

CHAPTER 9 DEVELOPMENT PLAN OF PRIORITY PROJECTS

9.1 Selection of Priority Projects for Short Term Development

It should be said that the projects proposed in the action area plan are all urgent and necessary to be implemented for improving the living environment of the UUS of Lusaka. However, financial constraints will not allow carrying out of all projects at the same time. Phased development will be necessary to overcome these constraints, so priority projects should be selected for urgent implementation by short-term target of year 2005.

(1) Urgency

To select priority projects, urgency of the project should be the first criteria.

As described in Chapter 7 “Guideline of Living Environment Improvement”, JST understands that the health and hygiene improvement project is urgent and is requested by the community enthusiastically. Thus, it is recommendable that water supply system development/improvement, health/hygiene education, sanitary toilet development, and garbage collection should be selected as the priority projects out of the action area plan to implement in the short run.

(2) Effectiveness

For the sustainability of the development of community, basic education of children should also be a high priority criteria. Because of stagnation of formal basic education in Zambia due to the shortage of the budget, community school is the best choice for UUSs to educate their children. The JST pilot project community school has proved the possibility of success in UUSs if the initial development cost was covered by the donor contribution. The community school with cost efficient development and community management will be effective for the improvement of education condition in UUSs. JST recommends that the community schools be the priority project in the environment improvement project in UUSs of Lusaka.

(3) Sustainability

Income generation of micro finance is also an urgent scheme to overcome the poverty problem in UUSs of Lusaka. However, the pilot micro finance scheme was not proved sustainable during the implementation, so follow-up of pilot the project is necessary. Therefore, JST recommends that income generation

program continues to be studied and wider program covering UUSs should start in the long run based upon further experience and lessons.

(4) Priority UUS

Each UUS has respective urgency and seriousness concerning living environment condition and JST should admit difficulty of selection of priority UUSs. Therefore, selection of priority UUSs is unrealistic for determination of the priority projects.

(5) Consideration of Specific Conditions by UUS

As described in section 8.1.2, Bauleni water supply system improvement projects will be a long term project due to the comparative nonurgency. Projects of health education in the community and schools in Bauleni will be automatically long term projects. VIP toilet development project in Bauleni is also advised to commence in the long term after the implementation of a clean and safe water supply system in consideration of the possibility of pollution of shallow groundwater by the VIP toilet.

(6) Conclusion

The priority projects to be implemented in the short term are summarized in the Table 9.1.1.

Table 9.1.1 Priority Projects of 8 UUS (Projects presented by red color mean priority projects to be done in the short term)

UUS	Water Supply	Health Education	Communal/Common Home VIP Toilet	Garbage Disposal	Community School	Road and Drainage	Income Generation
Bauleni	<ul style="list-style-type: none"> Upgrading of existing LWSC part Clinic water renovation 	<ul style="list-style-type: none"> Community health education School based health education in Bauleni CS and Bauleni Basic school 	<ul style="list-style-type: none"> Communal/comm on home VIP 	<ul style="list-style-type: none"> New project by SLP scheme 	<ul style="list-style-type: none"> New School 	<ul style="list-style-type: none"> Improvement of trunk road in UUS 	-
Chainda	-	<ul style="list-style-type: none"> Community health education School based health education in Chainda CS 	<ul style="list-style-type: none"> Communal/comm on home VIP 	-	<ul style="list-style-type: none"> Improvement of existing CS 	-	-
Chazanga	-	<ul style="list-style-type: none"> Community health education Sub-health center School based health education in Chazanga CS 	<ul style="list-style-type: none"> Communal/comm on home VIP 	-	<ul style="list-style-type: none"> New School 	<ul style="list-style-type: none"> Improvement of trunk/access road in UUS 	-
Chibolya	-	<ul style="list-style-type: none"> Sub-health center School based health education in Chibolya CS 	<ul style="list-style-type: none"> Communal/comm on home VIP 	-	-	<ul style="list-style-type: none"> Improvement of trunk road in UUS 	<ul style="list-style-type: none"> New Micro Finance
Freedom	<ul style="list-style-type: none"> New Project is proposed 	<ul style="list-style-type: none"> Community health education Sub-health center School based health education in Freedom CS 	<ul style="list-style-type: none"> Communal/comm on home VIP 	<ul style="list-style-type: none"> New project by SLP scheme 	<ul style="list-style-type: none"> New School 	<ul style="list-style-type: none"> Improvement of trunk/access road in UUS 	<ul style="list-style-type: none"> New Micro Finance
Kalikiliki	<ul style="list-style-type: none"> New Project is proposed 	<ul style="list-style-type: none"> Community health education Sub-health center School based health education in Kalikiliki CS 	<ul style="list-style-type: none"> Communal/comm on home VIP 	<ul style="list-style-type: none"> New project by SLP scheme 	<ul style="list-style-type: none"> New School 	<ul style="list-style-type: none"> Improvement of trunk/access road in UUS 	<ul style="list-style-type: none"> New Micro Finance
Ng'ombe	<ul style="list-style-type: none"> New Project is proposed 	<ul style="list-style-type: none"> Community health education Health center rehabilitation 	<ul style="list-style-type: none"> Communal/comm on home VIP 	-	-	<ul style="list-style-type: none"> Road improvement of first priority road 	-
Old Kanyama	-	<ul style="list-style-type: none"> Basic school sanitary education 	<ul style="list-style-type: none"> Communal/comm on home VIP 	-	-	<ul style="list-style-type: none"> Improvement of trunk road in UUS 	-

9.2 Detailed Development Plan of Priority Projects

9.2.1 Water Supply System Improvement Project

(1) Selected Priority Projects

The water supply system improvement projects aim to establish water supply system with stability and safety, and to mitigate the environmental and health risks. The strategy for a structural measures to be provided is to supply water at least with unit water supply of 30 lpcd and to improve accessibility time to less than 15 minutes between houses and water points. The strategy also includes to set up the water levy collection system based on the community-management in the settlements.

The Bauleni clinic water supply and Freedom and Ng'ombe water supply system improvement are the selected priority projects to be implemented by 2005 as described in the section 8.1.2. For development of the priority projects, the following targets at selected settlements are set at:

Targets of Priority Projects

Priority Projects	Target Service Level
Bauleni Clinic Water Supply	<ul style="list-style-type: none"> ➤ Urgent water supply development for normal clinic function ➤ Number of direct beneficiaries is estimated at 1,000 and indirect beneficiaries is estimated at 45,000 at present and 59,000 in 2005
Freedom Water Supply System Improvement	<ul style="list-style-type: none"> ➤ Served area is to be 100% of the area with demand of 30 lpcd by 2005 (Minimum water demand is 20 lpcd) ➤ Number of beneficiaries is estimated at 9,000 at present and 10,000 in 2005 ➤ Securing the minimum residual water pressure of 5m at tap-stand ➤ Water supply system to be established under auspices of RDC/committee
Kalikiliki Water Supply System Improvement	<ul style="list-style-type: none"> ➤ Served area is to be 100% of the area with demand of 30 lpcd by 2005 (Minimum water demand is 20 lpcd) ➤ Number of beneficiaries is estimated at 8,000 at present and 12,000 in 2005 ➤ Introduction of a levy collection system at the existing service area of LWSC ➤ Water supply system to be established under auspices of RDC/committee
Ng'ombe Water Supply System Improvement	<ul style="list-style-type: none"> ➤ Served area is to be 100% of the area with demand of 30 lpcd by 2005 (Minimum water demand is 20 lpcd) ➤ Number of beneficiaries is estimated at 30,000 at present and 48,000 in 2005 ➤ Securing of water supply to meet water demand of residents according to increase population for expanding area ➤ Water supply system to be established under auspices of RDC/committee

(2) Description of Priority Projects

Layout plans for water supply system improvement at Bauleni clinic, Freedom, Kalikiliki and Ng'ombe are illustrated as shown in Figures 8.1.12, 8.1.13, 8.1.14 and 8.1.15 respectively. The required water supply improvement plans are described below.

1) Factors for plan framework

The development plan with target year of 2005 are formulated according the following framework:

Plan Factors

Description	Bauleni Clinic	Freedom	Kalikiliki	Ng'ombe
Served Area (ha)	Clinic	43	61	91
Zones	Clinic	Whole area	Zones 1 to 5	Zones 1 to 11
Served Population in 2005	1,000 patients (59,000)	10,000	12,000	48,000
Number of Households in 2005	Clinic	1,000	1,200	4,800

2) Water source

The main source of drinking water will be boreholes (deep wells) to be newly developed at each settlement. Borehole depth is estimated to be between 60 m to 70 m (suction level: 50 m) for Bauleni clinic, and for Freedom, Kalikiliki and Ng'ombe between 70 m to 80 m (suction level: 60 m) approximately judging from hydrological data. Diameter of well is planned 150 mm for Bauleni clinic and 300 mm for Freedom and Ng'ombe.

The design pumping rate required for the submersible motor pump in each borehole is estimated at 0.9 m³/h for Bauleni clinic, 36 m³/h for Freedom and Kalikiliki and 48 m³/h for Ng'ombe. Borehole for the clinic is located within area of the clinic.

In Freedom, the borehole will be constructed at the southeastern reserved area of the settlement. Location of a new borehole will be constructed near the stream in Kalikiliki. A borehole for Ng'ombe will be situated near to the Great East Road since an abstraction capacity is predicted to be so low at Ng'ombe and the capacity of a area near the Great East Road is expected to be high.

3) Disinfection and reservoir

Groundwater will be treated with automatic chlorination system after pumped up and transferred to a service reservoir. The service reservoir shall have 2 hours of storage capacity to daily water supply. The typical service reservoir is proposed as shown in Figure 9.2.2.

4) Design water supply

Unit water consumption per capita is recommended to be 30 lpcd for the year 2005. Water requirement is estimated assuming system losses is 15% of water consumption, based on the results of the pilot project. Peak hourly flow factor is taken as 1.6.

5) Public-faucet (public tap stand) system

Public-faucet (public tap stand) system is adopted for water supply in Freedom and Ng'ombe. Operation time for water supply is 12 hours per day. The layout of the water delivery points and number of taps was determined from the following criteria:

- Maximum walking distance: 200 m
- Number of users per tap: 100 to 250

As for accessibility from houses to water points, the number of water points is recommended to be 11 points for Freedom, 16 points for Kalikiliki and 25 points for Ng'ombe in consideration of the existing fiscal conditions and the maximum walking distance of 200 m. The accessibility from houses to water points will be improved to be less than 10 minutes for all residents.

The recommended number of taps was determined based on the following WHO formula:

$$N_t = \frac{P * Q_p * P_f * W_f}{24 * Q_t * T_e}$$

Where,

- N_t*: Number of Taps
- P*: Population
- Q_p*: Per-Capita Demand (30 lpcd)
- P_f*: Peak Factor (1.6)
- W_f*: Wastage Factor (1.1)
- Q_t*: Standard Discharge Rate per Tap (0.17 l/s under 5 m of minimum head)
- T_e*: Tap Efficiency Factor (0.9)

The recommended number of taps is estimated at 56 in Freedom, 80 in Kalikiliki and 220 in Ng'ombe.

As the number of taps per tap stand is recommended 4 taps, the required number of tap stands is estimated at 14 in Freedom, 20 in Kalikiliki and 55 in Ng'ombe.

Planned public-faucet systems are proposed below considering the results of the above examination, and more workability and financial management of the O&M.

Public-faucet System

Description	Freedom	Kalikiliki	Ng'ombe
Number of Water Delivery Points	14	20	55
Number of Taps per Point	4	4	4
Number of Taps	56	80	220
Served Population per Point on average	714	600	873
Served Households per Point on average	71	60	87
Number of Users per Tap (each user represents five residents)	36	30	44
Accessibility (walking time on average: minute)	Less than 5	Less than 5	Less than 5
Operation Hours	9.7	8.2	11.9

Typical public tap stand are illustrated in Figure 9.2.3.

6) Hydraulic design for distribution system

Water will be delivered to residents through a pipeline. Water will be supplied by a gravity flow system. The minimum residual water height in the distribution main system under peak hourly flow is 15 m. The maximum pressure under zero flow is to be 60 m. At the end of public tap stand, the minimum residual water height is 5 m in the distribution sub main. Design criteria is summarized below:

Design Criteria

Parameter	Bauleni Clinic	Freedom	Kalikiliki	Ng'ombe
Design Population (persons)	1,000	10,000	12,000	48,000
Designed Unit Water Consumption	10 l/patient/d	30 lpcd	30 lpcd	30 lpcd
Daily Water Demand (m ³ /d)	8	200	240	960
System Losses/Wastage factor (%)	10	15	15	15
Daily Water Supply (m ³ /d)	9	230	280	1,100
Water Source (Borehole)	New	Existing/ New	New	Existing/ New
Design Water Yield at Borehole (l/sec)	> 0.25	> 5	> 10	> 10
Peak Factor	2.0	1.6	1.6	1.6
Hydrodynamic Pressure (m)	More than 10	15-60	15-60	15-60
Residual water Height at Tap (m)	5	5	5	5
Number of Public Tap Stand (unit)	In-house	14	20	55
Elevated Tank Capacity (m ³) & Height (m)	10/5	50/10	100/5	150/15

The layout plans of the distribution system are shown in Figures 9.2.4, 9.2.5 and 9.2.6 respectively for Freedom, Ng'ombe and Kalikiliki. The pipeline consists of polyvinyl chloride pipe (PVC) for trunk line, galvanized steel pipe (GSP) for road crossing and polyethylene pipe (PEP) for branch connection from trunk line up to stands.

(3) Planned Facilities

Main water supply facilities to be constructed are summarized in the following table:

Main Water Supply Facilities

Description	Unit	Bauleni Clinic	Freedom	Kalikiliki	Ng'ombe
Number of Boreholes	Unit	1	New: 1 + Exist: 1	New: 1	New: 2 + Exist: 1
Depth of Borehole	m	60-70	70-80	70-80	70-80
Capacity of Submersible pump	l/minute/ unit	15	400	600	800
Number of Submersible pump with flow meter, valve and pressure gage	Set	1	2	1	3
Lift pipe: GSP	m	50	60	60	60
Operation room with electric power	Unit	1	1	1	1
Booster Pump	Unit	-	-	-	2
Chlorination facilities	Unit	1	1	1	1
Boundary wall with height of 2m	m	Exist	160	160	160
Transmission pipe: GSP	km	-	0.5	1.0	3.0
Number of Elevated Tanks	Unit	1	2	1	1
Capacity of Elevated Tanks	m ³ /unit	6	50	100	150
Height of Elevated Tank	m	5	10	5	15
Distribution pipeline: PVC/PEP	km	0.1	6	8	10
Number of Public Tap Stand	Stand	-	14	20	50
Main water meter	Piece	1	2	1	2
Individual connection users	User	-	-	20	-
Users water meter	Piece	-	14	40	55

(Note) -: Not necessary

(4) Non-structural Measures Related with Water Supply System Improvement Project

The following non-structural measures are proposed to be undertaken by LCC as activities associated with the public water supply development as described in section 8.1.2.

- 1) Establishment of the water levy collection system with window/room and the community-managed O&M system

In order to sustain the project, it is proposed that the water levy collection system with window/room and the community-managed O&M system are established as described in section 8.1.2.

- 2) Execution of the comprehensive health and sanitation by Health Educators

Comprehensive health and sanitary education shall be conducted simultaneously by Health Educators for enhancing the efficiency of the water supply system improvement project as explained in section 9.2.2.

- 3) LCC/DHMT support for installation of VIP toilets/septic tanks

The following support of LCC/DHMT is required since local pit latrine shall be upgraded to VIP toilets/septic tanks in accordance with the sanitation development:

- Financial back-up to people through provision of a grant aid found or a soft loan with a revolving fund system for VIP toilet/septic tanks installation,
- The enforcement of installing VIP toilet/septic tanks and establishing legal regulations in new house-building areas.

- 4) "Care for sanitation/solid waste management" campaign

Dumping of domestic solid waste is one of the main reasons of pollution in water environment and living environment. "Care for sanitation/solid waste management " campaign shall be sponsored and carried out by LCC. The campaign is to educate people of the need for sanitary garbage collection facilities, in accordance with the regulations.

- 5) Improvement of solid waste and nightsoil collection systems

Solid waste and nightsoil collection systems are required to be improved by the department of public health under LCC. This improvement shall be enforced to reduce pollution of both the surface water and groundwater.

(5) Project Implementation

1) Executing agency

The water supply system improvement project is implemented by LCC in cooperation with LWSC and RDC.

Before the commencement of the project, various administrative procedures and preparatory activities will be required to LCC, as follows:

- Approval of the project implementation by the Government of Zambia,
- Decision and allocation of the project fund,
- Administrative procedure including application to international or domestic lending/donating agencies,
- Selection of consultants for studies, detail design and construction supervision,
- Land acquisition and compensation for structure measures,
- Selection of contractors through pre-qualification and the international or local competitive bidding,
- Construction works for structure measures and advisory works for non-structure measures,
- Establishment of organizations for community-based participation and O&M at each settlement.

2) Project execution method

All the project works will be executed on a contract basis. The construction equipment, materials and labor required for the works will be provided by contractors to be selected through the international or local competitive bidding. The international consultant will be employed for implementation of the project, such as planning, studies, designing, supervising of construction and community-capacity building.

3) Operation and Maintenance (O&M)

The water committee under RDC at Freedom, Kalikiliki and Ng'ombe shall operate and maintain the main facilities instead of LWSC. The specific arrangement for each settlement is based on ABO capacities and other circumstances.

(6) Direct Cost Estimate

1) Construction cost

The estimated total construction cost for priority projects is US\$7.8 million as shown below:

Construction Cost

Priority project	Cost (US\$1,000)
1. Bauleni Clinic Water Supply Project	300
2. Freedom Water Supply System Improvement Project	1,818
3. Kalikiliki Water Supply System Improvement Project	2,273
4. Ng'ombe Water Supply System Improvement Project	3,426
<u>Total</u>	7,817

2) Engineering services cost for structure measures

The cost of engineering services, including studies, basic design, detailed design and construction supervision, is estimated at 20% of the direct construction cost.

The engineering services include leveling & route survey for pipeline, topographic survey for borehole and elevated tank sites, hydrological survey and electric/physical resistance survey for the proposed borehole sites.

3) Project administration cost

The cost for the Project administration by the Government of Zambia is estimated at 3 % of the direct construction cost. Total direct cost for the implementation of the water supply system will be approximately US\$9.6 million as shown below.

Total Direct Cost for Water Supply System Improvement Project

(unit: US\$1,000)

Description	Bauleni Clinic	Freedom	Kalikiliki	Ng'ombe	Total
Construction cost	300	1,818	2,273	3,426	7,817
Engineering cost	60	364	455	685	1,564
Administration cost	9	55	68	103	235
Total	369	2,237	2,796	4,214	9,616

The cost of engineering services is roughly estimated at 20% of the direct construction cost. The cost of services are consisted of the following items:

Engineering Services for Social Research & Community Capacity Building

Items	Unit	Quantity
1. Personal Expenses		
- Community Organization Expert	M/M	12
- Water Supply Expert	M/M	6
- Local Social Scientists	M/M	48
2. Expenses for Activities		
- Meeting/Workshops for Community Mobilization	Time	20
- Training/Institutional Building	L.S	1
- Subletting Works	L.S	1
3. Operation Cost for Community Centers		
- Vehicle rental	Month	48
- OA equipment	Set	3
- Office expenditure & Miscellaneous	L.S	1

5) O&M cost

The community-based O&M cost is approximately estimated below:

O&M Cost

(US\$/year)

Description	Bauleni Clinic	Freedom	Kalikiliki	Ng'ombe
1. Tap Attendants (K50,000/month)	-	2,400	3,429	9,429
2. Technician for Mechanical (K75,000/month)	240	257	257	257
3. Security Guard (K75,000/month)	-	257	257	257
4. Accountant (K75000/month)	-	257	257	257
5. Electricity Charge	170	343	343	343
6. Maintenance (10% or 20% of above)	82	351	454	1,054
Total	492	3,865	4,997	11,597

6) Replacement cost

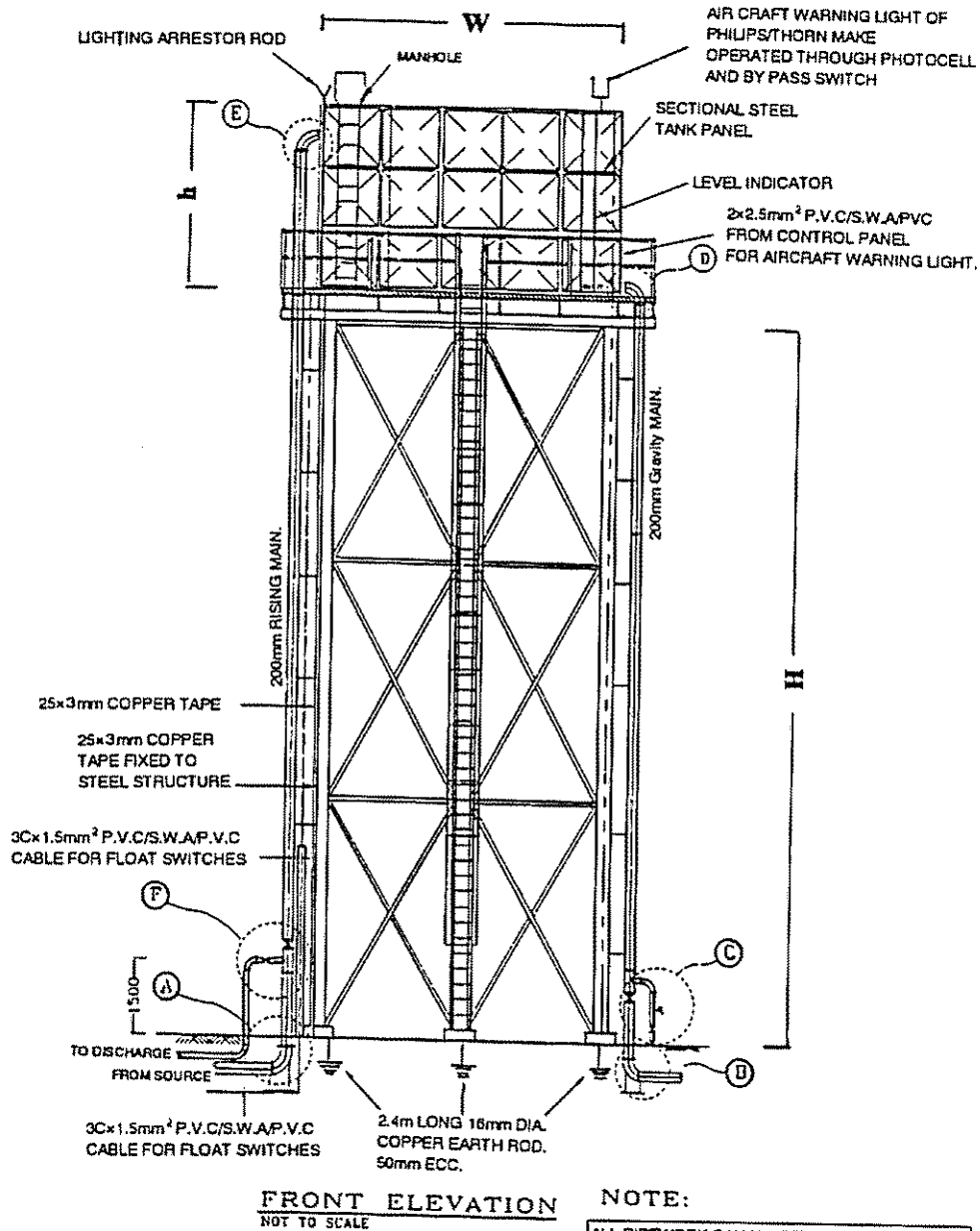
Most facilities except mechanical equipment have a life span of more than 15 years in general, and maybe more than 25 years with adequate execution of O&M. Mechanical equipment will be replaced after 10 years from installation and replacement cost is estimated below:

Replacement Cost

Description	Bauleni Clinic	Freedom	Kalikiliki	Ng'ombe
Submersible pump (unit: US\$)	6,000	40,000	40,000	40,000
Booster pump (unit: US\$)	-	-	-	60,000
Injection pump (unit: US\$)	1,600	1,600	1,600	1,600
Chlorine Generator (unit: US\$)	3,400	3,400	3,400	3,400
Total (unit: US\$)	11,000	45,000	45,000	105,000

(7) Implementation Schedule

The implementation of selected priority projects is scheduled to be done during 2002 to 2004 for Bauleni Clinic and Ng'ombe, and during 2005 to 2007 for Freedom and Kalikiliki, and disbursement schedule of water supply system improvement projects is presented as shown in Figure 9.2.7.



