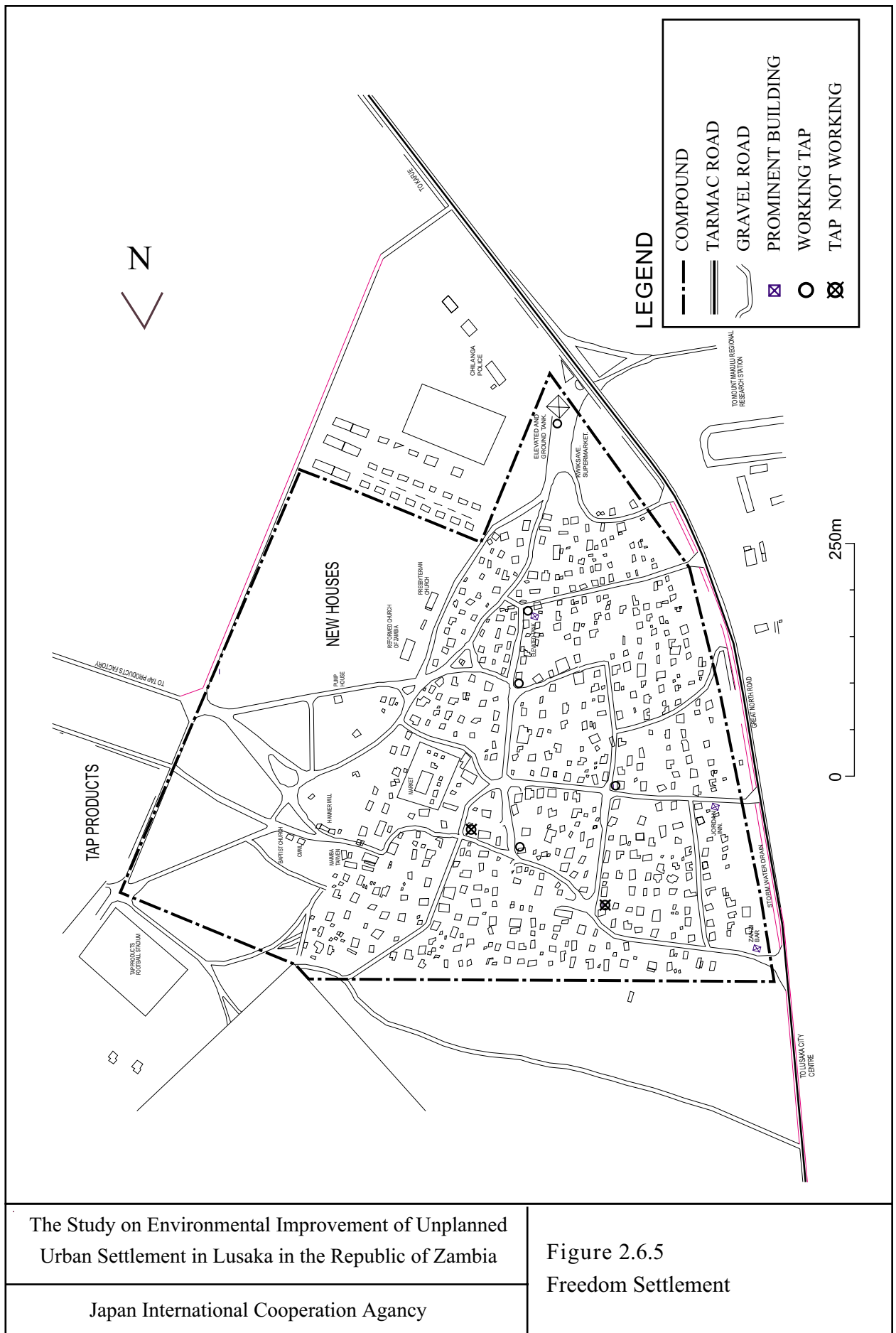


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Figure 2.6.4  
Chibolya Settlement

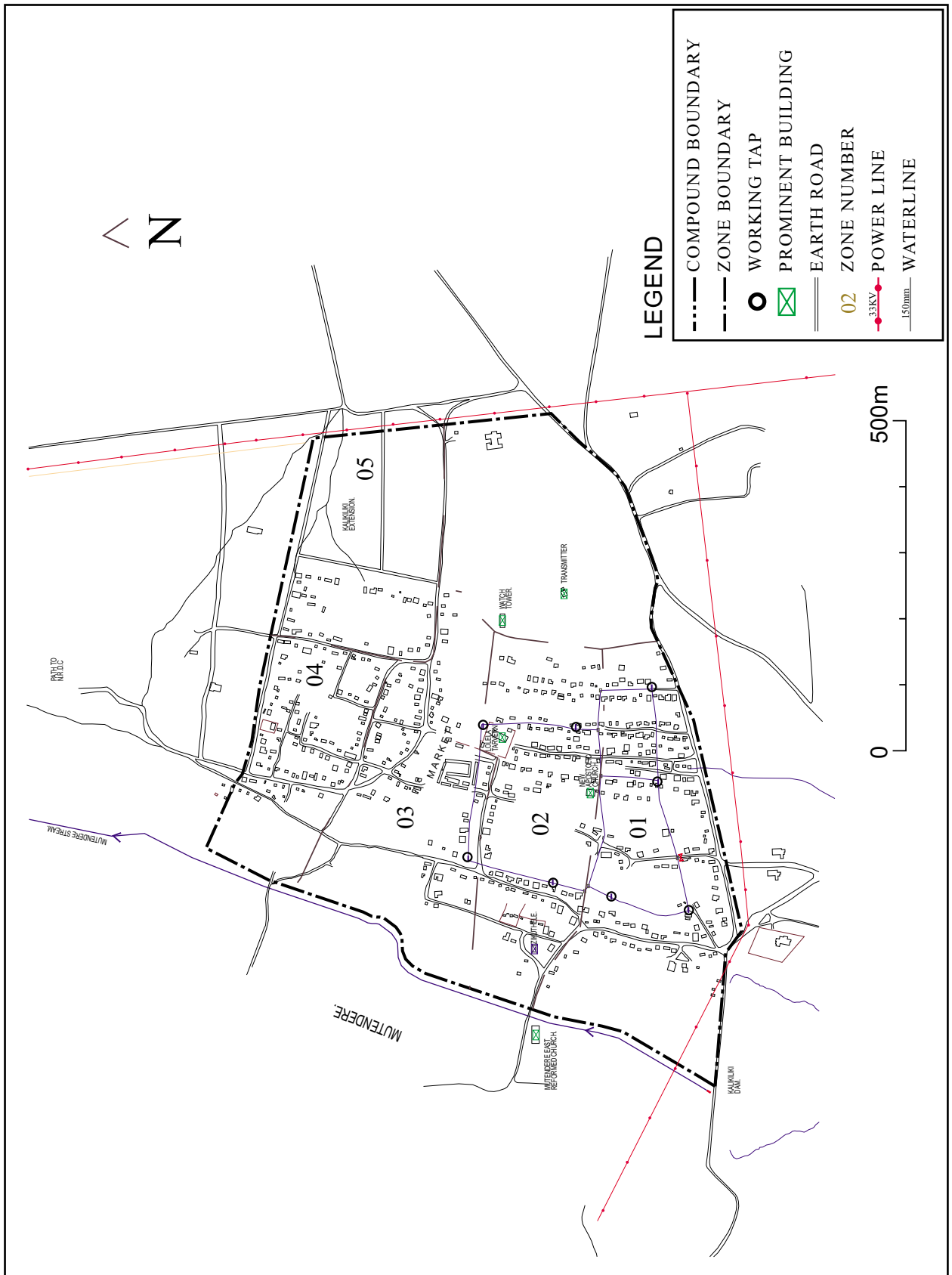




