テムの新規拡張事業を計画する前に，既存水道事業の基盤を強化するため，組織・経営の見直し，費用回収，維持管理，リハビリ，及び人材養成を重視した調査を実施する必要がある。

2. 既存浄水量を最大限有効に活用するため，配水システムの一部新設を含むリハビリの全体規模と範囲を特定し，各段階における実施内容とその効果及び実施スケジュールを明確にする必要がある。なお，水道システム全体が老朽化している中で，リハビリの実施には膨大な資金が必要であり，日本を含め多くの援助機関による協調融資が必要であると考えられるので，調査の内容も国際的に通用することが求められている。

3. 緊急改善事業の計画に当たっては下記の点を含めて検討し，水道事業が自助努力に基づいた独立採算性により経営されるようになるきっかけを作るための内容とすることが重要である。

・浄水場緊急改善の実施
・配水施設緊急改善の実施
・給水施設緊急改善の実施
・リペアショップの建設
・中堅技術者訓練所（センターのような大規模なものではない）の設置
・漏水防止対策用機材の供与

4. リハビリの調査結果を基に，下記の点を含めて検討し，NUWA がダルエスサラーム水道事業の将来的方向について明確にするための戦略を提言する必要がある。

・リハビリの全体規模と範囲を特定し，各段階における実施内容とその効果及び実施スケジュールを明確にする
・財政状態の改善プログラムを作成する
・経営，維持管理の改善プログラムを作成する
・M/P，F/S（水源調査を含む）の実施スケジュール作成に係る提言
・リハビリの調査結果を基に，新規拡張事業の実施プログラム作成に係る提言

4－4　調査項目及び内容

調査項目は，S/W に示す通りであり，また，内容のうち明確にしておくべきことは M/M に記した。項目とコメントを記すと次の通りである。

1. データ収集とレビュー

(1) 社会，経済，自然条件
(2) 実施中の水道プロジェクト及び関連するプロジェクト
(3) 水道計画及び関連する計画

（コメント）

Mtoni 浄水場の水源に対する既存資料の収集とレビューを含む。

2. 既存水道システムの調査

(1) 設計基準

(2) 水道施設の構造，容量，機能

（コメント）

既存のデータ，資料から得られる情報を基にレビューする。

3. 組織，経営及び財政状況調査

(1) 組織と機能

(2) 経営状況

(3) 財政状況

（コメント）

調査内容には，現状を分析するとともに，改善案の提言も含める。ただし，NUWA の本部については，DSMB 関連する部分について調査する。

4. 浄水場リハビリ計画調査

(1) 取水施設

(2) 浄水施設

(3) 水質

（コメント）

施設の機能を調査し，リハビリ計画を策定する。ただし，Upper Ruvu 系統については，イタリア政府による援助でリハビリを実施中であるので対象外とする。

5. 配水施設リハビリ計画調査

(1) 配水ポンプ，配水池

(2) 配水管

（コメント）

施設の機能を調査し，リハビリ計画を策定する。ただし，配水管の調査は次の順序で行う。

・ヒヤリングと水圧測定により，給水区域全体の状況を把握する

・配水本管の試掘を行い，管種及び管材の老朽度を確認する

・2 箇所のモデル地区（25ha/地区）を選び，配水本管の試掘を行い，管種・管材の老朽度及びバルブの設置状況を確認するとともに，配管図の作成方法を指導する。

なお，モデル地区の数については，ミニュッツでは 2 箇所になっているが，市内の配管の敷設が 3 つの年代に分かれていることを考えると，3 箇所以上のモデル地区(計

50ha）を選ぶことが望ましい

・配水本管のリハビリ計画を作成する。ただし，一部の新設も含む

6. 給水施設リハビリ計画調査

(1) 給水管

(2) メータ

（コメント）

施設の機能を調査し，リハビリ計画を策定する。ただし，給水施設のリハビリ調査は次の順序で行う。

・10箇所のモデル地区（20コネクション/箇所）を選び，給水管の試掘を行い，給水管の老朽度，分岐状態及び漏水の状態を確認する（3箇所は調査団とNUWAの共同作業，7箇所はNUWAが独自に実施する）

・各分岐にメータを設置し，消費水量の変化を確認する（同上）

・給水管のリハビリ計画を作成するとともに，メータ設置計画を作成する

なお，上記調査に並行して，統計的に信頼性のある方法でアンケート，ヒヤリング調査を実施し，水道料金，水需要の動向，水使用形態等について調査する。

7. 費用回収戦略の調査

(1) 料金徴収システムの作成

(2) 財務計画

（コメント）

上記リハビリ計画の実施に伴うリハビリ費用の支出，維持管理費支出及び水道料金徴収額の増加に伴う水道事業の財務計画を作成するとともに，持続的経営を可能にするための戦略を策定する。

8. 維持管理計画の策定

(1) 組織・経営・管理

(2) 浄水場

(3) 配水施設

(4) 給水施設

(5) 漏水防止戦略

(6) リペアショップ

（コメント）

リハビリの実施と維持管理方法は相互に関連して計画されるべきであり，それによって初めて持続的経営が可能になることを配慮し，維持管理のための組織，人員，役割を明確にした計画を策定する。なお，漏水調査については，本調査の中で調査団自らが実施して

も実効が上がらないばかりか，NUWA 側の自助努力の思想を損なうことになるので実施しない。むしろ漏水防止のための戦略を作成し，DSMB がルーチンワークの中で実施する手法を提示する。

9. トレーニング計画の作成

(1) 全体訓練プログラムの作成

（コメント）

上記 8 とともに，経営・維持管理に携わる人材の養成計画を作成する。計画の内容は次の通りである。

・組織の分析

・訓練ニーズの分析

・訓練内容の確認

・訓練方法の提言

10. 全体リハビリ計画の策定

(1) リハビリの範囲と規模の確認

(2) 実施スケジュールの作成

(3) 緊急プロジェクトの確認

（コメント）

上記 1 ～ 9 を総合し，リハビリの全体計画を策定するとともに，緊急的に実施するべきプロジェクトを確認する。

11. 緊急リハビリ事業の概略設計

(1) 概略技術設計

(2) 費用の算定

(3) 財務評価

12. ダルエスサラーム水道事業の将来的方向の策定及び提言

(1) リハビリの全体規模と範囲を特定し，各段階における実施内容とその効果及び実施スケジュールの作成

(2) 財政状態改善プログラムの作成

(3) 経営，維持管理改善プログラムの作成

(4) M/P，F/S（水源調査を含む）の実施スケジュールの作成に係る提言

(5) 既存資料及び本調査結果に基づく将来水需要量の予測を行い，新規拡張事業の実施プログラムの作成に係る提言

(コメント)

本調査によるリハビリ事業の実施だけでダルエスサラーム水道事業の問題がすべて解決するわけではなく，リハビリ事業の目的は水道事業が持続的発展をするための基盤作りにあることから，むしろ出発点と言える。

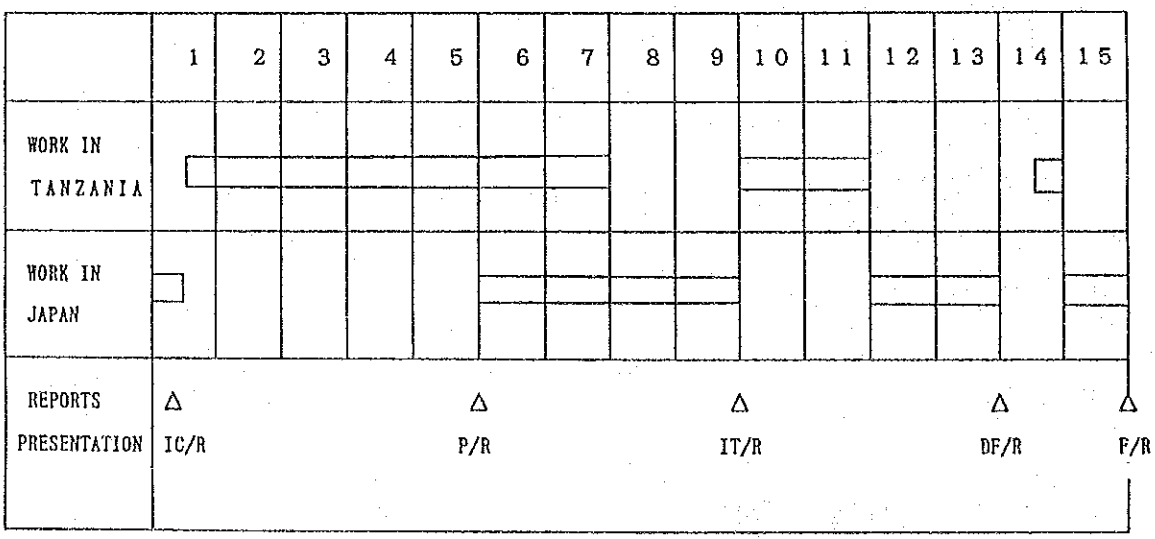
従って，調査の基本方針4に示す通り，1～11で行ったリハビリの調査結果を基に，NUWAがとるべきダルエスサラーム水道事業の将来的方向に関する戦略を提言する必要がある。

4－5　調査工程等

調査は，タンザニア国内での資料収集，現地調査と日本国内で行われる解析作業により構成される。現地調査は約8カ月を予定し，それ以降の国内作業を含め，ファイナルレポート提出まで合計15カ月間の工程である。

調査工程(案)は，下記の通りである。

Tentative Schedule



IC/R　：インセプションレポート
P/R　：プログレスレポート
IT/R　：インテリムレポート
DF/R　：ドラフトファイナルレポート
F/R　：ファイナルレポート

4－6　報告書

つぎの報告書を作成し，タンザニア国側に提出のうえ，説明，協議を行う。

(1)　インセプションレポート

英文　20部

現地調査開始時に提出。

(2)　プログレスレポート

英文　20部

調査開始後5カ月以内に提出。

(3)　インテリムレポート

英文　20部

調査開始後9カ月以内に提出。

(4)　ドラフトファイナルレポート

英文（メインレポート）　20部

（サポーティングレポート）　20部

（ベーシックデータ）　2部

調査開始後，13カ月以内に提出。

上記ドラフトファイナルレポートに対するタンザニア国側のコメントは，同レポートの提出後1カ月以内にJICAに通知される。

(5)　ファイナルレポート

英文（メインレポート）　30部

（サポーティングレポート）　30部

（ベーシックデータ）　2部

上記レポートは，ドラフトファイナルレポートのタンザニア国側のコメントを得てから1カ月以内に提出。

4－7　要員計画

本件調査には，概ね以下のような専門分野による要員構成が必要と考えられる。

①総括／水道施設計画　②水道施設計画　③配水管計画　④配水・給水計画（水量・水圧調査）　⑤配水・給水計画（配管調査）　⑥水源・水質　⑦組織・体制　⑧社会経済・財務　⑨積算

4－8　本格調査必要機材リスト（事前調査団案）

項　　目	数　量	備　考
1) 水圧計（自記録式）	10台	
2) 超音波流量計一式	4台	
3) 鋳鉄管腐蝕度計	3台	
4) パイプローケイター（鉄管用・非鉄管用）	各3台	
5) 距離計（メジャー式），巻尺（50m用）	各2台	
6) ピックハンマー（アスファルト掘削用・Engine付き）	3台	
7) 聴音棒（1.5m用，1.0m用）	各3本	
8) メータ（弁，箱，パイプ，ユニオン etc）φ1/2″	50個	
9) メータ（弁，箱，パイプ，ユニオン etc）φ3/4″	250個	
10) 給水管配管工事用器材	各5個	
①ドリル・タッピングマシン	5個	
②パイプ・スレッダー	5個	
③レンチ	5個	
④パイプ・カッター（小口径鉄管用）	5個	
〃　　（〃　PVC用）	2基	
⑥水中ポンプ（小型）	1基	
⑦ジェネレイター		
11) メータテスター（ポータブルタイプ，1/2″& 3/4″用）	各2基	
12) 水質試験	1式	
13) つるはし	6個	現地調達
14) スコップ（丸型・角型）	各6個	現地調達
15) 車輌（四輪駆動，ウィンチ付き）	2台	現地調達
16) コピーマシーン	1台	現地調達
17) その他		

添付資料：

1. 要　請　書
2. Scope of Work
3. 議事録（M/M）
4. 面談者リスト
5. 収集資料リスト
6. 関連資料の収集状況
7. 調査日程

1. 要 請 書

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF FINANCE, ECONOMIC AFFAIRS AND PLANNING

Telephone: 21271,

P.O. Box 9111,
DAR ES SALAAM.

Ref. No. TYC/E/450/11

27th October, 1988

Embassy of Japan,
P.O. Box 2577,
DAR ES SALAAM. (Att. Mr. Kaneko)

Dear Sir,

Re: REQUEST FOR MASTERPLAN AND FEASIBILITY STUDY ON IMPROVEMENT OF DAR ES SALAAM WATER SUPPLY SYSTEM

We would like to request for a Master Plan/Feasibility Study on improvement of water supply system in Dar es Salaam.

Dar es Salaam City has a population of about 1.8 million. Population growth of Dar es Salaam was 8.5 per cent per annum during 1967 - 1978; which makes it one of the fastest growing cities in the world. Water demand for Dar es Salaam City was estimated to be over 230,000 cmd in 1984, and is estimated at 290,000 cmd in 1988.

The total design capacity in Dar es Salaam is 273,000 cmd, however, due to the fact that the water supply systems have been quite old, the actual total capacity is much lower than that of the design capacity. At present, as you well know, there is a chronic shortage of water in the City of Dar es Salaam. In order to cope with the increasing demand of water in the city and to embark on rehabilitation of the water supply system in Dar es Salaam there is need to prepare a master plan and a feasibility study which will formulate an immediate improvement programme, a long term development plan and a short term development plan for the improvement and expansion of the water supply system in Dar es Salaam for the next 20 years.

We enclose herewith project writeup for your reference.

Thank you for your continued cooperation.

Yours faithfully,

P.J. Mbena

for: PRINCIPAL SECRETARY

REQUEST FOR MASTER PLAN AND FEASIBILITY STUDY ON
IMPROVEMENT OF DAR ES SALAAM WATER SUPPLY SYSTEM, TANZANIA

1: INTRODUCTION

The Government is fully committed to the International Drinking Water Supply and Sanitation Decade and recognizes the Decades needs for greater inter-sectoral cordination and international cooperation to achieve the goal. On carrying out to perform the intensions for the Decade, a logical frame work to carry the plans forward shall be established. One of the main obstacles to the formulation of overall strategy is the shortage of technical staff, insufficient data and information accumulated and funds for forward planning. Success in reaching the Decade objectives, therefore, depends largely on funds available in this sector from the external sources and from the national budget as well.