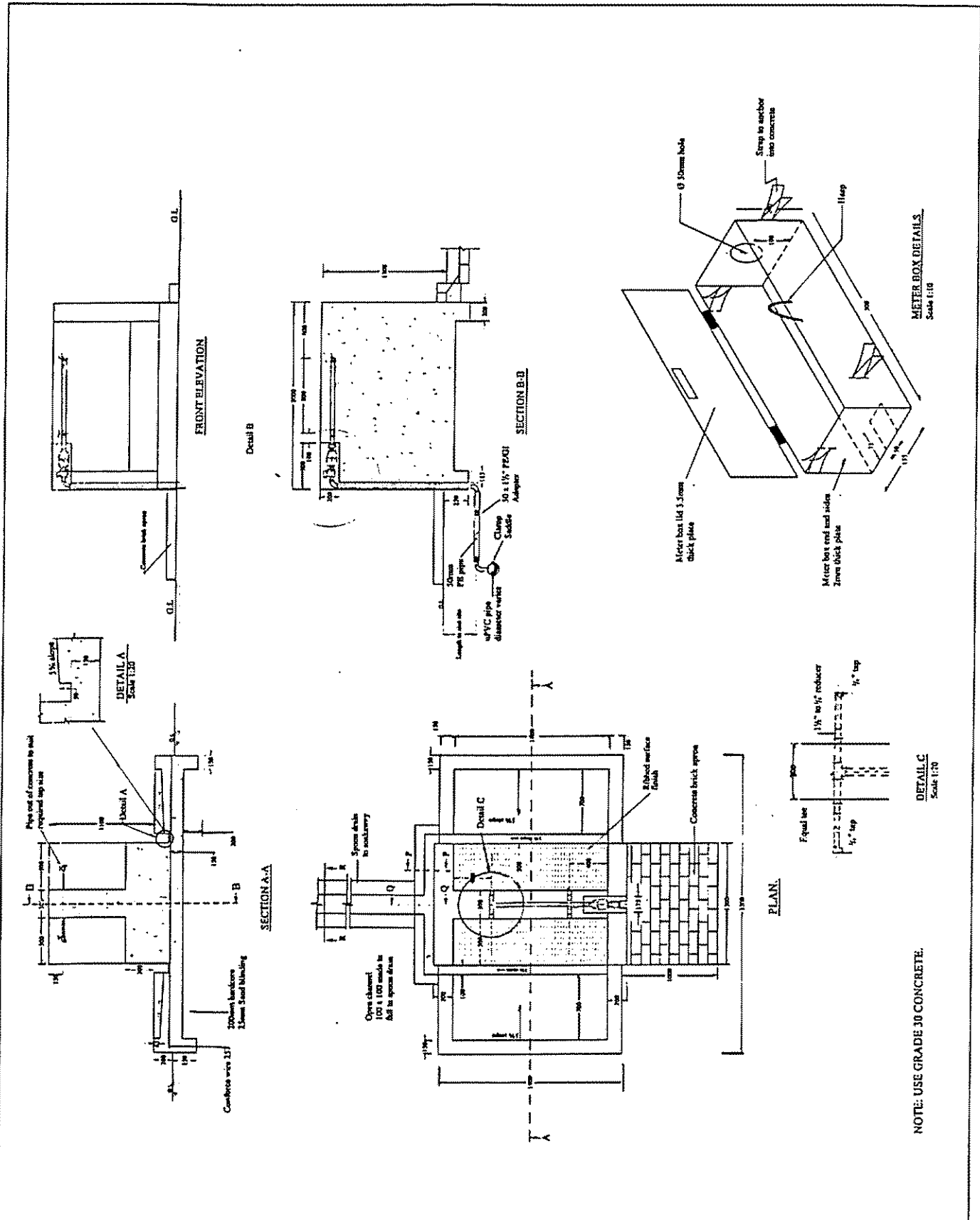
	W (m)	b (m)	H (m)
Bauleni Clinic	2.0	2.5	5
Freedom	3.7	3.7	10
Kalikilikiki	6.1	3.7	5
Ng'ombe	7.32	3.7	15

(Source: Chibolya Pilot Project)

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Figure 9.2.2
Typical Service Reservoir

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METER BOX DETAILS
Scale 1:10

DETAIL C
Scale 1:70

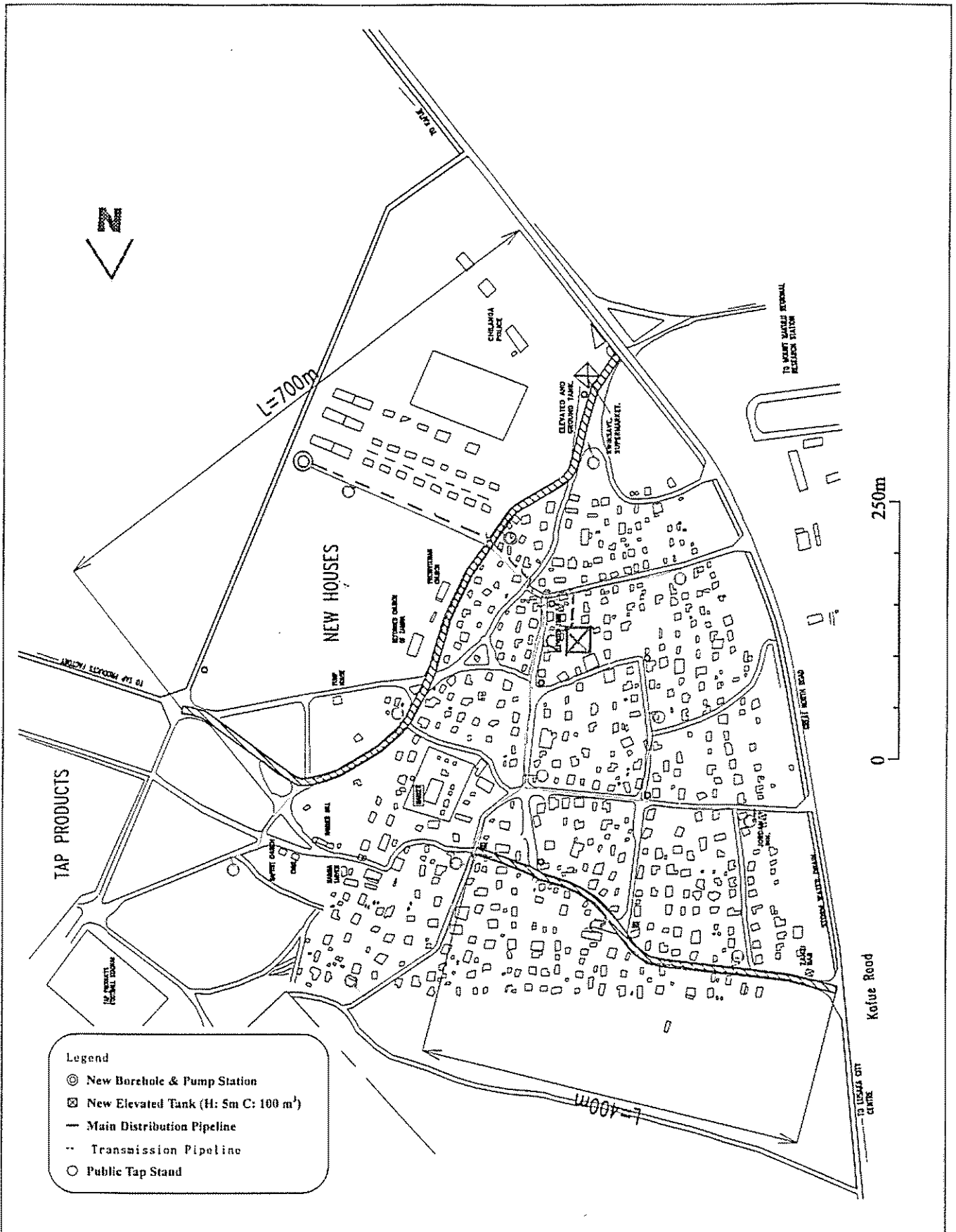
NOTE: USE GRADE 30 CONCRETE.

(Source: Chibolya Pilot Project)

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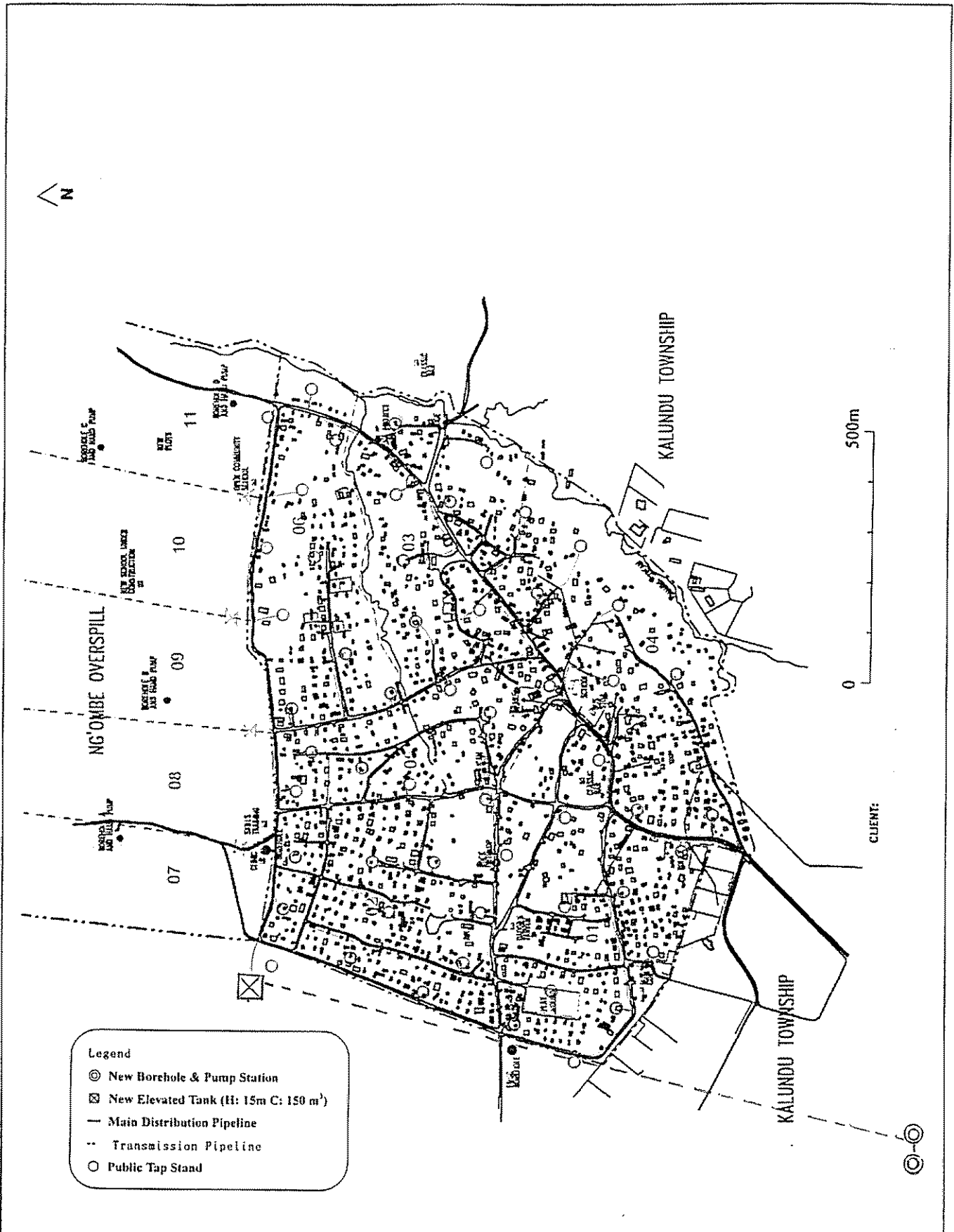
Figure 9.2.3
Typical Public Tap Stand



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Figure 9.2.4
Layout Plan of Freedom

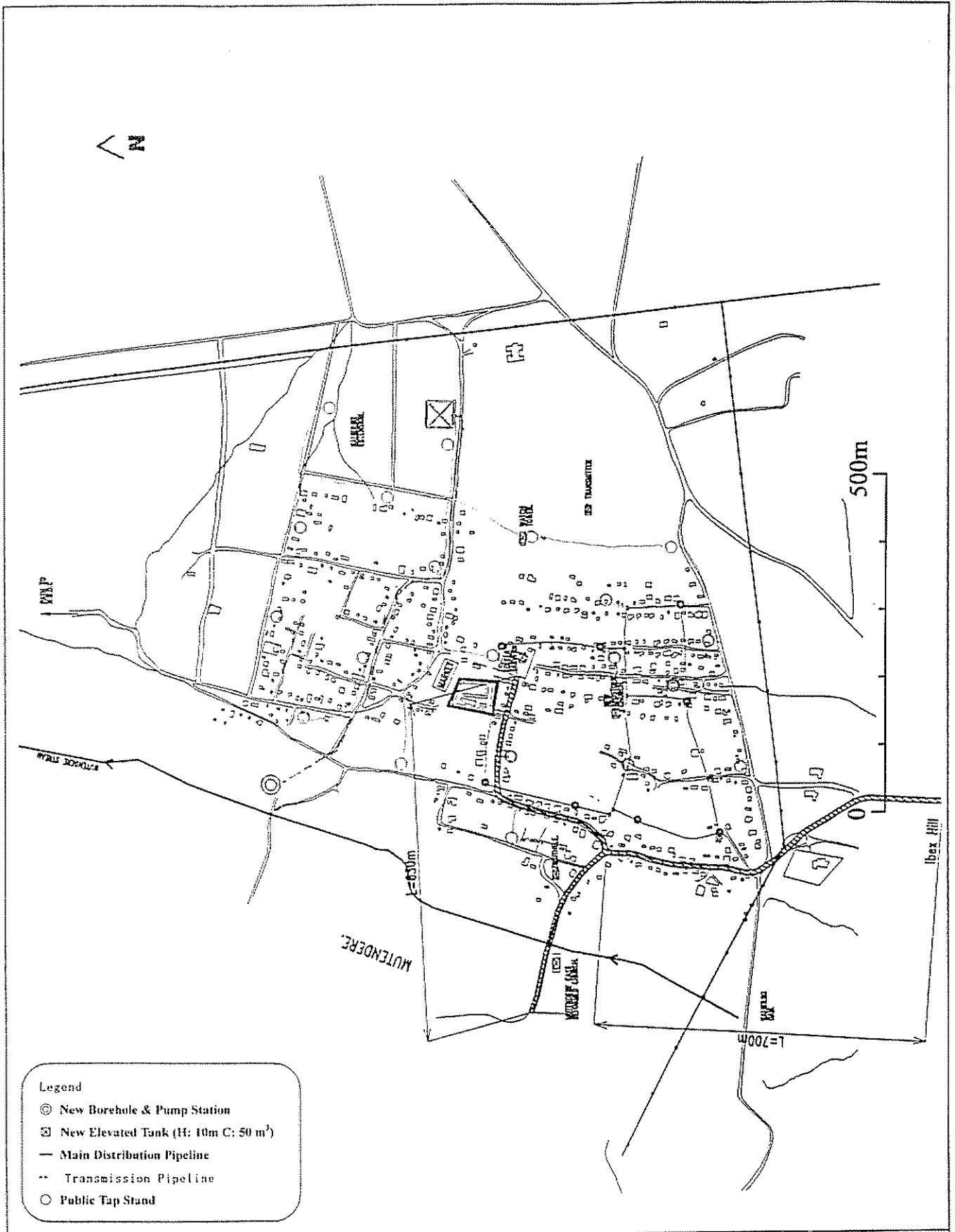
Japan International Cooperation Agency



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Japan International Cooperation Agency

Figure 9.2.5
Layout Plan of Ng'ombe



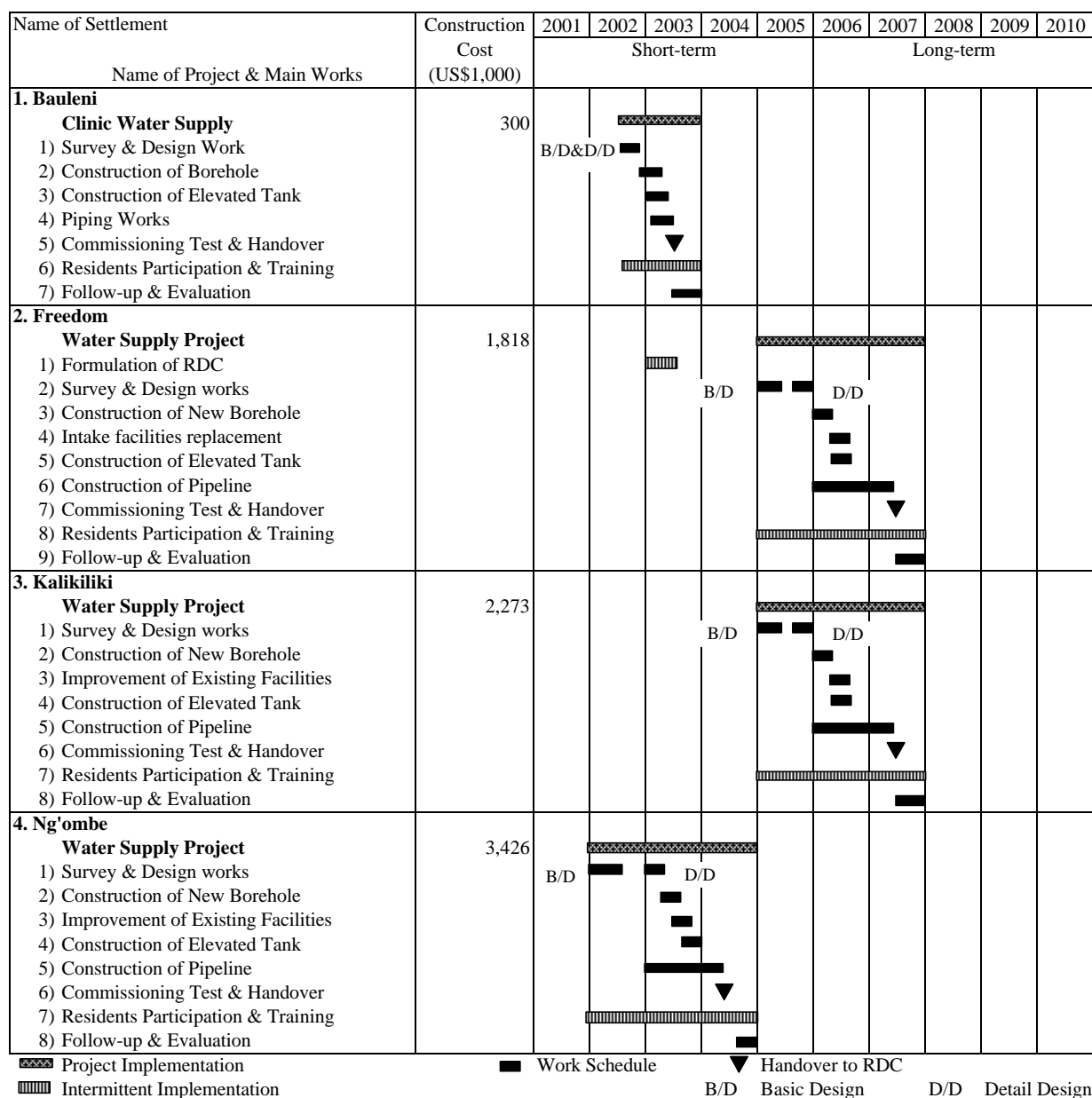
- Legend
- New Borehole & Pump Station
 - ⊗ New Elevated Tank (H: 10m C: 50 m³)
 - Main Distribution Pipeline
 - - - Transmission Pipeline
 - Public Tap Stand

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Figure 9.2.6
Layout Plan of Kalikiliki

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Figure 9.2.7 Implementation Schedule of Priority Water Supply Projects



9.2.2 Health and Hygiene Education and Health Facilities Improvement Project

(1) Community-based Health and Hygiene Education Project

1) Description of priority projects

Community-based health and hygiene education projects aim to empower the community to improve living conditions and hygiene behaviour. It also aims to widen knowledge and understanding of health and hygiene issues in the community through promoting participatory health and hygiene education activities. These health educational and promotional activities will be conducted effectively by strengthening the capacity of existing community health volunteer organizations (such as NHC, CHWs), which are in line with national and district health policy on volunteer health workers.

(a) Detailed plan by each settlement

Targets and plan framework of priority projects in each settlement is described below:

Targets of Priority Projects in Each Settlement

	Chainda	Ng'ombe	Chazanga	Freedom	Kalikiliki
Implementation Year (*)	Year 2002-2003	Year 2003-2004	Year 2005-2006	Year 2006-2007	Year 2006-2007
Served Area	All 5 zones	All 11 zones	All area	All areas	All 5 zones
Target area population total	17,000 (1999 data)	48,000 (2005 estimate)	29,000 (2005 estimate)	10,000 (2005 estimate)	12,000 (2005 estimate)
Target beneficiaries	8,500-12,750	24,000-36,000	14,500-21,750	5,000-7,500	6,000-9,000
Target households (**)	1,215-1,820	3,428-5,140	2,070-3,100	714-1,071	860-1,285
Possible Partner	World Vision	Africare	Care Prospect	Africare	Africare
Major intervention	1) Household (door-to-door) visits 2) Hygiene Promotion drama performances 3) Community meetings				

NOTE: (*) Project should be initiated one year before water supply system is completed

(**) Assuming that one household have an average of 7 people

Plan Framework

	ONE EXAMPLE
Project Duration	2 years
Timing of Implementation	During construction period of Water Project
Served Area	All zones of the target settlement
Target Population	50%-75% of total population in the settlement
Major Intervention Plans	Formation of NHC/CHW or utilizing existing groups NHC/CHW trainings Household visits, Hygiene Promotion drama performances
Approach	Participatory Health and Hygiene Education and Promotion Approach (PHAST, PRA)
NHC target number of trainee	5-15 members of the community
CHW target number of trainee	2 people from each Zone
Duration of the training	6 weeks training (4-5 weeks Class room and 1-2 weeks Practical training)
Possible Partner NGOs	World Vision, CARE PROSPECT, Africare

(b) Scope of works for implementation of the projects

The main process of the projects are summarized in the following table:

Main Works of Community-based Health and Hygiene Education Project

Stage I “PLAN”	Action
1. To Identify Problems and assess needs	1-1 Collect data through PRA/PHAST workshops
	1-2 Collect data on government policies, goals and regulatory standard on Health/Education
2. Identify Supporting Agency and Groups and Set up a team	2-1 Identify key community stakeholders to work with (which organization/group can be active and sustainable for sanitation facility development)
	2-2 Identify which supporting agencies are effective and collaborative
	2-3 Identify community health volunteers who can work as CHW members and form a group
3. To conduct participatory PHAST and/or CAP to analyse Problems and Plan for Solutions	3-1 Conduct Participatory training workshop (PHAST) to analyse the problems and identify risk practices
	3-2 Identify what might go wrong
	3-3 Conduct CAP workshop for planning
Stage II “Implementation”	Action
4. Practical Training	4-1 Design training programme and prepare training handouts
	4-2 Conduct practical training and evaluate the training
	4-3 Make annual work plan and get consensus
	4-4 Develop monitoring sheet
5. Implementation of Health and Hygiene Promotion Activities	5-1 Choose appropriate and acceptable strategies
	5-2 Conduct sensitisation campaign
	5-3 Conduct Door-to-door campaign
	5-4 Prepare for and conduct Promotional drama performances

“Monitoring and Evaluation”	<u>Action</u>
6. Monitoring	6-1 Develop process & impact monitoring sheets
	6-2 Monitor Process to see if the progress were made according to the work plan developed in the workshop
	6-3 Monitor Impact to see if the performance of activities is done towards achieving objectives.
7. Evaluation	7-1 Check Objectives and policies
	7-2 Evaluate progress of activities
	7-3 Evaluate Project Impact
	7-4 Evaluate Efficiency
	7-5 Evaluate Sustainability
“O&M”	<u>Action</u>
8. Institutional Sustainability of CHW (how to avoid dropouts)	8-1 Hold periodical meetings to check progress/process as well as institutional capacity
	8-2 Make guideline for the group that clearly describe group rules, each person’s defined roles and responsibilities, and penalties if any

2) Project implementation

(a) Methods

The Community Action Planning (CAP) method will be adopted throughout the project cycles. At the end of the first CAP workshop, it is expected that the community will master the practical skills to facilitate the participatory health education project and develop a work plan. Together with CAP, Participatory Hygiene and Sanitation Transformation (PHAST) shall be applied for promoting hygiene behaviour change. Together them will work as tools for empowering communities to eliminate water and sanitation-related diseases throughout the project implementation period.

(b) Expected organisation in charge

The project is implemented on a participatory basis in which the selected subcontractor (NGO) takes the role of facilitator to mobilize and promote community participation. The NGO takes full responsibility for facilitation of all work and coordination among relevant stakeholders. It will be responsible for formation and training of the NHC and CHW, with the supports of the health centre staff and RDC, and also for financial management of the project implementation. EHT shall be major partners of the NGO throughout all project cycles from planning to monitoring/evaluation. The priority for supervising health volunteers shall fall under the health centre, not under RDC since the health centre is a professional health organization. A more concrete explanation of the roles

and responsibilities of the various stakeholders in the project is described in the previous section 8.1.2.

3) Direct cost estimate

(a) Direct cost (including field operation cost)

The estimated total direct cost of five priority areas is about US\$371,000 as indicated in the table below. Most of the field operation cost shall be for training, IEC (Information, Education and Communication) and monitoring.

Direct Cost for Each Target Area (UNIT: US\$ 1,000)

Community-based Health and Hygiene Education	Chainda	Ng'ombe	Chazanga	Freedom	Kalikiliki
Implementation Year	2002-2003	2003-2004	2005-2006	2006-2007	2006-2007
Training and Monitoring Cost *	72	72	72	72	72
Field Operation cost total ()	72	72	72	72	72
Administration Cost (3% of)	2	2	2	2	2
Sub Total (+)	74	74	74	74	74
				TOTAL	371

* including personnel expenses

(b) Personnel expenses

The estimated total personnel costs for the priority projects is US\$180,000 and assignment of personnel in each project is summarized as follows:

Personnel	Unit	Quantity
Project Supervisor	M/M	24
Community Education Officers	M/M	48 (2 people)

(c) Administration cost

The cost for the project administration by the Government of Zambia is estimated at 3% of the direct field operation cost as shown in above table.

4) Expected impacts

Expected Impacts and indicators are summarized in previous section 8.1.2.

5) Implementation schedule

Implementation schedule of each Community-based Health and Hygiene Education Project is proposed below. Each project duration is 2 years.

	COMMUNITY HEALTH PROJECT	M1-2	M3-4	M5-6	M7-8	M9-10	M11-12	M13-14	M15-16	M17-18	M19-20	M21-22	M23-24
PLAN	1. Identify Problem/Assess Needs	■											
	2. Identify Supporting Agencies	■											
	3. Analyse Problem and Plan for solution	■											
DO	4. Plactical Training		■										
	5. Implementation of Health and Hygiene education (School Health Services)			■	■	■	■	■	■	■	■	■	■
SEE	6. Monitoring			■	■	■	■	■	■	■	■	■	■
	7. Evaluation												■

Figure 9.2.8 Implementation Schedule for Community-based Health and Hygiene Education

Implementation of selected five priority projects is scheduled to be done between the years 2002 and 2007. Based on the experience of the pilot study, the community-based health education project should be initiated before water supply system is completed (preferably, one year before its completion) because hygiene and sanitation knowledge need to be disseminated to the community by the health educators before water actually starts running.

(2) School-based Health and Hygiene Education, Services and Rehabilitation of Environmental Health Facilities (EHF)

1) Description of priority projects

The School-based Health and Hygiene Education Project aims to empower students, parents and teachers to effectively improve environmental sanitation and health conditions within and surrounding the school. It will expand knowledge and understanding of health and hygiene issues and also improve health conditions among students through health and hygiene education as well as basic school health services. Improvement of school environmental health facilities shall be also included in this component to improve overall health status of children.

(a) Detailed plan by each settlement

Targets and plan framework of priority projects are described below:

Targets of Priority Projects in Each Settlement

Area	Target School	Implementation Year	Number of students (teachers)	Sanitation Plan	Water Plan	SH services
Bauleni	Bauleni Basic Government School	2002	1400 (30)	1) 1 VIP (2X4) latrine for students 2) 2 VIP (2X1) latrine for teachers	Renew 2 taps	-Deworming -Micronutrient -Health Check -Health Education
Chainda	Community School to be built	2003	160 (6)	N/A	Not yet	Same as above
Chazanga	Community school to be built	2006	160 (6)	N/A	Not yet	Same as above
Chibolya	Community School already in place	2002	160 (6)	2 VIP (2X1) latrine for teachers	Not yet observed	Same as above
Freedom	Community School to be built	2007	160 (6)	N/A	Not yet	Same as above
Kalikiliki	Community School to be built	2007	160 (6)	N/A	Not yet	Same as above
Old Kanyama	New Kanyama Government School	2002	1800 (35)	1) 1 VIP (2X4) latrine for students 2) 2 VIP (2X1) latrine for teachers	NO	Same as above

Plan Framework

	ONE EXAMPLE
Project Duration	1 year
Timing of Implementation	One year after community school was established After community-based health and hygiene education structure is set up and some activities are in place
Served Area	Targeted government school (Kanyama and Bauleni) and community schools in the settlement
Target population	School students, teachers, PTAs and the community
Major intervention plans	Formation of School Health Coordinating Committee (SHCC) Health Education Basic health services (health check, deworming etc.) Environmental Health Facilities Improvements
Approach	Participatory Health and Hygiene Education and Promotion Approach (PHAST, PRA)
Target number of trainee	12 SHCC members PTA members and other teachers
Duration of the training	2 weeks
Possible Partner NGOs	CARE PROSPECT, AFRICARE, WORLD VISION etc.

