

8.2 Road Development Plan

8.2.1 Introduction

In the context of road development concept proposed in the previous section, concrete road development plans, or planning elements, have been proposed as explained below. Concrete road development plans by concept of road development are described as below:

Development Concept 1:

<Road Development to Enhance the Urban Traffic Efficiency>

This could be classified into two groups; one is radial roads and the other is circulating roads. Planning elements which correspond to this development concept consists of:

- Widening of Arterial Roads in the City Center
- Widening of Middle Ring Road with the Construction of Missing Links
- Widening of Trunk Roads from 2 lanes to 4 lanes.
- Construction of Grade Separated Intersection at Major Trunk Roads.

Development Concept 2:

<Road Development to Promote Urban Function in the Intensified Urban Development>

This concept consists of:

- Construction and Improvement of Collector Roads
- Rehabilitation of Pavement Condition on Local Roads.
- Reconstruction of Bridges on Trunk Roads

Development Concept 3:

<Road Development to Stimulate the Development of Potential Development Area>

Planning elements here are:

- Strengthening of Road Network in Kigomboni area including Construction of Bridge crossing at Harbor.
- Strengthening of Road Network along Pugu Road.

Development Concept 4:

<Road Development to Prevent Haphazard Urban Sprawl>

This concept consist of following elements:

- Construction of Outer Ring Road
- Improvement of Trunk and District Roads in Rural Area

Besides the above, there are some of the planning elements, such as enhancement of maintenance capability of MWCT, which relate to all the concept proposed here.

Details of the planning elements are described hereinafter.

8.2.2 Road Development Plan

The road development plan is prepared in line with the road development concept established in the preceeding paragraph 8.1 as well as in the result of identification on existing problems and issues. The development plan derived from each concept is outlined and presented below:

(1) Widening of Arterial Roads in the City Center

In order to maintain the urban function of Dar es Salaam as a center of administration, economy and social activities in Tanzania for the future as well as to facilitate the anticipated future traffic demand concentrating in the city center, it might be necessary to enlarge traffic capacity of the arterial roads in the city center.

It is recommended to widen Ohio Street and Sokoine Drive from 2 to 4 lane roads so as to form the inner ring road with 4 lanes surrounding the city center by connection with UWT Road. It is also recommended to widen Gerezani Street and Bandari Road from 2 to 4-lane roads in order to

reduce the traffic congestion between Dar es Salaam Harbor and city center. The section between Pugu Road and the roundabout at Gerezani Street shall also be widened to 4 lanes.

Fig. 8.5 shows the new road network system proposed for the city center which consists of the following works:

- (i) Widening of Ohio, Sokoine, Gerezani and Bandari Road from 2 to 4 lanes including reconstruction of Gerezani Bridge with 4 lanes (Sidewalk will be provided on both sides but no median strip will be provided because of the limited right-of-way.)

Right-of-way situations and Project Length;

- Ohio Street; No additional right-of-way might be required with the exception of the end section near harbor.

(4 lanes, L= 0.96 km)

- Sokoine Drive; Widening might be possible by reclamation of the land along seaside up to Marine Station. A part of land and building belong to DSM city council will be affected by the widening so that they must be demolished and relocated to the other suitable place.

(4 lanes, L= 0.17 km)

- Gerezani Road; No additional right-of-way might be required.

(4 lanes, L = 1.40 km)

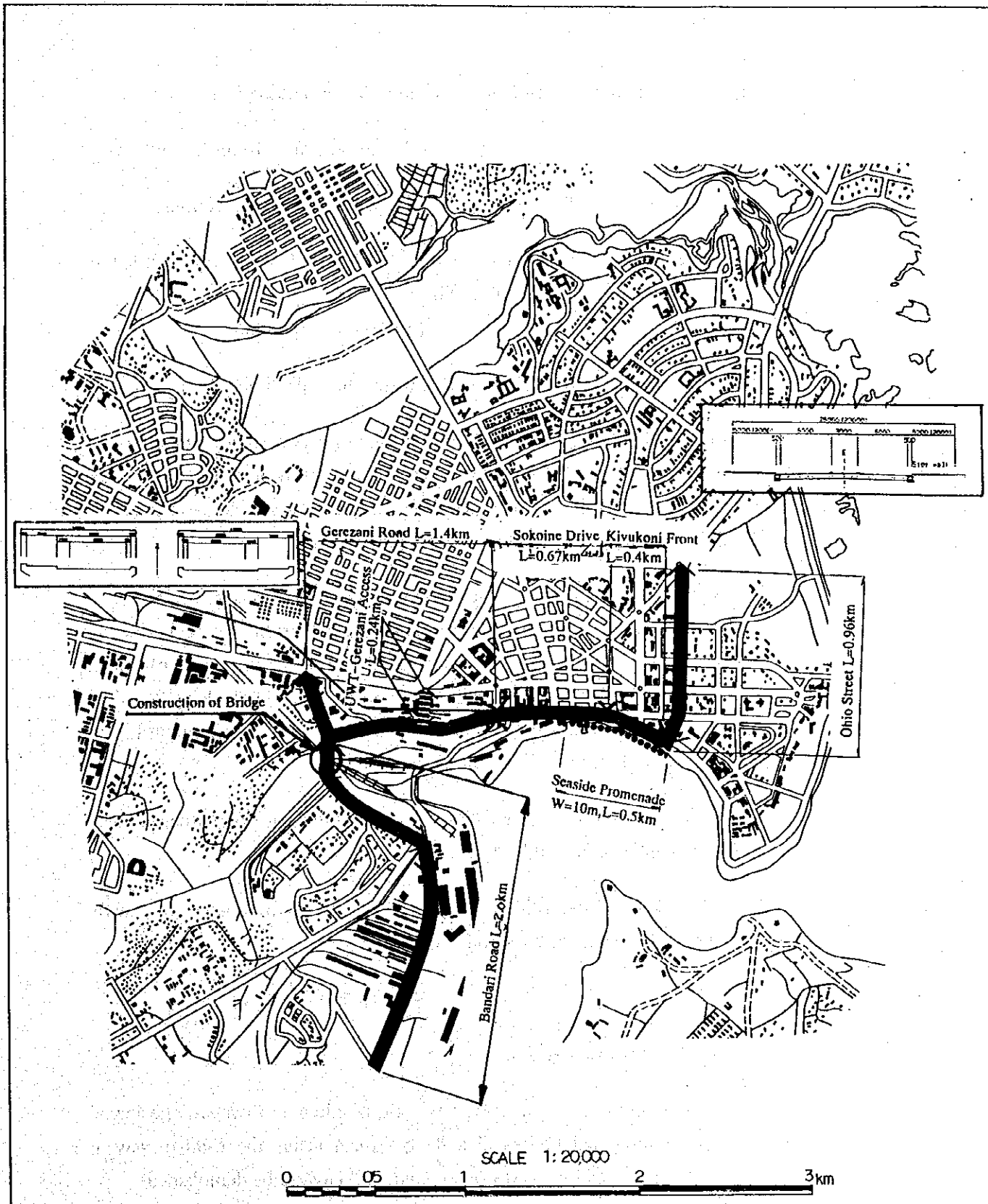
- Bandari Road; No additional right-of-way might be required.

(4 lanes, L = 0.90 km)

- Kivukoni Front; No additional right-of-way might be required.

(4 lanes, L = 0.40 km)

- (ii) Reconstruction of city bus terminal located near the park along Sokoine Drive (0.35 km²)



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Fig.8.5

Proposed Widening of Arterial Roads in City Center



Widening 4 Lanes



New Construction Section UWT-Gerezani Access



Seaside Promenade

- (iii) Construction of seaside promenade with car parking lots

(Promenade $W = 10$ m, $L = 500$ m)

- (iv) Improvement of roundabouts by signal controlled intersections.