This report, prepared by the National Urban Water Authority (NUWA) is firstly to suggest actions which should be carried out promptly to remedy problems in the existing water supply of Dar es Salaam and which will increase the present water supply by 20% that is, from 228,100 cmd delivery to 273,100 cmd, the original design capacity. Then, the contents of request for master plan and feasibility study are explained from Section 4.

2. BACKGROUND

The population of Dar es Salaam City, the capital of the United Republic of Tanzania, was approximately 1,240,000 in 1983. Its population growth for the period 1967-1978 was 8.5 percent per annum, which makes it one of the fastest growing cities in the world. As a result of explosive growth, water supply cannot fully cope with demand.

The total design capacity in Dar es Salaam is 273,000 cmd and it should suffice the estimated water demand of 230,000 cmd in 1984. But due to the age of water supply systems and to the inadequate maintenance - procurement of spare parts is quite difficult - the actual total capacity is much lower than that of

the design capacity. The present malfunctioning of the various components of the water supply system has created a chronic scarcity of water. The problems of supply are further compounded by under-utilization of the existing plants, unsatisfactory quality of processed water and heavy loss of water caused by leakage both from distribution system and from transmission pipelines.

In order to improve the situation, the Government of Japan, responding to the request of the Government of Tanzania granted the sum of 899 million Japanese Yen for the improvement/rehabilitation of Dar es Salaam water supply system which was completed in April, 1986.

According to this rehabilitation, although the rehabilitated capacity of the Upper Ruvu system is still under the design capacity of 82,000 cmd (cubic meters per day), it was increased to 40,000 cmd which has improved water supply in the city. As a result, the current capacity became as follows:

System	Current Capacity	Design Capacity
Mtoni	6,800	6,800
Upper Ruvu	40,000	82,000
Lower Ruvu	170,000	182,000
T O T A L	228,800	270,800

Besides, water demand will continue to increase due to the increasing population etc. One estimate is as follows:

1988	290,000 cmd
1998	510,000 cmd
2008	900,000 cmd

This means that the potential capacity (270,000 cmd) of the present systems should be just sufficient for the current city's requirements. Whereas, for the future, a large supply of water is absolutely necessary. Hence, further rehabilitation and expansion projects are

required to improve the present situation, as well as to enhance the effectiveness of the previous improvement project completed by the grant aid from the Government of Japan.

About half of the treated water in the Upper Ruvu system is either used legally and illegally or lost mostly due to leakage, from 50 km long transmission pipelines. If the leakage is detected, the current capacity should meet the current water demand. However, there are still problems on distribution system. The distribution system has been expanded in an unplanned way, without proper planning of the trunk main layout. In addition, the fairly long distance between the reservoirs and the consumers premises hinders as good pressure distribution to the whole area to be supplied. As a consequence, there is an extremely uneven distribution - pressure and heavy losses in the network.

3: PRESENT SITUATION AND SUGGESTED IMPROVEMENT

The city of Dar es Salaam is currently supplied with water from the three sources as follows:

- Upper Ruvu Water Treatment Plant started in 1959, completion of 5th phase in 1975, design capacity of 82,000 cubic meters per day (cmd), present production capacity in approximately 49,000 cmd (60% of the design capacity).

- Lower Ruvu water Treatment Plant started in 1976, design capacity of 182,00 cmd, present production capacity is approximately 164,000 cmd (90% of the design capacity).

- Mtoni Water Treatment Plant start of operation at full capacity in 1973, design capacity 6,136 cmd.

3-1 Upper Ruvu System

The Upper Ruvu System, using raw water from the Ruvu river is designed for a total capacity of 91,000 cmd but could never operate at full design capacity for a longer period for various reasons but mainly due to the insufficient intake facility and to the insufficient transmission pipelines.

The Government of Italy has pledged to provide financial support and technical assistance to rehabilitate and improve this system to enable it operate at its original design capacity.

The improvement will include

- improvement of intake facility
- construction of new pump house at intake
- construction of new pump house and additional treatment facilities at the treatment works
- provision of facilities along Mlandizi/Kimara rising main to take care of the unplanned high water comsumption along the main
- rehabilitation of Kimara storage tanks
- improvement of water situation to the critical water shortage areas in the upper service area of the distribution network.

The contractor for the project has already been chosen and commencement of works is expected around January 1988.

3-2 Lower Ruvu System

The Lower Ruvu system, completed in 1976 uses raw water from the Ruvu river. The intake facilities are placed at 27 km downstream from those of the Upper Ruvu system. The treatment plant is divided into two units, each with a capacity of 91,000 cmd. An adjacent plot in the treatment plant is reserved for future expansion of another unit of 91,000 cmd capacity. The problems relating to the Lower Ruvu system are not as numerous as the ones of Upper Ruvu since the facilities are comparatively new.

Urgent works are to rehabilitate/improve the existing facilities, that is, to increase the current capacity of 170,000 cmd to the design capacity of 182,000 cmd.

a) Rehabilitation of the intake facilities, particularly of the breastwall radial gates which control the sludge removal from the intake.

b) Construction of Grit Chamber

c) Rehabilitation of the existing pumping station

d) Doubling of the pipeline from the intake to the liftingstation (54" length 800)

e) Rehabilitation of the existing water treatment plant regarding in particular:

- chemical feeding system
- automation system for the clarifiers valves
- filters (replacement of sand beds, valves and semi-automatic control system)
- repair of flow controls

f) construction of clear water reservoir

g) rehabilitation and improvement of high lift pumping station.

3-3 Distribution System

In addition to an uneven distribution pressure in the city, there are great issues in the distribution system, estimated to be about 20-25%. Further, some of the pipes and fittings in the distribution system are clogged, worn out and inadequately sized. This problem is already noticeable in places like City Centre, Kurasini and Oysterbay. In addition, as Dar es Salaam grows, new areas will need water distribution system.

To carry out the future programme particularly on distribution system, it is required to assess the existing data, reports and informations for the purpose of formulating timely and orderly implementation toward the overall rehabilitation and/or expansion of the water supply facilities in future.

Thus, the preparation of a master plan and a feasibility study will become essential to optimize and/or to give priorities to the future rehabilitation and development projects for the water supply systems in Dar es Salaam.

4: DETAILS OF THE PROJECTS

Programme Goal

4-1 Programme Goal

Programme goal is focussed on the improvement of present water supply situation and the future development to accomplish steady, sufficient and clean water supply system which will contribute to the civil life and to the socio-economic activities in Dar es Salaam in coordination with the target of the National Development Plan.

4-2 Objectives of the Study

The objective of the study is to formulate an immediate improvement programme, a long-term development plan, and a short-term development plan for the improvement and expansion of the water supply system in Dar es Salaam for the next 20 years.

4-3 Study Period

Period of the study is estimated for 15 months. Starting from January 1988.

5: PROJECT WORK PLAN AND ACTIVITIES

Detailed works plan Project activities and scope work for each system.

Phase 1 (Immediate Improvement up to 3 months)

1) Evaluate all available data such as maps, geological, hydrological and climatological reports, census statistics, water production and demand etc. Analyse and develop such data and information as required to support the project analysis.

2) Define a general description of the proposed project, utilizing mentioned information and own investigation.

3) Conduct field surveys and make studies on population, socio-economics, locations of facilities, water production and consumption, capacity and requirements, availability of local construction materials and equipment and effect of the project on the environment.

4) Determine the chemical, physical and bacteriological quality of the water sources and treated water.

5) Determine the general capacities and efficiencies of the existing transmission, distribution, storage, pumping, treatment etc.

6) Determine the water leakage in distribution system as well as proposing systematic detection process of water leakages and the most cost-effective solution for improvement of the system.

7) Propose restoration of existing components for immediate improvement, to be implemented on a priority basis after been approved by NUWA.

8) Assess the expected impact of immediate improvement of the capacity and reliability of the existing water supply schemes.

Phase 11 (Master Plan up to 6 months)

1) Make hydrological study to determine the availability of various alternative water resources and prepare a development plan to

meet present and future demands.

2) Estimate increase in population, water demand of various consumers and land use from the projections of industrial and commercial growth over the designed period.

3) Delicate the service areas for the two specified periods (10 - 20 years), carefully evaluating future development of the study areas.

4) Provide the proposed water supply systems and develop alternative plans for water sourses, treatment, transmission and distribution of water supply systems for each period.

5) Select a plan, based on the least present cost, taking into consideration capital cost and annual operation and maintenance costs for at least 20 years.

Phase 111 (Feasibility Study up to 9 months)

1) Make preliminary engineering plans which are sufficiently accurate and complete to indicate the location, arrangement, evaluation and principal features of the project, which serve the basis for sound cost estimates, including drawings, design criteria and analysis, all sufficiently detailed to define the project.

2) Prepare cost estimates for the engineering, construction, operation and maintenance of the project recommended for the first period. Each of the cost items shall be defined in terms of local and foreign exchanges. Total cost estimated shall be a summation of the unit costs of the works including a bill of quantities and unit prices which consist of materials equipment and labour costs or other bases used for the estimates.

3) Prepare economic analysis of the project and its implications to the population with regard to health, income and social benefits as well as determine the community's willingness and ability to pay in terms of water tariff.

4) Prepare a financial plan based on the required investiment of the recommended project indicating sourse of funds and timing of

of the existing and projected financial operation including yearly estimate of revenue, operating expenditure, borrowing, capital investment, etc., and its effects of expected price escalation and water rate increase.

5) Prepare economic justification for the net benefits and costs. Costs shall be converted to economic cost to reflect alternative uses of resources by the nation. Benefits shall include effects of the Project on water users and national interest extended beyond local bounds.

6) Formulate proposals for further activities and respective Terms of Reference of detailed designs and tender documents, etc.

6: TIME SCHEDULE FOR PROJECT ACTIVITIES

ACTIVITIES	MONTHS 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Immediate Improvement	———
Long Term Master Plan	———
Feasibility Study	———

7: ASSISTANCE REQUESTED

7-1 Experts

ITEM	NO.	MAN-MONTH
Project Manager	1	12
Water Supply Engineer	3	36
Water Resources Engineer	1	12
Hydrologist	1	66
Socio-Economist	1	6
Other Experts	2	4
TOTAL	9	78

7.1.1 Justification for Requesting Experts:

A term of experts with multi-disciplinary fields of study will be required to solve such complicated yet delicate problem as a water supply system and come up with solid master plan and feasibility studies. It is anticipated that through the mission of these experts, NUWA counterparts will have transferred their technical know-how's, thus reducing, if not eliminating, the use of private consulting services.

7.1.2 Job Description of Each Expert Requested

Project Manager/Coordinator

A highly qualified person who has a diverse experience in the field on water supply. To be responsible for the progress, results and recommendations of the investigation and preparation of the master plan and feasibility study.

Experts

Highly qualified persons who have extensive experience in the field of work indicated and have been involved in International works are to be responsible for all phases of studies.

7.2 Fellowships

Field of Training	No.	M/M
1. General Planning	2	4
2. Water Engineering	2	4

7.2.1 Justification for Requesting Fellowships

In order to receive the most benefits possible from the Project, NUWA personnels should be given a chance for study tours such that the analyses and other important studies can be followed.

Complete knowledge of master plan, planning can readily be transferred. As a side benefit, these Tanzania personnels can be arranged to visit some water supply systems in other more developed countries.

7.3 Equipment

Description of Equipment	Amount Requested
1. Flow Measurement Equipment Set	5 Sets
2. Leakage Detector	3 Sets
3. Vehicle (Pick-ups)	5 Nos.

7.3.1 Justification for Requesting Equipment

Whenever a master plan study is performed, accurate quantity of water production and sale is always required. At the present, NUWA still lacks of flow measurement equipment both in quantity and quality. Modern equipment could spread up the work many times and yet give very accurate results.

A good master plan should also include evaluations of the existing system. Attempts should be made to detect leakages in the system. At the moment NUWA has inadequate device to do such a job. Leakage detectors provided by the Japanese Government can readily be used in this project and any subsequent projects that will follow.

In order not to render the above improvements just and by the completing of the project, a proper follow-up of the system and the taking up of prompt remedial measure is very vital if we are to make savings. In this case, vehicles will be needed to facilitate movement and also for carrying tools, equipments and other facilities needed for effecting improvements.

8: Tanzania Government Counterpart contributions to the Project:

1. Office space and facilities at NUWA
2. Laboratory facilities
3. Data provision
4. Data collection assistance and participation
5. Analysis assistance and participation
6. Policy guidance

2. Scope of Work

SCOPE OF WORK
FOR
THE STUDY ON REHABILITATION OF DAR ES SALAAM WATER SUPPLY
IN
THE UNITED REPUBLIC OF TANZANIA

AGREED UPON BETWEEN

NATIONAL URBAN WATER AUTHORITY
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

ON
7th OF JUNE, 1989

Mr. R. M. A. Swere
Director General,
National Urban Water
Authority

Mr. Haruo Iwahori
Leader of the Preliminary
Study Team,
The Japan International
Cooperation Agency (JICA)

Mr. N. K. MSimbira
Principal Secretary,
Ministry of Water

Endorsed by

Mr. M. T. Kibwana
Commissioner for External
Finance,
Ministry of Finance

I. INTRODUCTION

In response to the request of the Government of the United Republic of Tanzania (hereinafter referred to as "GOT"), the Government of Japan decided to conduct the Study on Rehabilitation of Dar es Salaam Water Supply in the United Republic of Tanzania (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

Accordingly, Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programmes of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned of GOT. The present document sets forth the Scope of Work with regard to the Study.

II. OBJECTIVE OF THE STUDY

The objectives of the Study are:

1. to prepare improvement plan for strengthening the National Urban Water Authority (hereinafter referred to as "NUWA")'s management and operation aspects to ensure sustainable development of NUWA.

2. to identify scope and size of the rehabilitation of the existing water supply system aiming at potable, sufficient and steady water supply throughout the service area, and to formulate timely and orderly implementation toward the overall rehabilitation.

3. to prepare preliminary design of the immediate rehabilitation work proposed above together with cost estimates and to verify viability of the rehabilitation from the aspects of costs and benefits.

III. STUDY AREA

The Study shall cover the water supply system for the city of Dar es Salaam.

IV. SCOPE OF THE STUDY

In order to achieve the objective mentioned above, the Study shall cover the following items:

1. Data collection and review
   (1) Socio-economic and Natural condition
   (2) On going water supply projects and other relevant projects
   (3) Water supply plan and other related plans

2. Study on existing water supply system
   (1) Design criteria
   (2) Structure, capacity and performance of water supply facilities

3. Study on institution, management, and financial condition
   (1) Institution
   (2) Management
   (3) Financial condition

4. Study on water treatment plants rehabilitation plan
   (1) Intake facilities
   (2) Treatment facilities
   (3) Water quality

5. Study on distribution system rehabilitation plan
   (1) Distribution pump and reservoir
   (2) Distribution pipe

6. Study on service system rehabilitation plan
   (1) Service pipe
   (2) Water meter

7. Study on cost recovery strategy
   (1) Water charge collection system
   (2) Financial plan

8. Formulation of maintenance plan
   (1) Management
   (2) Water treatment plant
   (3) Distribution system
   (4) Service system
   (5) Leakage prevention strategy
   (6) Repairshop

9. Formulation of training plan
   (1) Overall training program

10. Formulation of rehabilitation plan
   (1) Identification scope and size of rehabilitation
   (2) Formulation of implementation schedule
   (3) Identification of high priority project

11. Preliminary design of immediate rehabilitation work
   (1) Preliminary engineering design
   (2) Cost estimation
   (3) Financial evaluation

V. STUDY SCHEDULE

The Study will be carried out in accordance with the attached tentative schedule.