(b) Scope of works for implementation of the projects

The main process of the projects are summarized as below:

Summary of Main Works of School-based Health and Hygiene Education, Services and Rehabilitation of School Environmental Health Facilities (EHF)

Stage I “PLAN”	Action
1. To Identify Problems assess needs	1-1 Collect data through PRA/PHAST workshops
	1-2 Collect data on government policies, goals and regulatory standard on Health/Education
2. Identify Supporting Agency and Groups and Set up a team	2-1 Identify key community stakeholders to work with (which organization/group can be active and sustainable for sanitation facility development)
	2-2 Identify which supporting agencies are effective and collaborative
	2-3 Identify community health volunteers who can work as CHW members and form a group
3. To conduct participatory PHAST and/or CAP to analyse Problems and Plan for Solutions	3-1 Conduct Participatory training workshop (PHAST) to analyse the problems and identify risk practices
	3-2 Identify what might go wrong
	3-3 Conduct CAP workshop for planning
Stage II “Implementation”	Action
4. Practical Training	4-1 Design training programme and prepare training handouts
	4-2 Conduct practical training and evaluate the training
	4-3 Make annual work plan and get consensus
	4-4 Develop monitoring sheet
5. Implementation of School Health Education Health services Activities	5-1 Choose appropriate and acceptable strategies
	5-2 Promotional drama performances (training and show)
	5-3 Training other teachers
	5-4 Health talks (in and outside of school curriculum)
	5-5 School health check-ups and deworming treatment
	5-6 Construct demonstrative VIP latrine at school
“Monitoring and Evaluation”	Action
6. Monitoring	6-1 Develop process & impact monitoring sheets
	6-2 Monitor Process to see if the progress were made according to the work plan developed in the workshop
	6-3 Monitor Impact to see if the performance of activities is done towards achieving objectives.
7. Evaluation	7-1 Check Objectives and policies
	7-2 Evaluate progress of activities
	7-3 Evaluate Project Impact
	7-4 Evaluate Efficiency
	7-5 Evaluate Sustainability

Sustaining/ Management	Action
8. Institutional Sustainability of SHCC (how to avoid dropouts)	8.1 Hold periodical meetings to check progress/process as well as institutional capacity
	8.2 Make guideline for the group that clearly describe group rules, each person's defined roles and responsibilities, and penalties if any
9. Management of School Health Facilities	9-1 Analyse environmental health problems in and around school
	9-2 Select appropriate technology and sites for the facilities
10. Maintenance of school health facilities	10-1 schools/communities contribute as much as possible to the O&M costs of School Health facilities since it will increase feeling of responsibility, ownership and motivate them to maintain facilities.
	10-2 Cleaning could be done by several organizational options such as: cleaning committee, by classes on a rotation basis, with or without a rewarding mechanism
	10-3 Even though students are involved, final responsibility, involving supervision and corrective action if needed, should usually remain with the SHCC.

2) Project implementation

(a) Methods

The SHCC (school health coordination committee) consisting of different stakeholders shall be formed at early stage of the project planning and the members will master the practical skills needed to manage the participatory school-based health and sanitation activities by using methods such as CAP (Community Action Planning) and PHAST (Participatory Hygiene and Sanitation Transformation).

(b) Expected organisation in charge

The project is implemented based on participatory and school initiative approach in which selected subcontractor (NGO) with good experience working in school and the community-based health projects takes the role of facilitator to mobilize and encourage school initiatives and participation. The NGO takes full responsibility for facilitation of all work and coordination among relevant stakeholders. Concrete definition of roles and responsibilities of various stakeholders in the project are described in section 8.1.2.

3) Direct cost estimate

(a) Direct cost (including field operation cost)

The estimated total direct cost of projects in seven schools is about US\$ 235,000 as indicated in the following table. The field operation cost includes the cost for training, IEC (Information, Education and Communication) materials, school health service equipment (i.e. health check up, deworming) and monitoring.

Direct Cost for Each Target Area (UNIT: US\$ 1,000)

School-based Health and Hygiene Education	Bauleni	Chibolya	Old Kanyama	Chainda	Chazanga	Freedom	Kalilikiki
Type of school	Govern-ment	Community	Govern-ment	Community	Community	Community	Community
Implementation Year	2002	2002	2002	2003	2006	2007	2007
Construction Cost	5	5	5	0	0	0	0
Engineering Cost (20% of)	1	1	1	0	0	0	0
Training, IEC, Workshops, Monitoring *	26	26	26	26	26	26	26
Medical Equipment	4	4	4	4	4	4	4
Field Operation cost total (+ + +)	36	36	36	30	30	30	30
Administration Cost (3% of)	1	1	1	1	1	1	1
Sub Total (+)	37	37	37	31	31	31	31
						TOTAL	235

* including personnel expenses

(b) Personnel expenses

The estimated total personnel expenses for seven priority school projects is approximately US\$70,000 and assignment of personnel in each project is summarized below:

Personnel	Unit	Quantity
School Health Program Officer	M/M	12
School Environmental Health facility Technical Officer	M/M	12

(c) Administration cost

The cost for the project administration by the Government of Zambia is estimated at 3% of the direct field operation cost shown in the preceding table.

4) Expected impacts

Expected Impacts are summarized in section 8.1.2.

5) Implementation schedule

The implementation schedule of each School-based Health and Hygiene Education Project (duration 1 year) is proposed below. The implementation of selected seven priority projects is scheduled to be done between the years 2002 and 2007 and the disbursement schedule of this component is presented as shown in section 9.5.

	SCHOOL HEALTH PROJECT	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
PLAN	1. Identify Problem/Assess Needs	■											
	2. Identify Supporting Agencies	■											
	3. Analyse Problem and Plan for solution		■										
DO	4. Plactical Training		■										
	5. Implementeation of Health and Hygiene education (School Health Services)			■	■	■	■	■	■	■	■	■	■
SEE	6. Monitoring			■	■	■	■	■	■	■	■	■	■
	7. Evaluation												■

Figure 9.2.9 Implementation Schedule for School-based Health and Hygiene Education Project

(3) Health Facilities Improvement Project

1) Description of priority projects

According to DHMT standard, it is necessary to have at least one sub-health centre per 3,000 head of population in which two nurses from DHMT and a few CHW are stationed and provide basic MCH (maternal and child health), FP (family planning), basic treatment and counselling services. In this regard, it is necessary to consider building health centres in areas where people do not have good access to health services. Increasing the number of sub-health centre is in line with current national and district health policy, therefore it is planned that the project will establish sub-health centre in those areas. In Ng’ombe clinic, originally established by HUZA in 1997, the sewer system is not well designed so that the clinic has a problem with wastewater running back to the health centre. Therefore, sewerage facility (septic tank and pipes) needs to be completely relocated.

(a) Detailed plan by each settlement

Targets and plan framework of priority projects in each settlement is described below:

Plan Frame work for Sub-Health Centre Construction

Area	Target Population 2005 estimate	Standard number of staff needed	Remarks
Chibolya	46,000	<Human resources> 2 nurses, 2 CHWs , 1 maid	Not attached to community centre
Chazanga	23,000	1 security guard	Not attached to community centre
Freedom	10,000	<Services provided> Maternal and Child Health (MCH), Family Planning (FP), basic treatment and counselling	Established as an annex to community centre
Kalikiliki	12,000		Established as an annex to community centre

Plan Framework for Rehabilitation of Sanitation Facilities of Ng'ombe Clinic

Area	Wastewater volume (lpcd /day)*	Sewerage System plan	Remarks
Ng'ombe	10 lpcd/ 180 patients=1,800	2 septic tanks	Relocation of existing septic tanks

(Source LWSC)

Remarks: *unit amount of clinic waste water 10 l/out patient/day (clinic without out beds)

(b) Scope of works

In order to go through the process of sub-health centre construction with partial community participation involved, we need to follow the steps listed below:

Summary of Main Works of Health Facilities Improvement Project

Stage I "PLAN"	1-1 Identify relevant stakeholders and formulate task force (within community) for sub-health centre construction or rehabilitation of existing health centres 1-2 Organize workshop for work plan, role, and responsibilities, regarding construction and its operation and maintenance etc. 1-3 Organize workshop for work plan, role, and responsibilities, regarding construction and its operation and maintenance etc.
Stage II "Implementation"	2-1 Selection of volunteer/paid labours (skilled and unskilled) in the community 2-2 Agreement on construction issues, design, materials, conditions, storage of materials etc. with relevant stakeholders (sub-contractor, ABO, DHMT and so on) 2-3 Construction of facilities
Monitoring and Evaluation	3-1 Design community monitoring tools and monitor/evaluation 3-2 Design construction process monitoring tools and monitor/supervise 3-3 Hold participatory evaluation workshop on impacts, effectiveness, efficiency, sustainability
Sustaining and Management	4-1 Physical maintenance of the facility (key holding, daily cleaning, security, repair) 4-2 Running of the facilities (staffs' salary, drugs, medical equipment)

2) Project implementation

(a) Methods

The project will be implemented based on participatory approach in which selected subcontractor takes full responsibility for all works covering site survey, design, and construction. Methods for survey, design and construction, in principle, will follow the Zambian standards.

(b) Expected organisation in charge

This component of the project is implemented by NGO in close cooperation with DHMT. Specific roles and responsibilities of various stakeholders in the project are described in the section 8.1.2.

3) Direct cost estimate

(a) Direct cost (including field operation cost)

The estimated total direct cost is about US\$ 479,000 as indicated in the following table.

Direct Cost for each target area (UNIT: US\$ 1,000)

Sub-Health Center construction & Rehabilitation Implementation Year	Chibolya	Chazanga	Kalikiliki	Freedom	Ng'ombe
	2002	2005	2007	2007	2002
Construction Cost	70	70	70	70	20
Land acquisition Cost	0	0	0	0	2
Engineering Cost (20% of)	14	14	14	14	4
Medical Equipments	20	20	20	20	
Training Cost	5	5	5	5	0
O&M cost (1% of)	1	1	1	1	0
Field Operation cost total (+ + + + +)	110	110	110	110	26
Administration Cost (3% of)	3	3	3	3	1
Sub Total (+)	113	113	113	113	27
				TOTAL	479

(b) Personnel expenses

The estimated total personnel expenses for the five priority projects is US\$40,000 and assignment of personnel in each project is summarized below:

Personnel	Unit	Quantity
Building Manager	M/M	32 (4 people)
Skilled labours	M/M	56 (12 people)
Security Guard	M/M	32 (4 people)

(c) Administration cost

The cost for the Project administration by the Government of Zambia is estimated at 3% of the direct field operation cost.

4) Expected impacts

Expected Impacts are summarized in section 8.1.2.

5) Implementation schedule

The following table contains a tentative Implementation Schedule (1 year) for the construction period of sub-health centre construction and existing health centre rehabilitation.

	SUB HEALTH CENTER PROJECT	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
PLAN	1. Formulate Task Force	■											
	2. Identify Supporting Agencies	■■■											
	3. Organize Workshop for Work Plan		●										
DO	4. Select volunteer labours in the community		■										
	5. Agree on construction issues			■■									
	6. Construct facilities			■	■	■	■	■	■	■	■	■	■
SEE	7. Monitoring			●	●	●	●	●	●	●	●	●	●
	8. Evaluation												■

Figure 9.2.10 Implementation Schedule for Sub-health Centre Construction and Existing Health Centre Rehabilitation

9.2.3 Communal (Public/Household) VIP Latrine Development Project

(1) Description of Priority Projects

The majority of latrines in the settlements are traditional ordinary pit latrines with both home (often shared by a number of households) and communal pits and very few are improved pit latrines such as VIP (ventilated improved pit) latrines. (See section 8.1.2 “Priority Setting for VIP Latrine Project” for more information)

Most of the UUS residents are tenants, but their landlords who are supposed to be responsible for building latrines with their rental houses are not usually living in those places and that makes it difficult for us to involve both tenants and landlord in the project implementation. In addition, although it is a low cost sanitation technology, the VIP is still relatively expensive (average cost of single VIP latrine is about US\$200) for low-income households. In this regard, the project shall target communal (public/household) latrine and will aim to subsidize approximately 75-80% of the total cost of the latrine with 15-20% contributed by

the community. The project shall aim to improve existing sanitation facilities in the community (majority are ordinary pit latrines) and as a result will improve health conditions in the community as described more in detail in section 8.1.2.

1) Detailed plan by each settlement

Targets and plan framework of priority projects in each settlement is described below:

Targets of Priority Projects in Each Settlement

Area	Year	(a) Target Number of household * (Number of latrines)	(b) Number of latrines/ month (per zone)**	Important Remarks on Latrine technologies	Possible NGOs /partners currently working in the area
Chainda	2002-2003	1250 (625)	7	Standard type	WORLD VISION
Chazanga	2005-2006	2100 (1050)	N/A (Number of zone has not been decided)	<u>-Shallow well users should be given health education about risk of contamination and avoid special caution about siting of the latrine ***</u>	CARE PROSPECT
Chibolya	2005-2006	2500 (1250)	13	<u>-Avoid rock by up-and up-lifting latrine above-ground (40-50cm above)</u> <u>-The pit should be completely lined/sealed ***</u> <u>-Shallow well users should be given health education about risk of contamination</u>	CARE PROSPECT
Freedom	2006-2007	800 (400)	N/A (Number of zone has not been decided)	Standard type	
Kalikiliki	2006-2007	900 (450)	5	Standard type	
Ng'ombe	2003-2004	3400(1700)	9	Same as Chazanga ***	
Old Kanyama	2006-2007	4100 (2050)	5	Same as Chibolya ***	CARE PROSPECT

Remark: * Cover 50% of total population, one family is about 7 people, one pit shared by 2 households

** Construction period (18months) (b)= (a) ÷ 2 ÷ 18 ÷ (Number of zones in one settlement)

*** Other options to avoid risk of contamination of improved latrines are described in Annex-8 in Volume 3 (Appendix) of this Report.

Plan Framework

	ONE EXAMPLE
Project Duration	2 years
Timing of Implementation	1) Simultaneously with community-based health and hygiene education 2) Start at least one year before the water supply system is completed
Served Area	1) 50% of the households in the area (1-2 households share one latrine, called “Communal Household Latrine” 2) Major commonplace in the community such as market, church area, health centre and the school, called “Communal Public Latrine”
Target population	-50% of total number of household in the community -Primary target are Landlords (for household latrine) -Community people (for latrine used by general public)
Major intervention plans	-Formation of Latrine Construction Group (LCG) -Demonstration of several VIP latrine types -Mobilisation and Sensitisation (Demand creation) -Construction
Approach	-Participatory Approach (PHAST) -20-25% of total cost born by the community contribution -75-80% subsidy given by the project
Target number of trainee	9 – 10 members from each zone (needed to build 8-9 single pit latrines/month)
Duration of the training	2 weeks including practical training (building demo-latrines)
Possible Partner NGOs	AFRICARE, CARE PROSPECT, WORLD VISION etc.

2) Scope of works for implementation of the projects

The main process of the projects are summarized as below:

Main Works of Communal (Public/Household) VIP Latrine Development Project

Stage I “PLAN”	<u>Action</u>
1. Needs Assessment	1-1 Collect data through Household, Knowledge Attitude Practice survey, Focus Group Discussions, Direct Observation, Key Informant Interview
	1-2 Collect data on government policies, goals and regulatory standard
2. Identify Supporting Agency and Groups and set up a team	2-1 Identify key community stakeholders to work with (which organization/group can be active and sustainable for sanitation facility development) through stakeholder analysis
	2-2 Identify NGO with experience of community participatory latrine construction in peri-urban settlements and other supporting agencies are effective and collaborative
	2-3 Identify community bricklayers who can work as LCG (Latrine Construction Group) members
3. Conduct PHAST and/or CAP Workshop	3-1 Conduct PHAST workshop to analyse the problems and let stakeholders learn by themselves from each other
	3-2 Identify what might go wrong
	3-3 Conduct CAP workshop (2) for planning
Stage II “IMPLEMENTATION”	<u>Action</u>
4. Practical Training	4-1 Design training programme and prepare training handouts
	4-2 Conduct practical training (theory, technology)
	4-3 Make annual work plan and get consensus
	4-4 Create monitoring sheet

5. Choose appropriate and acceptable technology	5-1 Compare appropriate, affordable and acceptable options
	5-2 Construct Demonstration latrines
6. Create demand and select beneficiaries	6-1 Set up eligibility criteria for beneficiaries
	6-2 Conduct sensitisation campaign
	6-3 Choose beneficiary and sign MOU with each beneficiary, LCG & RDC
7. Supply of Materials	7-1 Collect from community and purchase tools and materials for construction and store them in the community
	7-2 Stimulate the Private Sector to develop parts of latrines
8. Construction	8-1 Management of construction progress
Monitoring and Evaluation	<u>Action</u>
9. Monitoring	9-1 Develop process & impact monitoring sheets
	9-2 Monitor Process to see if the progress were made according to the work plan developed in the workshop
	9-3 Monitor Impact to see if the performance of activities is done towards achieving objectives.
10. Evaluation	10-1 Check Objectives and policies
	10-2 Evaluate progress of activities
	10-3 Evaluate Project Impact
	10-4 Evaluate Efficiency
	10-5 Evaluate Sustainability
“O&M”	<u>Issues</u>
11. Communal (Demo) Latrine Physical Maintenance and Management	11-1 Key holding
	11-2 System of daily cleaning
	11-3 Security
	11-4 System of repairing
	11-5 User-fees and its use
12. Communal (households) Latrine Physical Maintenance and Management	12-1 Prepare proper use & maintenance training program and materials
	12-2 Conduct on-site training for the beneficiaries on O&M issues
13. Environmental Concerns	13-1 Ground water pollution
	13-2 Odour control
	13-3 Latrine Emptying
14. Further expansion of the project	14-1 Sourcing for Funds

3) Latrine design and standard

The project shall allow freedom for the beneficiary to choose their own design as long as they will not affect the safety and hygienic performance of the latrine. Sample technological options and characteristics of each option are described below:

Sample Checklist of Technical/design Options of VIP Latrines

	Possible Options	Odours	Flies	Socially acceptance	Construction Cost	Risk of collapsing or bandalism	Life span	Soil contamination
				Gender sensitiveness				
Size	1.Single 2.Double pits 3.Single pit + shower room (offset) 4.Double + shower room (offset)			Middle Middle High High	Low Middle Middle High		Middle Long Middle Long	
Concrete slab(sanplat)	1.Lightly-reinforced 2.Reinforced	Low Low	few few		Middle High	Middle Low	Middle Long	
Foot rest	1.No foot rest 2.Foot rest	High Low	Many a few	Middle High	Low Low			
Pit lining	1.Lining but perforated 2.Lining but completely sealed (where water table is high)				Middle High	Middle Low	Middle Short	Middle Low
Pipe	1.Concrete pipe 2.Asbestos pipe	Low Low	few few		Middle High	Low (theft) High (theft)	Long Long	
Super structure	1.(75mm) above the ground 2.Up lifted (where water table is high)				Low A bit High	Low Low	Long Long	Low
Roof structure	1.Concrete roof with chicken wire only 2.Concrete roof with reinforcement 3.Asbestos roof				Middle High High	Middle (collapse) Low (collapse) Middle (theft)	Long Long Middle	
Door	1.No door no rock 2.Wooden door without pad lock 3.Wooden door with pad lock 4.Wooden door (iron frame) with pad lock	High Middle Low Low	Many Middle Low Low		Low Middle High High	High High Middle Low	Short Middle Middle Long	

To be technically, culturally and environmentally appropriate and acceptable, each technology used should satisfy the following criteria. An example of the standard single VIP latrine design is described in the table below and shown in Figure 9.2.12. Other options to avoid risk of contamination improved latrines are described in Annex - 8 in Volume 3 of this Report.

- Cause no harmful surface soil contamination
- Cause no harmful contamination of untreated potable water sources
- In some soil conditions, sealed pit lining (not perforated) and up-lifted latrine is required to prevent it from collapsing
- Prevent the spread of disease by flies or animals
- Present no health risk to people using or maintaining the system
- Be free from offensive smells (odour control) and unsanitary conditions
- Be culturally acceptable and gender sensitive
- Use as little water as possible where this is scarce

Standard Type of Single VIP Latrine Design

Standard Single VIP latrine Design	
Siting	-Range between 7.5m-30m away from the drinking water source depending upon highest seasonal water table below the bottom of the pit -Near the house but away from trees so that air can flow easily over the pipe, airy or well-ventilated area
Size/volume of pit	-3 meters deep 1.3 meters in diameter -Lined it with cement mortared block (3 wheelbarrows of building sand+ four shovels of normal Portland cement)
Cover Slab	-Squat hole (14cm X 28cm) and pipe hole (14cmX14cm) and footrests -7.5-10cm thickness -Concrete mixture 1:5cement to sand ratio -Use reinforcement bar (18mm for cover slab)
Vent pipe	-Made of blocks and cement mortar of mixture ratio 1: 4 -25cmX35cm (outside), 14cmX14cm (internal space), 2m (height) -Build opposite side of doorway (doorway should face towards the wind)
Superstructure	-Any kind of materials can be used. (Cement blocks are preferable)
Fly screen	-Made of stainless steel or plastic. (35cm X 45cm) -Should be fitted to the head of the vent pipe and strong cement mortar
Roof	-Ferro cement roof (mixture 1:3 cement to sand ratio, 1.3mX1.3m) -Chicken wire (0.9m X 4m) and if possible reinforcement bar 18mm

4) Demand driven approach

Health Educators in the community and RDC and LCG will conduct the “Safe Sanitary VIP Latrine Campaign” within the communities to raise awareness among the community about the need for safe and sanitary facilities and to initiate demand driven projects. A door-to-door visit together with construction of communal (public) demonstration latrines in the public place such as clinic, schools and church facilities shall be undertaken. When the people start showing interest in the project, the expected beneficiary contribution from and selection criteria should be explained. Examples of selection criteria to become beneficiaries are described as follows: 1) Permanent residents of the settlement and 2) Those who can contribute according to the rules and recommended by the RDC.

5) Training

Training of the LCG (latrine construction group: 9-10 people from each zone) shall be conducted. It is recommended that the most appropriate and sustainable system of latrine construction is that local private masons or bricklayers be trained to construct the latrine. When there is no such business enterprise, community members or existing CBO can be selected as LCG

members. Selection criteria to become a latrine construction group member are; 1) Commitment to hard labour for minimum wage, 2) sufficient level of household income, 3) Previous bricklaying or related experience, 4) literacy level, and 5) Period of residency. On-site training shall also be done to expose the beneficiaries to construction and maintenance skills during the construction of the pit latrines.

6) Community participation (contribution)

The project shall provide the beneficiaries with 75-80% subsidy in form of materials such as cement, reinforcement bars, chicken wire, and fly screen. The beneficiary shall contribute the remaining 20-25% of supplies in the form of labour, sand, crushed stones and water. The beneficiaries' labour contribution shall include:

- Digging the pit and moulding the bricks for pit lining, and superstructure building
- Preparing the locally obtainable materials (such as river sand, crushed stones, building sand)

The competence of the LCG members should be monitored by RDC with assistance by the NGO and EHT in charge of the settlement that should from time to time monitor the standard of construction of latrines in his/her area to ensure that high construction standard is maintained. It is also recommended to conduct a simple test¹ on the sand collected/obtained by the beneficiaries as part of their contribution to avoid slab or roof failures.

7) Operation and maintenance

Maintenance (such as latrine emptying) and cleanliness after construction should be re-emphasised and necessary measures have to be taken to assure O&M of common (household) VIP latrines. The expected life span of the standard single VIP latrine is 12-14 years for a family size of 6 to 7 persons. For the long-term operation, maintenance and replacement requirements of the technology should be well explained to the beneficiaries as follows:

- The need to keep the slab clean
- The purpose of the darkened superstructure, vent and fly-screen and how to check they are working properly
- The purpose and use of stopper if it is a sealed-lid latrine

¹ Thoroughly shaking a sample of the sand in water in a transparent bottle and then leaving it to observing the depth of the clay and silt which settle on top of the sand to reject sands which contain excessive amounts of these very fine

- The way/timing to eventually dig another pit and to move the slab and re-build a superstructure or sludge removal by vacuum tanker.
- The addition of ash and chemical (such as PITKIN, FATKIN) to control odour and decrease the volume of feces

(2) Project Implementation

1) Methods

The CAP method will be adopted throughout the process, especially in planning, monitoring and evaluation. It is expected that the community (LCG, specifically) will master the practical skills needed to mobilize and promote construction of VIP latrines and their correct use in the community and construct those facilities. Together with CAP, PHAST method shall be used to mobilize, create demand among the community, and promote hygiene behaviour change. (Such as proper way of using latrine, importance of maintenance, and hand washing after use of latrines etc.)

2) Expected organisation in charge

The project will be implemented using a participatory approach in which the selected subcontractor (NGO) with good experience in urban sanitation program in collaboration with DHMT. Health officers from the health centre (namely EHT) takes full responsibility for works covering initial situation analysis, project designs, construction training and M&E in close collaboration with the EHT who shall be involved from the beginning of the project planning stage to the end of the project. A more concrete explanation of the roles and responsibilities of various stakeholders and their relationship during project implementation period is described in the section 8.1.2 (see Venn diagram, Defined Roles, Primary and Secondary Roles of Each Stakeholder).

(3) Direct Cost Estimate

1) Direct cost (including field operation cost)

The estimated total direct cost is about US\$ 1,756,000 as indicated in the following table.

particles. Screening of dust and dirt from crushed stones may also be necessary.

Direct Cost for Each Target Area (Unit: US\$ 1,000)

	Chainda	Ng'ombe	Chazanga	Chibolya	Freedom	Kalikiliki	Old Kanyama
Communal (Public/Home VIP Latrine)							
Implementation Year (2 years)	2002-2003	2003-2004	2005-2006	2005-2006	2006-2007	2006-2007	2006-2007
Construction Cost	98	273	166	300	59	70	487
Training, IEC, Workshops, Monitoring *	36	36	36	36	36	36	36
Field Operation cost total (+)	134	309	202	336	95	106	523
Administration Cost (3% of)	4	9	6	10	3	3	16
Sub Total (+)	138	318	208	346	98	109	539

* including personnel expenses

TOTAL 1,756

2) Personnel Expenses

The estimated total personnel expenses for priority projects is US\$201,600 and assignment of personnel in each project is summarized below:

Personnel	Unit	Quantity
Project Supervisor (Latrine Technician)	M/M	24
Field Worker (Latrine Technician)	M/M	24

3) Administration Cost

The cost for the project administration by the Government of Zambia is estimated at 3% of the direct field operation cost as shown in above table.

(4) Expected Impacts

Expected Impacts and indicators are summarized in section 8.1.2.