- (v) Construction of short-cut between UWT Road and Gerezani Road at DSM Railway Station, if possible

(4 lanes, $L = 0.24$ km)

- (2) Widening of Middle Ring Road with construction of Missing Link

The route consisting of Morocco, New Kigogo and Chang'ombe Roads was defined as the Middle Ring Road for the study purpose which was confirmed in the Minutes of Discussion on the Progress Report signed by MWCT and the Study Team on January 24, 1994.

The Middle Ring Road, forming the major trunk road network in the city, will play an important role in streamlining urban traffic by reduction of traffic concentration into the central area. According to the result of traffic demand forecast, anticipated traffic volume on the Middle Ring Road is estimated to be more than 30,000 ADT in the year 2000 which might be far beyond the traffic capacity of 2 lane road.

The proposed measures to be taken for the Middle Ring Road are as shown in Fig. 8.6 and summarized below:

- (i) Widening of the Middle Ring Road from 2 to 4 lane road with sidewalks being built on both sides.

(4 lanes, $L = 9,600$ m)

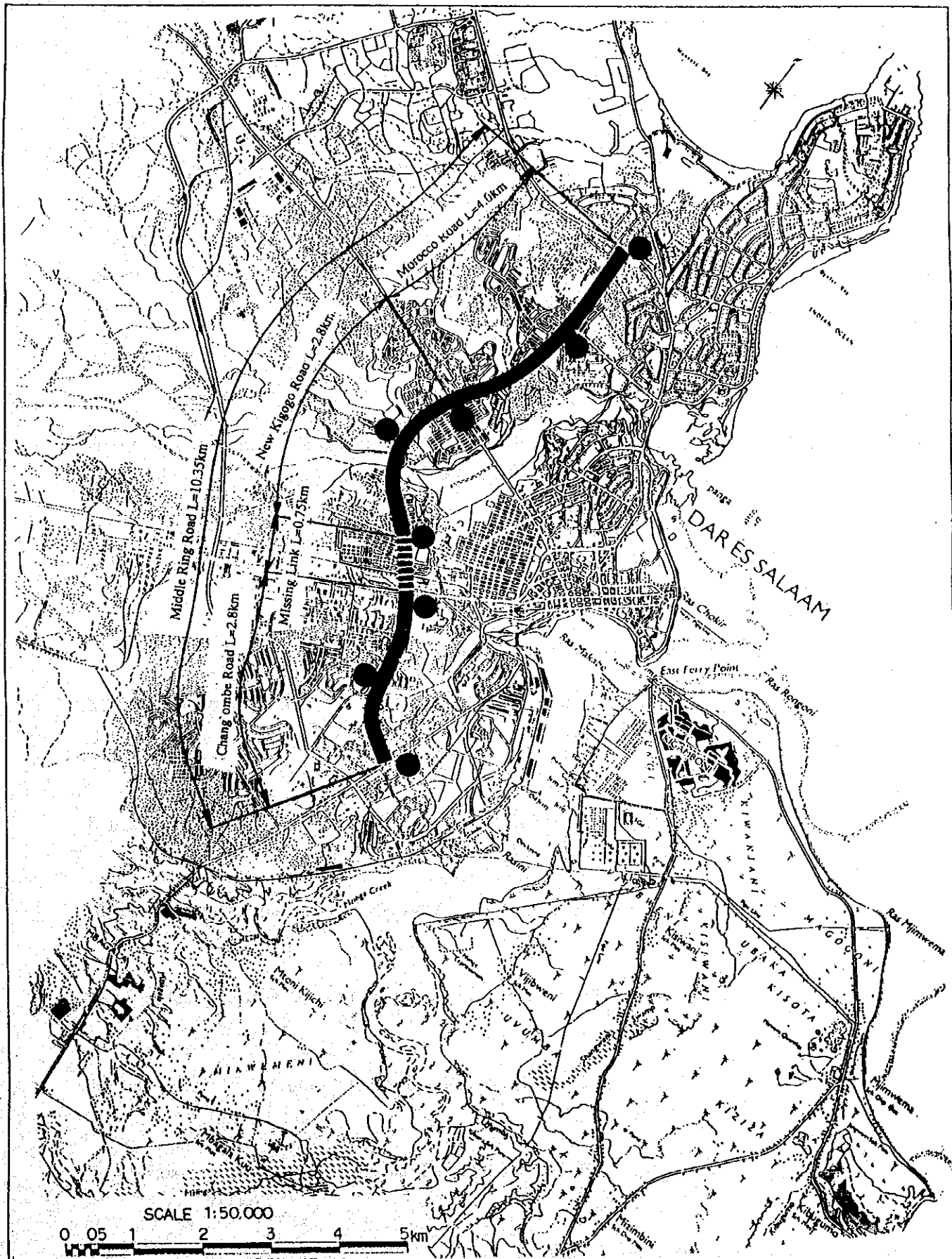
Right-of-way situations;

- No additional right-of-way will be required. However, the many buildings and houses illegally occupied inside the right-of-way along the section of Morocco Road will have to be demolished.

- (ii) Construction of missing link between New Kigogo and Chang'ombe Road

(4 lanes, $L = 750$ m)

Right-of-way situations;



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Fig.8.6
Proposed Widening of Middle Ring Road
with Construction of Missing Link



Widening of Middle Ring Road



Construction of Missing Link



Construction of Bus Station

- Missing link having four lanes will be constructed between New Kigogo Road and Changómbe Road utilizing the railway land upon approval of TRC (Tanzania Railways Corporation). A 50 m wide right-of-way has to be reserved along the proposed road. Some of the railway facilities may be affected by the construction of road so that they must be demolished and relocated by TRC to a suitable place outside the proposed right-of-way.

- (iii) Construction of bus station for changing at every important intersection of radial trunk road (8 places)

Bus stations will be provided for changing at the following important intersections in order to improve the convenience for the public:

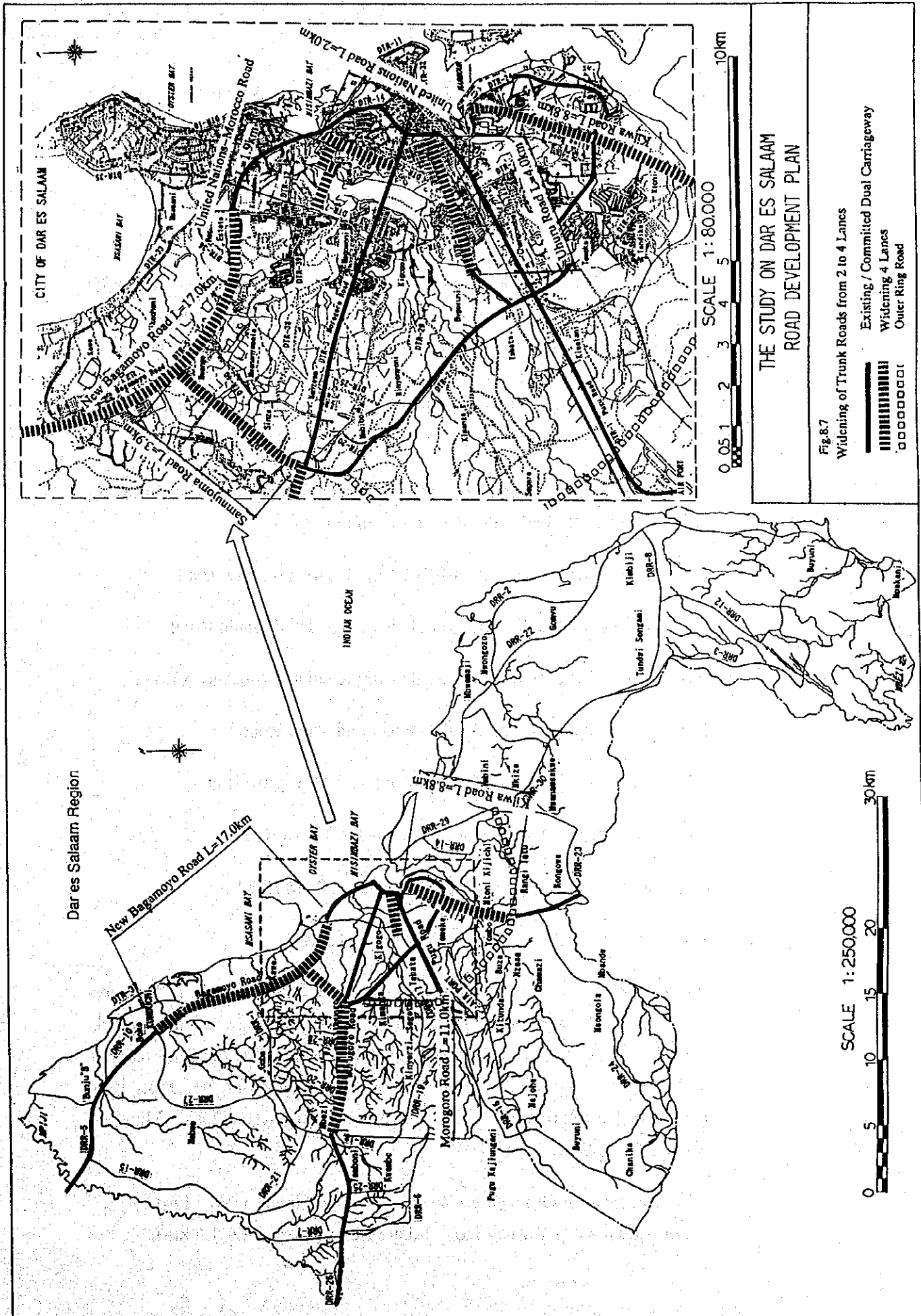
New Bagamoyo Road, Mwinijuma Road, Morogoro Road, Old Kigogo Road, Uhuru Road, Pugu Road, Temeke Road and Kilwa Road