VI. REPORTS

JICA will prepare and submit the following reports in English to GOT.

1. Inception Report:
   Twenty (20) copies beginning of the Study in Tanzania.

2. Progress Report:
   Twenty (20) copies within five (5) months
   after commencement of the Study

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3. Interim Report:

Twenty (20) copies within nine (9) months after commencement of the Study

4. Draft Final Report:

Twenty (20) copies within thirteen (13) months after commencement of the Study

GOT will provide JICA with its comments within one (1) month after the receipt of the Draft Final Report.

5. Final Report

Thirty (30) copies within one (1) month after the receipt of the said comments on the Draft Final Report from GOT.

VII. UNDERTAKINGS OF THE GOVERNMENT OF TANZANIA

1. To facilitate the smooth conduct of the Study, GOT shall take the necessary measures:

(1) to secure the safety of the Study team,

(2) to permit the members of the Study team to enter, leave and sojourn in Tanzania for the duration of their assignment therein, and exempt them from alien registration requirements and consular fees,

(3) to exempt the members of the Study team from taxes, duties and other charges on equipment, machinery and other materials brought into Tanzania for the conduct of the Study,

(4) to exempt the members of the Study team from income tax and other charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Study team for their services in connection with the implementation of the Study,

(H)

(5) to provide necessary facilities to the Study team for remittance as well as utilization of the funds introduced into Tanzania from Japan in connection with the implementation of the Study.

(6) to secure permission for entry into private properties of restricted areas for the conduct of the Study.

(7) to secure permission for the Study team to take all the data and documents (including photographs and maps) related to the Study out of Tanzania to Japan. and

(8) to provide medical services as needed. Its expenses will be chargeable on the members of the Study team.

2. GOT shall bear claims. if any arises against the members of the Study team resulting from. occuring in the course of. or otherwise connected with the discharge of their duties in the implementation of the Study. except when such claim arise from gross negligence or willful misconduct on the part of the members of the Study team.

3. NUWA. as counterpart and contact agency to the Study team. shall act in relation with other govermental and non-governmental organizations concerned for the smooth implementation of the Study.

4. NUWA shall. at its own expense. provide the Study team with the following. in cooperation with other relevant organizations concerned. if necessary:

(1) available data. maps and information related to the Study.

(2) full-time counterpart personnel.

(3) appropriate number of personnel for field survey.

(4) suitable office space with necessary equipment in Dar es Salaam. and

(5) credential or identification cards.

(H)

VIII. UNDERTAKING OF JICA

For the implementation of the Study, JICA shall take the following measures:

1. to dispatch, at its own expense, the Study team to Tanzania, and

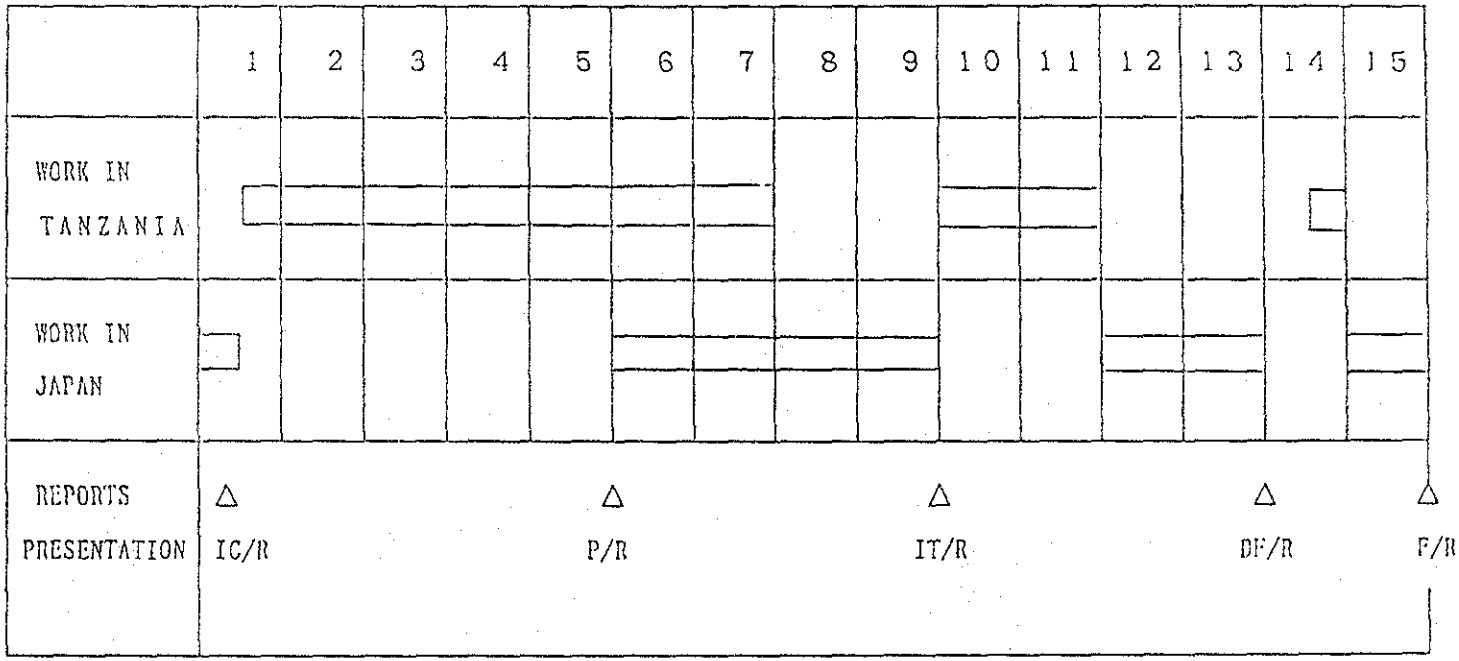
2. to pursue technology transfer to the Tanzanian countepart personnel in the course of the Study.

IX. CONSULTATION

JICA and NUWA shall consult with each other in respect of any matter that may arise from or in connection with the Study.

(4)

Tentative Schedule



3. 議事録 (M/M)

MINUTES OF MEETING

FOR

THE STUDY ON REHABILITATION OF DAR ES SALAAM WATER SUPPLY

IN

THE UNITED REPUBLIC OF TANZANIA

AGREED UPON BETWEEN

NATIONAL URBAN WATER AUTHORITY

AND

THE JAPAN INTERNATIONL COOPERATION AGENCY

ON

7th OF JUNE, 1989

Mr.R.M.A.Swere
Director General,
National Urban Water
Authority

Mr.Haruo Iwahori
Leader of the Preliminary
Study Team
The Japan International
Cooperation Agency (JICA)

I. INTRODUCTION

In response to the request of the Government of the United Republic of Tanzania, for the Study on Rehabilitation of Dar es Salaam Water Supply (hereinafter referred to as "the Study"), the Government of Japan decided to dispatch, through the Japan International Cooperation Agency (hereinafter referred to as "JICA") responsible for the implementation of the technical cooperation programmes of the Government of Japan, the Preliminary Study Team (hereinafter referred to as "the Team ") headed by Mr.Haruo Iwahori to Tanzania from 30th May to 13th June, 1989 in order to discuss and to exchange views on the Study with authorities concerned of Tanzanian Government.

As a result of the series of discussion, both sides have agreed upon and signed the Scope of Work.

The meetings agreed as follows:

1. The title of the Study is "The Study on Rehabilitation of Dar es Salaam Water Supply ".

2. 'Rehabilitation' defined herein implies;
   (1) rehabilitation of the existing water supply system, and
   (2) necessary improvement of the distribution system for the maximum utilization of existing production capacity.

3. The NUWA requested the study on water resource development for the future expansion of the Dar es Salaam water supply.
   The Team advised the NUWA to request it as another technical assistance, if necessary.

4. In the Study, the area along the transmission pipe lines shall be excluded.

5. In the Study on institution, management, and financial condition, present NUWA head office shall be included together with NUWA DSMB as far as the Dar es Salaam water supply business is concerned.

6. In the Study on water treatment plant rehabilitation plan, the Upper Ruvu water treatment plant and its transmission line which are being implemented under the aid of Italian Government shall be excluded.

7. Scope and procedure for the Study on distribution pipe and service system rehabilitation plan is as follows:

(1) to investigate present water supply condition in the total supply area by hearing or checking of pressure,

(2) to select two model-areas (25ha/area), then draw distribution pipe networks,

(3) to select 10 model-areas (3model-areas by the JICA Study Team and NUWA, 7model-areas by NUWA) (20connections/area), then check accounted for water and unaccounted for water, and

(4) to identify scope and size of the rehabilitation.

8. NUWA agreed to provide approximetely 150m² office with necessary equipment and facilities such as desks, chairs, cabinets, etc., three engineers for field survey, data collection, review, and interpretation, 15 technical staff, 15 labourers for survey activities at the site, one typist, one secretary and two drivers during the survey period of 10 months.

9. The Team requested Tanzanian side two vehicles and necessary equipment for the Study. However, due to shortage of vehicles and necessary equipment for the Study, the Team was strongly advised to prepare the vehicles and necessary equipment by Japanese side for the smooth execution of the study.

10. In reference to technology transfer, NUWA requested the Team to receive participants for technical training in Japan during the course of the Study.
The Team answered that the request will be conveyed to the authorities concerned in Japan.

11. All data and documents in the submitted Questionnaire other than the data collected by the Team during its stay shall be prepared before the Study begins.

(H) 12. The Scope of Work will be effected after endorsement by the Ministry of Finance.

LIST OF ATTENDANCE

MEETING IN NUWA DSM BRANCH OFFICE 7th JUNE, 1989

1. TANZANIAN SIDE

1. MR. R.M.A. SWERE	DIRECTOR GENERAL NATIONAL URBAN WATER AUTHORITY
2. MR. R. RUHONGOLE	DIRECTOR FOR MANPOWER DEVELOPMENT AND ADMINISTRATION NUWA
3. MR. A. RUGASHUMBA	DIRECTOR OF OPERATIONS NUWA
4. MR. L. MATERU	AG. DIRECTOR, PROJECT PLANNING AND IMPLEMENTATION NUWA
5. MR. A. KAAYA	AG. BRANCH MANAGER NUWA DSM BRANCH
6. MR. D.M. MIHAMBO	DISTRIBUTION ENGINEER NUWA DSM BRANCH
7. MR. M. MPINA	LEGAL OFFICER NUWA
8. MR. A. SENGUO	HEAD OF PLANNING UNIT NUWA

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2. JAPANESE SIDE

MR. HARUO IWAHORI	DEVELOPMENT SPECIALIST. INSTITUTE FOR INTERNATIONAL COOPERATION, JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
MR. ISAO OHMORI	WATER SUPPLY ENGINEER. WATER SUPPLY DIVISION, WATER SUPPLY AND ENVIRONMENTAL SANITATION DEPT ENVIRONMENTAL HEALTH BUREAU, MINISTRY OF HEALTH & WELFARE
MR. MITSUAKI FURUKAWA	STAFF. SECOND DEVELOPMENT SURVEY DIVISION, SOCIAL DEVELOPMENT COOPERATION DEPT., JICA
MR. TAKAYUKI NIIKURA	WATER SUPPLY ENGINEER. OVERSEAS SERVICES DEPT., NIHON SUIDO CONSULTANTS CO. LTD.
MR. HIROYASU YODA	WATER SUPPLY ENGINEER. OVERSEAS SERVICES DEPT., NIHON SUIDO CONSULTANTS CO. LTD.

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4. 面談者リスト

面談者リスト

部　　局	担　　当	氏　　名
MINISTRY OF FINANCE	COMISSIONER FOR EXTERNAL FINANCE	M.T. KIBWANA
	FINANCIAL MANAGEMENT OFFICER	MBENA
MINISTRY OF WATER	PRINCIPAL SECRETARY	N.K.MSIMBERA
NATIONAL URBAN WATER AUTHORITY (NUWA)	DIRECTOR GENERAL	ROBERT M.A. SWERE
	LEGAL SECRETARY	MARTIN A. MPINA
	DIRECTOR MANPOWER ADM	R.E.K RUHONGOLE
	DISTRIBUTION ENG.	D.M. MIHAMBO
	PROJECT IMPLEMENTATION	L.W. MATERU
	QUALITY CONTROL MANAGER	L.H. LIKUDA
	CHIEF INTERNAL AUDITOR	M. MUAKIBIKI
	PROJECT ENGINEER	M. MULAGWANDA
DAR ES SALAAM BRANCH	BRANCH MANAGER	KAAYA
	LOWER RUVU T/P ENG.	E.T. NYANGE
	UPPER RUVU T/P ENG.	KASIGA B.M.M.
	MTONI T/P ENG.	RHALD O. SIMBA
日本国大使館	公　使	田　中　三　郎
	一等書記官	金　子　正　彦
JICA 事務所	次　長	飯　塚　駿　介
		本　村　　洋

5. 収集資料リスト

収集資料リスト

<REPORTS AND DOCUMENTS (報告書類)>

1) "REPORT ON THE DAR ES SALAAM WATER DISTRIBUTION SYSTEM: VOLUME 1 OF 2" BY UNDERWOOD McLELLIAN & ASSOCIATES LIMITED, CANADA, AUGUST 1977 ……配水管の改修計画書

2) "TECHNICAL SUPPLEMENTS 1, 2, 3 & 4: DAR ES SALAAM MASTER PLAN" BY MARSHALL MONAGHAN LTD., ONTARIO CANADA, OCTOBER 1979 ……ダルエスサラーム市マスタープラン

3) "PROPOSAL FOR A JAPANESE GOVERNMENT GRANT FOR THE IMPLEMENTATION OF MASTER PLAN AND FEASIBILITY STUDY ON IMPROVE OF DAR ES SALAAM WATER SUPPLY SYSTEM" BY GOVERNMENT OF UNITED REPUBLIC OF TANZANIA, DECEMBER 1980 ……日本政府への要請書