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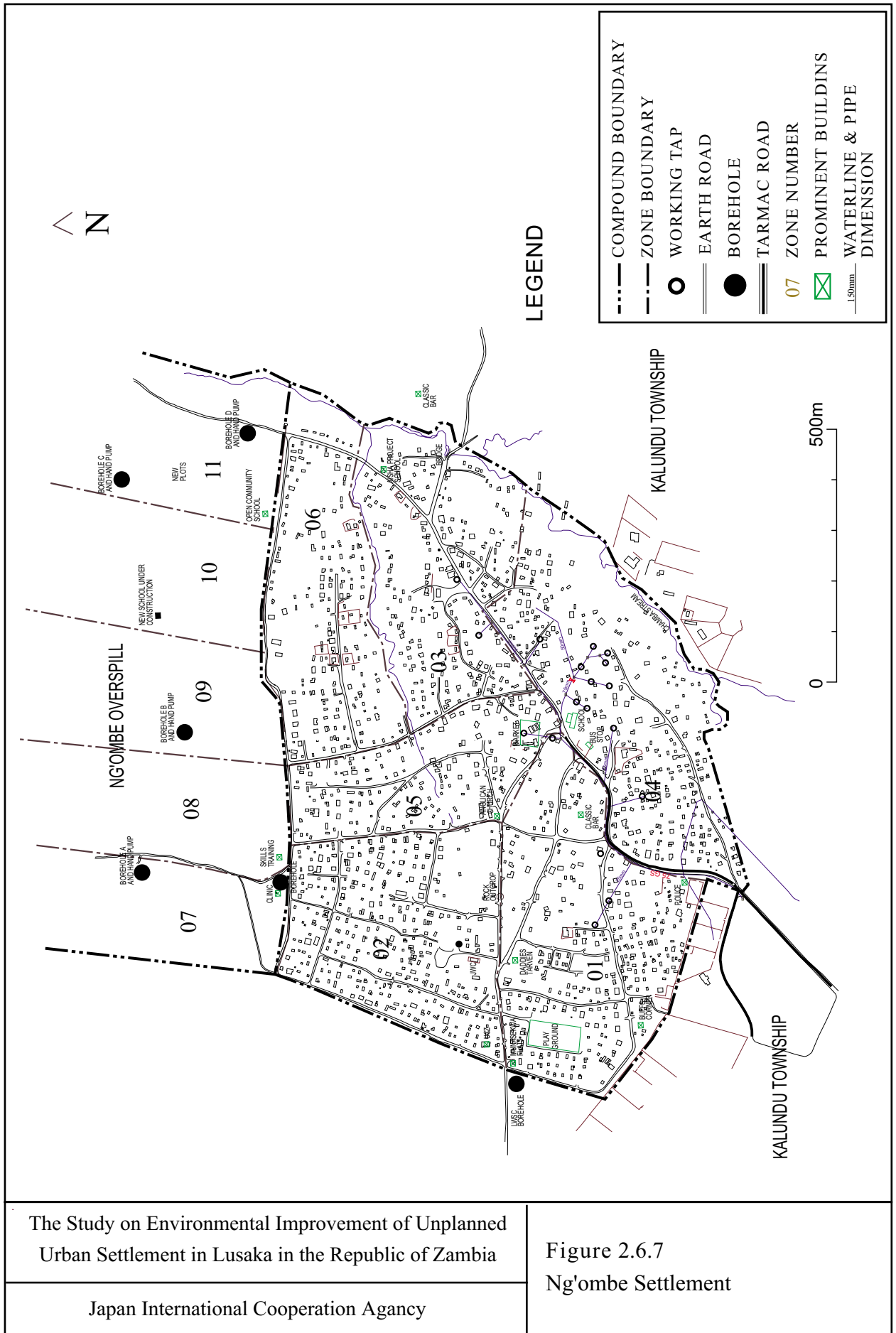
Figure 2.6.5  
Freedom Settlement