(3) Widening of Trunk Roads from 2 Lanes to 4 Lanes

In order to establish the basic frame of urban road network system in DSM as well as to cope up with the anticipated traffic demand in future, it is recommended to widen major trunk roads from 2 to 4 Lanes.

Proposed sections for widening to 4 lanes to talling 43.0 kms are presented in Fig. 8.7 and summarized as shown below:

- (i) New Bagamoyo Road from Morocco Road Junction up to Wazo Hill (17.0 km)
- (ii) Mpakani Road from Ubungo Junction up to New Bagamoyo Road (3.9 km)
- (iii) Morogoro Road from Ubungo Junction up to 7.5 km point of Morogoro Road (1 1.0 km)
- (iv) Uhuru Road from Msimbazi Road up to existing 4 lane section of Uhuru Road (4.0 km)
- (v) United Nation Road (2.0 km)



(vi) United Nation-Morocco Road (1.9 km)

(vii) Kilwa Road from Gerezani Road up to Outer Ring Road
(8.8 km)

(4) Construction of Grade-separated Intersections at Major Trunk Roads

At-grade intersection might sometime become a bottleneck point of traffic flow in urban area. To establish smooth traffic management and operation of the future heavy traffic demand in Dar es Salaam, the introduction of grade separated intersections (grade separation) were considered for the intersections crossing between dual carriageway roads of which future traffic volume exceeds the capacity of signal controlled intersections.

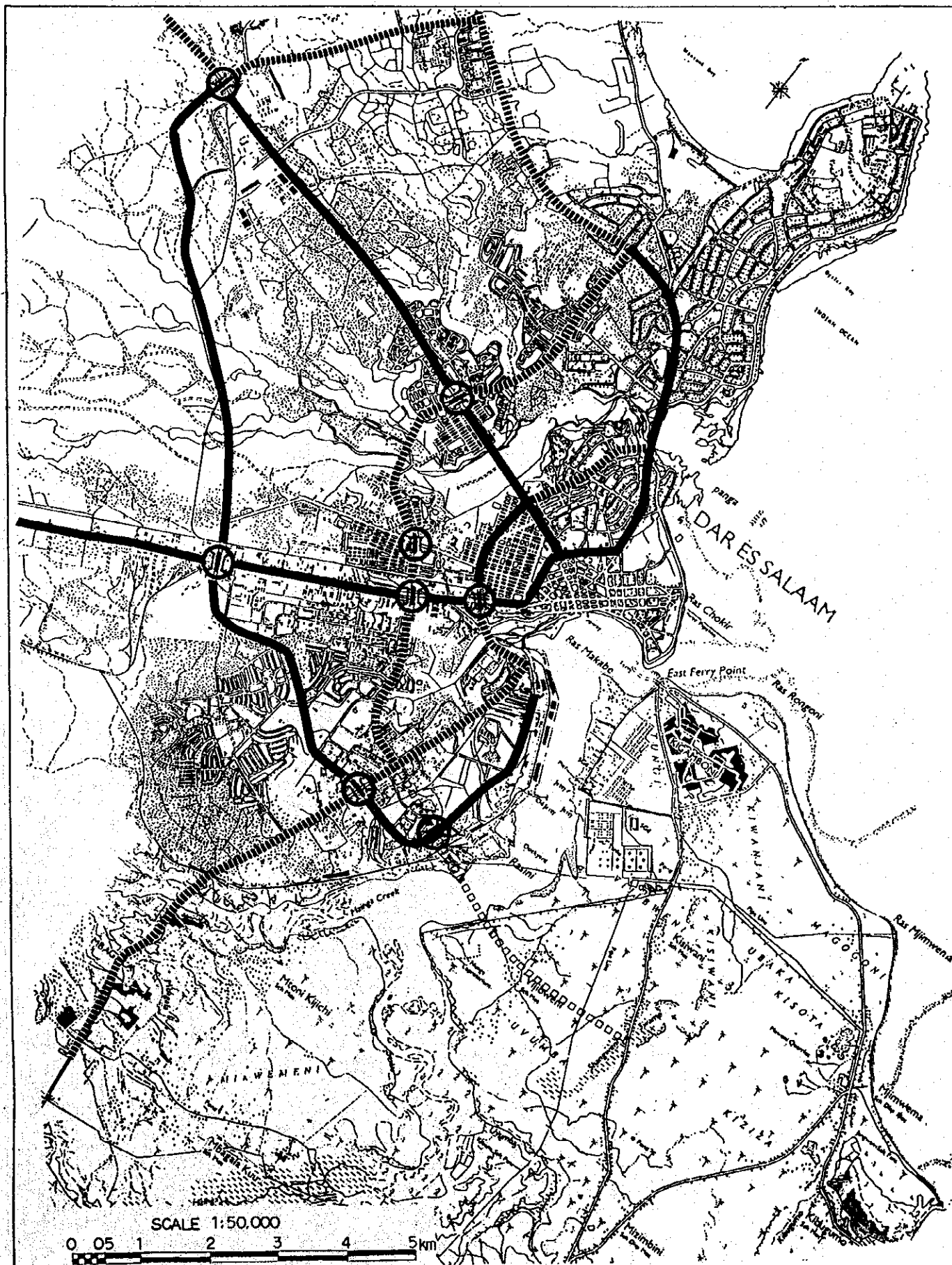
The introduction of grade separation is recommended at the following intersections with the locations is shown in Fig. 8.8.

- (i) Intersection between the Middle Ring Road and Pugu Road
- (ii) Intersection between the Middle Ring Road and Uhulu Road
- (iii) Intersection between the Middle Ring Road and Morogoro Road
- (iv) Intersection between Mandela Road and Pugu Road
- (v) Intersection between Mandela Road and Morogoro Road
- (vi) Intersection between Mandela Road and Kilwa Road
- (vii) Intersection between Msinbazi Road and Pugu Road

(5) Construction and Improvement of Collector Roads

As pointed out in paragraph 4.3.2, road density in the areas between Mandela Road and Middle Ring Road indicated extremely low due to lack of collector roads. In order to facilitate anticipated traffic demands as well as to improve accessibility to the public bus services in the areas, it is recommended to strengthen collector road network system inside Mandela Road area as shown in Fig. 8.9.