4) "1ST ANNUAL REPORT AND ACCOUNTS FOR THE PERIOD ENDING 30TH JUNE, 1983" BY NUWA ……NUWAの会計報告書

5) "2ND ANNUAL REPORT AND ACCOUNTS FOR THE PERIOD ENDING 30TH JUNE, 1984" BY NUWA ……NUWAの会計報告書

6) "3RD ANNUAL REPORT AND ACCOUNTS FOR THE PERIOD ENDING 30TH JUNE, 1985" BY NUWA ……NUWAの会計報告書

7) "UPPER RUVU INTAKE PROBLEMS" BY UNIVERSITY OF DAR ES SALAAM, MAY 1985 ……ダルエスサラーム総合大学のUPPER RUVU取水施設の問題点についてスタディしたもの

8) "REHABILITAION STUDY OF THE LOWER RUVU WATER TREATEMNT PLANT, TANZANIA" BY GORE & STORRIE LIMITED, 1986 ……カナダ援助によるLOWER RUVU浄水場の改修計画書

9) "SECTOR STRATEGY AND ACTION PLAN (FINAL DRAFT)", AUGUST 1987 ……MINISTRY OF WATERの基本方針, 方策, 事業計画に対する立案書

10) "MEASURES TO STRENGTHEN NATIONAL URBAN WATER AUTHORITY (DISCUSSION DRAFT)", NOVEMBER 1987 ……世銀がNUWAの組織運営についてレビューしたもの

11) "REVIEW OF THE STATUS OF THE LOWER RUVU WATER TREATMENT PLANT, TANZANIA" BY GORE & STORRIE LIMITED FOR STOTHERT MANAGEMENT LIMITED, DECEMBER 1988 ……1986年のLOWER RUVU浄水場改修計画書の改定版

12) "1988 POPULATION CENSUS: PRELIMINARY REPORT" BY BUREAU OF STATICS, MINISTRY OF FINANCE, ECONOMIC AFFAIRS AND PLANNING, DAR ES SALAAM, 1988 ……1988年の人口センサス速報結果

<DATA AND INFORMATION (データ類)>

13) "THE URBAN WATER SUPPLY ACT", 1981

14) "NUWA FUNCTION AND JOB DESCRIPTION" BY NUWA, 1989

15) "ORGANIZATION CHART OF MINISTRY OF WATER, NUWA & DSMB", 1989

16) "ACCOUNTS OPERATION MANUAL" NUWA

17) "BALANCE SHEET AND INCOME STATEMENT 1987 AND 1988" NUWA

18) "REPORTS OF THE AUDITORS, NUWA", JUNE 1986

19) "LIST OF MOTOR VEHICLES AT DAR ES SALAAM BRANCH" DSMB, 1989

20) "COUNTRY EXTERNAL SUPPORT INFORMATION", MAY 1989

<DRAWING (図面類)>

21) "DSM WATER DISTRIBUTION SYSTEM" BY DSMB, AUGUST 1988 (SCALE: 1/25,000, PIPES OF 6" IN DIAMETER OR MORE)

22) "DSM WATER DISTRIBUTION SYSTEM" BY DSMB, 1983 (SCALE: 1/25,000 OR 1/10,000, 5 SHEETS THAT SHOW LOCATION OF VALVES, FIRE HYDRANTS AND PIPE DIAMETER)

以上の他に重要資料として次のものがある。これらは事前調査の段階では全てのコピーをとることができなかったものである。

-"HYDROLOGICAL YEAR-BOOK 1950-1959" BY THE WATER DEVELOPMENT & IRRIGATION DIVISION, MINISTRY OF AGRICULTURE, 1963
……RUVU 川の水文データ

-"HYDROLOGICAL YEAR-BOOK 1971-1980" BY THE MINISTRY OF WATER
……RUVU 川の水文データ

-"INVESTIGATION REPORT, COAST/DAR ES SALAAM REGIONS WATER MASTER PLAN" VOLUME 1 BY CANADIAN INTERNATIONAL DEVELOPMENT AGENCY, FEBRUARY 1978 ……RUVU 川の水文データ (コピーの一部を提示)

-"REHABILITAITON AND IMPROVEMENT OF UPPER RUVU WATER SYSTEM, DAR ES SALAAM WATER SUPPLY SYSTEM" VOLUME 1 (ECONOMIC EVALUATION) BY LODIGIANI S.p.A ……UPPER RUVU 浄水場改修改善計画書

-"DRAWINGS: LOWER RUVU WATER SUPPLY SYSTEM" BY UNDERWOOD McLELLAN & ASSOCIATES LIMITED, JULY 1973 (SCALE: 1/100, 1/1,000) ……LOWER RUVU 浄水場及び送水管市設図 (コピーの一部を提示)

"EXISTING WATER SUPPLY SYSTEM TO UKONGA GONGO LA MBOTO TPDF CAMP AND PUGU SECONDARY SCHOOL" BY DSMB, SEPTEMPBER 1976 (SCALE: 1/10,000)

"INVESTIGATION REPORT"

COAST/DAR ES SALAAM REGIONS WATER MASTER PLAN の APPENDICES VOLUME 1 より引用

RUVU RIVER AT KIBUNGO
STATION NUMBER 1H5
LAT. 7°01'S LONG 37°48'E
CATCHMENT AREA 420 sq. km

RUNOFF DATA IN 1/1

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1953											124.8	160.7	
1954	123.7	91.6	133.3	198.3	269.0	101.3	54.9	39.1	32.0	49.9	70.8	75.5	1239.4
1955	40.2	103.1	64.6	224.7	326.0	150.7	107.2	66.7	41.7	44.3	95.7	117.2	1382.1
1956	146.8	136.9	181.2	261.1	232.3	131.9	67.0	43.5	32.6	27.7	68.7	58.7	1388.4
1957	72.2	91.6	64.6	317.2	209.6	87.2	58.7	57.0	47.0	47.0	63.1	85.5	1280.8
1958	64.9	78.1	136.0	241.7	204.4	102.8	50.8	37.9	31.7	22.4	35.2	57.3	1063.3
1959	64.3	52.9	66.4	118.7	130.4	43.5	32.6	39.9	30.8	51.4	54.0	44.2	729.1
1960	69.4	42.2	154.5	361.3	122.9	81.1	49.1	35.2	27.3	36.7	30.2	17.5	1027.4
1961	22.9	85.8	108.5	136.1	117.3	54.03	118.0	59.6	88.0	148.8	453.9	191.1	1584.0
1962	219.9	93.0	178.9	228.6	240.6	78.5	56.5	94.5	77.5	66.5	81.1	125.2	1540.9
1963	205.9	108.1	186.7	318.8	144.9	81.2	57.2	41.1	28.0	21.0	325.0	178.1	1696.2
1964	163.4	80.8	168.9	310.4	163.4	91.2	50.0	41.1	28.3	72.4	29.1	41.8	1240.8
1965	52.1	39.1	65.7	296.5	148.2	91.2	50.0	32.2	39.9	100.3	175.0	179.5	1269.6
1966	186.2	170.2	192.9	323.6	169.5	111.0	64.0	41.4	46.9	51.7	86.9	63.3	1507.6
1967	34.3	87.1	58.1	161.2	265.0	167.9	119.3	93.3	179.3	94.5	-	476.4	-
1968	190.7	84.0	174.3	514.0	271.9	229.5	86.4	53.8	40.0	34.3	145.5	140.0	1964.5
1969	51.9	49.0	144.8	289.3	234.0	101.9	63.6	74.0	54.5	73.1	109.3	85.7	1331.2
1970	100.2	146.4	170.0	312.4	132.1	60.2	40.5	31.9	59.5	38.8	144.4	167.3	1403.6
1971	91.9	64.8	269.0	246.0	204.3	78.6	80.7	43.6	33.3	35.2	28.1	27.9	1003.3
1972	104.0	36.9	89.0	-	306.0	97.9	60.2	42.4	69.0	107.4	174.3	163.6	1250.7
1973	190.5	135.0	119.5	429.0	335.7	102.4	80.5	75.7	41.2	43.8	85.5	91.7	1730.5
1974	64	38.8	77.6	351.7	357.1	120.5	86.4	49.0	46.7	45.7	34.5	32.1	1304.3
1975	49.8	21.0	70.2	202.1	203.1	84.0	66.0	38.6	47.4	59.3	33.1	79.3	953.8
MEAN	105.0	83.5	121.6	278.2	221.3	98.1	68.2	51.4	49.6	57.8	112.6	110.2	1357.4

KOVU RIVER AT KIDUNDA
STATION NUMBER 1K3
LAT. 7°16'S LONG 38°18'E
CATCHMENT AREA 6780 sq.km.

RUNOFF DATA IN 1/1

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1950													
1951								6.0	3.7	6.1	23.9	25.7	
1952	20.0	18.4	17.0	53.5	59.5	13.0	7.2	5.1	4.2	4.4	13.2	4.6	220.1
1953	5.2	2.3	7.5	29.9	55.0	17.0	7.5	6.1	7.0	7.3	7.4	9.2	161.4
1954	15.3	7.9	18.1	23.1	45.5	13.8	6.9	4.7	3.2	5.0	6.4	7.2	157.1
1955	4.6	24.8	12.6	58.1	92.1	32.0	16.9	10.1	6.0	5.6	10.5	12.0	285.3
1956	22.9	32.6	34.6	79.4	53.5	21.1	10.6	6.7	4.7	3.6	8.7	7.1	271.3
1957	14.2	18.4	17.2	73.4	85.6	18.4	10.6	8.5	7.5	6.9	10.6	13.7	285.0
1958	7.1	12.7	26.0	59.5	56.1	20.9	9.5	6.3	4.2	3.2	3.5	10.9	219.9
1959	7.4	13.5	14.3	16.4	19.1	6.1	4.7	4.8	3.8	3.9	5.6	4.7	104.3
1960	16.5	6.6	26.6	81.1	27.7	13.1	7.8	4.9	3.2	3.7	3.1	1.4	195.7
1961	1.9	17.0	17.4	23.1	30.7	8.0	13.7	7.1	7.3	14.0	72.1	52.8	265.1
1962	66.1	24.0	55.7	46.8	52.2	14.0	9.1	10.3	8.0	5.0	7.3	12.6	331.1
1963	27.8	15.6	39.9	87.2	38.2	13.7	9.4	6.0	3.6	2.5			
1964													
1965													
MEAN	19.1	16.2	23.9	52.6	51.3	15.9	9.5	6.7	5.1	5.5	14.4	13.5	233.6

RUVU RIVER AT LIKULA
STATION NUMBER 1H10
LAT. 7°16'S LONG 38°10'E
CATCHMENT AREA 5870 sq.km

RUNOFF DATA IN M3

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1965													
1966									6.1	6.7	10.8	8.2	-
1967	4.1	13.6	11.8	38.4	66.8	36.1	19.5	16.2	24.3	14.9	43.7	-	-
1968	47.3	20.3	74.3	-	-	43.5	18.1	10.6	7.6	5.2	21.6	29.0	-
1969	9.7	10.5	30.6	36.4	80.0	18.6	10.9	9.8	7.4	7.4	12.5	11.6	245.2
1970	29.5	50.1	48.3	58.8	24.8	10.7	6.2	3.8	8.1	4.6	2.7	22.4	269.8
1971	16.9	12.7	-	68.4	34.6	14.7	12.7	6.9	4.5	5.0	3.7	6.3	-
1972	20.4	7.0	17.8	87.1	93.7	23.4	11.1	7.0	9.3	13.4	19.8	22.6	332.4
1973	40.8	30.9	27.3	80.6	108.1	16.7	9.9	-	4.5	3.9	8.6	10.0	-
1974	7.6	5.5	7.2	47.9	-	19.0	11.5	6.6	4.1	4.6	2.8	2.8	-
1975	7.9	2.4	14.4	38.3	50.9	17.5	10.5	5.6	6.2	6.7	4.3	10.7	175.5
MEAN	20.5	17.0	29.0	57.0	65.6	22.2	12.3	8.3	8.2	7.2	13.0	13.7	274.00

RUVU RIVER AT RUVU ESTATE
STATION NUMBER 1H2
LAT 6°48'S LONG 38°39'E
CATCHMENT AREA 12635 sq.km

RUNOFF DATA IN M³/S

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1950								5.12	6.34	5.18	4.43	9.30	
1951	5.18	10.45	8.62	22.46	26.95	10.84	7.58	4.09	2.60	3.23	14.04	4.55	130.60
1952	13.00	9.59	9.86	28.90	37.40	7.26	4.01	2.81	2.21	2.30	5.87	2.75	126.06
1953	2.69	1.26	2.89	15.82	44.53	11.62	4.90	3.49	3.92	3.52	3.76	4.13	102.53
1954	8.41	4.17	8.04	12.30	39.55	10.94	4.76	2.99	2.13	2.79	3.41	3.51	102.98
1955	1.81	9.96	7.44	39.15	57.51	27.14	9.10	5.16	2.71	2.21	4.36	5.14	171.70
1956	19.53	21.68	24.02	48.04	42.57	14.15	5.89	3.76	2.62	1.93	4.20	2.23	190.72
1957	6.45	17.97	10.35	29.88	63.96	11.81	6.68	4.96	3.52	4.41	7.75	14.35	182.10
1958	5.89	7.30	12.89	26.56	42.77	15.04	7.23	4.20	2.85	1.78	1.52	4.26	132.26
1959	3.76	6.42	9.35	10.74	17.09	4.37							
MEAN	7.40	9.87	10.38	25.98	41.37	12.57	6.27	4.06	3.21	3.04	5.48	6.69	136.32

KUVU RIVER AT MOROGORO ROAD BRIDGE
STATION NUMBER 1E8
LAT 6°41'20"S LONG 38°41'55"E
CATCHMENT AREA 13945 km²

RUNOFF DATA IN M3

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1959											2.55	2.75	
1960	6.00	4.83	10.44	39.22	27.18	7.71	4.86	2.87	1.64	1.30	1.65	0.64	108.33
1961	0.63	8.42	9.50	7.58	19.61	5.42	7.73	4.54	3.03	8.20	83.67	42.58	201.33
1962	68.15	12.38	27.21	23.99	28.61	8.35	5.14	5.01	4.44	2.90	3.25	5.52	194.96
1963	11.69	8.46	14.38	64.66	27.66	8.30	6.18	3.97	2.59	1.79	24.41	39.32	213.40
1964	24.17	7.76	19.23	71.53	21.90	13.10	4.98	3.83	2.85	3.50	2.48	1.82	177.14
1965	4.96	3.47	3.85	27.21	12.70	8.25	3.70	2.62	2.35	3.64	8.18	11.11	92.05
1966	9.55	12.81	13.44	42.60	20.86	10.23	6.59	3.96	2.88	2.46	3.97	3.55	132.88
1967	1.63	4.27	4.69	19.35	43.89	20.24	9.29	8.25	10.57	7.52	14.21	55.67	199.58
1968	30.56	9.00	32.82	131.97	60.91	27.91	10.02	5.42	3.79	2.69	10.69	30.20	355.58
1969	4.93	6.48	10.71	21.91	46.37	9.31	5.41	4.04	3.18	2.85	4.40	4.60	124.21
1970	7.72	18.95	21.56	28.56	12.01	5.29	3.23	1.98	2.90	1.94	1.11	6.35	112.31
1971	7.15	5.84	2.60	26.37	25.03	7.06	5.33	2.16	1.10	1.08	1.00	1.97	84.70
1972	0.67	1.94	-	27.82	45.42	15.82	4.14	1.96	3.07	5.11	9.16	11.22	-
1973	19.29	-	14.22	31.94	54.52	9.66	5.29	4.32	2.61	2.19	3.40	4.70	-
1974	5.24	2.98	2.45	16.98	58.02	11.93	6.18	3.17	2.19	2.11	1.58	1.20	112.03
1975	3.36	1.27	8.03	28.29	28.76	12.37	5.36	2.81	2.36	2.55	1.67	4.14	100.97
MEAN	12.73	7.26	15.01	38.12	33.27	11.31	5.84	3.83	3.41	3.24	10.44	13.37	155.83

KIZINGA RIVER AT MZAGALA
STATION NUMBER 1J5
LAT 6°54'S LONG 39°14'E
CATCHMENT AREA 191 sq.km.