(5) Implementation Schedule

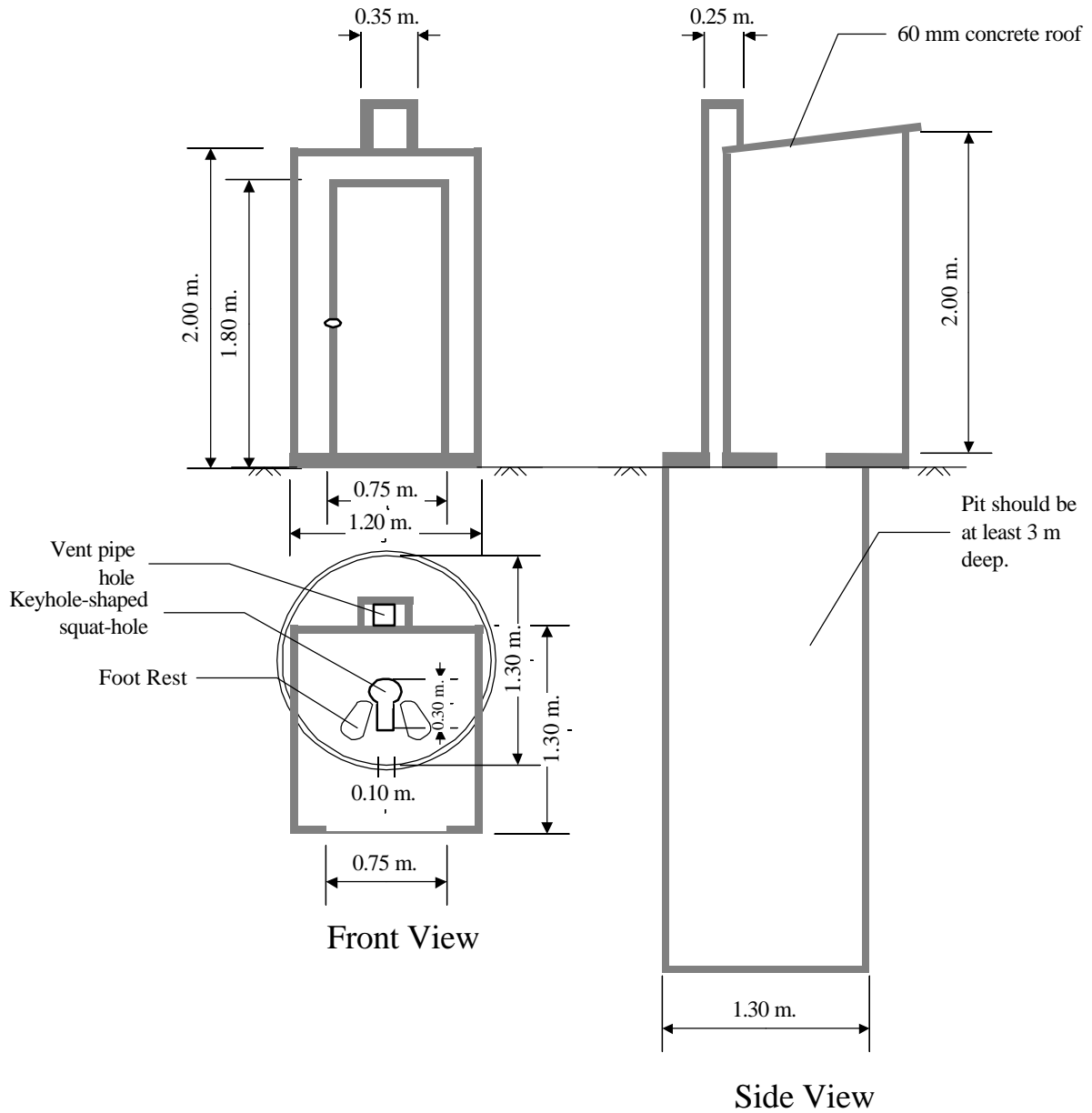
Implementation schedule of a Communal (Public/Household) VIP Latrine Project is proposed below. Each project duration is 2 years.

		M1-3	M4-6	M7-9	M10-12	M13-15	M16-18	M19-21	M22-24
PLAN	1. Identify Problem/Assess Needs	█							
	2. Identify Supporting Agencies	█							
	3. Analyse Problem and Plan for solution	█							
DO	4. Practical Training and Workshop		█						
	5. Create Demand			█					
	6. Select Beneficiaries			█					
	7. Supply Materials			█	█	█	█	█	█
	8. Construction			█	█	█	█	█	█
	9. Follow-up Training				█	█	█	█	
SEE	10. Monitoring			█	█	█	█	█	█
	11. Evaluation								█
SUSTAIN	12. Maintenance and Operation				█	█	█	█	█

Figure 9.2.11 Implementation Schedule for Communal (Public/Household) VIP Latrine

The implementation of the selected seven priority projects is scheduled to be done between the years 2002 and 2007 and is presented as shown in

Section 9.6. Based on experience from the pilot study, the VIP latrine construction project should be implemented after the water supply project is completed and during the time that the community-based health education project is being conducted.



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Figure 9.2.12

Standard Design of Single VIP Latrine

9.2.4 Community School Development Project

(1) Detailed Plan by Each Settlement

As already mentioned in section 8.1.2 (5), the five settlements (Bauleni, Chainda, Chazanga, Freedom and Kalikiliki) shall be selected as the priority areas.

These are as were justified based on the number of existing government and community schools in the settlements. Although the enrolment rates and number of out-of-school children should also be considered to decide the priority areas, there are no official data to show the out-of-school children in each settlement. An unofficial estimate reported that 40-60% of school-aged children (6-15) cannot go to school in urban settlements.

The following table shows the design of priority project.

Target Setting of the Priority Project in 5 Settlements

	Bauleni	Chainda	Chazanga	Freedom	Kalikiliki
Classroom	2	2	2	2	2
VIP latrine	4 pits	4pits	4pits	4pits	4pits
Water supply	1	1	1	1	1
Land availability	OK	OK	OK	OK	OK
No. of pupils To be enrolled	160 (40x4cls)	385 (no fixed classes)	160 (40x4cls)	160 (40x4cls)	160 (40x4cls)
No. of teachers	4 (at least)	4 (at least)	4 (at least)	4 (at least)	4 (at least)
Organisations to Construct	NGO New PTA RDC	NGO Existing PTA	NGO New PTA RDC	NGO New PTA RDC	NGO New PTA RDC
Organisations to Management & Running	PTA NGO	PTA NGO	PTA NGO	PTA NGO	PTA NGO

Design of the Chibolya Community School as shown in section 5.3.6, the pilot project development, shall be replicated to the standard design of the community school for above priority projects.

Planned locations of the priority projects by each UUS are proposed in Figures 9.2.14 to 17.

(2) Scope of Works

The scope of works is formulated based on the project cycle. For a newly established school, for example, there are 14 steps to complete school building and systematise school management and running.

Following table shows the each step and brief summary of actions for that.

Scope of Works for Community School Implementation

1. Situation Analysis	<ul style="list-style-type: none"> • Assessing present situation of primary education • Justification by national policies and goal
2. Set-up organisational structure and supporting agencies	<ul style="list-style-type: none"> • Identification of existing community groups to handle the project • Identification of supporting agencies
3. Needs assessment and CAP workshop	<ul style="list-style-type: none"> • Identification of community problems and needs in education • Identification of problems, solutions and formulate action plans • Set-up analysis method and indicators
4. Site identification	<ul style="list-style-type: none"> • Land acquisition
5. Selection of pupils	<ul style="list-style-type: none"> • PR activity • Selection procedure
6. PTA formation	<ul style="list-style-type: none"> • Election
7. Selection of teachers	<ul style="list-style-type: none"> • Selection procedure from the candidate residing in the community
8. Selection of labours	<ul style="list-style-type: none"> • Selection procedure from PTA, EC, etc
9. Organising workshop	<ul style="list-style-type: none"> • Choosing core participants • Agenda setting
10. Construction	<ul style="list-style-type: none"> • Management and supervision
11. Teacher's training	<ul style="list-style-type: none"> • Program arrangement
12. Monitoring	<ul style="list-style-type: none"> • Process monitoring • Impact monitoring
13. Evaluation	<ul style="list-style-type: none"> • Objectives and policies • Process and progress of activities • Impact assessment • Efficiency • Sustainability
14. Operation and Management	<ul style="list-style-type: none"> • Physical maintenance • School running

(3) Implementation Method

Design of school building can adopt the Micro Project standard of the Zambian government. It has two classrooms with a storage room and an office. According to the regulation of Zambian Community School Secretariat, children to be accommodated in one class should not exceed 40 to maintain the quality of education. Community school covers from level 1 to 4. If a two-shift system is arranged, the school can conduct classes for four levels in one day.

Detailed design is attached at the end of this section.

(4) Role and Responsibilities of Stakeholders

Main stake holders are PTA, Education Committee (if necessary), RDC, LCC (Site officer, Community Development Officer and Engineering Staff), an NGO and a Donor. Initially, RDC and EC have the main role to mobilise the community and promote participation. However, after PTA is formed, RDC should gradually

withdraw and hand over school management and running to PTA. The table and diagram showing stakeholders and their role and responsibilities are shown in 8.1.2.

(5) Expected Impacts

Expected impacts and indicators are summarised in section 8.1.2.

(6) Schedule

Community School Development may take about 8 months. Initially it takes 2-2.5 months to prepare for organisational set-up, identification of key people/groups, teachers pupils, and consensus building in the workshop.

Construction usually takes 4-5 months depending on season and timing of material delivery. However, in the case of expanding an existing school such as Chainda community school it may take less time. The existing school already has a PTA which has more motivation and enthusiasm for participation. So they take less time in taking action to gain consensus among stakeholders. Therefore, the existing school needs about 5-6 month to complete construction.

Following is a tentative Work Plan of the construction process and system establishment to have a school running within 8 months. (Case for a new school)

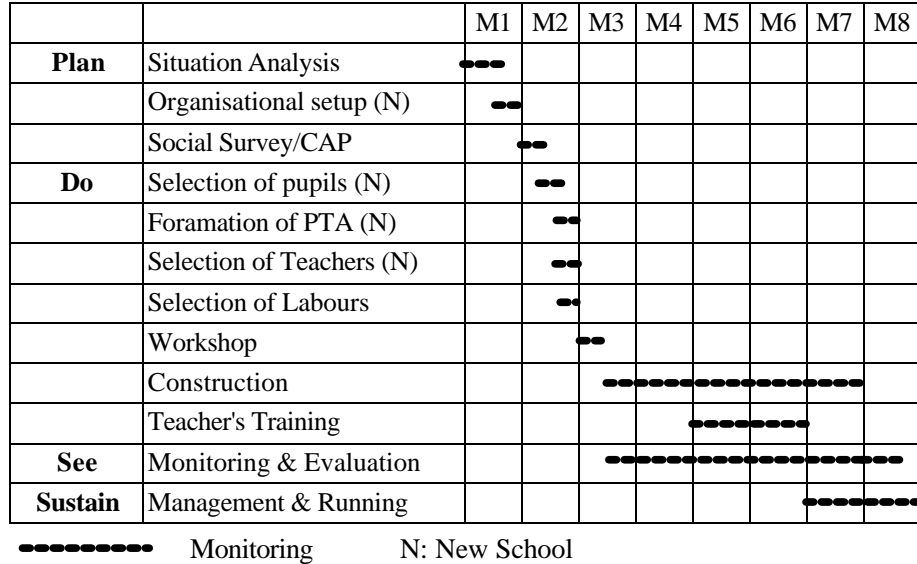


Figure 9.2.13 Work Schedule for Priority Community School Implementation

(7) Cost Estimate

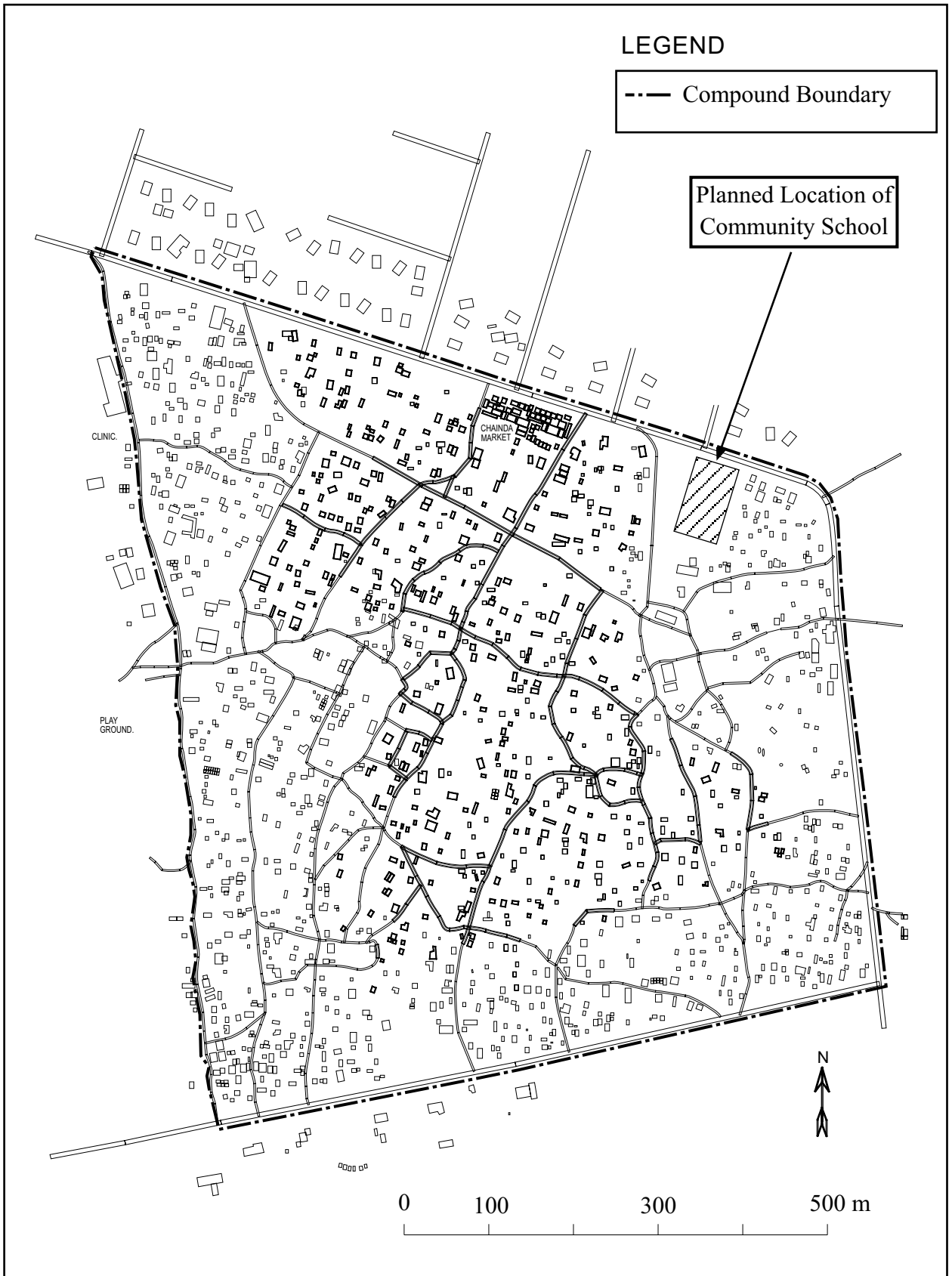
The following table shows the cost estimate of the five proposed schools. Chainda is presumed to cost less since there is an existing PTA that would contribute more

unpaid labour. Also, material costs differ from settlement to settlement according to the location. Remote areas involve greater delivery cost. For example, Freedom is far from the central town of Lusaka so the price is accordingly much higher than other settlements.

Cost Estimate of Five Priority Community Schools

(Unit: US\$)

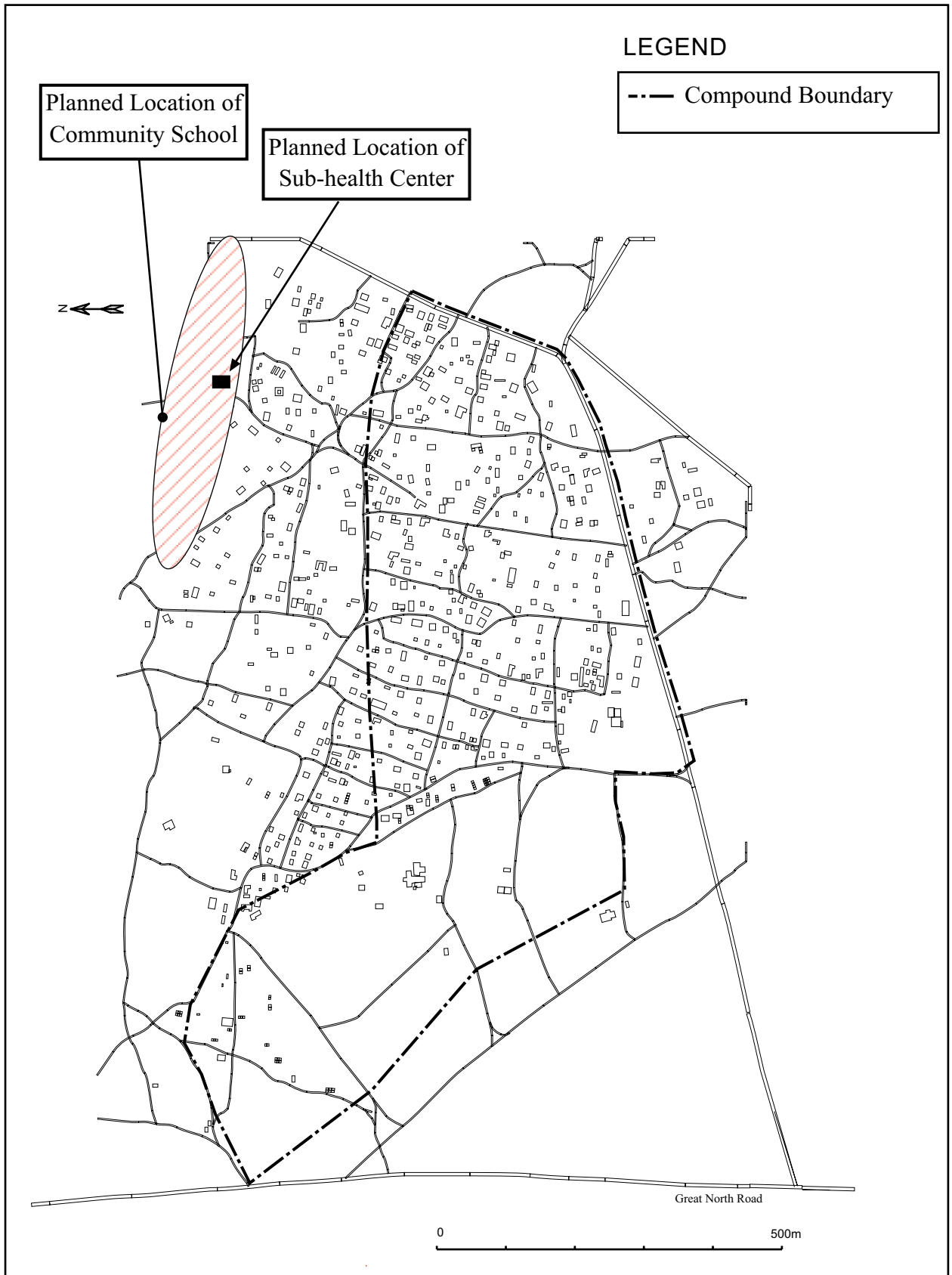
Construction component	Bauleni (New)	Chainda (Existing)	Chazanga (New)	Freedom (New)	Kalilikiki (New)	Total
1 Construction Cost	54,000	64,000	62,000	62,000	49,000	291,000
2 Land Acquisition Cost						
3 Engineering Cost (20% of 1)	10,800	12,800	12,400	12,400	9,800	58,200
4 Administration Cost (3% of 1)	1,600	1,900	1,900	1,900	1,500	8,800
Subtotal	66,400	78,700	76,300	76,300	60,300	358,000
Software component						
5 Teachers Training cost	2,700	1,000	2,700	2,700	2,700	11,800
6 Teaching materials	2,000	2,000	2,000	2,000	2,000	10,000
Subtotal	4,700	3,000	4,700	4,700	4,700	21,800
Total	71,100	81,700	81,000	81,000	65,000	379,800



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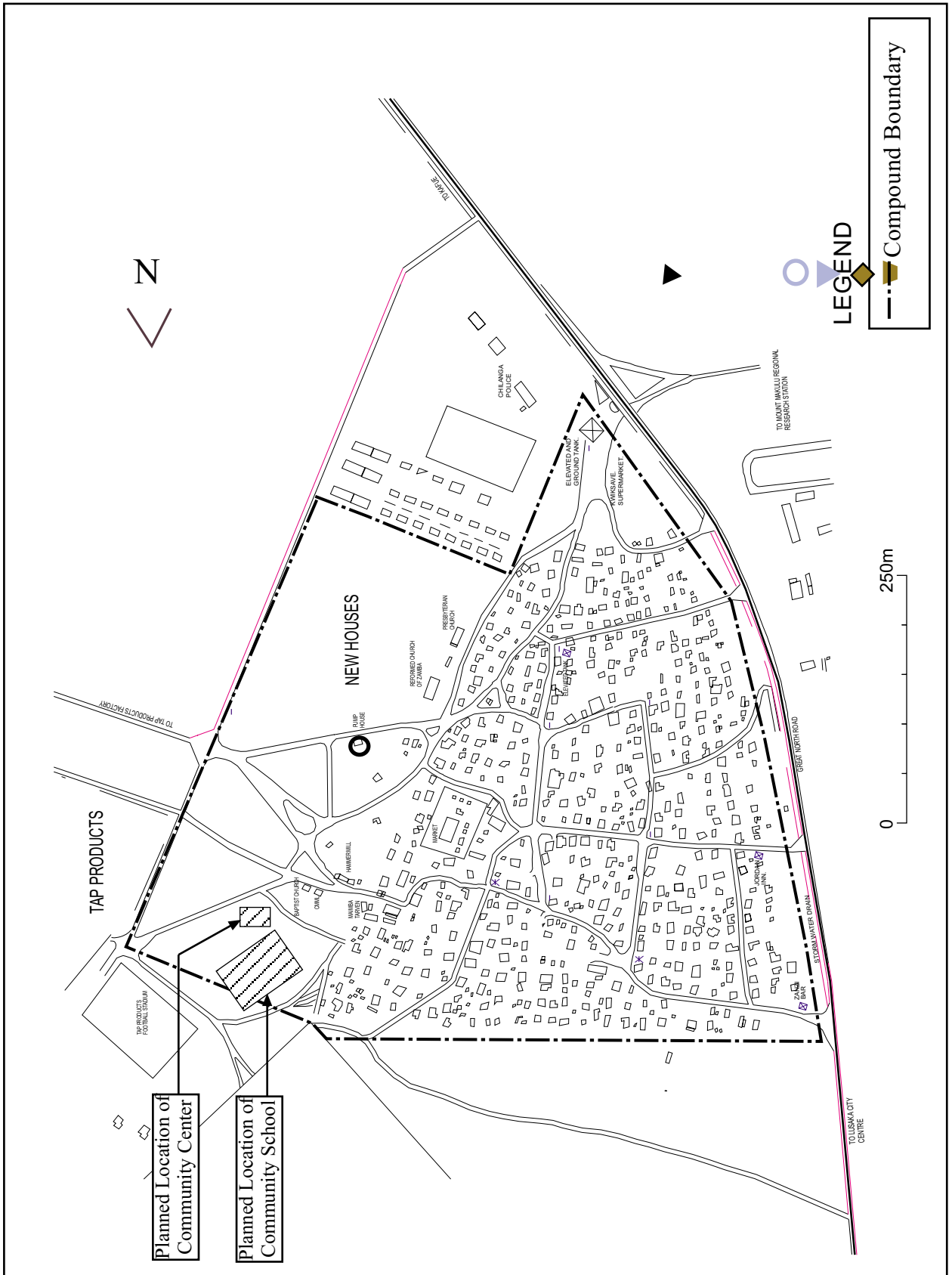
Figure 9.2.14
Health and Education Improvement Master Plan of Chainda



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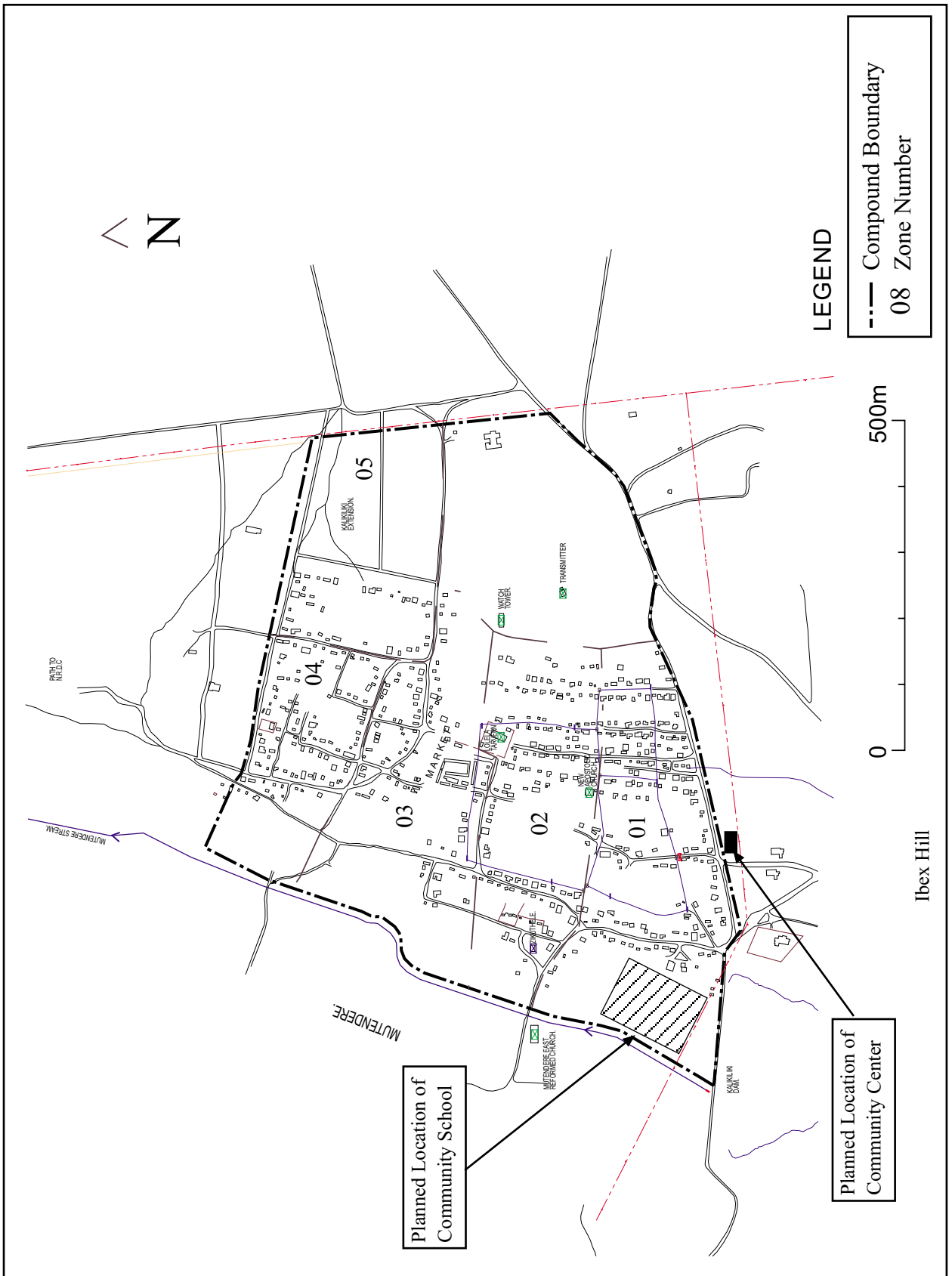
Figure 9.2.15
Health and Education Improvement Master Plan of Chazanga



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Figure 9.2.16
Health and Education Improvement Master Plan of Freedom



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Figure 9.2.17
Health and Education Improvement Master Plan of Kalikiliki

9.2.5 Garbage Disposal Program

(1) Selected Priority Projects

The garbage disposal program aims to set up a community-managed garbage collection system with waste levy collection to mitigate the environmental and health risks. The objective of structural measures for the garbage disposal program is to have garbage generated at households collected and delivered to transfer stations by the community.