- Improvement of Old Kigogo Road (2 lanes, L= 6.5 km)
- Construction of New Kigogo – Tabata Road (2 lanes, L= 1.5 km)

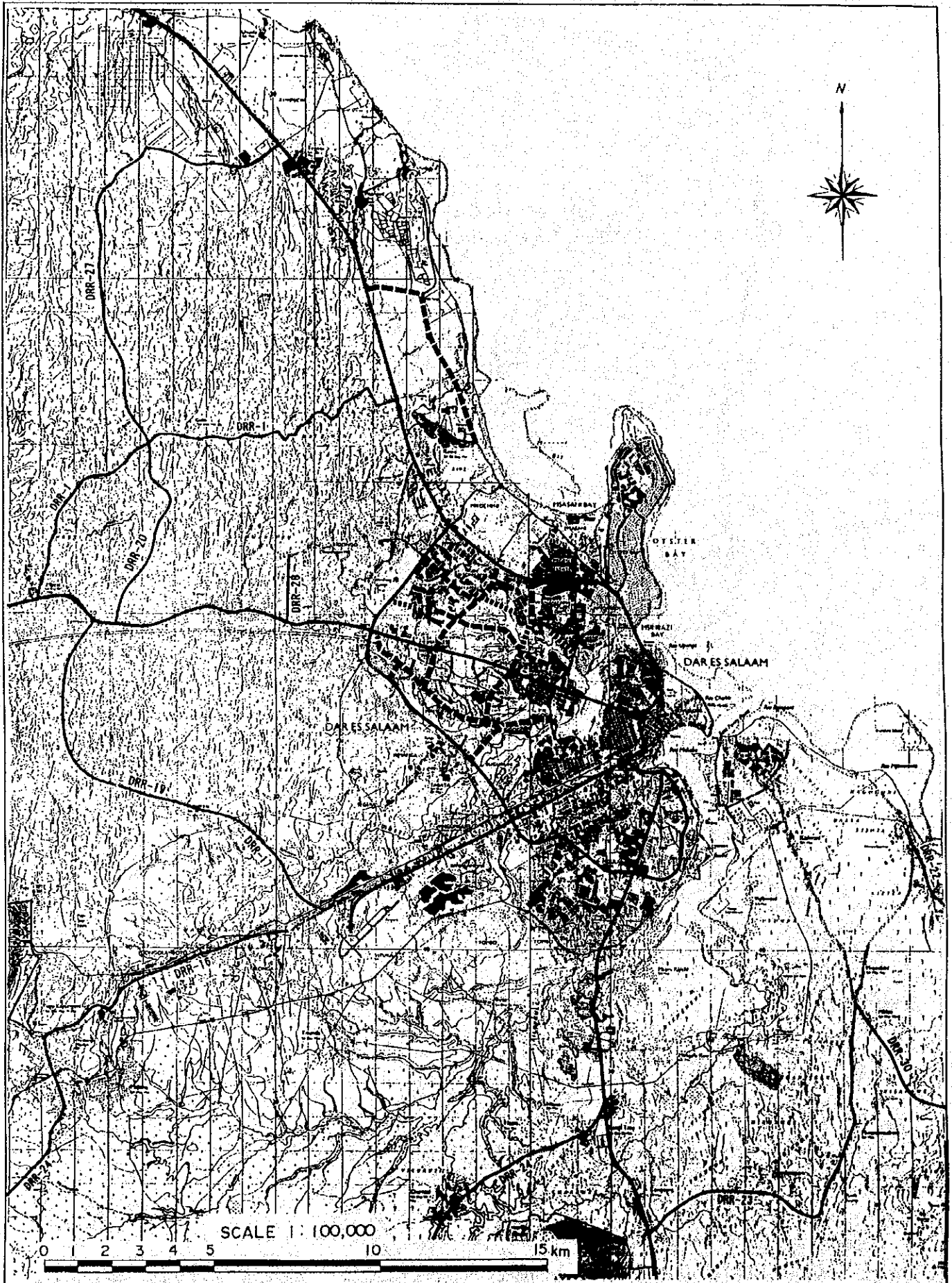


SCALE 1:50,000
 0 0.5 1 2 3 4 5 km

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Fig.8.8 Location of Proposed Grade Separation

-  Grade Separation
-  Existing / Committed Dual Carriageway
-  Proposed Widening / Construction to be Dual Carriageway
-  Kurasini Bridge and Access Road



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Fig.8.9 Proposed Road Development to disperse
Urban function in Wider Area

-  Improvement of Collector Roads
-  New Construction of Collector Roads
-  Existing Collector Road

- Improvement of the following roads;

(2 lanes, Total L = 113.0 km)

- DTR-20 Morogoro - NIT Extension (5.9 km)
- DTR-25 Old Kigogo - Mandela (1.5 km)
- DTR-26 Kagera Street and Extension (3.6 km)
- DTR-36 Mikochehi Access (1.3 km)
- DTR-38 Mwinjuma - Sinza Road/Ext. (6.1 km)
- DTR-39 Mwinjuma - Mpakani Road) (4.7 km)

In addition to the above, following road is recommended to be improved to cope up with the anticipated future traffic demands between Kunduchi areas and the City Center;

- Extension of old kigogo road to the north along the coast (2 lanes, l= 6.7 km)

(6) Rehabilitation of Pavement Condition on Local Roads

Local roads located in the Central area, Chang'ombe area and Kariakoo area were and will be rehabilitated under the program of Japanese Grant Aid (Dar es Salaam Road Improvement and Maintenance Project-DRIMP) which was started in 1992 and is expected to be completed in 1995. However, many other local roads will remain poor as they are seriously damaged and deteriorated to the extent that routine maintenance is no longer cost effective.