RUNOFF DATA IN MM

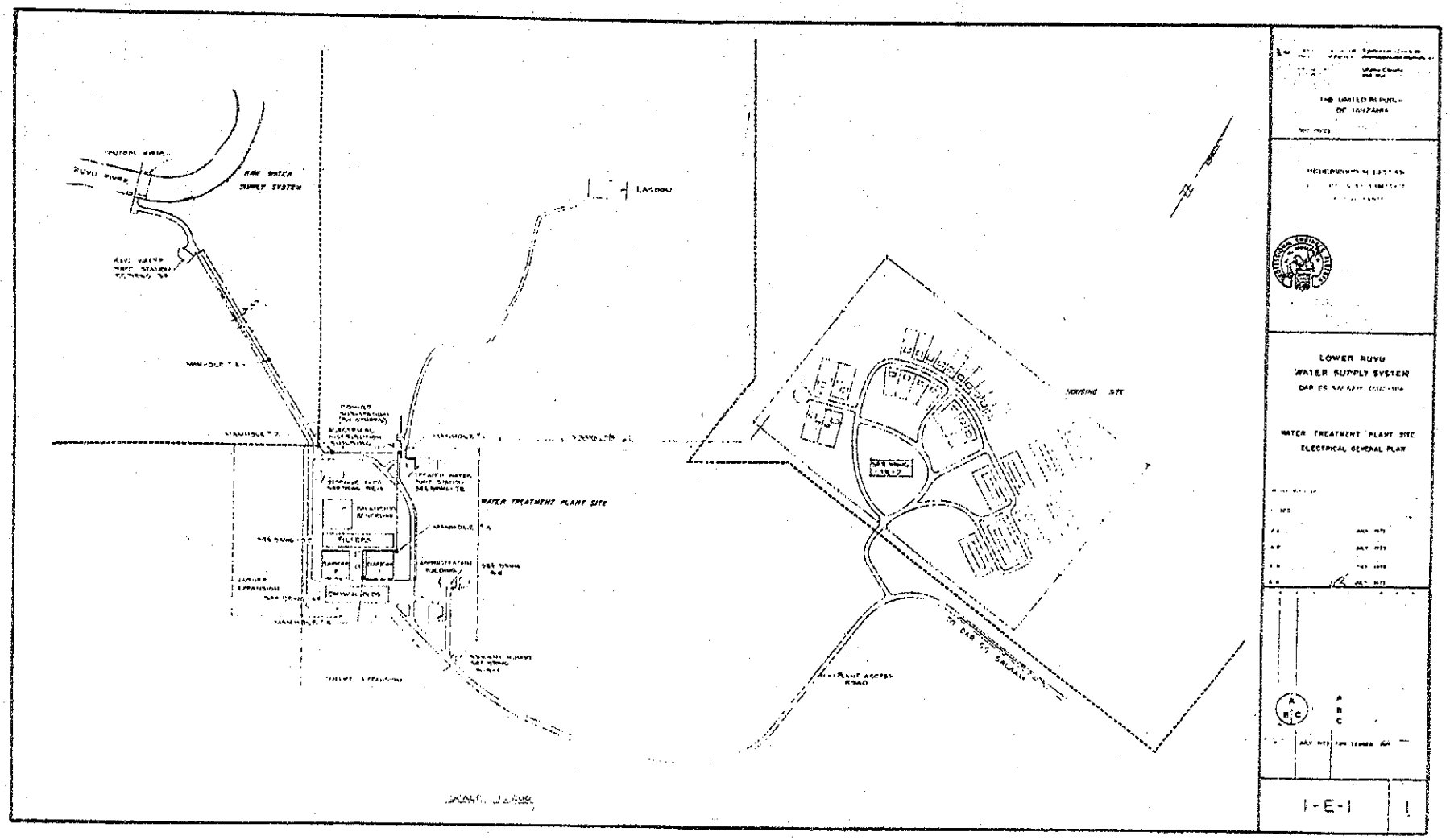
YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1966											1.55	1.85	
1967	0.97	0.80	0.75	8.55	12.77	10.12	6.33	2.75	2.37	3.18	8.79	13.42	70.80
1968	2.77	2.63	23.38	38.81	30.92	21.51	10.35	6.37	4.18	3.81	19.11	21.01	184.22
1969	8.48	8.34	16.40	20.53	37.36	19.08	12.37	9.76	6.44	4.36	7.71	7.54	158.37
1970	6.14	5.05	3.44	11.55	9.71	2.52	-	1.35	1.95	0.95	0.72	2.12	-
1971	1.04	1.11	1.12	7.52	11.15	4.76	2.03	1.77	0.54	1.91	0.48	0.67	34.10
1972	1.29	0.56	2.32	17.86	37.92	13.25	7.47	4.07	2.72	3.35	8.47	7.45	106.73
1973	3.86	1.89	1.52	16.42	20.73	9.67	6.02	3.11	1.44	1.01	0.52	1.56	67.75
1974	1.52	0.74	0.94	9.77	10.36	2.15	2.22	0.92	0.70	0.67	0.49	0.37	33.00
1975	0.29	0.18	0.47	11.28	20.62	7.91	1.72	0.59	1.90	0.39	1.67	1.42	48.44
1976	0.23	0.15	5.51	13.95	22.59	10.30	8.40	3.66	1.97	2.15	-	-	-
MEAN	2.66	2.15	5.58	13.82	16.91	10.13	6.32	3.44	2.42	2.18	4.50	5.22	75.32

LUZINGA RIVER AT MAJIMATITU
STATION NUMBER 1J6
LAT. 6°57'S LONG. 39°15'E
CATCHMENT AREA 525 sq.km.

RUNOFF DATA IN l/s

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1967											2.94	9.42	
1968	1.05	0.10	10.77	28.81	20.21	13.51	1.84	0.78	0.36	0.36	15.06	20.06	112.91
1969	2.71	1.50	8.27	21.94	35.47	9.84	3.82	2.30	1.49	0.83	2.04	5.27	95.5(
1970	2.66	4.60	8.51	3.93	3.29	0.99	0.38	0.13	0.27	0.07	0.01	0.14	24.9(
1971	-	-	-	8.72	10.23	3.53	0.98	0.35	0.12	0.01	0	0	-
1972	0	0	0.23	21.05	33.28	11.64	2.31	0.96	0.44	0.46	2.78	3.17	64.4(
1973	0.15	0.08	0.09	0.89	15.57	2.13	1.26	0.69	0.17	0.07	0.02	0.09	21.2(
1974	0.12	0.02	0.08	-	-	0.89	0.65	0.06	0	0	0	0	-
1975	0	0	0.63	-	-	-	0.84	0.15	2.07	1.20	0.05	0.25	-
1976	0.11	0	1.51	3.90	12.09	7.03	2.51	1.03	0.19	0.09			
MEAN	0.85	0.79	3.79	12.75	18.59	6.20	1.62	0.72	0.57	0.34	2.54	4.27	53.0(