Chainda, Freedom and Kalikiliki are selected for priority garbage disposal programs as described in section 8.1.2. Midden boxes at each zone and a transfer station are to be constructed in the settlements. The number of beneficiaries is estimated at 17,000 at present and 23,000 in 2005 for Chainda. For Freedom it is estimated at 9,000 at present and 10,000 in 2005. For Kalikiliki it is estimated at 8,000 at present and 12,000 in 2005. The program targets the garbage collection of 100% of the area in the settlements.

(2) Description of Priority Projects

Layout plans for midden boxes and transfer stations at Freedom, Kalikiliki and Chainda are illustrated as shown in Figure 8.1.30 to Figure 8.1.32, respectively. The required disposal programs are described below.

1) Factors for plan framework

The development plan with target year for completion of 2005 is formulated according to the following factors:

Plan Factors

Description	Chainda	Freedom	Kalikiliki
Served Area (ha)	63	43	61
Zones	5	None exist	5
Served Population in 2005	23,000	10,000	12,000
Number of Households in 2005	2,300	1,000	1,200

2) Garbage generation

Garbage generation at each zone is estimated in the table below on the supposition that the generation rate is 0.5 kg per capita per day (kgpcd) in 2005. For garbage generation of Freedom, the area is divided into six sub-areas including an area for new houses since there are no zones at

present in Freedom. The total volume of garbage is 18 m³/d in Chainda and 8 m³/d in Freedom and 9 m³/d in Kalikiliki.

Estimate of Garbage Generation

Zone	Chainda		Freedom		Kalikiliki	
	Population	Generation (m ³ /d)	Population	Generation (m ³ /d)	Population	Generation (m ³ /d)
1	3,670	2.9	1,660	1.3	2,660	2.0
2	6,120	4.8	1,660	1.3	2,660	2.0
3	8,560	6.7	1,660	1.3	2,120	1.6
4	2,450	1.9	1,660	1.3	2,440	1.8
5	2,200	1.7	1,660	1.3	2,140	1.6
New Houses Area at Freedom			1,700	1.5		
Total	23,000	18.0	10,000	8	12,020	9.0

3) Demarcation of collection area

Location of collection points is recommended to be within 5 minute walk of each house. Basically a collection point will be located in each zone. The area is demarcated by six collection sub-areas for location of midden boxes in Chainda and Freedom taking consideration of accessibility.

4) Midden boxes

The required yard size is approximately 20 m² with height of 2 m. The number of midden boxes is estimated at six for each settlement. Each midden box should be equipped with a passageway for leachate treatment.

5) Transfer station

The required number of transfer stations is one per settlement at a size of 6 m by 5 m and height of 2 m. The structure of the transfer station is same of the midden box. The transfer station has a working space for the collection truck of LCC/private sector and is located on a trunk road in the settlements.

6) Procurement of collection equipment and tools

The equipment (tractor, wheelbarrows and tools) are to be procured by the committee for garbage collection by which a community entrepreneur conduct under waste management committee at each settlement.

7) Waste levy collection window/room

A waste levy collection window/room is to be provided in the community center when it is constructed. The minimum office space is required area of 15 m³ (a frontage of 3 m and a depth of 5 m).

8) Plan framework

Plan framework is summarized below:

Plan Framework

Description	Chainda	Freedom	Kalikiliki
Design Population (persons)	23,000	10,000	12,000
Designed Unit Waste Generation (kgpcd)	0.5		
Unit weight (g/cm ³)	0.384		
Daily Waste Generation (m ³ /d)	18	8	9
Collection points (Number)	6	6	5
Transfer station (Number)	1	1	1
Recycling System at Midden Box	Yes	Yes	Yes
Waste Levy with Window/room	Yes	Yes	Yes
Final Disposal	New site at Kabwe		

(3) Planned Facilities and Equipment

Garbage collection facilities and equipment are summarized below:

Main Collection Facilities and Equipment

Item	Unit	Chainda	Freedom	Kalikiliki
1. Collection facilities				
1.1 Midden Boxes	Number	6	6	5
1.2 Transfer Station	Number	1	1	1
2. O&M Equipment				
2.1 Tractor with Trailer	Set	1	1	1
2.2 Wheelbarrow	Number	2	2	2
2.3 Shovel	Piece	3	3	3
2.4 Hard Broom	Piece	2	2	2
2.5 Rake	Piece	2	2	2
2.6 Miscellaneous equipment	L.S	1	1	1

(4) Non-structural Measures Related to Garbage Disposal Program

The following non-structural measures are proposed to be undertaken by LCC as activities associated with the public solid waste management as described in section 8.1.2.

- 1) Establishment of the waste levy collection system with window/room and the community-managed O&M system,
- 2) Execution of the comprehensive health and sanitary education by Health Educators,
- 3) Introduction of the method for solid waste management and business with small scale,
- 4) "Care for sanitation/solid waste management" campaign,
- 5) Improvement of solid waste and nightsoil collection systems by practical use of private sector.

(5) Project Implementation

- 1) Executing agency

The garbage disposal program is to be implemented by LCC in cooperation with RDC.

Before the commencement of the project, various administrative procedures and preparatory activities will be required by LCC, as described in section 9.2.1. These include management of project funds and implementation of consultants/contractor tender.

- 2) Project execution method

All the project works will be executed on a contract basis.

- 3) Operation and Maintenance (O&M)

At Chainda, Freedom and Kalikiliki community entrepreneur shall conduct routine O&M instead of the waste management committee under RDC.

(6) Direct Cost Estimate

- 1) Construction and procurement costs

The estimated total construction and procurement costs for priority programs are US\$ 47.8 thousand as summarized below:

Construction & Procurement Costs

Priority project	Cost (US\$1,000)		
	Construction	Procurement	Total
1. Chainda Garbage Disposal Program	6.6	9.6	16.2
2. Freedom Garbage Disposal Program	6.6	9.6	16.2
3. Kalikiliki Garbage Disposal Program	5.8	9.6	15.4
Total			47.8

2) Engineering services cost for structure measures

The cost of engineering services, including studies, basic design, detailed design and construction supervision, is estimated at 20% of the direct construction cost. The engineering services also include education, institutional/technical training and support for establishment of the community-managed O&M system.

3) O&M cost

The approximate cost of community-based O&M at each settlement is estimated below:

O&M Cost

(US\$/year)

Description	Number	Chainda	Freedom	Kalikiliki
1. Worker (K50,000/month)	5	857	857	857
2. Driver (K75,000/month)	1	257	257	257
3. Security Guard (K75,000/month)	1	257	257	257
4. Representative (K75,000/month)	1	257	257	257
5. Maintenance (30 % of above)	L.S.	489	489	489
6. Disposal by LCC/private sector (K10,000/time)	96/48 times	274	137	137
Total		2,391	2,254	2,254

4) Replacement cost

Most facilities, except for mechanical equipment, have a life span of more than 15 years in general and possibly more than 25 years with adequate O&M. Mechanical equipment will be replaced after 10 years of operation and the replacement cost is estimated below:

Replacement Cost

Description	Chainda	Freedom	Kalikiliki
Tractor: 1 unit (US\$)	4,000	4,000	4,000

(6) Implementation schedule

Implementation schedule of the garbage disposal project is proposed below. The implementation of the selected priority programs is scheduled to be conducted by 2003 for Chainda, and 2006 for Freedom and 2007 for Kalikiliki.

Priority project	2001	2002	2003	2004	2005	2006	2007
1. Chainda Garbage Disposal Program			■				
1.1 Establish of Waste Committee & Entrepreneur			■				
1.2 Design & Construction			■				
1.3 Care for Sanitation/Waste Management Campaign							
1.4 O&M with Waste Levy Collection			▼				
2. Freedom Garbage Disposal Program						■	
2.1 Establish of Waste Committee & Entrepreneur						■	
2.2 Design & Construction						■	
2.3 Care for Sanitation/Waste Management Campaign							
2.4 O&M with Waste Levy Collection							▼
3. Kalikiliki Garbage Disposal Program							■
3.1 Establish of Waste Committee & Entrepreneur							■
3.2 Design & Construction							■
3.3 Care for Sanitation/Waste Management Campaign							
3.4 O&M with Waste Levy Collection							▼

Figure 9.2.18 Implementation Schedule for Water Supply System Improvement

9.2.6 Community Center Development Project

(1) Necessity of Community Center

As described in the Action Area Plan, a community center is proposed for water levy collection window/room as well as for supporting community management with meeting and training facilities and offices of RDC and LCC.

Sub-health center proposed for the provision of basic maternal and child health and family planning as well as basic medical treatment and counseling service will be able to be accommodated in the community center.

(2) Precondition for Design

Preconditions for the design and construction planning of the community center are as follows.

- Community participation will be mobilized in the construction work, although contractor or NGO will be the subcontractor for the construction and facility/equipment procurement works.
- Design will be finalized in the planning workshop with the agreement of stakeholders, such as the community, DHMT, LCC-DPH, etc.
- Local design standard and local materials utilization were predominantly considered.

(3) Design Element

The following elements were considered for inclusion in the design of the community center.

- water levy collection window/room with furniture
- sub-health center with facility and equipment
- meeting/training room with furniture
- RDC office with furniture
- LCC site office with furniture
- Other miscellaneous accessories (toilet, kitchen, car parking)

A list of necessary elements for the community center in each UUS is summarized below. These were categorized into three types (A, B and C) of community center.

Community Center Design Element by UUS

	Levy collection room	Sub-health center	Meeting/training room	RDC office	LCC site office	Others	Design Type
Bauleni		Health center is existing			existing		B
Chazanga	To be developed by CARE			To be developed by CARE	To be developed by CARE		C
Chibolya	To be developed by CARE			To be developed by CARE	To be developed by CARE		C
Freedom							A
Kalikiliki							A
Ng'ombe		Health center is existing			existing		B

A: Full element type B: Without sub-health center type C: Sub-health center type

(4) Design

The community centers were designed as shown in Figures 9.2.19 to 9.2.22 by design type. The planned location of the community centers was decided by considering the availability of land and accessibility by residents of the community. Community centers' location of Chazanga, Freedom, Kalikiliki, Bauleni, Chibolya, and Ng'ombe are shown in Figure 9.2.15, 16, 17, 23, 24, and 25.

The scale of room, necessary facilities and equipment were designed by referring to the existing examples in UUS of Lusaka such as the George sub-health center, LCC site offices in Bauleni, Kanyama, etc.

Design spec and assumption are summarized below.

- Roof: asbestos concrete roof
- Wall: Mortar with paint coating
- Window: iron frame with burglar bar
- Wall fence: 2.4 m height, metal gate, barbed wire
- VIP toilet
- Assumed water can be supplied by pipeline from outside
- Facility/equipment to be procured for the sub-health center was described in the health education project.

(5) Cost

The development cost of the community centers is estimated at approximately US\$823,000 as shown below. The ‘A’-type center that includes a community center and sub-health center is most costly at US\$187,000, while the ‘B’-type (only community center) is estimated at the lower cost of US\$111,000.

Development Cost of Community Center

(Unit: US\$)

Construction component	Bauleni	Chazanga	Chibolya	Freedom	Kalikiliki	Ng’ombe	Total
	B type	C type	C type	A type	A type	B type	
<input type="checkbox"/> Construction Cost	90,000	70,000	70,000	130,000	130,000	90,000	580,000
Community Center	90,000	0	0			90,000	440,000
Sub-health center	0	70,000	70,000	130,000	130,000	0	140,000
<input type="checkbox"/> Medical equipment	0	20,000	20,000	20,000	20,000	0	80,000
<input type="checkbox"/> Engineering Cost (20% of <input type="checkbox"/>)	18,000	14,000	14,000	26,000	26,000	18,000	116,000
<input type="checkbox"/> Administration Cost (3% of above)	3,200	3,100	3,100	5,300	5,300	3,200	23,200
Subtotal	111,200	107,100	107,100	181,300	181,300	111,200	799,200
Software component							
<input type="checkbox"/> Staff Training cost	0	5,700	5,700	5,700	5,700	0	22,800
<input type="checkbox"/> Administration Cost (3% of above)	0	200	200	200	200	0	800
Subtotal	0	5,900	5,900	5,900	5,900	0	23,600
Total	111,200	113,000	113,000	187,200	187,200	111,200	822,800

(6) Implementation Schedule

All community centers proposed except for Bauleni are proposed to be implemented as the priority project, while the Bauleni community center will be developed in line with the water supply system improvement project by 2010.

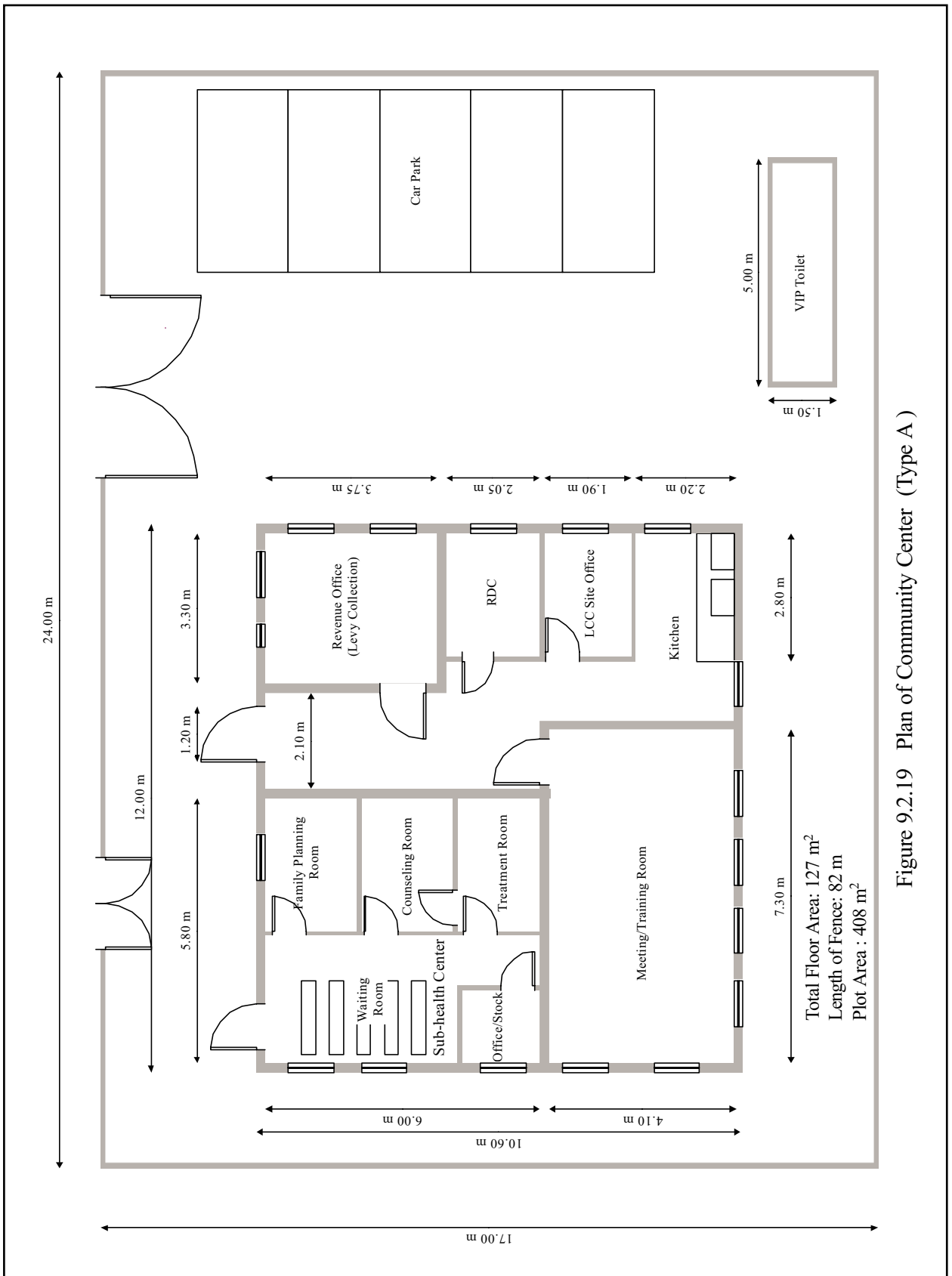


Figure 9.2.19 Plan of Community Center (Type A)

<p>The Study on Environmental Improvement of Unplanned Urban Settlement in Lusaka in the Republic of Zambia</p>	<p>Figure 9.2.19</p>
<p>Japan International Cooperation Agency</p>	<p>Plan of Community Center (Type A)</p>

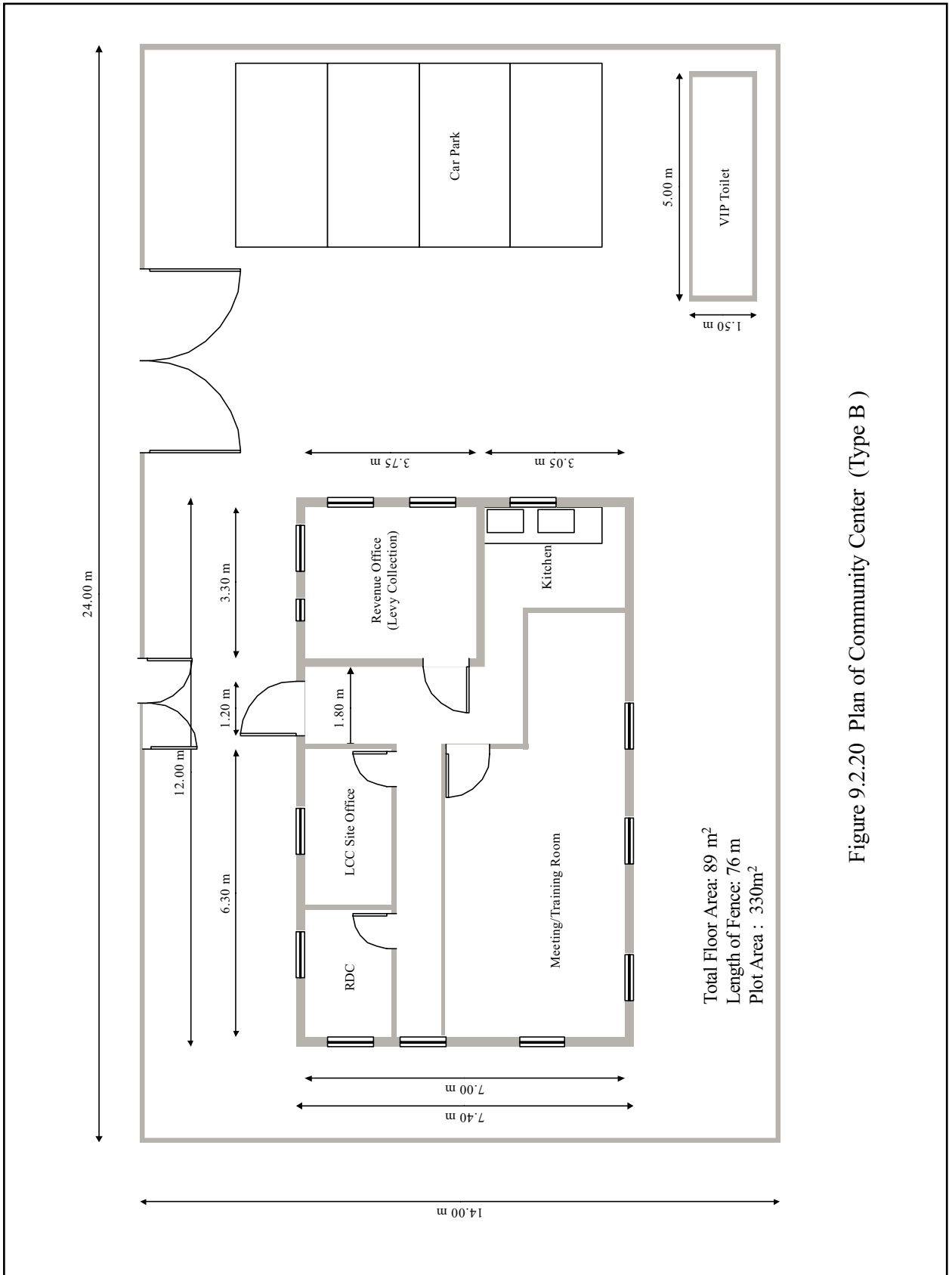
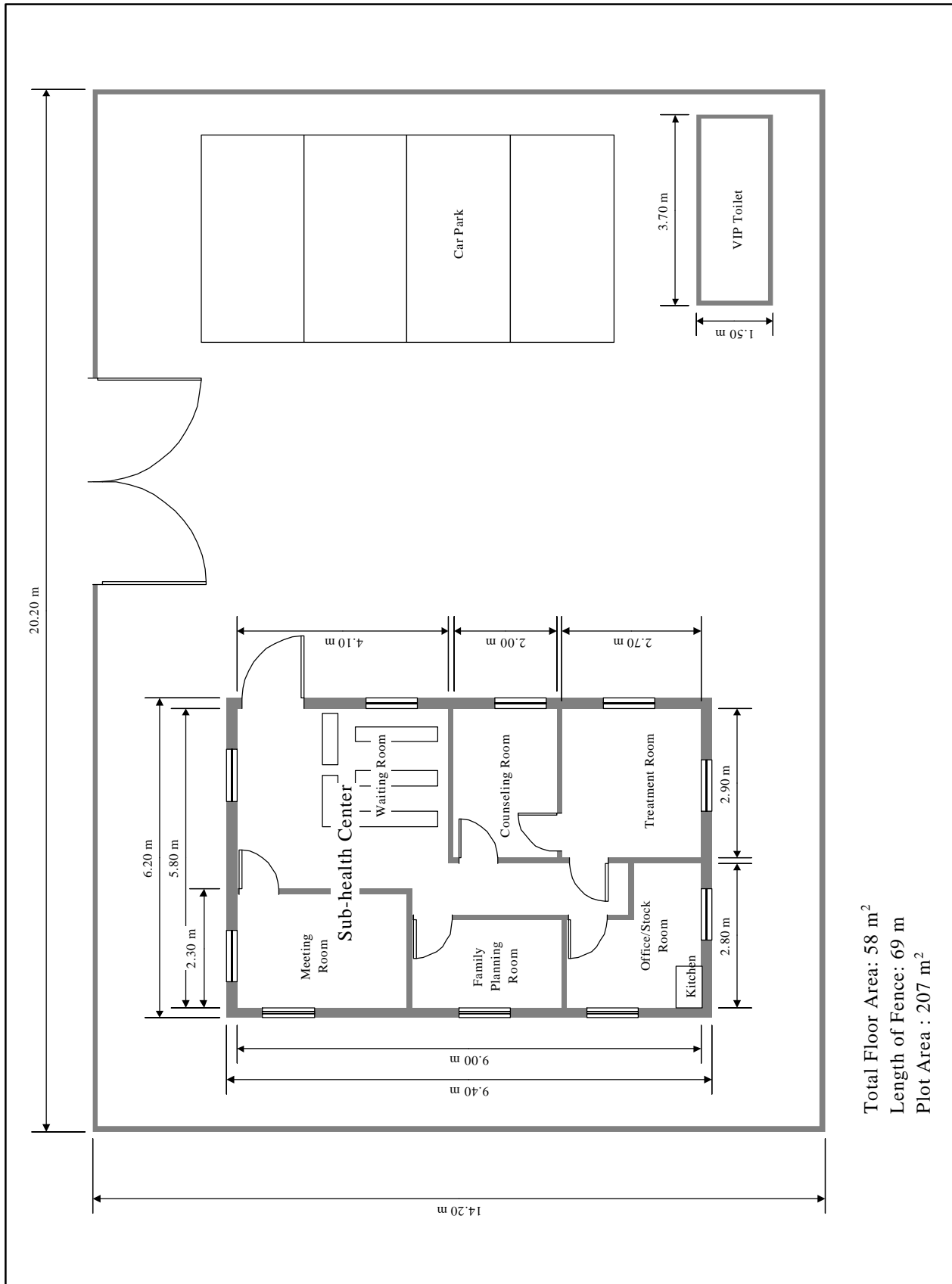


Figure 9.2.20 Plan of Community Center (Type B)

The Study on Environmental Improvement of Unplanned Urban Settlement in Lusaka in the Republic of Zambia

Japan International Cooperation Agency

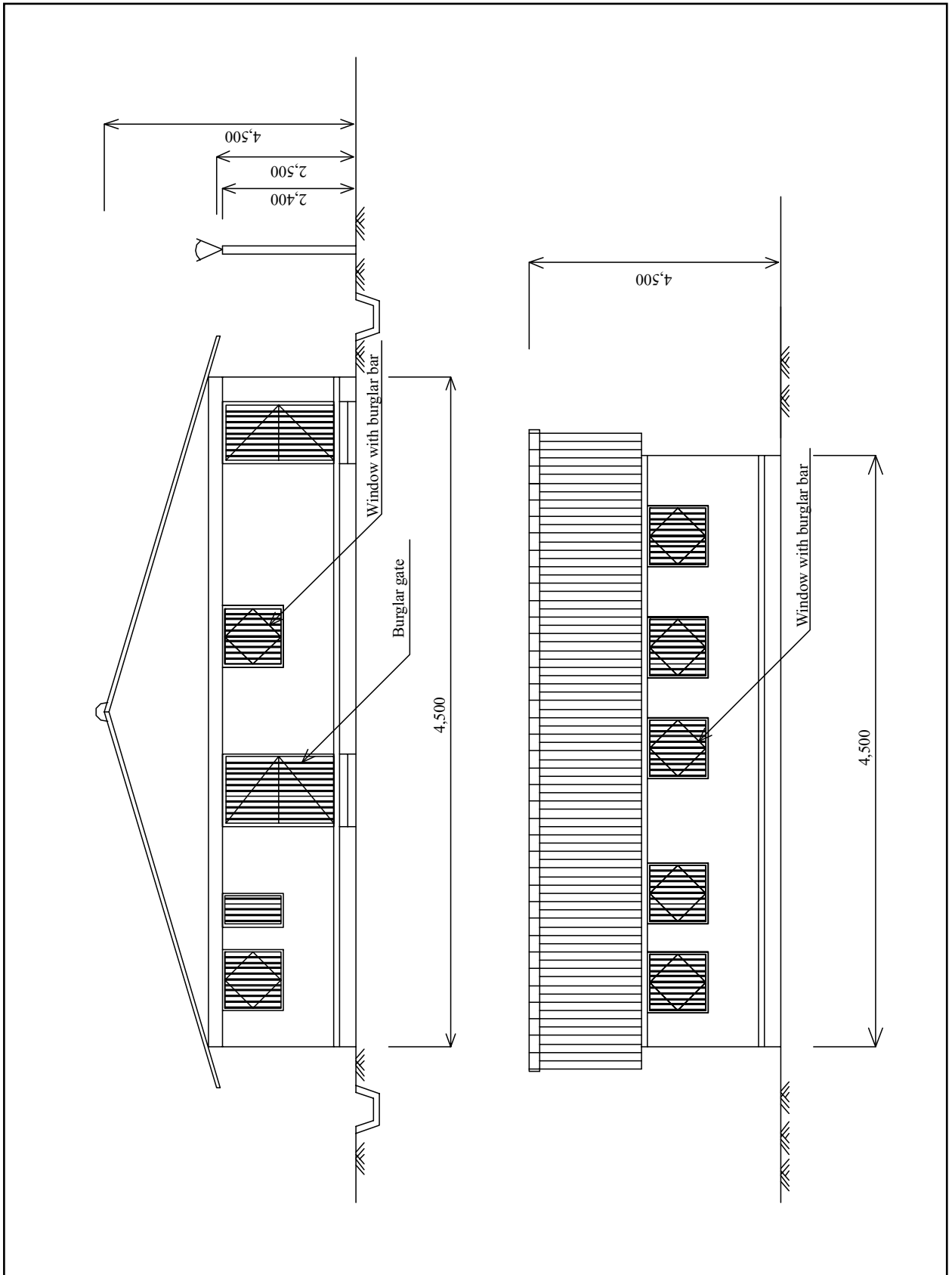
Figure 9.2.20
 Plan of Community Center (Type B)