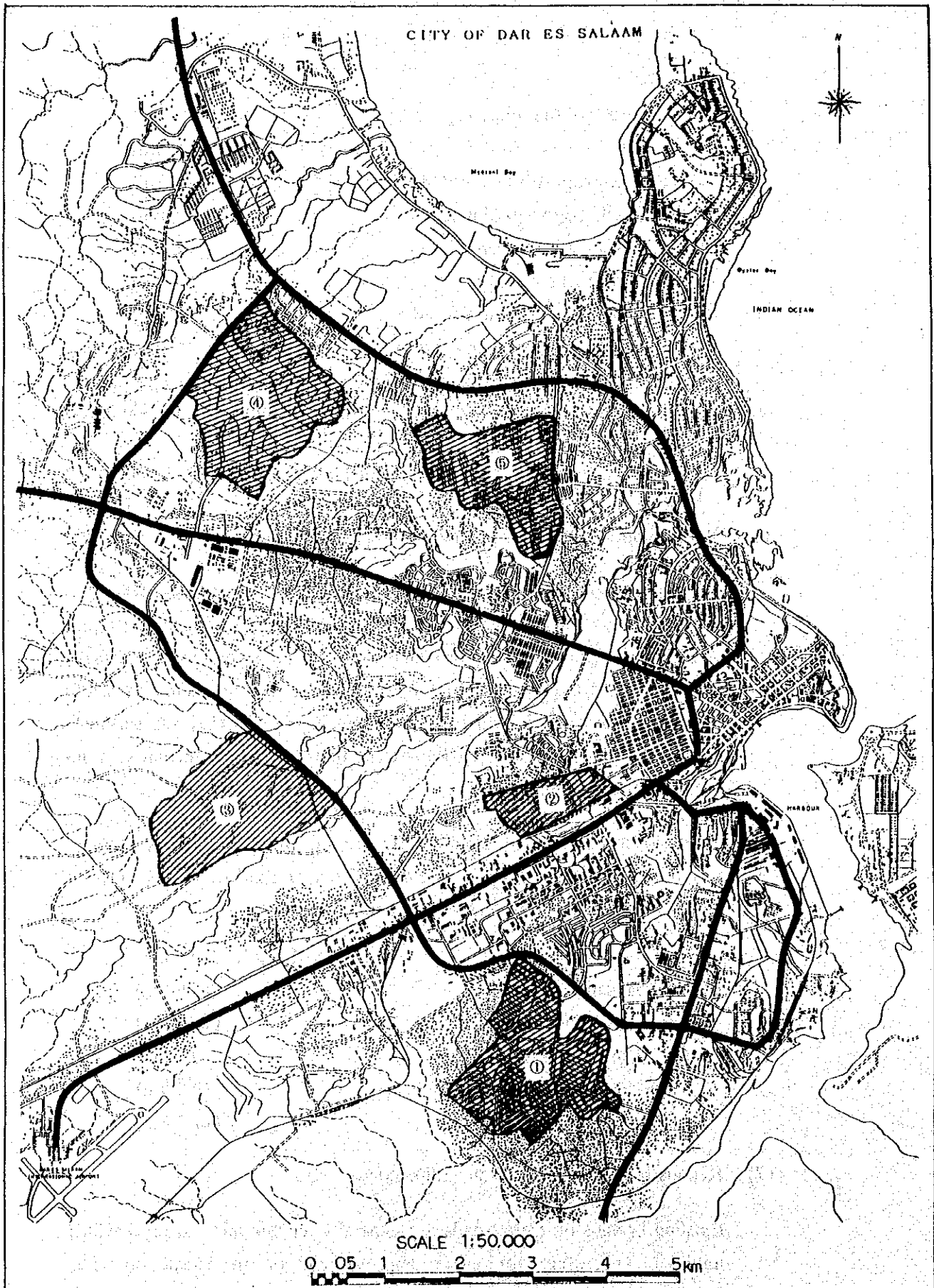
Since local roads have directly effected on the daily life of people, improvement of these roads is essential. The local roads to be rehabilitated are as shown in Fig. 8.10 and summarized as follows:

(2 lanes, Total L = 59.8 km)

- Local roads in Temeke area (13.9 km)
- Local roads in Ilala area (10.3 km)
- Local roads in Tabata area (9.2 km)
- Local roads in Sinza area (9.2 km)
- Local roads in Mwinjuma areas (17.2 km)

(7) Reconstruction of Bridges on Trunk Roads

Existing bridges on trunk roads are generally narrow and old ones which might be necessary for either improvement or reconstruction. The following



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Fig.8.10 Local Roads to be Rehabilitated

- ① Temeke Area Roads (L=13.9km)
- ② Hala Area Roads(L=10.3km)
- ③ Tabata Area Roads(L=9.2km)
- ④ Sinza Area Roads(L=9.2km)
- ⑤ Mwinyijuma Area Roads(L=17.2km)

bridges are recommended to be rehabilitated or replaced from the view point of safety of traffic and location of which are presented in Fig. 8.11:

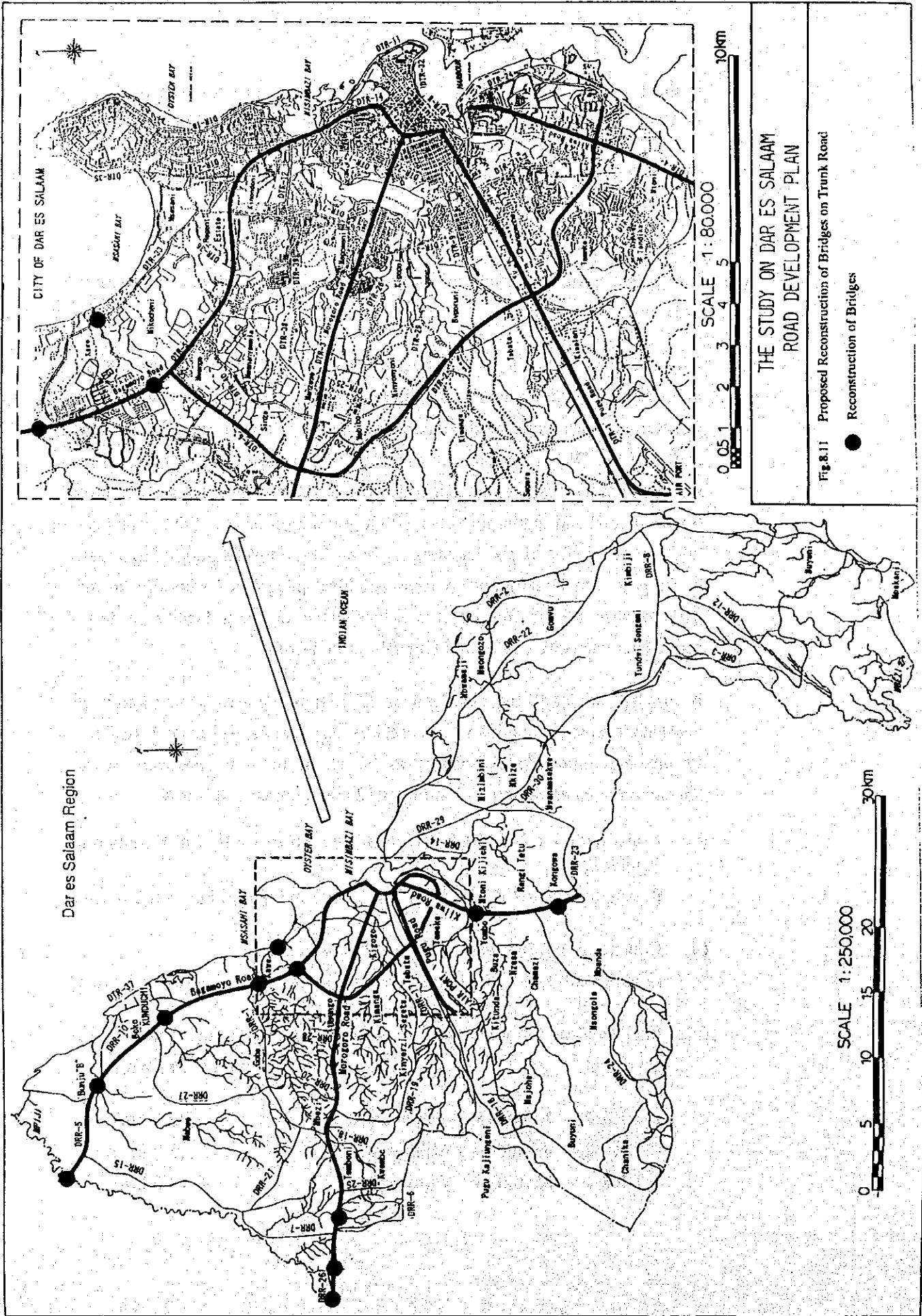
- (i) Bridges to be rehabilitated 1 No. or 38 m
- (ii) Bridges to be reconstructed 9 Nos. or 306 m

(8) Strengthening of Road Network in Kigamboni Area including Construction of Bridges Across Harbor

Kigamboni is a viable alternative for the development of residential, industrial and commercial facilities in Dar es Salaam from the view point of geographical proximity to the city center. In line with the recommendation stated in the Dar es Salaam Master Plan prepared in 1979, the Tanzania Government has placed high priority to the development of Kigamboni area for residential and industrial areas with a population of 265,000 by the year 2000 as well as for tourist facilities to about 30 km further south. However, development of Kigamboni area has not been progressed smoothly in the past because of the inefficient and unreliable crossing facility of ferry service between city center and Kigamboni Peninsula.