"DRAWINGS : LOWER RUVU WATER SUPPLY SYSTEM" より主要図面のみ縮少コピー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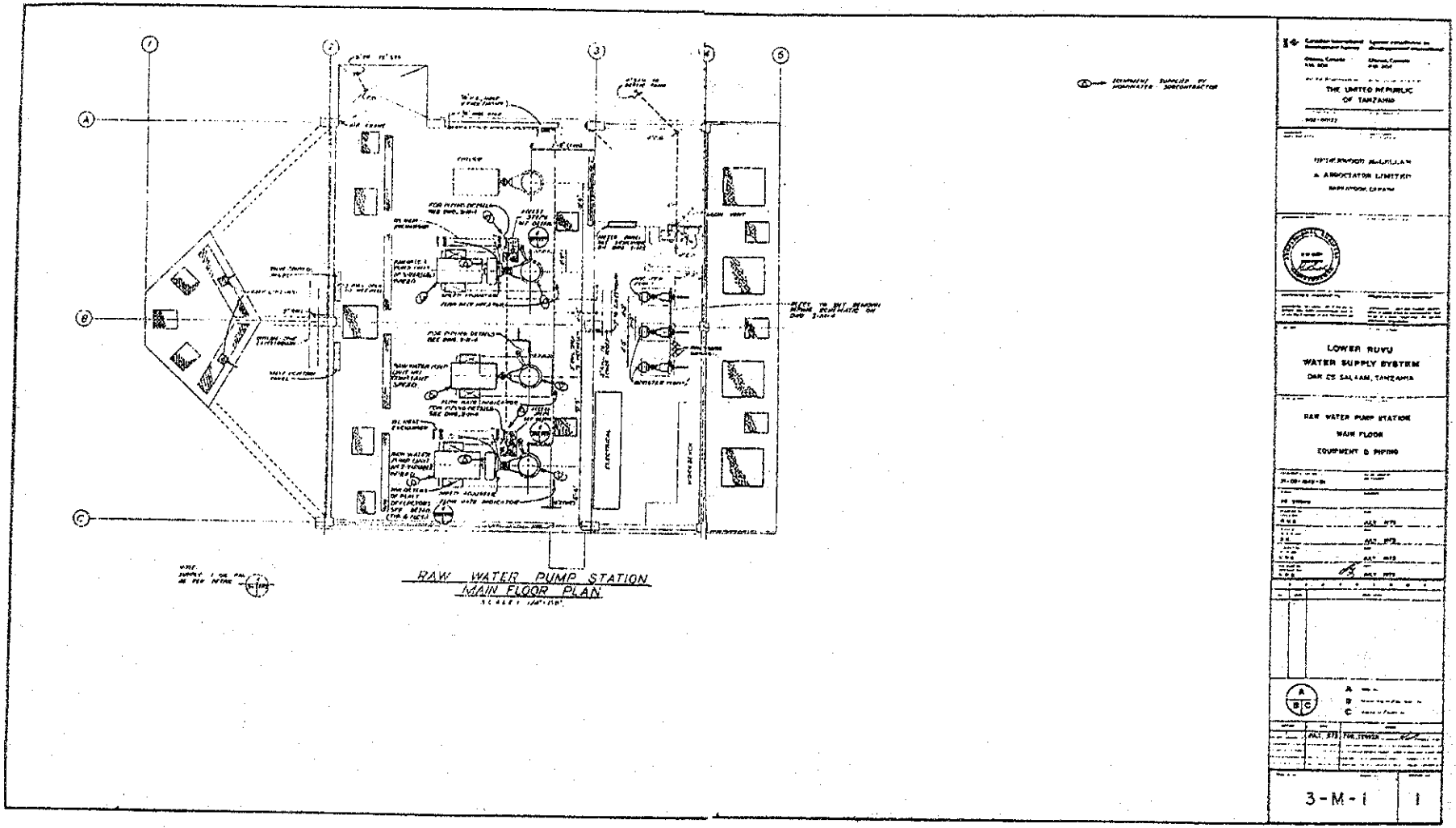
LAGOON
WATER TREATMENT PLANT SITE
FILTERS
LOWER RUVU
WATER SUPPLY SYSTEM
WATER TREATMENT PLANT SITE
ELECTRICAL GENERAL PLAN
I-E-1
1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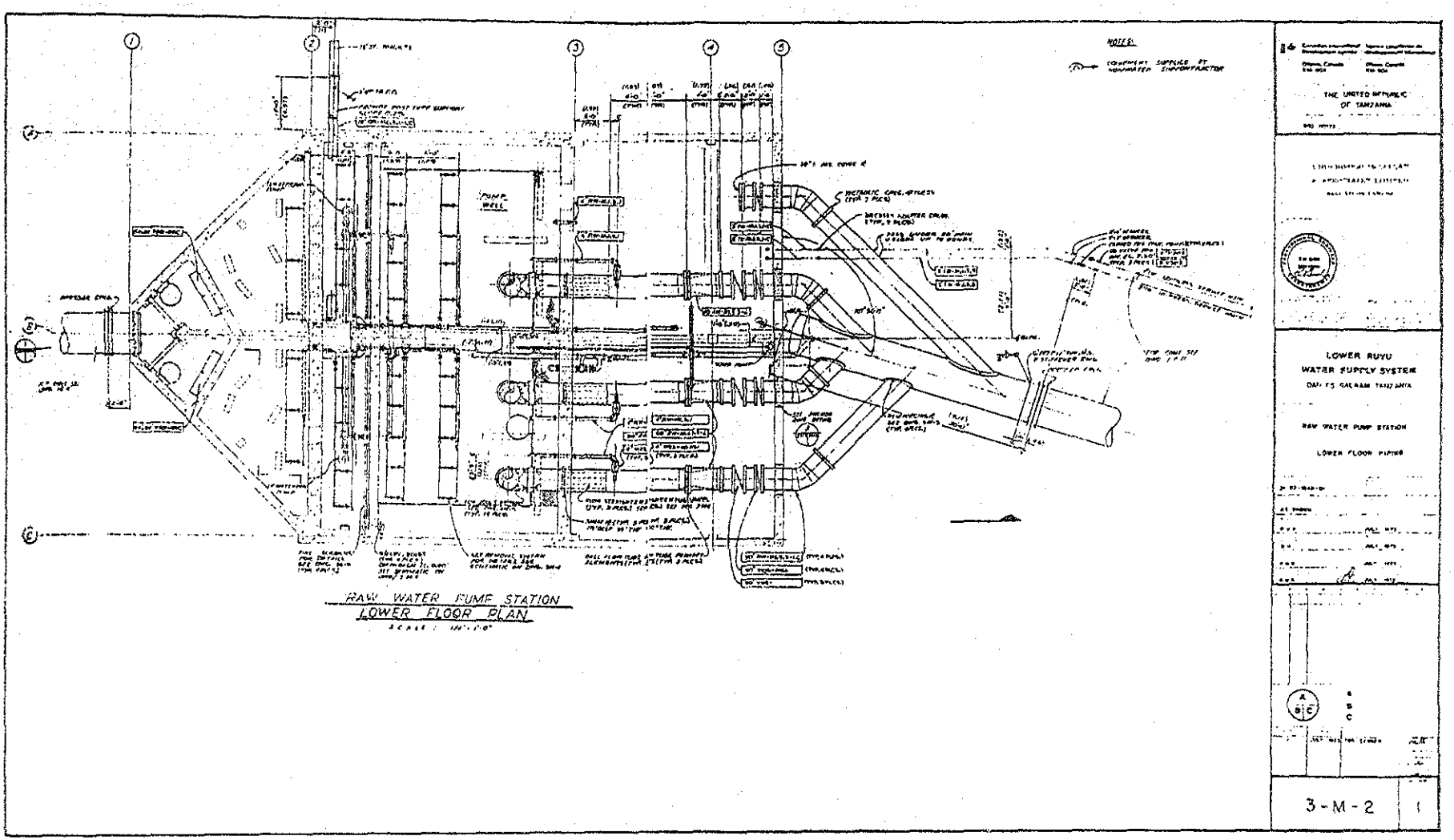
MAIN FLOOR PLAN
THE UNITED REPUBLIC OF TANZANIA
LOWER RUVU
WATER SUPPLY SYSTEM
DAR ES SALAAM, TANZANIA
RAW WATER PUMP STATION
MAIN FLOOR
EQUIPMENT & PIPING
3-M-1
1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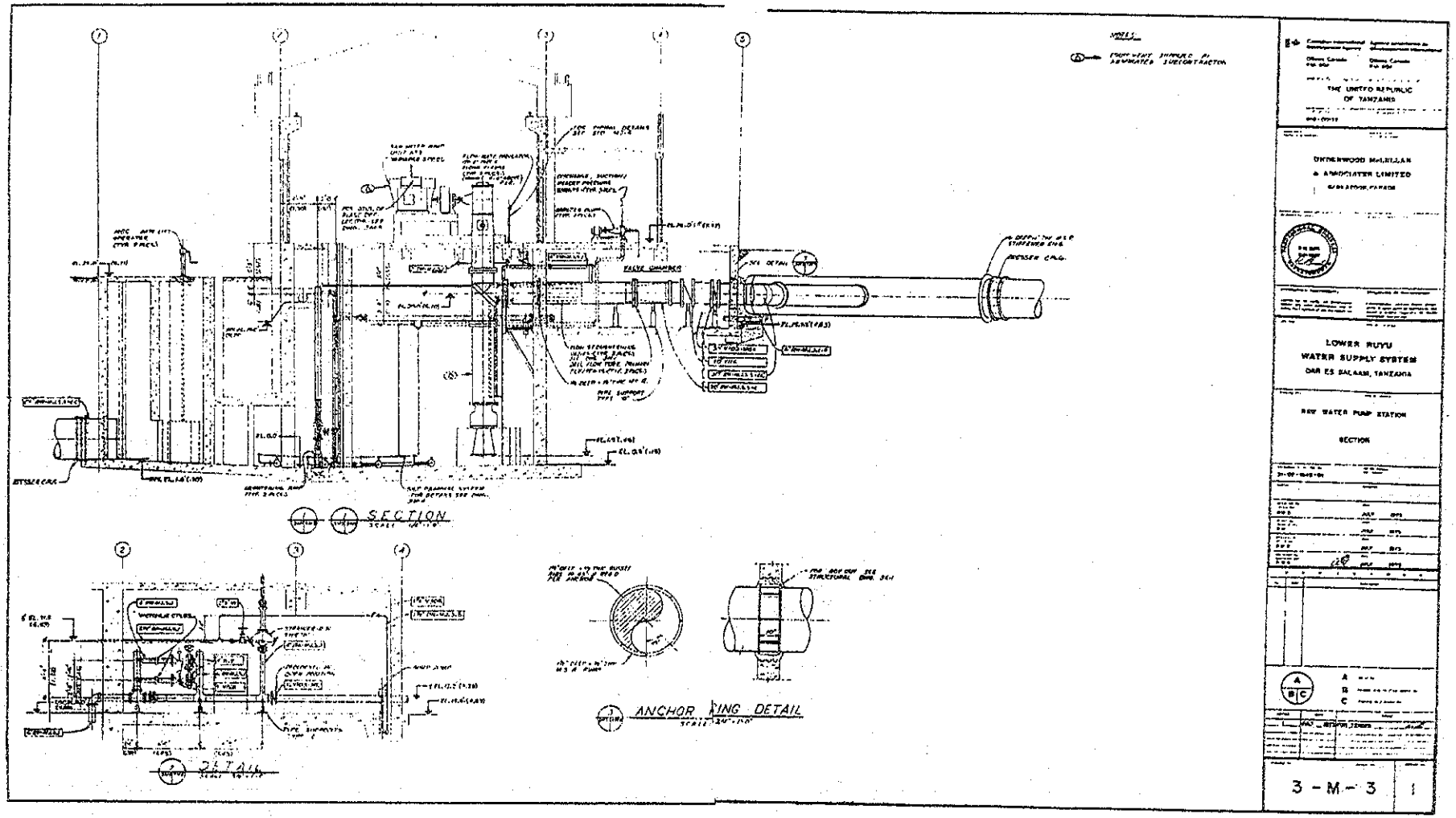
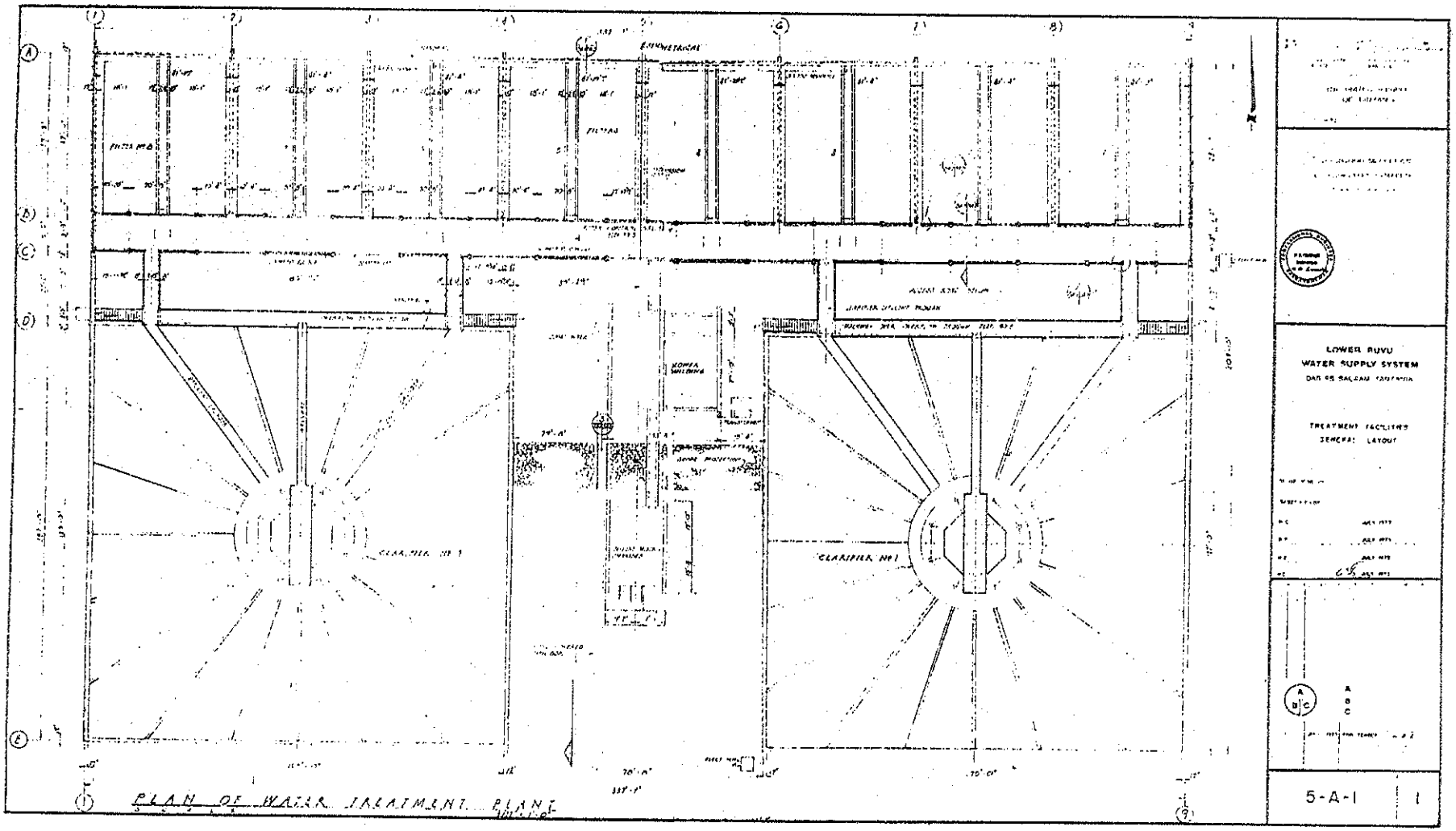
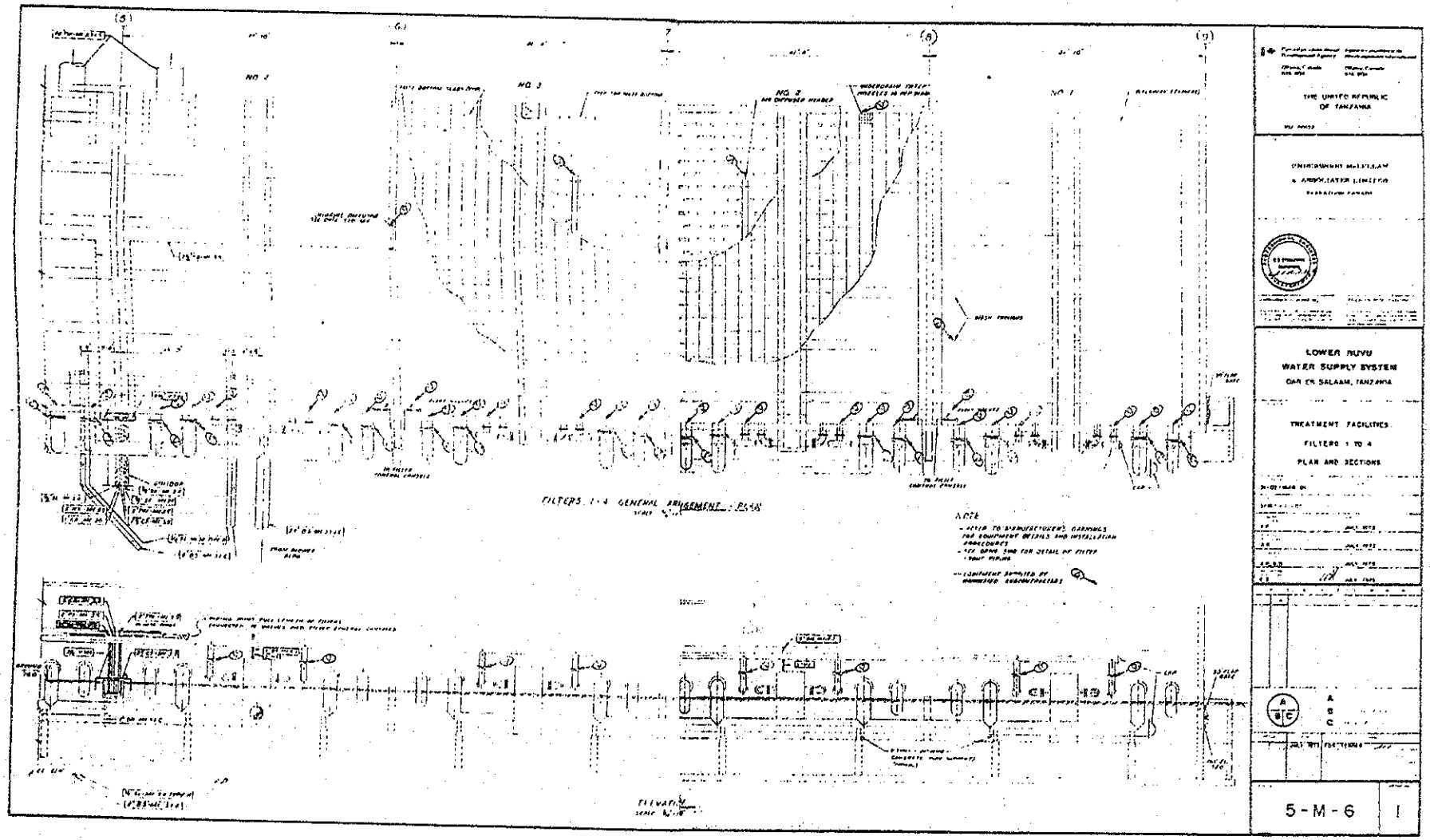
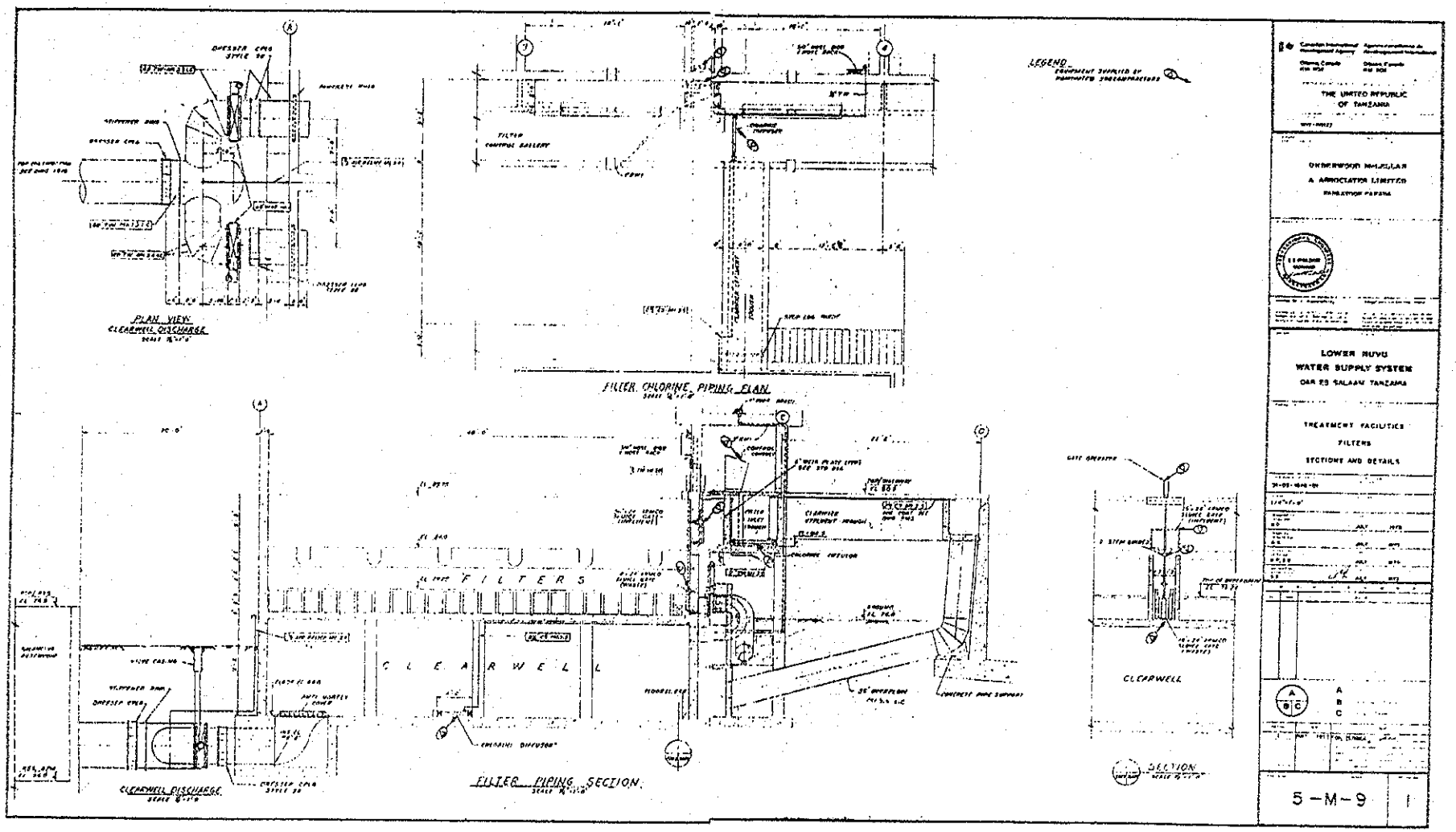
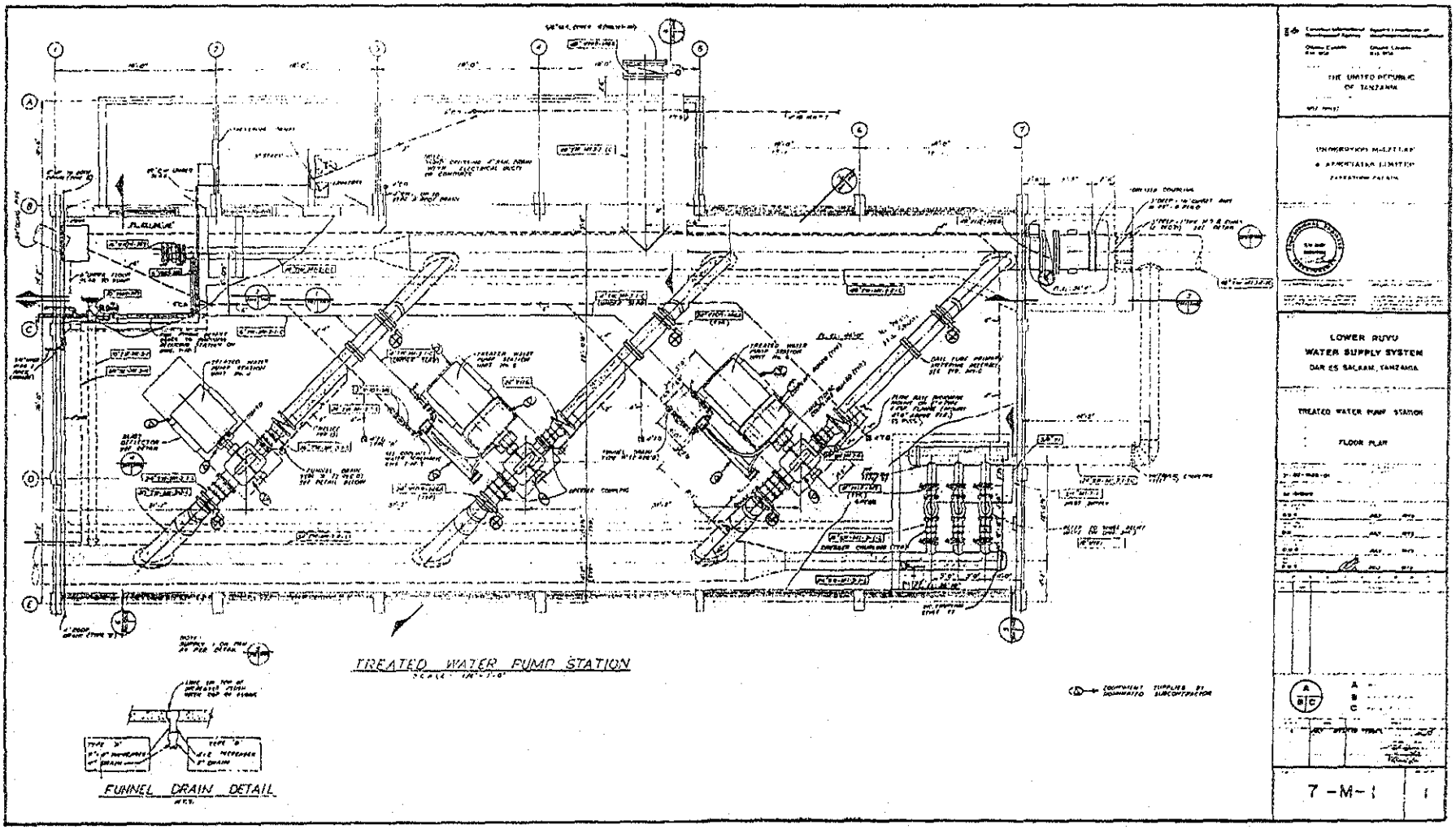
RAW WATER PUMP STATION
LOWER FLOOR PLAN
THE UNITED REPUBLIC OF TANZANIA
LOWER RUVU
WATER SUPPLY SYSTEM
RAW WATER PUMP STATION
LOWER FLOOR PIPING
3 - M - 2
1