The Study on Environmental Improvement of Unplanned Urban Settlements in Lusaka in the Republic of Zambia

Japan International Cooperation Agency

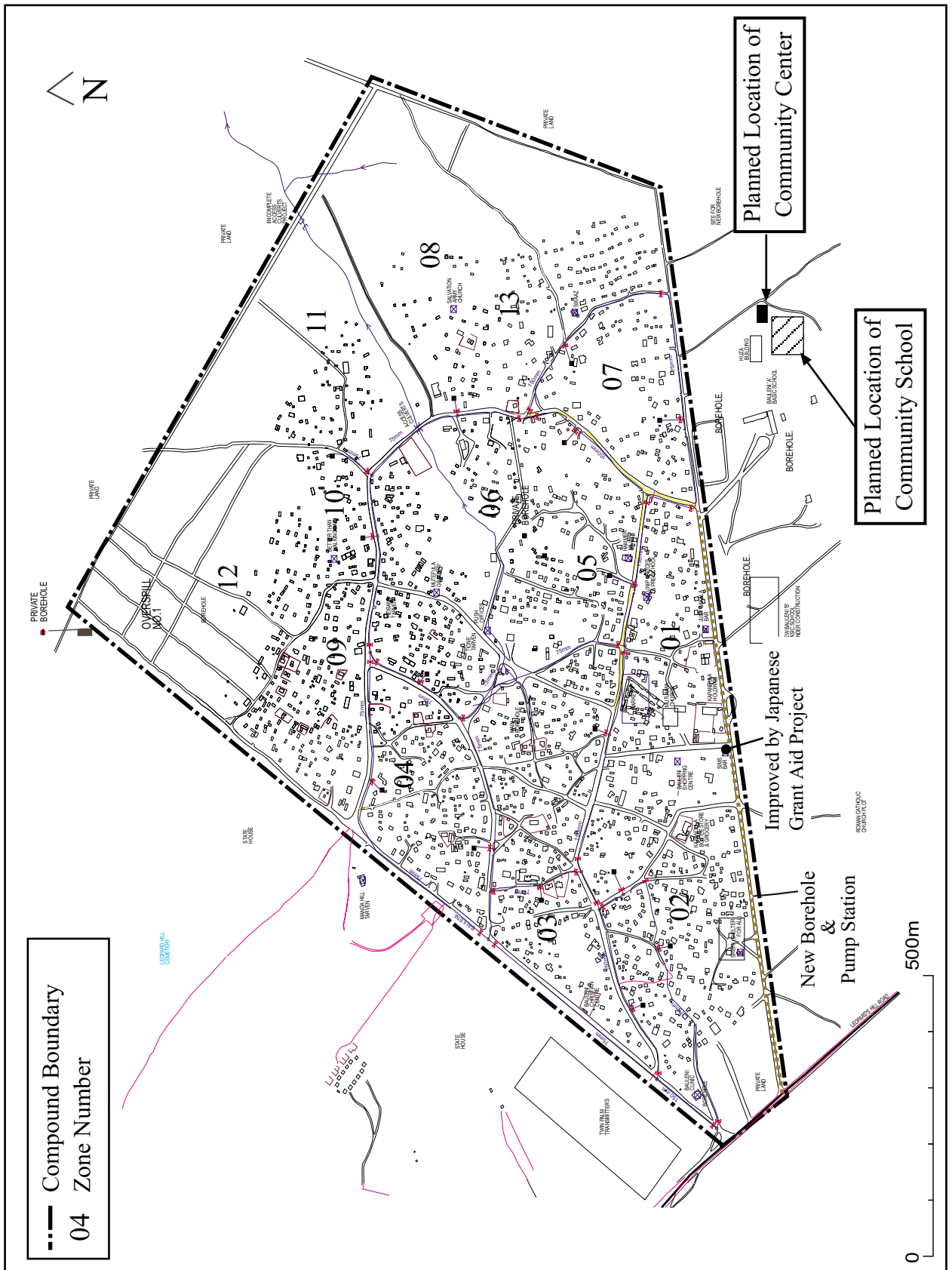
Figure 9.2.21
Plan of Community Center
(Type C)



The Study on Environmental Improvement of Unplanned Urban Settlement in Lusaka in the Republic of Zambia

Japan International Cooperation Agency

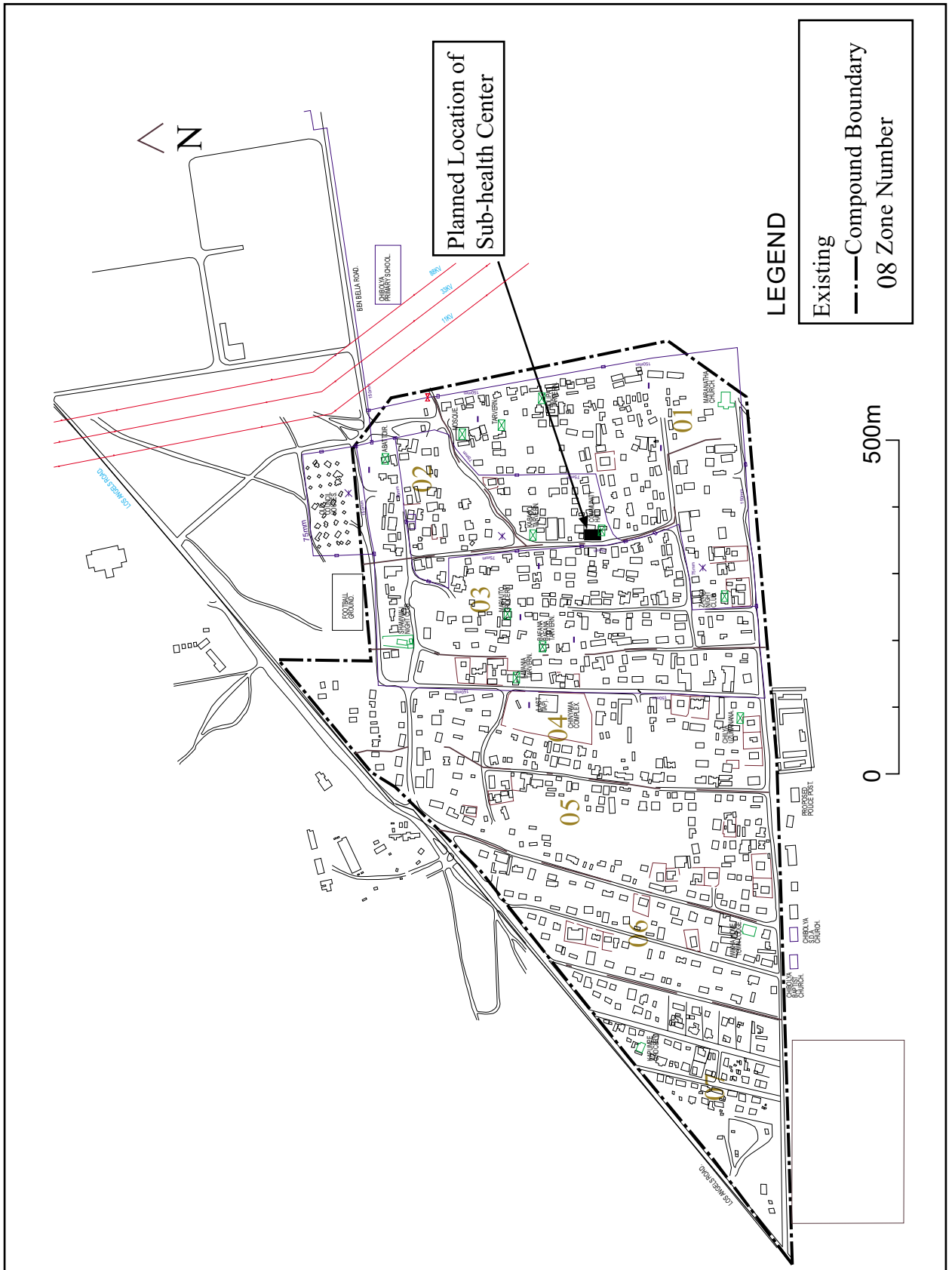
Figure 9.2.22
 Typical Elevation of
 Community Center (Type A)



The Study on Environmental Improvement of Unplanned Urban Settlement in Lusaka in the Republic of Zambia

Japan International Cooperation Agency

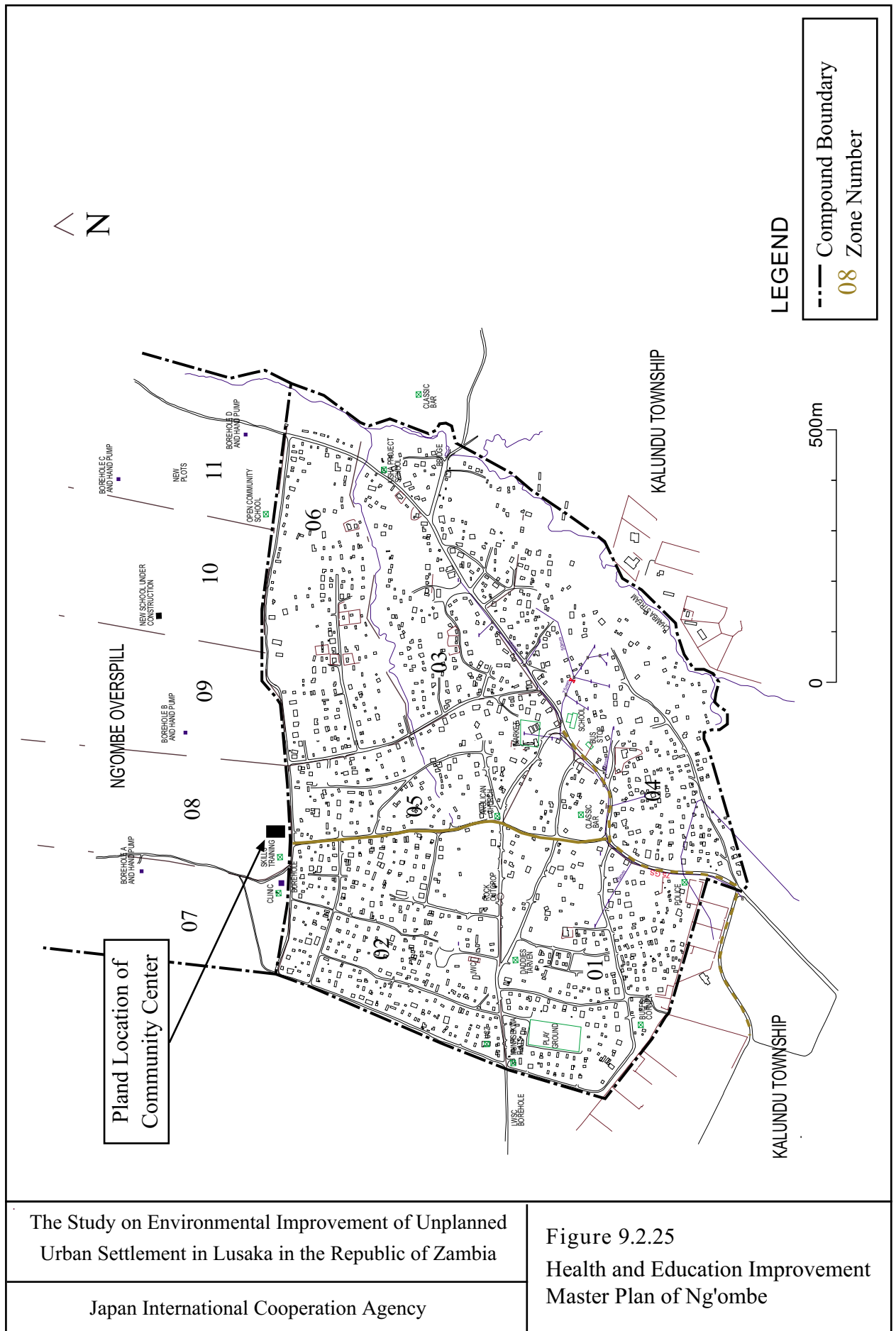
Figure 9.2.23
Health and Education Improvement Master Plan of Bauleni



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Figure 9.2.24
Health and Education Improvement Master Plan of Chibolya



The Study on Environmental Improvement of Unplanned Urban Settlement in Lusaka in the Republic of Zambia

Japan International Cooperation Agency

Figure 9.2.25
Health and Education Improvement Master Plan of Ng'ombe

9.3 Development Cost of Priority Project

(1) Preconditions

The development cost of the priority projects to be implemented in the short term is estimated on the basis of the following preconditions.

(a) Currency for cost estimation and exchange rate

All the cost should be made in US dollar. The exchange rate applied in the estimate is US\$1.0 = Kwacha 3,700, US\$1.0 = Japanese Yen 115 (as of March, 2001).

(b) Applied current prices

Prices are estimated as of March 2001.

(c) Structure of construction cost

The construction cost will cover the preparation work, main works, engineering service cost, physical contingency and price escalation contingency.

(d) Import duty and value added tax

Import duty and value added tax on materials, machinery and equipment are assumed to be exempted and excluded from the cost estimation.

(e) Engineering service expense

The engineering service expense is estimated in proportion to the direct construction cost. The basic and detailed design, and supervision work are estimated at 20% in total of direct construction cost.

(f) Physical and price contingency

The physical contingency is estimated at 5% of the direct construction cost and engineering service expenses. The price contingency is estimated on the basis of price escalation at the rate of 3% per annum.

(g) Soft component cost

Costs for community mobilization such as CAP workshop operation and community training are estimated in the community capacity building cost.

(2) Estimation of Development Cost

The total development cost for the priority project of eight UUSs to be implemented is estimated at approximately US\$ 17.39 million. The cost by

phase of development is estimated at US\$7.57 million for Phase 1 and US\$9.82 million for Phase 2 as summarized in the following table.

Summary of Priority Projects Cost for Short Term Development

(unit: US\$1,000)

Phase	Item	Water Supply System	Health/ Hygiene Education	VIP Toilet	Community School	Garbage Disposal	Community Center	Total
Phase 1 (2002-2004)	1 Development Cost	4,583	317	456	309	20	224	5,909
	2 Community capacity building							834
	3 Contingency							825
	4 Sub total							7,568
Phase 2 (2005-2007)	1 Development Cost	5,032	253	1,298	71	39	487	7,180
	2 Community capacity building							834
	3 Contingency							1,810
	4 Sub total							9,824
Total								17,392

Note: Community center includes water levy collection room, sub-health center, etc.

Physical contingency as well as price contingency are included in the contingency cost.

Operation and Maintenance cost is not included.

Source: JST

Detailed cost by UUS and sector is shown below.

Summary of Priority Projects Cost for Phase 1 Development

(unit: US\$1,000)

Item	Water Supply System	Health/ Hygiene Education	VIP Toilet	Community School	Garbage Disposal	Community Center	Total
I Development Cost	4,583	317	456	309	20	224	5,909
1) Bauleni	369	37					406
2) Chainda		105	138	82	20		345
3) Chazanga				81			81
4) Chibolya		37		81		113	231
5) Freedom							
6) Kalikiliki				65			65
7) Ng'ombe	4,214	101	318			111	4,744
8) Old Kanyama		37					37
II Community capacity building							834
III Physical Contingency							337
IV Price Contingency							488
V Total							7,568

Note: Construction cost, engineering cost, administration cost are included in the development cost.

Cost for cap workshop and community training are inclusive in Community capacity building cost

Operation and Maintenance cost is not included.

Source: JST

Summary of Priority Projects Cost for Phase 2 Development

(unit: US\$1,000)

Item	Water Supply System	Health/ Hygiene Education	VIP Toilet	Community School	Garbage Disposal	Community Center	Total
I Development Cost	5,032	253	1,298	71	39	487	7,180
1) Bauleni				71			71
2) Chainda							
3) Chazanga		105	208			113	426
4) Chibolya			346				346
5) Freedom	2,236	74	98		20	187	2,615
6) Kalikiliki	2,796	74	108		19	187	3,184
7) Ng'ombe							
8) Old Kanyama			538				538
II Community capacity building							834
III Physical Contingency							401
IV Price Contingency							1,410
V Total							9,824

Note: Construction cost, engineering cost, administration cost are included in the development cost.

Cost for cap workshop and community training are inclusive in Community capacity building cost

Operation and Maintenance cost is not included.

Source: JST

9.4 Institutional Improvement Plan

In the course of the implementation of the pilot project, the Peri-urban section of Housing Department, LCC has worked out effectively and efficiently. Planning of the pilot projects, workshop operation with community, monitoring of pilot projects' implementation and evaluation after the completion had been successfully carried out through the cooperation with the Peri-urban section. Departments of Engineering, Public Health, and Planning were also contributory to the success of pilot projects of the road improvement, hygiene education, and community school.

In the same manner, LCC should play key role in the realization of the action area plan and be a counterpart organization who can participate in the implementation work of the priority projects, as explained in 9.6.

Despite the remarkable achievement of relevant departments of LCC and expected role for the realization of the action area plan, several institutional improvements should be proposed to cope with the considerable work of the action area plan implementation.

Further, considering that LCC has the responsibility for supervision of the community organization of UUS, LCC should supervise the community to keep transparent management concerning developed projects.

In this regard, the institutional capability improvement and strengthening methods of LCC is discussed hereunder for the purpose of the implementation of the action area plan and sustainability of the developed projects.

(1) Organization Strengthening

1) Enhancement of peri-urban section

The Peri-urban section is responsible for the development of UUS in Lusaka City. Staff organization with one assistant director and five core staff (Community Development Officers - CDO) as shown below is insufficient to manage the additional projects of action area plan. If the projects of the action area plan start, the assistant director as well as core staff will be concentrated into the projects with working for workshop meeting, monitoring of the progress, etc. and may forget the daily business. In this regard, distribution of staff to UUS should be made properly in order to implement the action area plan smoothly. New assignment of temporary staff or rearrangement of staff assignment will be necessary.

Present Distribution of Peri-urban Section Staff (June 1999)

CDO Staff	Responsible UUS	
	Number of UUS	Name of UUS
No.1	8	George, Chunga, Lilanda, Kanyama, Chibolya, Chinika, Emmasdale/Matero
No.2	7	Chaisa, Chipata, Garden, Kabanana, Marrapodi/Mandevu, Chazanga
No.3	4	Kalingalinga, Mtendere, Kalikiliki, Kaunda Square
No.4	5	Chawama, Jack, Bauleni, Linda, Kabwata
No.5	3	Chainda, Kamanga, Ng'ombe

Source: LCC, Housing and Social Services

2) Institutional building of EHTs (Environmental Health Technician)

LCC now has only five Health Inspectors (HIs) who are engaged in desk work and no field-based Environmental Health Technicians (EHTs). Since March 1998, due to financial constraints, eight EHTs were seconded from LCC-DPH to DHMT (District Health Management Team) and assigned to the government 1st referral health centres² to work at the field level. Each EHT covers one catchment area, which includes approximately five or six settlements. Performances of EHTs are currently monitored and supervised directly by an officer (EHT Supervisor) of DHMT (as described in the figure below) and EHT supervisor coordinate these two organizations (LCC and DHMT).

² Under the Health Reform in 1994, curative and some preventative services were separated from the LCC, Department of Public Health (LCC-DPH) to the District Health Management Team (DHMT), leaving only a few preventive services (such as residential spraying, distraction of mosquito breeding grounds and solid waste collection from primary collection point) to the LCC.

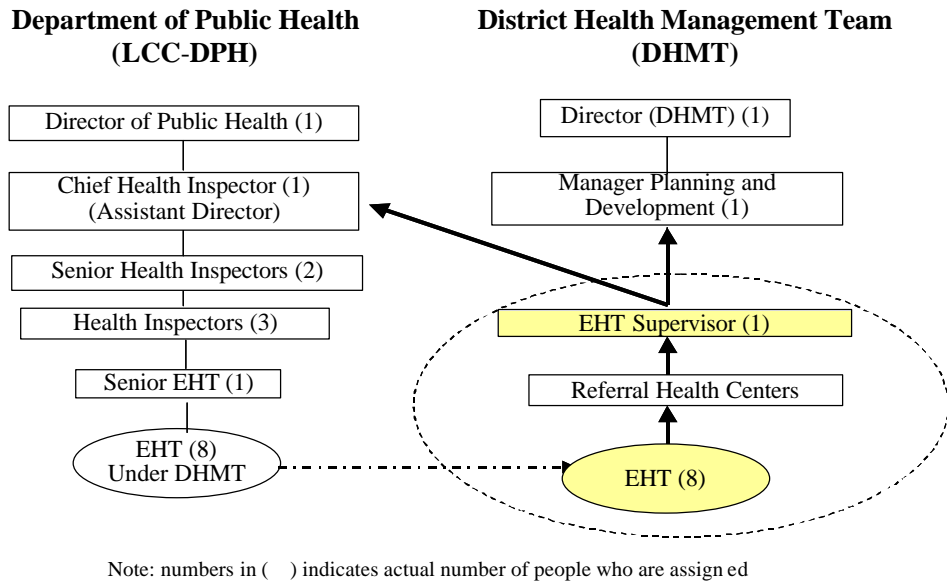


Figure 9.4.1 EHTs' Position in DHMT and LCC-DPH Organ Grams

In the pilot project, JST worked closely with an LCC-DPH (Department of Public Health) health inspector whose major responsibility was not sanitation but nutrition. Although two EHTs in the pilot area were somewhat involved in the activities, most of the community work (identification, planning, training, monitoring, implementation and evaluation) was conducted by the subcontractor, NGO. In realization of Action Area Plan, in which hygiene and sanitation improvement component shall be the major component, EHTs should be involved fully from the beginning of the project so that the effectiveness and sustainability of the projects are ensured. EHTs' knowledge and skills on sanitation are proved to be high but they are not well trained for participatory methods for promoting hygiene behaviour, sanitation improvements and community management of health, hygiene and sanitation projects. In this regard, the project shall include training for those EHTs to acquire knowledge and skills for participatory health and hygiene project cycle management (problem identification, planning, monitoring and evaluation) as well as refreshing their technical (Environmental Health) knowledge and skills so that they will in turn be able to work as an facilitator and implementation body of the project without receiving much assistance from NGO.

(2) Manpower Enhancement

1) Recruitment of water service staff

LCC does not have a water-supply and sewerage department. These are the most urgent and basic needs of the community, and Lusaka Water and Sewerage Company is taking responsibility for the water management in UUS of Lusaka City. However, it was discovered that LWSC does not work sufficiently in the pilot projects' implementation. Even in the community training concerning the engineering skill, water quality monitoring skill, LWSC's performance was evaluated as insufficient. Considering that LWSC is a private company, since privatization in 1990, JST supposes that public service for low-income area is rather difficult for LWSC.

In case of the action area plan realization, in which water supply improvement will be the major component with numerous works, the full assistance of water engineers is necessary. A new water engineer should be stationed in the Peri-urban section or in Engineering Department to substitute the LWSC's poor performance.

In addition to the engineering aspect, management skill of water system is also crucial. Specialists in water supply management techniques shall be recruited for the water project management.

2) Recruitment of community school staff

Although the Ministry of Education (MOE) exclusively handles education matters in Zambia, it is desirable that staff concerning development, management, and operation of the community school in Lusaka City be appointed by LCC. The staff for the community school will implement the action area plan with the cooperation of MOE.

MOE takes responsibility for the policy matter such as the role of community school in UUS, coordination with regular schools, training of teachers, setup of education goal and curriculum development, while LCC shall supervise the development of community school and assist the community and PTA for operation and management.

Staff will belong to the Peri-urban section of Housing Department.

(3) Regularization of Partnership Forum

To strengthen the partnership between the donors, NGOs, relevant Ministries and LCC, policy dialogue and aid work sharing and cooperation method have being

discussed in the Partnership Forum. The partnership forum was commenced from 1999 chaired by the LCC Town Clerk with the cooperation of MLGH, however, the expected outcomes have not yet been satisfactorily attained due to the time constraints of members.

For the implementation of action area plan, effective functioning of the forum is important. Namely, avoiding the duplication, sharing of role and job, work collaboration, cost sharing, standardization of operation and management, etc. shall be taken through the meeting of the forum.

The following are propositions to strengthen the forum.

- Frequent and regular holding of forum
- Participation from every major international NGOs
- Incentives for participating NGOs: maximum cooperation to dissolve constraints for NGO activity

Sensitization to the community that participating NGOs in the forum is recommendable to collaborate.

(4) Financial Management

LCC shall take the following measures to improve its financial status and social services.

1) Strict budget management

Taxes comprising Rates (Property Tax) and Personal Tax are the main fiscal sources for LCC to manage and implement its expenditure budget. Besides, Salary and Wage bills for the employees share the single largest portion of the whole expenditure. Due to a shortage of revenue and stricter cash budget management, LCC is forced to delay the payment to the civil servants, which is obviously creating significant problems in the area of unreliable basic social services delivery and even deteriorating Tax and Dues collection powers. Therefore, LCC shall conduct strict budget management in terms of both the revenue and expenditure sides.

2) Updating rateable value

Taking account of the high inflation since 1995, over 25% annually, the property value deems unrealistic. Under the financial assistance from World Bank and USAID, LCC is trying to update the value base of the rateable properties (land and building) for the Rates. It is necessary to strengthen the City revenue base in relation to Rates.

3) Retrenchment of LCC staff

In order to improve LCC's financial status after stoppage of the budgetary support from the Central Government, LCC has tried to reduce the number of staff. LCC shall make efforts to encourage retrenchment of staff. Also, LCC shall consider the adverse effects on its capacity to deliver its legitimate services to the citizen without sufficient staffing.

4) Strengthening secured revenue base

The most urgent task of LCC would be strengthening its secured revenue base, particularly those from Rates and Rents. LCC has organized Rates collection teams, which achieved a certain success in FY2000, but it is not sufficient to keep up with provision of delivery of the City's basic social services. It is urgent for LCC to update the rateable value to realistic and practicable level and to fully cover the rateable property without leakage of legitimate properties liable to Rates, and to properly enforce the Rating Act, coupled with good governance and professional civil servants.

9.5 Financial and Socio-economic Evaluation

9.5.1 Financial Evaluation

In this sub-section, financial evaluation is focused on the water supply projects in Ng'ombe, Freedom and Kalikiliki, which are generally considered to be profitable. The other projects such as health / hygiene education, VIP toilet construction, community school construction, garbage disposal and community center construction, shall be developed as social service, because they are considered to be non-profitable and of high public benefit for the communities of the UUS.

Generally, the financial evaluation aims at assessing the financial viability of investment in the projects. Taking into account that the planned water supply projects shall be developed in the unplanned urban settlements by means of community participation, they are easily imagined to be non-profitable if initial investment cost is considered. Therefore, firstly, the condition of break-even point of revenues and expenses/cost was analyzed by including the initial investment cost. Secondly, the financial viability was evaluated on the basis of cost recovery concepts of O&M cost and replacement cost of water supply facilities exclusive of the initial investment cost.