In order to stimulate the development of Kigamboni area, construction of permanent crossing facility across creek is essential instead of present ferry system. Recommended measures to be taken for the enhancement of Kigamboni area are illustrated in Fig. 8.12 and summarized below:

- (i) Construction of Harbor Bridge at the northern tip of Kigamboni Peninsula
(2 lane road L= 2.80 km including a 1400 m long bridge with 2 lanes.)
- (ii) Construction of Kurasini Bridge at Kurasini creek
(2 lane road L = 5.30 km including a 600 m long bridge with 3 lanes.)
- (iii) Improvement of following regional roads to 2-lane roads with pavement; (2 lanes, Total L= 24.7 km)
 - DRR 22 Kigamboni – Mjimwema (43.0 km)
 - DRR 23 Kongowe – Mjimwema (5.0 km)
 - DRR 14 Kivukoni – Vijibweni (6.5 km)



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Fig. 8.11 Proposed Reconstruction of Bridges on Trunk Road
● Reconstruction of Bridges

- (iv) Rehabilitation of following regional road to 1-lane road with gravel surface;

(1 lanes, Total L = 113.0 km)

- DRR 2 Mwongoza – Gomvu (12.5 km)
- DRR 3 Chekeniwasonga – Buyuni (43.1 km)
- DRR 8 Kimbiji – Chekeni wasonga (11.5 km)
- DRR 12 Kimbiji – Tundwi – Songani (18.0 km)
- DRR 22 Kivukoni – Kimbiji – Pemba – Mnazi (13.4 km)
- DRR 30 Kibada – Gezauple (14.5 km)

- (9) Strengthening of Road Network along Pugu Road

Expansion of urban area will proceed along the radial road of Pugu Road and the tendency of outward shift of urban area would continue until it will reach urban boundary of Dar es Salaam. In order to promote well-ordered development in the frontage as well as to provide efficient transportation network in newly developed area, it is proposed to strengthen the road network along Pugu Road by construction of ladder step roads as shown in Fig. 8.13.

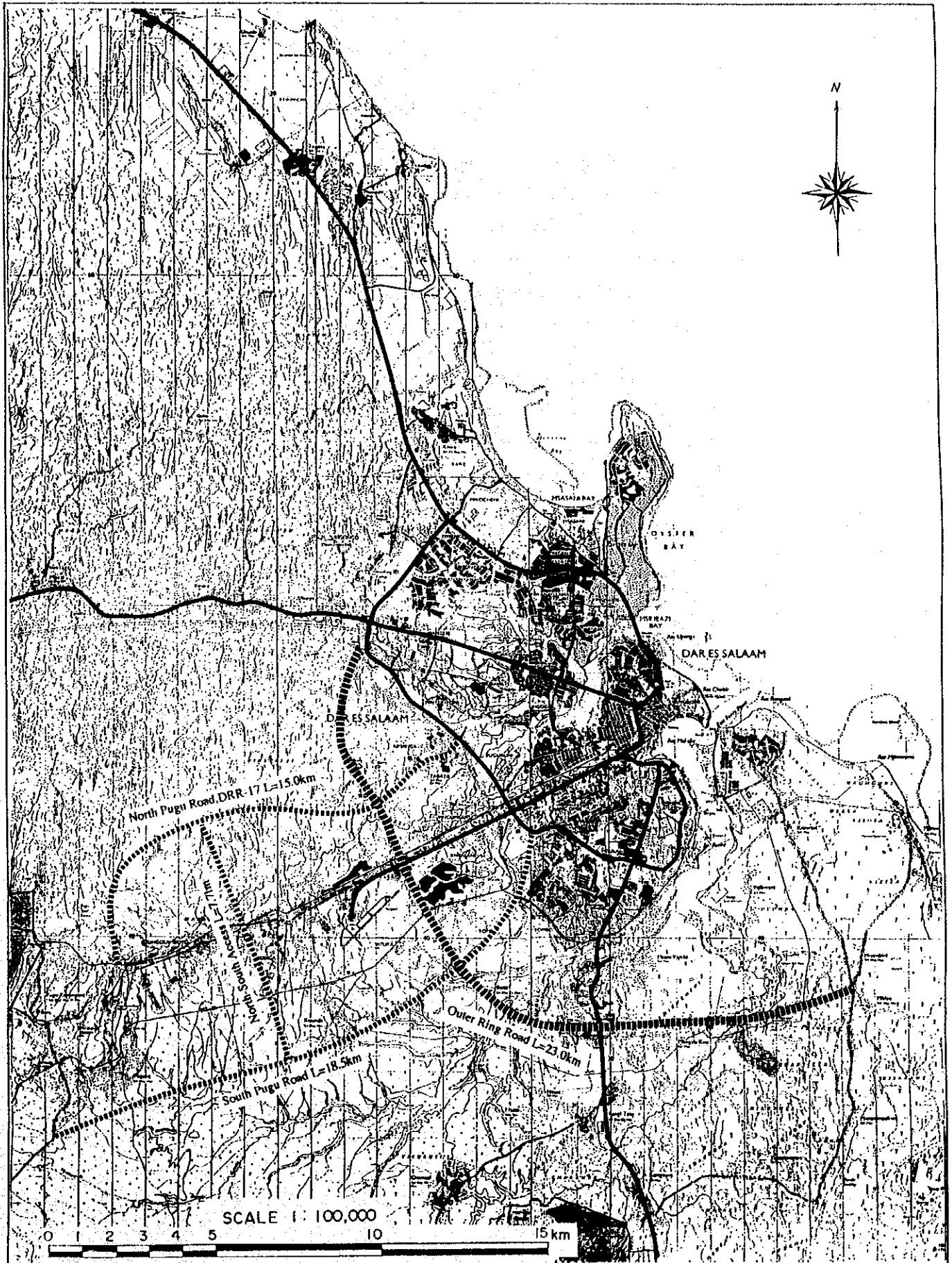
(2 lanes, Total L= 31.2 km)

- Construction of South Pugu Road (18.5 km)
- Improvement of North Pugu Road(DTR- 17) (15.0 km)
- Construction of North-South Access (7.7 km)

- (10) Construction of Outer Ring Road



Rapid increase of population has forced urban sprawl in the urban fringes. In Dar es Salaam, urbanization is rapidly proceeding in the western area along the Pugu Road as well as in the southern parts of urban fringe. In order to enhance urban development as well as to prevent disordered land-use development, the Outer Ring Road is planned outside Mandela Road (Port Access). It is expected to function as a collector road connecting with major radial roads as shown in Fig. 8.13.

- Construction of Outer Ring Road (2 lanes, L= 23.0 km)



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Fig. 8.13 Proposed Road Development to disperse
Urban function in Wider Area