SECTION
ANCHOR RING DETAIL
THE UNITED REPUBLIC OF TANZANIA
UNDERWOOD McLELLAN & ASSOCIATES LIMITED
LOWER RUVU
WATER SUPPLY SYSTEM
DAR ES SALAAM, TANZANIA
RAW WATER PUMP STATION
SECTION
3 - M - 3
1

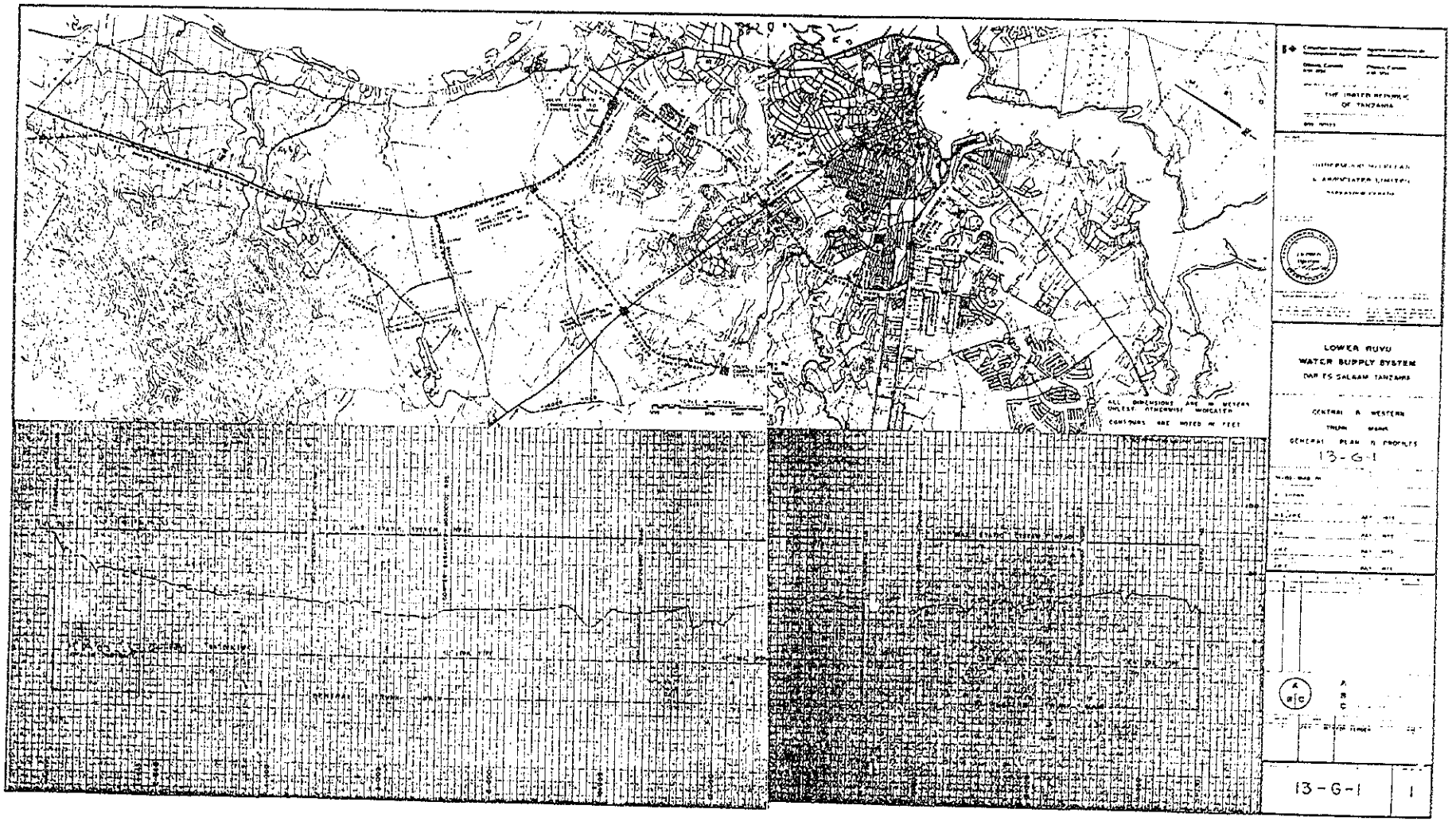

LOWER RUVU
WATER SUPPLY SYSTEM
DAR ES SALAAM TANZANIA
TREATMENT FACILITIES
GENERAL LAYOUT
5-A-1
1
PLAN OF WATER TREATMENT PLANT


THE UNITED REPUBLIC OF TANZANIA
LOWER RUVU
WATER SUPPLY SYSTEM
DAR ES SALAAM, TANZANIA
TREATMENT FACILITIES
FILTERS 1 TO 4
PLAN AND SECTIONS
5 - M - 6
1


PLAN VIEW
CLEARWELL DISCHARGE
FILTER CHLORINE PIPING PLAN
FILTERS
CLEARWELL
CLEARWELL DISCHARGE
FILTER PIPING SECTION
LEGEND
CLEARWELL
SECTION
THE UNITED REPUBLIC OF TANZANIA
LOWER RUVU
WATER SUPPLY SYSTEM
DAR ES SALAAM TANZANIA
TREATMENT FACILITIES
FILTERS
SECTIONS AND DETAILS
5 – M – 9
1


THE UNITED REPUBLIC OF TANZANIA
LOWER RUVU
WATER SUPPLY SYSTEM
DAR ES SALAAM, TANZANIA
TREATED WATER PUMP STATION
FLOOR PLAN
7 -M- 1
1
TREATED WATER PUMP STATION
FUNNEL DRAIN DETAIL

LOWER RUVU
WATER SUPPLY SYSTEM
DAR ES SALAAM, TANZANIA
12-P-35


THE UNITED REPUBLIC OF TANZANIA
LOWER RUVU
WATER SUPPLY SYSTEM
DAR ES SALAAM TANZANIA
CENTRAL & WESTERN
TRUNK MAINS
GENERAL PLAN & PROFILES
13-G-1
13-G-1
1

6. 関連資料の収集状況

REQUIRED DATA QUESTIONNAIRE

FOR

THE STUDY ON REHABILITATION OF DAR ES SALAAM WATER SUPPLY

- ◎ mark in the "Request of Availability " is the Data/Item which the Preliminary Study Team strongly request during the stay in Dar es Salaam for the smooth conduct of the Study.

- ○ mark in the "Request of Availability " is the Data/Item which the Preliminary Study Team strongly request for the smooth conduct of the Study before the Study begins and which the Preliminary Study request to check in case of available.

- Please mark ○ for the Data/Item in the "Availability" which is available before the Study begins.

- Please mark × for the Data/Item in the "Availability" which is not available before the Study begins.

Japan International Cooperation Agency

Data／Item	Request of Availability	Availability	Agency & Name of Reports
I. GENERAL INFORMATION			
1. Counterpart Agency to JICA Study Team a. Organization and Function ~~b. Composition of Counterpart~~	◎	◎	—ORGANIZATION CHART OF MINISTRY OF WATER, NUWA, OSMBRANCH (DSMB)
2. Background of the Request a. Present Condition of Existing Water Supply System b. Basic Idea on Expansion of Water Supply System c. Basic Idea on Improvment of Water Supply System	◎	◎	—項目 2a, 2b, 2c のみあり —項目 2c についてはなし
d. Budgetary Arrangement for Implementation of the Project		×	
3. Basic data of the Waterworks (Attatched Form 1)	◎	◎	—NUWA または DSMB より一部受領 —図面は添付リストのものか Available 添付リスト，収集資料リスト参照のこと

○ --- Abailable　　× --- Not Available

Data／Item	Request of Availability	Availability	Agency & Name of Reports
II. TECHNICAL INFORMATION			
1. Existing Facilities (Specifications, Drawings etc)	◎		
a. Water Source			
— Dam and Reservoir (Capacity, Level, Fluctuation)		×	
— Surface Water and River (Location, Flow and Level of River, Intake Capacity)		◎	—Ruvu 川水文データ，1950—1959，(MINISTRY OF AGRICULTURE,1963)，1971—1980，(MINISTRY OF WATER)，1978 (CIDA) などがある —水文データの一部を受領（収集資料参照のこと）
— Well (Location, Depth, Diameter)		×	
— Private Water Sources (Capacity)		×	
b. Purification Plant (Location, Treatment Method, Capacity, Water Quality, Water Quality Standard)		◎	—LOWER RUVU 浄水場設計図あり。一部コピー受領（収集資料参照）。竣工図はなし —UPPER RUVU 及び MTONI 浄水場設計図はない I.3に記述の通り
c. Water Supply Pipe (Location, Supply Method, Capacity Pipe Specification)		◎	