(1) Concept of Financial Evaluation

The water supply projects were evaluated in terms of “Financial Internal Rate of Return (FIRR)” based on the cash-flow streams of revenues and expenses/costs. The internal rate of return is the discount rate at which the present value of cash inflow is equal to the present value of cash outflow. In other words, it is the discount rate at which the present value of the net receipts from the projects is equal to the present value of investments. All inputs and outputs were valued at the market (current prices). The financial revenues consisted of collection fees for registration and water tariff. The financial costs were composed of the initial investment cost (mainly construction cost) of water supply facilities, O&M cost and replacement cost of the facilities and equipment.

The initial investment cost for the water supply projects is supposed to be financed through grant aid and/or counter value fund, etc. The financial viability is evaluated on the basis of cash-flow analysis considering price escalation.

The evaluation period is set at 20 years after installation of the water supply facilities taking into account their economic life.

(2) Preconditions for Financial Analysis

1) Construction cost

The cost is inclusive of direct construction cost as a major financial outflow from the viewpoint of the projects.

2) O&M cost

As described in section 9.2.1, The O&M cost, which consists of remuneration of administrative staff, electricity charges for pump operation and maintenance of facilities, is estimated at 11,597 (US\$/year) in Ng'ombe, 3,865 (US\$/year) in Freedom, and 4,997 (US\$/year) in Kalikiliki,.

3) Replacement cost

As described in section 9.2.1, it is assumed that mechanical equipment such as submersible pump, booster pump, injection pump and chlorine generator will be replaced after 10 years from installation. The replacement cost of is estimated at 105,000 (US\$) in Ng'ombe, 45,000 (US\$) in Freedom, and 45,000 (US\$) in Kalikiliki, respectively.

4) Land acquisition cost

The land in unplanned urban settlements is owned by the State. Therefore, it is assumed that any land acquisition cost will not be generated in the analysis.

5) Taxation

Generally, several taxes such as import duties and value-added tax, etc. in association with the transactions during the period of construction are supposed to be imposed on the developers. In the Study, however, they are assumed to be subject to tax exemption, since the developers will be MLGH and/or LCC.

6) Revenues for registration fee and water tariff

As described in section 9.2.1, it is assumed that the basic registration fee and water tariff are to be set at 5,000 (Kwacha/household/year) and 3,000 (Kwacha/household/month), respectively, considering the pilot projects and the similar projects in other settlements.

7) Escalation

All the costs and revenues are assumed to escalate at an annual rate of 3%.

(3) Results of Financial Analysis

Financial Internal Rate of Return (FIRR)

Under the preconditions mentioned above, the FIRRs for the three water projects could not be computed due to the low benefits, as shown in Table 9.5.1 for the sample of Ng'ombe. This indicates that the water supply projects in these three settlements are not profitable if the initial investment cost is considered. This is as was expected.

The conditions of break-even point of revenues and expenses/cost were analyzed and are shown below. For reference, the sample of Ng'ombe water supply system project under the water levy condition of 8,500 (Kwacha /household/month) is shown in Table 9.5.2.

Conditions of Break-even Point of Revenues and Expenses/Cost

Conditions	Water Tariff (K/household/month)	Annual Increasing Ratio of Water Tariff (%)	FIRR (%)
1. Ng'ombe	8,500	-	0.03
	-	9	0.06
2. Freedom	40,000	-	0.95
	-	25	3.12
3. Kalikiliki	30,000	-	1.99
	-	22	3.24

However, the above conditions for break- even point are not realistic and comprehensive for the community. Therefore, it is necessary for investment at the initial stage to be financed by grant aid and/or counter value fund.

Financial Viability for O&M

The financial viability for O&M is evaluated on the basis of cash flow analysis (table of statements) considering price escalation.

The table of statement for Ng'ombe in the basic case such as the preconditions of 5,000 (Kwacha/household/month) and 3,000 (Kwacha/household/month) is shown in Table 9.5.3. As the statement shows in the column of cumulative net cash flow, it is expected that there will be no years of deficit. For the other two settlements, the same results can be derived based on similar analysis. This means that operation of the projects by the community in each of three settlements can financially cover the O&M cost and replacement cost.

The marginal collection ratio of water tariff for financial viability is summarized below and is 32% for Ng'ombe, 72% for Freedom and 32% for Kalikiliki. For reference, the Ng'ombe case is shown in Table 9.5.4.

	Marginal Collection Ratio for Financial Viability (%)
Ng'ombe	32
Freedom	72
Kalikiliki	32

**Table 9.5.1 Financial Cost and Benefit Flow and FIRR
(Ng'ombe Water Supply Project)**

FIRR= #DIV/0!		(at 2001 constant price)						
	Development Cost (US\$)	O&M Cost for Water Supply (US\$)	Replacement Cost of Equipment (US\$)	Cost Total (US\$)	Registered Fee (US\$)	Water Fee (US\$)	Revenue Total (US\$)	Balance (US\$)
2,001				0			0	0
2,002	301,350			301,350			0	-301,350
2,003	1,971,900			1,971,900			0	-1,971,900
2,004	2,151,450			2,151,450			0	-2,151,450
2,005		11,597		11,597	6,486	46,703	53,189	41,592
2,006		11,597		11,597	7,015	50,506	57,521	45,924
2,007		11,597		11,597	7,586	54,620	62,206	50,609
2,008		11,597		11,597	8,204	59,068	67,272	55,675
2,009		11,597		11,597	8,872	63,879	72,751	61,154
2,010		11,597		11,597	9,595	69,081	78,676	67,079
2,011		11,597		11,597	9,985	71,894	81,879	70,282
2,012		11,597		11,597	10,392	74,822	85,214	73,617
2,013		11,597		11,597	10,815	77,869	88,684	77,087
2,014		11,597	105,000	116,597	11,255	81,040	92,295	-24,302
2,015		11,597		11,597	11,714	84,340	96,053	84,456
2,016		11,597		11,597	12,191	87,774	99,965	88,368
2,017		11,597		11,597	12,687	91,348	104,035	92,438
2,018		11,597		11,597	13,204	95,068	108,272	96,675
2,019		11,597		11,597	13,742	98,939	112,681	101,084
2,020		11,597		11,597	14,301	102,968	117,269	105,672
2,021		11,597		11,597	14,592	105,065	119,657	108,060
2,022		11,597		11,597	14,889	107,204	122,093	110,496
2,023		11,597		11,597	15,193	109,387	124,579	112,982
2,024		11,597	105,000	116,597	15,502	111,614	127,116	10,519
Total		231,940	210,000	4,866,640	228,220	1,643,187	1,871,407	-2,995,233

FIRR= #DIV/0!

Table 9.5.2 Financial Cost and Benefit Flow and FIRR (Ng'ombe Water Supply Project)

FIRR= 0.03% (at 2001 constant price)

	Development Cost (US\$)	O&M Cost for Water Supply (US\$)	Replacement Cost of Equipment (US\$)	Cost Total (US\$)	Registered Fee (US\$)	Water Fee (US\$)	Revenue Total (US\$)	Balance (US\$)
2,001				0			0	0
2,002	301,350			301,350			0	-301,350
2,003	1,971,900			1,971,900			0	-1,971,900
2,004	2,151,450			2,151,450			0	-2,151,450
2,005		11,597		11,597	6,486	132,324	138,811	127,214
2,006		11,597		11,597	7,015	143,101	150,116	138,519
2,007		11,597		11,597	7,586	154,756	162,342	150,745
2,008		11,597		11,597	8,204	167,359	175,563	163,966
2,009		11,597		11,597	8,872	180,989	189,862	178,265
2,010		11,597		11,597	9,595	195,730	205,324	193,727
2,011		11,597		11,597	9,985	203,700	213,685	202,088
2,012		11,597		11,597	10,392	211,995	222,387	210,790
2,013		11,597		11,597	10,815	220,628	231,443	219,846
2,014		11,597	105,000	116,597	11,255	229,612	240,867	124,270
2,015		11,597		11,597	11,714	238,962	250,676	239,079
2,016		11,597		11,597	12,191	248,693	260,884	249,287
2,017		11,597		11,597	12,687	258,820	271,507	259,910
2,018		11,597		11,597	13,204	269,359	282,563	270,966
2,019		11,597		11,597	13,742	280,328	294,070	282,473
2,020		11,597		11,597	14,301	291,743	306,044	294,447
2,021		11,597		11,597	14,592	297,683	312,276	300,679
2,022		11,597		11,597	14,889	303,744	318,634	307,037
2,023		11,597		11,597	15,193	309,929	325,121	313,524
2,024		11,597	105,000	116,597	15,502	316,239	331,741	215,144
Total		231,940	210,000	4,866,640	228,220	4,655,696	4,883,916	17,276

FIRR= 0.03%

Table 9.5.3 Cash Flow Analysis (Ng'ombe Water Supply Project)

Collection Ratio of Tariff	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	
	(Unit: US\$)																								
Cash Inflow																									
(1) Registered Fee				7,301	8,132	9,056	10,090	11,239	12,519	13,919	14,385	15,420	16,529	17,716	18,993	20,339	21,824	23,394	25,077	26,835	27,699	29,111	30,594		
(2) Collection Fee for Water Tariff				52,564	58,551	65,219	72,646	80,920	90,135	96,620	103,571	111,022	119,009	127,571	136,749	146,567	157,133	168,438	180,555	189,750	199,431	209,596	220,260		
Cash Outflow																									
(1) O&M Cost for Water Supply				13,083	13,444	13,847	14,293	14,691	15,131	15,585	16,053	16,535	17,031	17,542	18,068	18,610	19,166	19,743	20,335	20,945	21,574	22,221	22,888		
(2) Replacement Cost of Equipment				0	0	0	0	0	0	0	0	0	0	154,196	0	0	0	0	0	0	0	0	0	207,227	
Net Cashflow				46,812	53,239	60,429	68,473	77,468	87,522	94,454	101,903	109,907	-35,686	127,748	137,674	148,337	159,789	172,089	185,297	195,168	205,536	216,486	226,700		
Cumulative Net Cashflow				46,812	100,051	160,480	228,953	306,421	393,944	488,397	590,300	700,297	664,519	792,267	929,941	1,078,277	1,238,066	1,410,155	1,595,452	1,796,621	1,996,176	2,212,662	2,433,422		

Table 9.5.4 Cash Flow Analysis (Ng'ombe Water Supply Project)

Collection Rate of Tariff	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Cash Inflow																								
(1) Registered Fee				2,336	2,602	2,899	3,229	3,596	4,006	4,294	4,603	4,934	5,289	5,670	6,078	6,515	6,984	7,466	8,025	8,414	8,864	9,315	9,790	
(2) Collection Fee for Water Tariff				16,621	18,736	20,870	23,247	25,894	28,843	30,918	33,143	35,527	38,083	40,823	43,760	46,908	50,283	53,900	57,778	60,723	63,818	67,071	70,489	
Cash Outflow																								
(1) O&M Cost for Water Supply				13,083	13,444	13,847	14,283	14,691	15,131	15,585	16,053	16,535	17,031	17,542	18,068	18,610	19,166	19,743	20,335	20,945	21,574	22,221	22,888	
(2) Replacement Cost of Equipment				0	0	0	0	0	0	0	0	0	154,196	0	0	0	0	0	0	0	0	0	0	207,327
Net Cashflow				6,104	7,894	9,921	12,213	14,600	17,718	19,627	21,693	23,927	-127,854	28,991	31,770	34,813	38,096	41,643	45,467	48,211	51,108	54,165	-149,835	
Cumulative Net Cashflow				6,104	13,999	23,920	36,132	50,932	68,650	88,277	109,970	133,897	6,043	34,994	66,763	101,576	139,675	181,318	226,785	274,996	326,103	380,268	230,434	

32 (N)

(Unit: US\$)

9.5.2 Socio-economic Evaluation

(1) Characteristics of Socio-economic Impacts/Effects

The projects will generate many economic impacts/effects, which will induce not only environmental improvement but also socio-economic conditions upgrading in the UUSs of Lusaka.

The characteristics of socio-economic impacts/effects are summarized below.

There are short-term and long-term impacts/effects.

There may be lower economic impacts due mainly to the small-scale of projects in the limited target area of the UUSs, compared with the conventional infrastructure development serving the entire city.

Therefore, social impact will be significant if the living conditions of UUSs in the Capital City was drastically improved. Upgrading of community living standard will induce a social stability of compounds as well as Lusaka.

It should be recognized that the development projects of the action area plans are indispensable for low-income residents in the UUSs to ensure civil-minimum social/public services and projects despite the results of economic feasibility/impact.

Assessment of social impacts/effects in monetary value is limited to a few items.

The socio-economic impacts/effects of the projects of the action area plan are assessed on both qualitative and quantitative terms hereinafter.

(2) Socio-economic Impacts/Effects

The socio-economic impacts/effects can be analyzed by comparing the situation for no implementation of development projects (“Without Project”) with the situation after implementation of the development projects (“With Project”). Both short and long term impacts/effects are summarized by each project below.

1) Water Supply System Improvement Projects in Ng’ombe, Freedom and Kalikiliki

The water supply projects in Ng’ombe, Freedom and Kalikiliki and will generate the socio-economic impacts/effects shown below.

Socio-economic Impacts by Water Supply System Improvement Projects

Short term Impacts/Effects			Long term Impacts/Effects		
	Socio-economic Impacts/Effects	Beneficiary		Socio-economic Impacts/Effects	Beneficiary
1	Sales revenue of water	Water Committee	1	Availability of sustainable O&M of water supply system	Water committee and residents
2	Increase of production activities time caused by reduction of drawing water time	Residents	2	Reduction of disease	Residents
3	Ensuring purified water	Residents	3	<ul style="list-style-type: none"> • Contribution to upgrading consciousness for sustainable O&M • Increasing land value 	Residents
4	Facilitation of knowledge and skill on pipe installation (by community participation)	Residents			

2) Health education projects in eight UUS

The health education projects in eight UUS will generate the socio-economic impacts/effects as shown below.

Socio-economic Impacts by Health Education Projects

Short term Impacts/Effects			Long term Impacts/Effects		
	Socio-economic Impacts/Effects	Beneficiary		Socio-economic Impacts/Effects	Beneficiary
1	Improvement of knowledge and skills on health and sanitation	Trainees and residents	1	Contribution to disease prevention	Residents
2	Promoting health and sanitation behavior change	Residents	2	Reduction of medical expenditure	Residents

3) VIP toilet development programs in eight UUS

The VIP toilet development programs in eight UUS will generate the socio-economic impacts/effects shown below.

Socio-economic Impacts by VIP Toilet Projects

Short term Impacts/Effects			Long term Impacts/Effects		
	Socio-economic Impacts/Effects	Beneficiary		Socio-economic Impacts/Effects	Beneficiary
1	Improvement of sanitary conditions in the settlements	Residents	1	Contribution to disease prevention	Residents
2	Improvement of knowledge and skill on toilet construction (by community participation)	Residents	2	Reduction of medical expenditure	Residents
3	Create job opportunities (bricklaying and safe and sanitary latrine construction skills)	Residents			

- 4) Community school development projects in Bauleni, Chainda, Chazanga, Freedom and Kalikiliki

The community school development projects in Bauleni, Chainda, Chazanga, Freedom and Kalikiliki will generate the socio-economic impacts/effects as shown below.

Socio-economic Impacts by Community School Development Projects

Short term Impacts/Effects			Long term Impacts/Effects		
	Socio-economic Impacts/Effects	Beneficiary		Socio-economic Impacts/Effects	Beneficiary
1	Reduction of numbers of out-of-school children	Community	1	Contribution to entire community development	Community
2	Opportunities in getting scholarship, knowledge, language, etc.	Students	2	<ul style="list-style-type: none"> Increase of employment opportunity for skilled or white color jobs Increase of income level 	Students
3	Job creation for teachers	Teachers	3	Income generation	Teachers
4	<ul style="list-style-type: none"> Establishment of PTA Revenue for PTA fund 	PTA	4	<ul style="list-style-type: none"> Contribution to sustainable O&M of community school Contribution to control of vandalism 	PTA

- 5) RDC community center with sub-health center construction projects in Chibolya, Freedom and Kalikiliki

The RDC community center with water levy collection window and sub-health center in Chibolya, Freedom and Kalikiliki will generate the socio-economic impacts/effects shown below.

Socio-economic Impacts by Community Center Development Projects

Short term Impacts/Effects			Long term Impacts/Effects		
	Socio-economic Impacts/Effects	Beneficiary		Socio-economic Impacts/Effects	Beneficiary
1	Fund rising for O/M of water facility	RDC and Residents	1	<ul style="list-style-type: none"> • Upgrading of income level • Contribution to affordability of expenditure for RDC activities 	RDC
2	Provision of basic PHC services	Residents	2	<ul style="list-style-type: none"> • Availability of financial management for social services • Contributions to sustainable O&M of water supply system, road, etc. 	RDC and Residents
3	Community income generation through rental parking space, etc.	RDC	3	<ul style="list-style-type: none"> • Contribution to sustainable RDC activities • Contribution to control of vandalism 	RDC and residents
4	Contribution to security control	RDC	4	Empowerment of RDC development	RDC

6) Community empowerment by implementation of the projects

The socio-economic impacts/effects on community empowerment will be generated by implementation of the projects through community participation method as show below.

Socio-economic Impacts by Community Empowerment by Implementation of the Projects

Short term Impacts/Effects			Long term Impacts/Effects		
	Socio-economic Impacts/Effects	Beneficiary		Socio-economic Impacts/Effects	Beneficiary
1	Facilitation of knowledge and skill on social services facilities installation (by community participation)	Residents	1	<ul style="list-style-type: none"> • Contribution to sustainable O&M of social services facilities • Contribution to entire community development • Contribution to control of vandalism 	Community
2	Improvement of knowledge and skill on health and sanitation	Residents	2	Contribution to disease prevention	Residents
3	Opportunities in getting scholarship, knowledge	Residents	3	Increase of income level	Residents
4	Contribution to security control	RDC	4	Empowerment of RDC development	RDC

In addition to the above impacts/effects caused by each project, it is expected that multiplier effects through the combination of both hardware and software components will be generated as summarized below. In particular, combination of water supply projects, construction of community center and VIP toilet projects as hardware, and RDC empowerment, hygiene education and community school education as software is expected to contribute to impacts/effects.

Socio-economic Impacts by Combination Projects both of Hardware and Software

Components

Short term Impacts/Effects			Long term Impacts/Effects		
	Socio-economic Impacts/Effects	Beneficiary		Socio-economic Impacts/Effects	Beneficiary
1	Reduction of construction cost	Community	1	-	-
2	<ul style="list-style-type: none"> • Smooth operation of water supply, community center and VIP toilet system including O&M of facilities and water tariff collection • Relatively high collection ratio of water tariff 	Community	2	<ul style="list-style-type: none"> • Contribution to entire community development • Contribution to sustainable O&M of facilities • Contribution to control of vandalism 	Community
3	<ul style="list-style-type: none"> • Increasing improvement degree of sanitary conditions of residents • Contribution to disease prevention 	Residents	3	<ul style="list-style-type: none"> • Improvement of environmental conditions in the settlements • Contribution to disease prevention • Reduction of medical expenditure 	Community

(3) Economic Evaluation

In this sub-section, the economic evaluation is focused on the water supply projects in Ng'ombe, Freedom and Kalikiliki, taking project scale and availability of quantitative analysis into account. It is difficult for the other projects to assess economic impacts/effects in monetary value, due to relatively small scale and characteristics of their software components.

The economic evaluation aims at assessing the economic feasibility of the project from the viewpoint of the regional/national economy. In principle, the economic feasibility is evaluated in terms of economic internal rate of return (EIRR).

1) Concept of economic evaluation

EIRR is calculated on a cash flow basis, consisting of the following:

Economic Cost

- (+) Construction cost of water supply projects in Ng'ombe, Freedom and Kalikiliki;

- (+) O&M cost of water supply projects in Ng'ombe, Freedom and Kalikiliki; and
- (+) Replacement cost of equipment of water supply projects in Ng'ombe, Freedom and Kalikiliki.

Economic Benefit

Among the economic effects described earlier, the following items were converted into monetary value and adopted for economic analysis.

- (+) Cost saving of water transportation thanks to installment of public standpipes;
- (+) Land incremental value in Ng'ombe, Freedom and Kalikiliki, and
- (+) Cost saving of medical expenditure thanks to supply of clean potable water.

2) Preconditions for economic evaluation

Economic cost

In general, the economic cost, which is the cost for the entire country, is obtained by deducting the transfer payment comprising import duties and VAT from the financial cost. As those taxes are assumed to be subject to tax exemption in the Study, the financial cost is used for the economic cost. No escalation is considered for the economic cost.

Economic benefit

- Cost saving of water transportation thanks to installment of public stand-pipes

The annual cost saving of water transportation thanks to installment of public standpipes is estimated based on the following formula. The saving time is assumed to be 1.5 (hours at a time) and average frequency for water collection per day is assumed at five times per household, based on a comparison between baseline and post-project household surveys in the pilot projects.

$(\text{Time value / person}) \times (\text{Saving time of water transportation / day}) \times 365$

- Land incremental value in Ng'ombe, Freedom and Kalikiliki

The rental fee for residential land of 3,000 (Kwacha/household/month) for land with inadequate infrastructure and 6,000 (Kwacha/household/month) for land with adequate infrastructure is

adopted by LCC at this moment. Taking this into consideration, the land incremental value is assumed to be equivalent to the difference, viz. 3,000 (Kwacha/household/month)

- Cost saving of medical expenditure thanks to supply of clean potable water

According to baseline household surveys in the pilot projects, about half of interviewees spent less than 10,000 (Kwacha/household/month). The current average medical expenditure is assumed 8,000 (Kwacha/household/month). Although the cost saving of medical expenditure thanks to supply of clean potable water cannot be evidently identified, it is assumed that half of the current average medical expenditure, viz. 4,000 (Kwacha/household/month) for economic analysis.

3) Results of economic analysis

Under the preconditions mentioned above, the EIRR is calculated to be 3.7% as shown in Table 9.5.5. Although this value demonstrates that the water supply projects are not economically viable, it is noted that the items available adopted for economic benefits are limited to converted in monetary value.

As described before, it should be recognized that the development projects including the water supply projects are indispensable for low-income residents in the UUSs to ensure civil-minimum social/public services and projects regardless of the results of economic feasibility/impact.

Table 9.5.5 Economic Cost and Benefit Flow and EIRR

EIRR= 3.68% (at 2001 constant price)

	Development Cost (US\$)	O&M Cost for Water Supply (US\$)	Replacement Cost of Equipment (US\$)	Cost Total (US\$)	Reduction of Water Collection Time (US\$)	Land Incremental Value (US\$)	Reduction Cost of Medical Expenditure (US\$)	Benefit Total (US\$)	Balance (US\$)
2,001								0	
2,002	301,350			301,350				0	-301,350
2,003	1,971,900			1,971,900				0	-1,971,900
2,004	2,151,450			2,151,450				0	-2,151,450
2,005	396,900	11,597		408,497	187,432	46,703	62,270	296,405	-112,092
2,006	2,847,600	11,597		2,859,197	202,697	50,506	67,342	320,545	-2,538,652
2,007	2,039,100	11,597		2,050,697	219,206	54,620	72,826	346,651	-1,704,046
2,008		20,459		20,459	309,889	83,246	110,994	504,130	483,671
2,009		20,459		20,459	331,769	89,076	118,769	539,614	519,155
2,010		20,459		20,459	355,341	95,351	127,135	577,827	557,368
2,011		20,459		20,459	368,039	98,728	131,638	598,405	577,946
2,012		20,459		20,459	381,230	102,235	136,313	619,778	599,319
2,013		20,459		20,459	394,934	105,875	141,167	641,976	621,517
2,014		20,459	105,000	125,459	409,170	109,655	146,207	665,033	539,574
2,015		20,459		20,459	423,961	113,580	151,440	688,981	668,522
2,016		20,459		20,459	439,327	117,656	156,875	713,858	693,399
2,017		20,459	90,000	110,459	455,293	121,889	162,518	739,700	629,241
2,018		20,459		20,459	471,881	126,284	168,379	766,544	746,085
2,019		20,459		20,459	489,117	130,849	174,465	794,431	773,972
2,020		20,459		20,459	507,027	135,589	180,786	823,402	802,943
2,021		20,459		20,459	516,332	138,051	184,068	838,452	817,993
2,022		20,459		20,459	525,819	140,560	187,414	853,794	833,335
2,023		20,459		20,459	535,492	143,118	190,824	869,435	848,976
2,024		20,459	105,000	125,459	545,355	145,725	194,300	885,381	759,922
2,025		20,459		20,459	555,411	148,383	197,844	901,637	881,178
2,026		20,459		20,459	565,663	151,092	201,456	918,211	897,752
2,027		20,459	90,000	110,459	576,117	153,853	205,138	935,108	824,649
Total		443,971	390,000	10,542,271	9,766,505	2,602,626	3,470,168	15,839,300	5,297,029

EIRR= 3.68%

9.6 Implementing Plan

9.6.1 Implementing Work Flow

The key organizations of the Zambian Government for the implementation of the priority projects concerning the environment improvement in UUS will be MLGH and LCC. Communities will also play key roles in the actual implementation of the projects.

Figure 9.6.1 shows the actual work flow for the implementation of the priority projects as explained hereunder in detail.

Start-up Stage

MLGH should undertake to formulate the fund source for the priority project implementation (of Figure 9.6.1). Several sources are conceivable as shown subsequent section, MLGH with the cooperation of Ministry of Finance shall arrange the finance source not only from foreign aid but also the central government finance such as counter value fund.

Considering the presence of several donors, partnership and work sharing for the priority projects should be initiated by MLGH with LCC. The forum for peri-urban development is an opportunity to exchange policy dialog and sharing principles (of Figure 9.6.1).

Project Implementing Stage

MLGH will subcontract implementation works of the priority projects (of Figure 9.6.1) and the subcontractor should work under the cooperation with LCC and communities. This cooperation is most important for the smooth and effective implementation and sustainability of the priority projects. LCC will play a key role in this cooperation work. In LCC, the Housing Department, especially the peri-urban section, will take a lead for actual implementation work. Further, there are many relevant organizations who will need to participate in the implementation work for a smooth and successful result.

Organization of a task force is recommended to make this cooperation work effective(of Figure 9.6.1). Progress supervising, problem solution, decision making, agreement among stakeholders, etc. shall be carried out in the task force member meeting. Possible member configuration of the task force is proposed in Figure 9.6.2.

In addition to this governmental implementation work, non-governmental aid by NGOs is also conceivable as shown in Figure 9.6.1. NGO will assist the

community to develop the priority projects through subcontracted consultants and contractors (of Figure 9.6.1).

Aftercare Stage

After the implementation of the priority projects, operation and maintenance work should be done for the project sustainability. Peri-urban section and relevant departments of LCC and LWSC as well as relevant ministries shall support the community for the operation and maintenance work (of Figure 9.6.1). On the basis of the pilot projects experience, JST proposes that the aftercare work should be carried out for at least 6 months after implementation of the priority projects. The task force members below should contribute effectively to the support of the community in the operation and maintenance work.