 Construction of Outer Ring Road
 Strengthening of Road Network along Pugu Road

(11) Improvement of Trunk and District Roads in Rural Areas

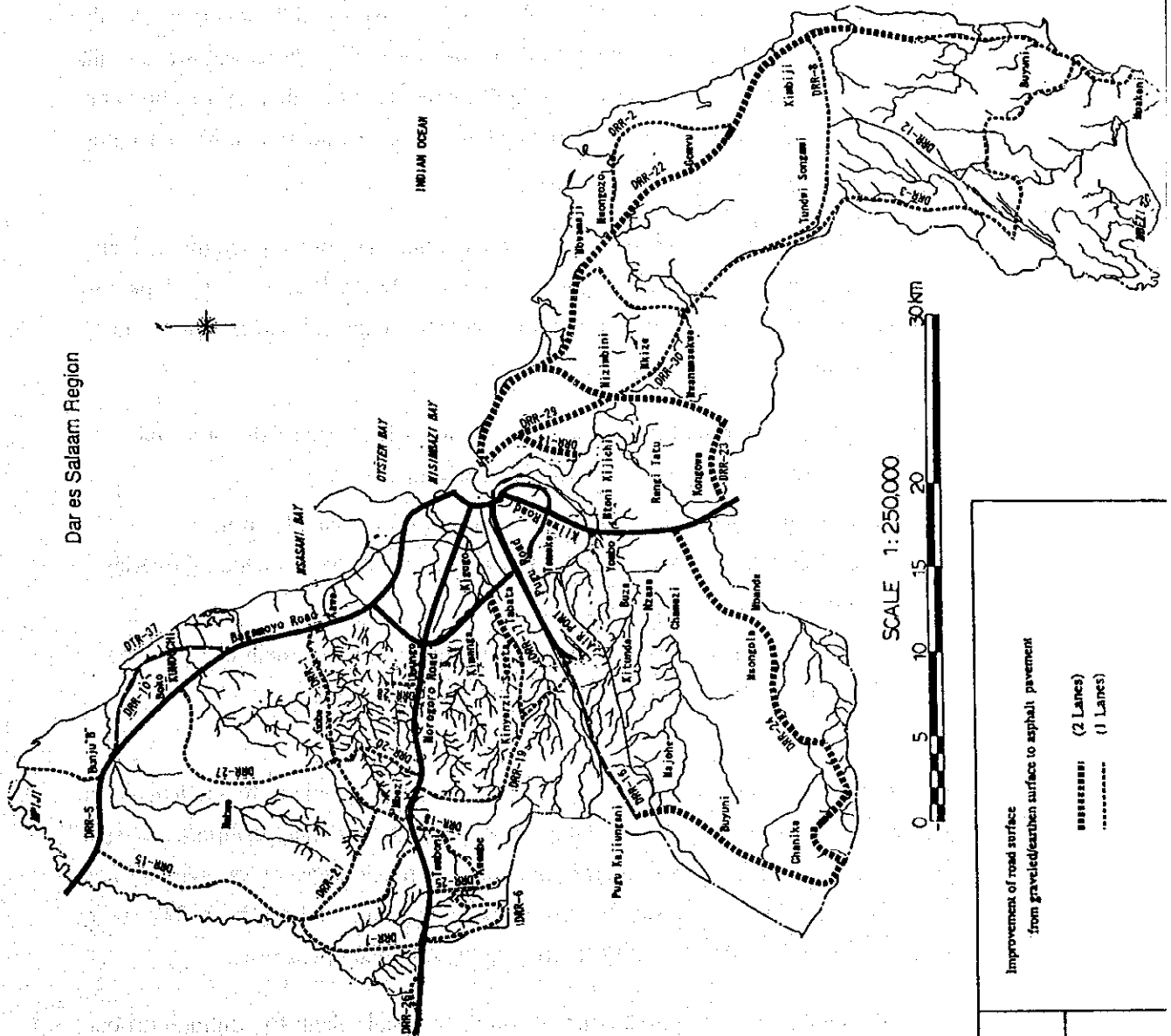
A number of towns and villages located in rural areas are developed along the regional roads and new settlement are continuously developing along those roads. Their function is important in the transportation of cargoes as well as commuters to higher type of roads. Although these roads are mostly narrow and in poor condition, the standard of road is generally acceptable for the present traffic volume.

However most of those roads are gravel and earth roads. Dust pollution, caused by these roads in the dry season, damages to the roadside crops and results in inconvenience and health hazard to the commuters and the people living along the roads

Improvement of road surface from graveled/earthen surface to asphalt pavement with minor improvement of drainage and alignment are recommended to all regional roads located in Dar es Salaam Region as shown in Fig. 8.14.

- All regional roads in Dar es Salaam Region from DRR No. 1 to DRR No.30
(1 lane, 113.0 km in total)
(2 lane, 35.7 km in total)

Dar es Salaam Region



Improvement of road surface
from gravel/earthen surface to asphalt pavement

————— (2 Lanes)
- - - - - (1 Lane)

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Fig.8.14
Improvement of Important Roads in Rural Areas

8.2.3 Strengthening of Maintenance Capability

Trunk Road Maintenance (TRM) under the Ministry of Works, Communications and Transport is the agency responsible for conducting road maintenance for trunk and regional roads in Dar es Salaam Region, while Road Maintenance Division in Dar es Salaam City Council (DCC) for district and local roads. Daily production of road maintenance by both maintenance units, however, were small because of the lack of resources of budget, materials, equipment and manpower, which resulted in deterioration of pavement to the extent that normal routine maintenance is no longer cost effective.

Road maintenance capability for the above units has been strengthened and improved with the road maintenance program of DRIMP assisted by Japanese Government, in which the following improvement measures have been recommended:

- Strengthening of road maintenance depots under DCC (main depot at Ilala Garden) and 3 site-depots at Kisitu, Kigogo and Temeke)
- Procurement of plants and equipment required for daily and routine maintenance works as well as for major improvement work including overlay and reconstruction of pavement
- Technical assistance on administration and supervision for maintenance work including training of mechanics and operators

However, road maintenance situation in Dar es Salaam seems to be unchanged in bad condition as it was due to financial constraints and inappropriate policies regarding road maintenance operation. Since maintenance work is essential not only for extending pavement life but also for keeping the traffic safety, it is recommended for MWCT and DCC to take the following measures:

- (i) To allocate appropriate amount of funds to enable them to continue proper road maintenance work
- (ii) To strengthen road maintenance unit organized by DCC at Ilala Garden under the program of DRIMP in terms of funds, man-power, equipment and materials
- (iii) To prepare firm plans and programs for daily and routine maintenance work and fulfill these plans and program in order to maintain the roads

under all weather condition. Daily/routine maintenance includes bush cleaning, ditch cleaning, dragging, gravel patching, pot-hole patching, grading and road furniture installation.

The field survey revealed that many sections of roads have been blocked and damaged by water or flooding which occur frequently during the rainy season due to lack of proper maintenance of roadside drainage and insufficient capacity of storm drainage system provided along the roads. Special attention shall be paid for cleaning of drainage system along the roads.

8.3 Number of Traffic Lanes and Typical Cross-section

8.3.1 Required Number of Traffic Lanes for Proposed Road

The traffic lanes of the present road network in Dar es Salaam Region were investigated by the Study Team through the road inventory survey and the results are presented in Chapter 4.

The required number of traffic lanes for each road development plan was studied and determined for the year 2010 taking into consideration the following factors:

- (i) Functional requirement to meet the road classification expected to each road development plan,
- (ii) Future traffic demand,
- (iii) Land-use development plan, and
- (iv) Environmental conditions including land acquisition situation.

The proposed number of traffic lanes for each road development plan was presented in Table 8.2.

8.3.2. Proposed Typical Cross -sections

Typical cross sections were developed for the year 2010 along with traffic lane numbers determined above taking into account surrounding local conditions including land-use pattern.

Fig. 8.17 shows proposed typical cross section as well as the required right-of-way width to be applied for each road development plan.