○ --- Abailable　　× --- Not Available

Data／Item	Request of Availability	Availability	Agency & Name of Reports
d. Water Distribution			
− Service Reservior (Location, Capacity)		×	−KIMARA RESERVOIR のスケッチ程度のもの１枚，他に特記すべき図面なし −UNIVERSITY RESERVOIR の図面見当らず
− Pumping Station (Booster) (Location, Capacity, Pressure)		×	−計画あるも実施されていない(SINZA.B.S)。その他４箇所の B.S は概略位置図 (1/25,000) にあるのみ
− Distribution Network or Zone (Location, Area, Location and Specification of Control valves, Population, Capacity, Usage, Leakage, Shortage)		×	−特筆する詳細な配管図なし，項目Ｉ.3参照のこと
2. Water Demand	◎		
a. Population in Water Supply Areaby sub-area		◎	−1988年，POPULATION CENSUS：PRELIMINARY REPORT.
b. Zones of Water Supply Area			
c. Population Served in Water Supply Area by sub-area		×	−給水人口は NUWA の推定値のみ (DSMB によれば1988年イギリスのコンサルタントにより別の PROJECT で家族構成等の実体調査が行われているが FINAL REPORT はまだ出ていない)

○ --- Abailable × --- Not Available

Data／Item	Request of Availability	Availability	Agency & Name of Reports
d. Water Consumption and Service Connection		◎	—NUWA 及び DSMB に関連する資料あり
— Per Capita Per Day			
— Household Use			
— Commercial Use			
— Industrial Use			
— Others			
E. Public Information Activities			
3. Operation of the Facilities	○	○	—LOWER RUVU 浄水場 1) WATER QUALITY (RAW & TREATED WATER DAILY RECORD) 2) CHEMICAL CONSUMPTION & STORAGE 3) PUMP OPERATION (INTAKE & HIGH LIFT PUMP) Ampare,Voltage 4) FLOW RATE (INTAKE,HIGH LIFT PUMP, HOURLY) 5) SLUDGE CONCENTRATION IN (LARIFIER) 6) WATER LEVEL IN CLEAR WELL (HOURLY) 7) PRESSURE OF TRANSMISSION LINE (HOURLY)
a. Operation Records			
— Reserviors and Wells			
— Purification Plants			
— Pumping Stations			
— Distribution Network (Presure, Water Quality, Leakage)			
— Others			
b. Water Quality Records.			
— Reserviors and Wells		×	
— Purification Plant		◎	—LOWER & UPPER 浄水場資料あり (DSMB) MTONI 浄水場なし

○ --- Abailable　　× --- Not Available

Data／Item	Request of Availability	Availability	Agency & Name of Reports
c. Maintenance Records (Contents and expenses) — Intakes and Wells — Purification Plants — Pumping Stations — Distribution Networks — Others	○	○	—Repair of Pumps,Electrical Devices,Mechanical Equipment including Switchgear,Mixers etc. —Repair of Concrete Structures of Clarifier & Filter —Clearing of Concrete Pipes. — Painting of Clarifier Structures (Records on Expenses are available at DSMB)
4. Rehabilitation of the Facilities	◎	◎	—Upper Ruvu & Lower Ruvu Treatment Plants の Rehabilitation に係わる調査報告書は NUWA または DSMB にある —入手済み REPORT については収集資料リスト参照
a. Rehabilitation Records Purification Plants Pumping Station Distribution Network			—Upper Ruvu 浄水場及び送水施設，配水施設の一部の Rehabilitation はイタリア政府の援助で実施中であり，そのプロジェクトの概要を知ることができる Lower Ruvu 浄水場についてはカナダ政府の調査報告書及び NUWA の調査がある スペアパーツプロジェクトが実施中であるが，抜本的改修工事は実施されていない スペアパーツプロジェクトの実施項目の内訳については今回入手できていない

○ --- Abailable　　× --- Not Available

Data／Item	Request of Availability	Availability	Agency & Name of Reports
III. ADMINISTRATIVE AND FINANCIAL INFORMATION	◎		
1. Institution and Organization			
1) Structures and key functions of the following organizations, their interrelations and their relations with other government agencies. A diagram shown interrelation of the organizations and other government agencies.		◎	—組織図（MOW,NUWA, DSMB)あり
a) Ministry of Water and Energy			—関連する「THE URBAN WATER SUPPLY ACT」1981, 入手済み
b) National Urban Water Authority c) Region's Water Department d) Dar Es Salaam Water Branch e) Dar Es Salaam Local Government if any involvement			
2) Their capitalization, budgeting and funding and their recent summarized financial statements (other than MWE AND MLHUD) and Local Government.		◎	—NUWAのINCOME STATEMENT, BALANCE SHEET (1987, 1988) のSUMMARY入手済み
3) Function and/or job-description of each division, section, and sub-section of the above organizations including the number of staff. for what work for project implementation, they are involved and how.		◎	
4) Other agencies concerned with the projects, if any. Their key functions and government financial supports they receive.		○	
5) Any involvement of Local Government and key functions government financial supports they receive.		×	
2. Administration and Management	◎		
1) Meter reading a. number of meter readers b. capability of the meter readers(meters/day) c. how often they read. d. type, brand and size of meters installed e. Number of stored meters f. Method of estimating water consumption in case of unmetered connections		◎	収集資料リスト参照
2) Budgetary system of the DSMB Procedures required for project planning, budget preparation, internal screening and final approval.		◎	〃
3) Accounting system of the DSMB a. Criteria, manuals and/or guidelines for accounting b. To what organization the accounting record reported c. By what organization supervised		◎	〃
4) Procurement and inventory of the DSMB a. Logistic system and procedures for procurement, warehousing and delivery		◎	〃

○ --- Abailable　　× --- Not Available

Data／Item	Request of Availability	Availability	Agency & Name of Reports
b. Information on existing storage, warehouse, stock yard including layout, areas, materials stored and their safe custody and control		○	—NUWA または DSMB に原簿あり
5) Bill rendering and collection Procedures and bill collection performance		○	—NUWA に記録あり，電算機使用
6) Auditing a. Who, when, how and other related regulations for internal audits b. Names of auditing agencies, related laws, orders and regulations for external audits		◎	—報告書あり，収集資料リスト参照
3. Operation and maintenance	◎		
1) Organization and formation for operation and maintenance a. Organiztion structure for operation and maintenance of the system		◎	—Lower & Upper Ruvu のみ組織図あり
b. Number and status of staff in charge and their job-description		◎	
c. Routine maintenance work done by the DSMB		×	
2) Operation and Maintenance a. List of tools and equipment owned by the DSMB		×	
b. Procedures taken to provide spare part when needs arise		×	
c. Who and how to repair the damaged parts of the facilities		○	
d. Layout, area and inventories of the stock yards		○	
e. Motor vehicles and bikes owned by the DSMB		○	
f. Chemicals required(name, volume, source countries, delivery period)		○	—薬品，仕様，消費量の概要について聞取り済み
4. Financial aspects of the DSMB.	◎	○	
1) Financial performance in the past 5 years a. Income statement		◎	
b. Balance sheet			
c. Cash flow statement			
2) Water tariff structure a. Year established		◎	
b. Number of consumer categories			
c. Water tariff level by category and by water consumption			
d. Method how to set up water tariff level			

○ --- Abailable　　× --- Not Available

Data／Item	Request of Availability	Availability	Agency & Name of Reports
5.Policy	◎	◎	—関連資料を MOW より入手済み 収集資料リスト参照
a.National Policy for Water Supply			—SECTOR STRATEGY AND ACTION PLAN FINAL DRAFT AUGUST 1987
b.MWE, NUWA, NUWA DSM Branch Policy			— MEASURES TO STRENGTHEN NATIONAL URBAN WATER AUTHORITY,1987
c.Relevant Plan and Priority (national and regional)			
d.Relevant On-going Project			
e.Relevant Received Projects			
6.Law and Regulation	◎	◎	—NUWA "THE URBAN WATER SUPPLY ACT" 1981
a.Water Supply			
b.The Water and Sewarage Authority			
c.Road			
d.Construction			

○ --- Abailable　　× --- Not Available

Data／Item	Request of Availability	Availability	Agency & Name of Reports
IV. RELEVANT DATA ・ INFORMATION AND STUDIES			
1. General	○	○	MINISTRY OF LANDS (Hydro, Drilling Section) が担当
a. Topographic Maps			
b. Acrophotographs (if available)			
c. Geological Maps			
d. Road Maps			
e. Existing Drilling Data			
f. Conditions of Existing [illegible] Rivers (length, width, depth, capacity and flow)			
g. Existing Ground Water Data			
h. Meteorological Data (temperature, humidity, sunshine hour an rain fall)			
i. Attatched Form 2, 3			
2. Socio-Economic Parameter	◎	○	MINISTRY OF FINANCE (Planning Commision)
a. National Budget in Last 5 Years			
b. Budget for Infrastructure in Last 5 Years			
c. Administrative District (city, town and village)			

○ --- Abailable　　× --- Not Available

Data / Item	Request of Availability	Availability	Agency & Name of Reports
d. Population and Household (trends and forecasts)		○	Mriminister's Office (Central Statistical Bureau)
e. Infrastructure (Road, Transportation, harbor)		○	〃
3. Relevant Plans and Studies	◎	○	MINISTER OF LANDS
a. City Planning			
d. Land Use			
c. Economic Development Program			
d. Existing Study Report			
4. Sanitary Condition	○	○	D.S.S.D (Dra es Salaam Sewerage and Sanitation Dept.)
a. Sewerage System			
b. Epidemic Diseases			
5. Undergound Existings	○		
a. Electric Cable		○	TANESCO
d. Sewerage		○	City Council
c. Gas Pipeline		○	Tanzania Petroleum Development corporation (TPDC)
d. Telephone Cable		○	Tanzania Post & Telecommunication corp. (TPTC)
e. Others			

○ --- Abailable　　× --- Not Available

Data / Item	Request of Availability	Availability	Agency & Name of Reports
6. Basic Prices for Surveying	◎	○	MINISTRY OF LANDS & MINISTRY OF WATER
a. Topographic Surveying			
— Planimetric Surveying (per m²)			
— Leveling Survey (per m)			
b. Boring			
c. Others			
7. Cost Estimation and Work Schedule	○	○	National Construction Council.
7-1 List of price			
a. Construction materials			
b. Equipment required			
7-2 List of wages	◎	○	MINISTRY OF LABOUR
a. Laborer			
b. Driver			
c. Typist			
d. Others			
7-3 Working hour	○	○	NUWA
a. Working time per day			
b. Working day per year			
c. Workability duringrainy season			

○ --- Abailable　　× --- Not Available

Data / Item	Request of Availability	Availability	Agency & Name of Reports
8. GENERAL IMFORMATION			
8-1 Available organizations for topographic survey, geological survey a. Name and address b. Ability of staffs c. Facilities possessed	◎	○	MINISTRY OF LAND
8-2 Conditions around the study office a. Posible location of the office b. Accommodation -Name and address -Charges c. Communication facilitiy d. Hospital -Name and address -Ability of staffs -Facilities possessed f. Formalities for using of transceiver	◎	○	NUWA

○ --- Abailable　　× --- Not Available

ATTACHED FORM-1 LIST OF AVAILABLE DRAWINGS

DRAWINGS

NO:	T I T L E	S C A L E	Y E A R	SHEETS	AUTHORITY
1.	Lower Ruvu Water Supply System Vol. 4 & 5	Varies	1973	69	Ministry
2.	Rehabilitation & Improvement of Upper Ruvu System Vol.IV	1:25000	June,1987	Book let	N U W A
3.	Dar es Salaam Water Distribution System DRW No. G.118	1:25000	Aug,1988	1	N U W A
4.	Distribution-North West Portion DRW No. G.103	1:25000	-	1	N U W A
5.	Distribution-South West Portion DRW No. G.107	1:25000	-	1	N U W A
6.	Distribution-South East Portion DRW No. G.104	1:25000	-	1	N U W A
7.	Distribution-North East Portion DRW No. G.105	1:25000	-	1	N U W A
8.	Distribution-South West Portion DRW No. G.106	1:25000			

NOTE. a. 項目 NO.1 はカナダのコンサルタント (UNDER WOOD Mc LELLAN & ASSOCIATED LIMITED, CANADA) が1973年設計したもの。69枚は送水管設計図，他に Lower Ruvu 浄水場設計図がある。なお As built Drawing は作成されていない（添付資料参照）。

b. 項目 NO.2 以下は OSWB が作成したもの。6″ 以上の配水本管のみ記載。管種，弁類，河川横断，排泥設備，消火栓等については記載しているものもあるが無いものもあり，完備されていない。

PRICE SUVEY (AS OF 30 JUNE 1989)

UNIT : タンザニア・シリング, TSH

1.	Personal expences	(AVG.)	
	Labour 55/day	1,650/month	
	Driver 106/day	3,180/month	
	Typist 99/day	2,970/month	
2.	Hiring Car Equipment		
	Helicopter	/hr./day	Infor. not available
	Saloontype Car MIN.	7,500/day	
	Jeep(4WD) MIN.	19,000/day	
	Wagon(4WD) MIN.	10,000/day	
	Truck AVG.	25,000/day	
	Mini Bus AVG.	8,500/day	Per Trip Within City (7ton)
	Copy Machine	/Month	Maintenance /month *NOTE
3.	Consumable Goods		
	Gasoline	67/l	
	Disel oil AVG.	20/l	
4.	Purchase		
	Topographic Map	/sheet	
	Aerialphoto	/sheet	
	Copy Machine	/set	
	paper(A4 Size)	/box	

NOTE : *Photo Copy : A4 size 20 TSh/Sheet (AVG)

: A3 size 30 TSh/Sheet (AVG)

INFORMATION FROM DSMB

7. 調査日程

調査日程

日　順	月　日	行　程	調　査　内　容
1	5月30日(火) 31日(水) 6月1日(木)	東京発 (パリ経由) ダルエスサラーム着	JICA事務所にて打合せ 日本大使館にて打合せ 大蔵省表敬，水質源省表敬 NUWA表敬，団内打合せ
2	6月2日(金)		NUWA DSM Branchにて協議，団内打合せ
3	6月3日(土)		Lower Ruvu 浄水場調査 団内打合せ
4	6月4日(日)		Upper Ruvu 浄水場系統調査 団内打合せ
5	6月5日(月)		水質源省にてS/W協議 NUWA DSM Branchにて資料収集，Mtoni 浄水場調査，給配水施設調査，団内打合せ
6	6月6日(火)		水質源省にてS/W，M/M協議 NUWA DSM Branchにて資料収集 JICA事務所にて資料整理，給配水施設調査 団内打合せ
7	6月7日(水)		水質源省，大蔵省にてS/W及びM/M署名，日本大使館，JICA事務所結果報告 資料収集，団内打合せ 給配水施設調査
8	6月8日(木)		資料収集，団内打合せ (岩堀，大森，古川 ダルエスサラーム発) 給配水施設調査
9	6月9日(金)		資料収集 給配水施設調査
10	6月10日(土)		資料収集（古川帰国） (新倉，与田 ダルエスサラーム発)
11 12 13	6月11日(日) 6月12日(月) 6月13日(火)		(岩堀，大森 帰国) (新倉，与田 帰国)