- Peri-urban section of Housing Department, LCC as the coordinator
- Health Department, LCC for water quality supervision
- Engineering Department, LCC for road maintenance skill training and road repairing work
- Ministry of Health for the operation of sub-health center
- LWSC for technical assistance of water supply system O/M
- NGOs for management of community school
- Soft component consulting expert for assistance and monitoring for O&M works

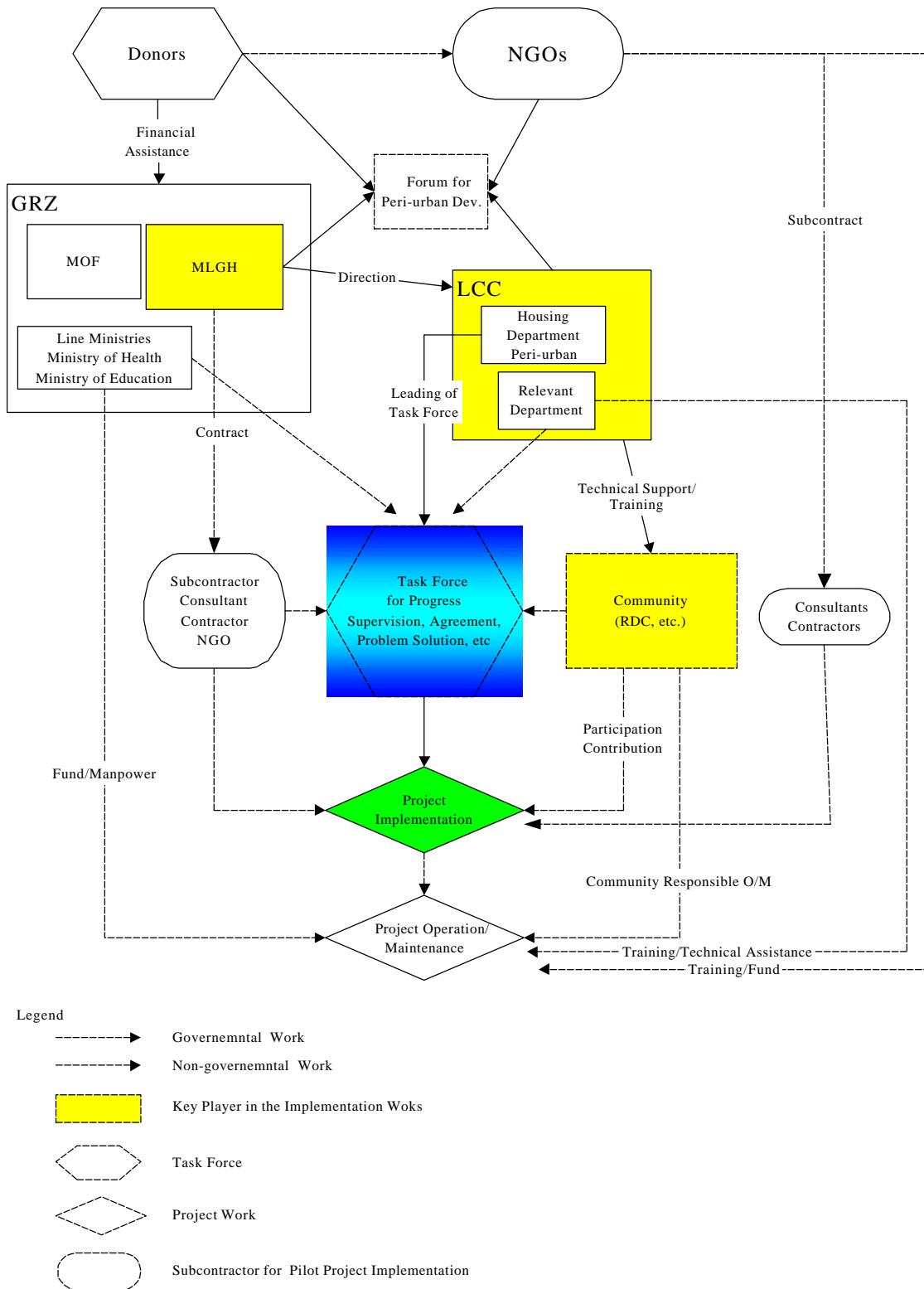


Figure 9.6.1 Work Flow for the Implementation of Priority Projects

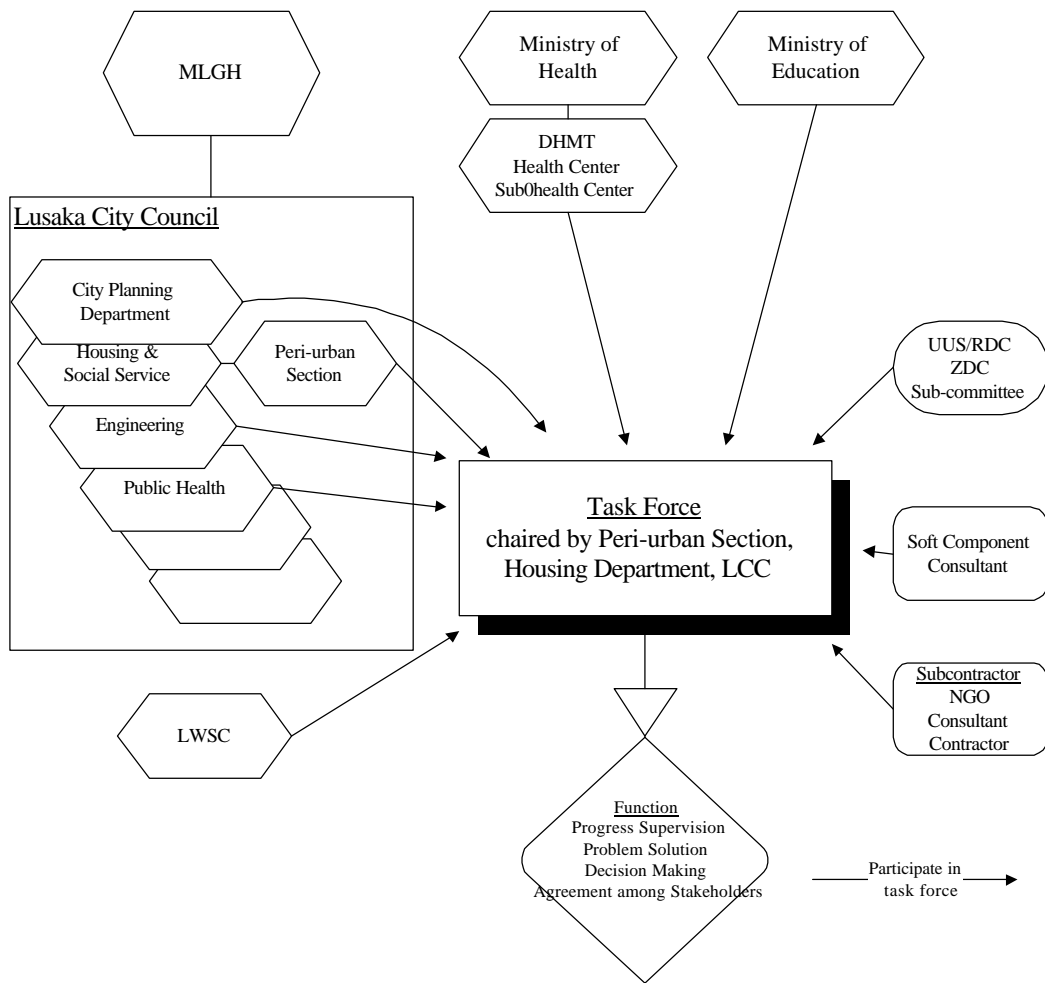


Figure 9.6.2 Conceivable Task Force Members

9.6.2 Implementing Schedule

Implementing schedule of the priority projects was conceived on the basis of the following assumptions.

- (1) Phased development method shall be taken in consideration of appropriate cost disbursement by phase.
- (2) Priority projects planned in one compound should be carried out as concurrently as the community capacity allows in order to achieve the project effect comprehensively.
- (3) Especially, the water supply facility development project and health education project as well as VIP toilet project are planned to be conducted concurrently in a compound to maximize the effectiveness for health and sanitary condition improvement of the compound.
- (4) Following details are preconditions for formulating the implementation schedule.
 - The community center with levy collection room shall be constructed in line with water supply system development.
 - The community center with sub-health center will be constructed in line with the conduct of the health education project.
 - VIP toilet should be developed concurrent with the implementation of the water supply system project.
 - Some school health education will be carried out in the community schools that are to be constructed in the priority projects.

Priority projects implementation was divided into two phases over five years. Phase 1 is designated from 2002 till 2004 while phase 2 is from 2005 till 2007. The other projects proposed in the action area plan are planned to be implemented after 2007. Implementing schedule of priority projects is shown in Table 9.6.1 and the detailed implementing schedule by UUS is presented in Table 9.6.2.

9.6.3 Fund Source for Implementation

Initial development cost for the priority projects should be covered by the Zambian government fund, although the operation and maintenance and replacement cost could be managed by the community participation. ODA obtained through the Zambian government will be main method of fund raising for the priority projects. Judging from previous aid experience in Zambia from bilateral and multilateral donors, the following foreign aid sources should be targeted to finance the initial development costs of the priority projects.

Alternatives of Fund Sources and Schemes for Priority Projects Implementation

Alternatives ODA Source	Priority Project							
	Water Supply System	Health Hygiene Education	VIP Toilet	Solid Waste	Community School	Community Center	Road Improv.	Community Capacity Building
I Japanese ODA								
(1) General Grant Aid								
(2) Counter Value Fund								
(3) Grass Root Grant Aid								
(4) Community Empowerment Program								
II World Bank (ZAMSIF)								
III UNDP								
IV USAID								
V Irish AID								

In addition to ODA mentioned above, NGO who could assist the implementation of the priority projects through original fund sources, and be independent from the official aid, should be taken into consideration for the fund raising.

Table 9.6.1 Detailed Implementing Schedule of Priority Projects for Short Term Development

	2001	2002	2003	2004	2005	2006	2007
1 Water Supply System Improvement							
(1) Bauleni (LWSC area))							
(2) Bauleni2 (Clinic water supply)							
(3) Freedom							
(4) Kalikiliki							
(5) Ng'ombe							
2 Health/Hygiene Education							
(1) Bauleni							
(2) Chainda							
(3) Chazanga							
(4) Chibolya							
(5) Freedom							
(6) Kalikiliki							
(7) Ng'ombe							
(8) Old Kanyama							
3 VIP Toilet							
(1) Bauleni							
(2) Chainda							
(3) Chazanga							
(4) Chibolya							
(5) Freedom							
(6) Kalikiliki							
(7) Ng'ombe							
(8) Old Kanyama							
4 Community School							
(1) Bauleni							
(2) Chainda							
(3) Chazanga							
(4) Freedom							
(5) Kalikiliki							
5 Garbage Disposal							
(1) Bauleni							
(2) Chainda							
(3) Freedom							
(4) Kalikiliki							
6 Community Center							
(1) Bauleni (B type)							
(2) Chazanga (C type)							
(3) Chibolya (C type)							
(4) Freedom (A type)							
(5) Kalikiliki (A type)							
(6) Ng'ombe (B type)							
7 Community capacity building (Soft component, Expert)							
Development Phase		← Phase 1 →			← Phase 2 →		








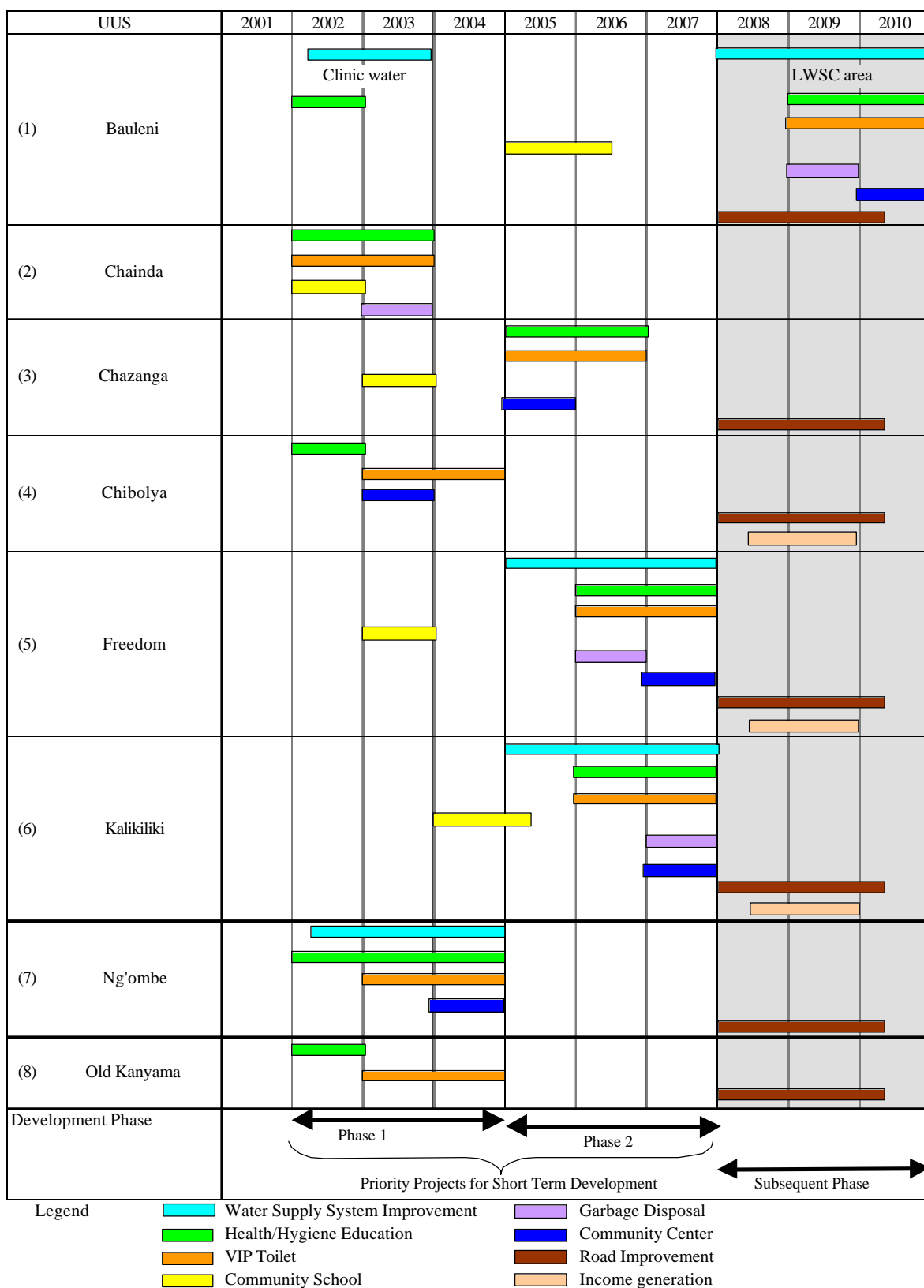
Legend		Planning/design work		School health
		Construction work		Community health education
		After care work		Health center renovation
		Project implementation		

Table 9.6.2 Implementing Schedule of Priority Projects by UUS



CHAPTER 10 CONCLUSIONS AND RECOMMENDATIONS

10.1 Present Condition and Necessity of Improvement

(1) Urgency of environment improvement of UUS

While the living environment of the township in Lusaka City was improved to a certain extent thanks to the international aid as well as the inheritance developed in the past, the living environment of UUS, where half the population of the city is said to reside, remains untreated and suffering from poor conditions. The improvement of the living environment in UUSs was urgent and GRZ legalized the status of the UUS to allow improvements to commence.

Although some donors and NGOs are intervening for the improvement of the UUS environment in a sector-wise manner, comprehensive and integrated development has not been attempted.

The following table summarizes the present condition of the eight target UUSs of this study.

Present Condition of Present Social Services in UUS

UUS (population)	Water Supply	Road/ Drainage	Primary Education	Health Center	Waste Disposal	Toilet
Bauleni (45,000)	Old LWSC facility (JST developed pilot project)	Undeveloped	Public schools are developed near some UUSs, approximately 50 % of out-of-school children are reported due to the shortage of the school, expensive cost of tuition, uniform, etc.	Developed	Undeveloped	Pit Latrine is mainly utilized.
Chainda (17,000)	Developed by World Vision	Developed by World Vision		Developed	Undeveloped	
Chazanga (29,000)	Developing by CARE	Undeveloped		Undeveloped	CARE Developing	
Chibolya (25,000)	Developed by JST & CARE	Undeveloped		Undeveloped	CARE Developing	
Freedom (9,000)	Undeveloped	Undeveloped		Undeveloped	Undeveloped	
Kalikiliki (8,000)	Undeveloped	Undeveloped		Undeveloped	Undeveloped	
Ng'ombe (30,000)	Undeveloped	Undeveloped		Developed	CARE Developing	
Old Kanyama (57,000)	Developed by CARE	Undeveloped except for access road		Developed	CARE Developing	

(2) Necessity of integrated development

Environmental improvement in UUS shall be effective and efficient when integrated with the development of social services. It is apparent that the integrated developments of water system improvement, health and hygiene education, garbage disposal system improvement, sewerage system improvement, and drainage improvement will improve sanitary conditions of the UUSs drastically. Development of community schools in line with water supply system development and garbage disposal improvement will make the projects more efficient.

Therefore, it is strongly recommended that the integrated development of the environmental improvement projects be undertaken for the UUSs.

(3) Replication in other UUSs

The pilot projects implemented in the three UUSs will be in other UUSs. The number of UUSs with undeveloped social services is increasing and expanding due to the population influx into the urban area of Lusaka City and other major cities in Zambia. By the adding of further lessons in the course of implementation of the priority projects proposed in the Study, appropriate development of the social services shall be carried out in other UUSs in order to create the well planned urban settlements which will induce social stability of Zambia.

10.2 Development Plan

(1) Action area plan

As mentioned above, the integrated development covering various sectors of water supply, road and drainage improvement, primary education, health care, waste disposal, shall be done for the environment improvement of UUSs. The master plan, called the action area plan in the Study, was designed to realize appropriate social services in the eight target UUSs by implementation of integrated development. It means that every social service, except for these already developed by donors and NGOs, were planned to be developed in the action area plan.

In this context, the water supply system improvement, health education, VIP toilet development, health center development, garbage disposal, community school development, and road and drainage improvement were planned for the environment improvement of the eight UUSs in the action area plan.

(2) Characteristic of the Action Area Plan

The action area plan proposed in the Study has the following advantageous characteristics;

- Relatively inexpensive development cost will be possible because of community participatory development. Development costs of the action area plan by conventional method and the community participatory method are estimated at 43.8 million US\$ and 31.8 million US\$ respectively. Community will participate in the construction directly to cut the project development cost. Furthermore, lower quality of facilities of the project, designed for community participatory method with assumption of the repair and facility replacement by the community will realise the cheaper project cost.
- Ownership nourishment for vandalism prevention will be attained by the community participation from the planning stage of the project.
- Sustainability of the projects will be attained by the self-sustained operation and maintenance work by the community. Lower O/M cost, prompt action to emergency faults in the system, ideas and measures for improvement, and better management will arise from the self-sustained community O/M work.

(3) Plan of priority projects

It is understood that every project proposed in the action area plan cannot be implemented simultaneously due to the financial, time and human resources constraints. Therefore, the Study proposed a plan of priority projects to be implemented preferentially. The JST judged that sanitary environment improvement as well as primary education enhancement, the basic elements of social services, shall be the priority projects in consideration of the community needs and present situation of the target UUSs.

In detail, following projects are proposed as the priority projects.

- water supply system improvement
- health and hygiene education
- VIP latrine development
- Sub-health center development
- Garbage disposal
- Community school development
- Community center development (for community empowerment facility and water levy collection facility)

10.3 Development Method

(1) Implementing organization

- 1) Social service development in UUSs should be carried out by community participation in order to attain sustainability in the operation and maintenance work and management of developed system, and to prevent vandalism. For this purpose, participation in the project planning, participation in the construction work by voluntary basis as well as employed labor basis, participation in the project evaluation, participation in the O/M and management skill training shall be necessary for the community. The community participation method is the only way to nurture a sense of ownership and understanding of responsibility.

It should be acknowledged that the pilot projects verified that voluntary participation was not inevitable to nourish the ownership sense of the community, if the community participate in the projects from the start of the project.

- 2) ABO such as Resident Development Committee (RDC) represents the community. The members of RDC, Zone Development Committee (ZDC) under RDC, and sub-committee such as water committee or education committee will participate in the projects directly. More direct participants should be invited in addition to those representatives. For instance, the residents along the road should participate in the road improvement project.
- 3) A public organization who will play a major role for the project implementation will be the Peri-urban Section of the Housing Department of LCC. However, the Peri-urban Section is too weak to cope with the integrated projects implementation. A Task Force should be set up by the participation of relevant organizations for the smooth and efficient implementation of the projects. It should be made up as follows: the chief of the Peri-urban Section as the chairperson, staff responsible for target UUSs, representatives of the community, subcontractor of the project such as NGO, contractor, supervising consultant, relevant department staff of LCC, and relevant ministry staff from MOE and MOH.
The Task Force will exist to cope with problems, decision making, progress management of the projects.

- 4) To play a core role in the Task Force, there will need to be enhancement of the Peri-urban Section such as manpower strengthening. Since only five staff are carrying out daily service for 27 UUSs under a manager and an assistant manager in the Peri-urban section, specific staff to engage in the project implementation exclusively will be necessary. In addition, recruit of a water technician will be necessary in the Peri-urban Section considering that the water supply system improvement project is the most important. The number of water engineers responsible for the UUS is limited in LWSC and the service for UUS area is insufficient. Therefore, allocation of a water engineer in the Peri-urban Section to specifically work for projects proposed in the Study will be necessary for the success of the water supply system improvement project. At the same time, a specialist for community school development as well as management will be necessary in consideration of the limited staff of the Ministry of Education.
- 5) The projects will be implemented smoothly and efficiently if work is sublet to NGOs, that have plenty of experience in the social service development of UUS. From the international NGO, CARE PROSPECT in the field of health and hygiene education, and Africare for VIP latrine development are leading agencies of the local NGO, Challenge International Ministry (CIM) will contribute for the community school development. These NGOs are collaborating with the communities and have the know-how concerning the community participatory development method.
- 6) Employment of a local or international consultant will be necessary to supervise the several subcontractors' performance as well as undertake community capacity building program. A capable international consultant will coordinate and induce the multiple effect in the integrated development.

(2) Implementing Program

- 1) As described before, the improvement of sanitary conditions and the primary education enhancement are the priority projects. However, simultaneous implementation of all priority projects seems difficult because of the financial, time, and human resource constraints that require phasing of the priority projects. In the Study, some priority projects, which should be implemented in the short run because of

urgent needs, were selected as short-term priority projects and studied in detail.

- 2) The water supply system development of Ng'ombe, Freedom and Kalikiliki, where no system is serving, were selected as short-term priority projects. In line with the water supply system development in the three UUSs, the health and hygiene education, VIP latrine development, garbage disposal, sub-health center and community center development are selected as the short-term priority projects. Moreover, the health and hygiene education and VIP latrine development in Chainda, Chibolya, Old Kanyama, where water supply systems are already developed by cooperation of NGOs, are recommended as the short-term priority projects. Further the community school development for the primary education enhancement is also recommended as a short-term priority project. A detailed plan of the short-term priority projects is explained in Chapter 9.
- 3) The short-term priority projects will be implemented in two phases. In Phase 1 during the three years from 2002 to 2004, the water supply system development, health and hygiene education, VIP latrine development, and the community center development were planned to be implemented in Ng'ombe where the population is large and top urgency is admitted. Among three UUSs with the developed water supply system, Chainda was selected to implement the health and hygiene education, VIP toilet development, and garbage disposal and Chibolya for the sub-health center development in the short-run to respond to the strong needs. Concerning the community school development, Chainda, Chazanga, Freedom, Kalikiliki were selected for development during phase 1 in consideration of the urgent needs.
- 4) In phase 2, from 2005 to 2007, the remaining priority projects such as water supply facility development together with health and hygiene education, VIP latrine development, garbage disposal, sub-health center and community center development in Freedom and Kalikiliki are proposed for implementation.

(3) Finance Arrangement for the Priority Project Implementation

Although economic internal rate of return (EIRR) of water supply projects in the short-term priority projects is estimated at 3.7%, it is expected to contribute sufficiently to be environmental improvement of UUS in Lusaka by means of

qualitative analysis. With respect to financial internal rate of return (FIRR), none of the water supply projects show a positive rate of return, which is financially unfeasible with far lower than a required investment rate to provide opportunity for private investment. This means the investment is recommended, but public investment is necessary.

Since the local public finance is not available due to the financial constraints of LCC, international aid is the sole measure to arrange finance for the implementation of the projects. Japanese grant aid, counter value fund, grass root grant aid, and other donor's grant aid and loan, as well as NGO's grant aid are possible sources of aid for consideration.

10.4 Sustainability

- (1) It is concluded from the experience of the pilot projects that a minimum of six months care after the project implementation is mandatory even though the projects are the self-sustained by the community. In the early stages of self-operation and management, several problems and obstacles will occur that the community can not cope with. For instance, the saving of the water levy is not enough and the community cannot treat sudden fault in the system during the start-up stage. Although one year guarantee is available by the project contractor, urgent treatment will not be available and support from the donor will be necessary during at least six months.
- (2) An inspection system for the operation and management of the implemented projects should be developed for transparency of fund use. Even the community basis operation and management should be carefully supervised, especially through audit of the levy account of the water supply system. Development of the Inspection program and training of inspection staff to be stationed in Peri-urban Section of LCC should be done by the Legal Department, Finance Department and Housing Department of LCC.
- (3) The community should carry out operation and management of the implemented projects with the assistance of public support from LCC and relevant governmental organizations. The community, for instance, dispatches the tap attendant and accountant for the levy management of water supply system. This community participation in the operation and management induces 100 % cooperation of the community and guarantees the sustainability of the water project.

- (4) Skill and know-how are necessary for the operation and management of the implemented projects. Therefore, training of the community members in the requisite skills and know-how should be done during the project implementation. Repairing skill, accounting and bank account management know-how, fund raising measures know-how, personnel affairs management know-how, etc. will be important. Theoretical knowledge and field training will be useful for the practical training of the community members concerning the operation and management of the projects.
- (5) For development sustainability, it is necessary to establish the monitoring and evaluation system for O&M of the proposed projects. Continuous evaluation utilized by quantitative indicators and measures to be improved for the projects will contribute to enhance significant and values of the projects.

10.5 Other Recommendations

- (1) Flood problem and poor drainage in Chibolya, Old Kanyama located in the center of Lusaka City should be addressed. However, to settle the flood problem the improvement of not only drains inside the UUS but also development of downstream rivers is necessary. Therefore, a careful study on the improvement of the downstream rivers is proposed in addition to the road and drainage improvement projects in UUS.
- (2) In the road improvement project, resettlement issues should be paid due attention. In the densely populated UUS residential area, the roadside is occupied by the residents and once the road width expansion is planned, resettlements of the roadside residents will be inevitable. Although, a precedent of relocation due to the road development is reported in Bauleni, densely populated UUSs such as Chibolya have no room for relocation. So, the road improvement plan should be designed to minimize the need for relocation. This problem should be sorted out within community with the assistance of LCC.
- (3) The settlement of the replacement of the existing final dumping site and realization of transportation method between the UUS and the final dumping site are the precondition for the garbage disposal projects in UUS.
- (4) A manual for the environment improvement by community participation was developed during the Study. JST wishes for the manual to be utilized by relevant organizations, especially the community, LCC staff and NGOs to improve the social service in UUS.