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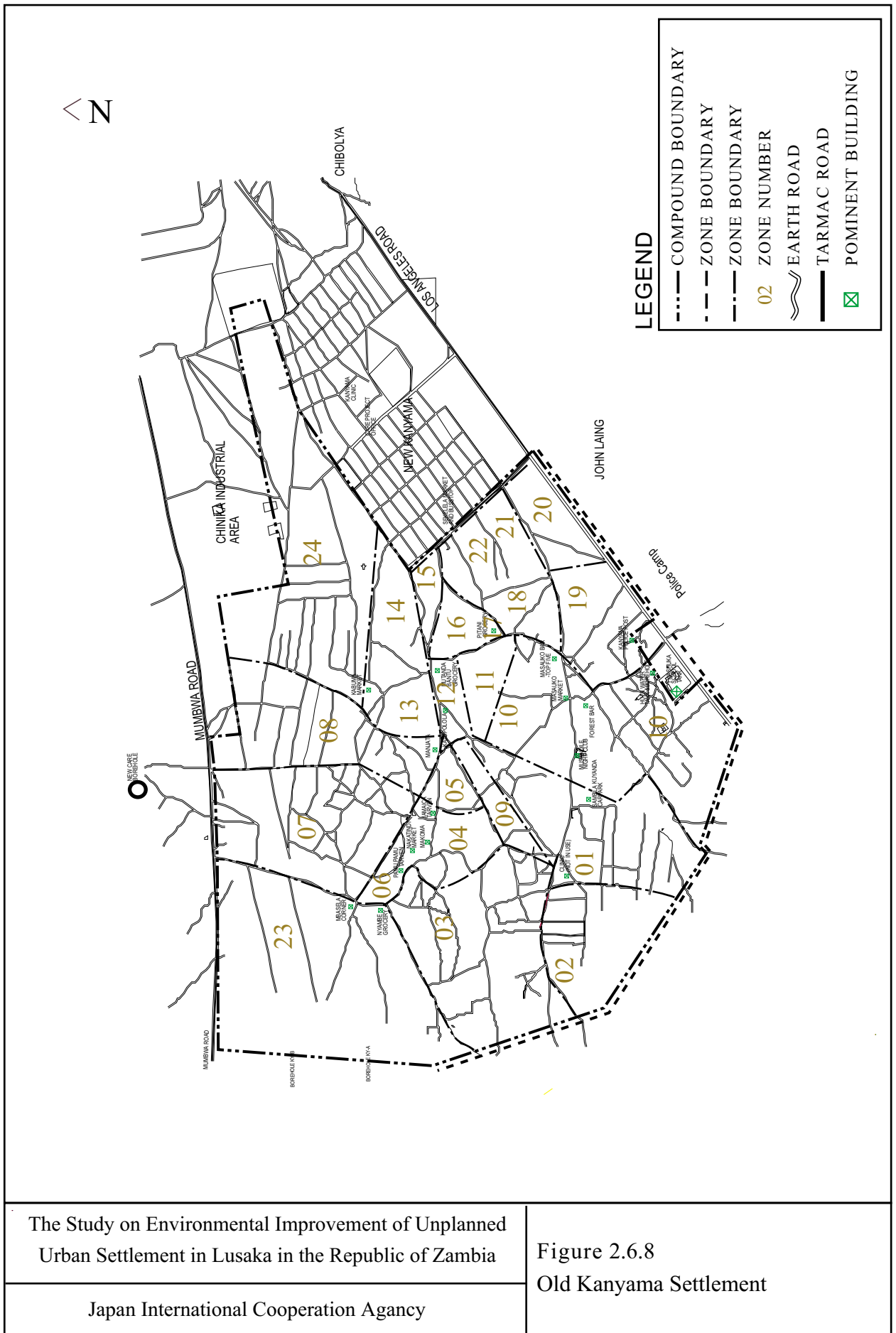
Figure 2.5.12  
Existing Infrastructure in Kalikiliki Settlement



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Figure 2.6.7  
Ng'ombe Settlement



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Figure 2.6.8  
Old Kanyama Settlement