Table 8.2 Proposed Traffic Lane Number for each Road Development Plan in 2010

Name of Road	4 Lanes	3 Lanes	2 Lanes	1 Lane
Pugu Road(DTR-1)				
Nelson Mandela Road(DTR-2)	0			
Monogoro Road(DTR-3) from City Center upto Mbezi	0			
Monogoro Road(DTR-3) from Mbezi upto Regional Boundary			0	
Kilwa Road(DTR-4) beyond Handiri Road			0	
upto Outer Ring Road Junction				
Kilwa Road(DTR-4) beyond Outer Ring Road Junction				0
upto Regional Boundary				
New Bagamoyo Road(DTR-5) from City Center upto Wazo Hill				0
New Bagamoyo Road(DTR-5) from Wazo Hill upto Regional Boundary				
Sam Nujomas Road(DTR-6)	0			
Morocco Road(DTR-7)	0			
Sokaine Drive (DTR-8) beyond Gerezani Road Junction				
upto Kivukoni Front Junction				
Sokaine Drive (DTR-8) from Kivukoni Front Junction upto End Point				0
Uhuru Road(DTR-9)				
Samora Avenue(DTR-10)				0
Ocean Road(DTR-11)				0
Kibondoni Road(DTR-12)				0
United Nations Road(DTR-13)				0
Jambun Street(DTR-14)				0
Makaba Street(DTR-15)				0
Gerezani Road(DTR-16)				0
Ohio Street(DTR-17)				0
Kemysita/Toure Drive(DTR-18)				0
Zanaki Street(DTR-19)				0
Monogoro Road-NII(DTR-20)				0
Chang omba Road(DTR-21) beyond Pugu Road Junction				0
upto Kilwa Road Junction				
Chang omba Road(DTR-21) beyond Chang omba Road Junction				0
upto Nelson Mandela Road Junction				
Msimbazi Road(DTR-22)				0
Libya Street(DTR-23)				0
Bandari Road(DTR-24)				0
Old Kigogo/Mandela Road(DTR-25)				0
Kagera Street(DTR-26) and Extension				0
Hale Selassie(DTR-27)				0
Temeke/Mbagala(DTR-28)				0
Old Kigogo Road(DTR-29)				0
Nkurumth Street(DTR-30)				0
New Kigogo Road(DTR-31) and Missing Link				0
Kivukoni Front(DTR-32)				0
Old Bagamoyo Road(DTR-33)				0
Uhuru/Railway(DTR-34)				0
Chole Road(DTR-35)				0
Mitocbemi Access(DTR-36)				0
Beach Access(DTR-37)				0
Mwinyijuna / Suiza Road(DTR-38) and Extension				0
Mwinyijuna / New Bagamoyo Road(DTR-39) and Extension				0
Shekilango Road(DTR-40)				0
Outer Ring Road				0
New Suiza Road				0
New Kigogo-Tabara Road				0
Extension of Old Bagamoyo Road				0
Pugu South				0
Pugu North				0
North-South Access				0
DRR-1				0
DRR-2				0
DRR-3				0
DRR-4				0
DRR-5				0
DRR-6				0
DRR-7				0
DRR-8				0
DRR-9				0
DRR-10				0
DRR-11				0
DRR-12				0
DRR-13				0
DRR-14 from Kivukoni to 3.5km point				0
DRR-14 from 3.5km point to End Point to 3.5km point				0
DRR-15				0
DRR-16				0
DRR-17 from 7.5km point up to Pugu Road Junction				0
DRR-17 from Nelson Mandela Road up to 7.6km point				0
DRR-18				0
DRR-19				0
DRR-20				0
DRR-21				0
DRR-22 from Kivukoni up to Kimbiji(L=43.0km)				0
DRR-22 from Kimbiji up to Mnaza(L=13.4km)				0
DRR-23				0
DRR-24				0
DRR-25				0
DRR-26				0
DRR-27				0
DRR-28				0
DRR-29				0
DRR-30				0
Kurazini Bridge				0
Harbor Bridge				0

Fig.8.15 Typical Cross Section of Proposed Road

	Right-of-Way	Typical Cross Section
<p>1. Trunk Road in Urban Area Middle Ring Road New Bagamoyo Road Sam Nujoma Road Morogoro Road</p>	<p>50 m</p>	<p>Right of Way Width 50000</p>
<p>2. Trunk Road in City Center Ohio Street Sokoine Drive Gerezani Road Bandari Road Kivukoni Front United Nations Road Uhuru Road</p>	<p>30m</p>	<p>Right of Way Width 30000</p>
<p>3. Collector Roads inside Nelson Mandela Road Outer Ring Road South and North Pugu Road</p>	<p>30m</p>	<p>Right of Way Width 30000</p>

Fig 8.15 Typical Cross Section of Proposed Road

		Typical Cross Section	
	Right-of-Way		
4. Harbor Bridge	50m		
5. Kurasini Bridge	50m		

8.4 Preliminary Cost Estimate of Proposed Road Development

For the purpose of preliminary evaluation as well as the implementation plan, Preliminary cost estimate was carried out for the proposed road development plan in 2010. The unit rates were developed on the basis of the recent cost data and the bid prices of the similar projects in Dar es Salaam currently offered in the tender.

Cost estimate was made assuming the following:

- (i) All costs for the projects are estimated on the price level at January, 1994.
- (ii) Exchange rate are as shown below:
US\$ 1.0 = Tsh. 490 = ¥110 (As of January, 1994)
- (iii) Construction work will be executed by an international contractor.

The unit rates for the major work items are presented in Appendix 8.1..

Based on the above unit rates, the unit quantity as well as the unit costs of each improvement measure were calculated by applying these unit rates to the estimated unit quantities obtained from the proposed typical cross sections for each road development plan. The results are shown in Appendix 8.2 and Appendix 8.3 respectively.

The preliminary cost was estimated applying these unit costs to the estimated quantities of each road development plan as shown in Appendix 8.4.

Summary of the preliminary costs for each development plan are presented in Table 8.3.

Table 8.3: Summary of Preliminary Cost Estimate by Project (1/2)

Unit: Million Tsh.

Package No.	Name of Road	Length km	Lane No.	Construction Cost	Land Compensation Cost	Remarks
A-1	Widening of Arterial Roads in the City Center					
	- Widening of roads from 2 lanes to 4 Lane					
	Ohio Street	0.96	4	580		
	Sokoine Drive	0.67	4	400		
	Gerazani Road	1.40	4	900		
	Bandari Road	2.00	4	1,590		
	Kivukoni Front	0.40	4	240		
	- Construction of Seaside Promenade with car parking lots	Sum			200	
- UWT-Cerezani	0.24	4	140		20	Rail Sta. to be removed
	Sub Total	5.67		4,050	20	
A-2	Widening of Middle Ring Road with construction of Missing Link					
	- Widening of Roads from 2 lanes to 4 lane					
	Morocco Road	4.00	4	3,000		
	New Kigogo Road	2.80	4	2,450		
	Chang'ome Road	2.80	4	1,900		
- Missing Link of Middle Ring Road	0.75	4	440		20	
	Sub Total	10.35		7,790	20	
A-3	Widening of Trunk Roads from 2 lanes to 4 lanes					
	- DTR-5: New Bagamoyo Road	4.40	4	4,000		
	DTR-5; Mpakani - Wazo hill section	12.60	4	9,040		
	- DTR-6: San Nujoma Road (Mpakani Road)	3.90	4	3,140		
	- DTR-3: Morogoro Road	11.00	4	10,010	280	
	- DTR-9: Uhuru Road	4.00	4	2,590	400	
	- DTR-13: United Nation Road	2.00	4	1,360	50	
	- DTR-4: Kilwa Road up to Mandera Road	3.20	4	2,180	80	
	DTR-4; Mandera Road up to Outer Ring	5.60	4	3,950	30	
	New; Morocco Road - United nation Road	1.90	4	2,950	50	
	Sub Total	48.60		39,220	890	Morocco-Wazo Hill Long-term
A-4	Grade Separation of Intersections					
	8 location	Sum		25,760	0	
A-5	Construction and Improvement of Road Network inside Mandela Road					
	- UWT Road	2.00	4	360		Overlay
	- Uhuru Road	1.20	2	220		Overlay
	- Old Kigogo Road	6.50	2	2,670		
	- Old Kigogo - Tabata	1.50	2	620		
	- Morogoro -NIT (DTR-20)	1.40	2	570		
	- New Sinza Road	3.80	2	1,700		
	- Kagera Road	2.40	2	1,110		
	- Mwinjuma-H. Bagamoyo and Ext.	3.60	2	1,040		20
	- DTR-25 Old Kigogo- Mandera	1.00	2	410		
	- DTR-36 Mikocheni Access	1.30	2	530		
	- DTR-38 Mwinjuma-Sinza	6.10	2	2,480		20
	- DTR-39 Mwinjuma-New Bagamoyo	4.70	2	1,900		20
	- Extension of Old Bagamoyo	6.70	2	2,750		
	- DTR-28 Temek-Mbagala	4.70	2	1,930		
	- DTR-18 Keniyatta-Toure Drive	7.60	2	680		
	- DTR-35 Chole Road	3.00	2	1,080		
	- DTR-27 Haile Selasie	5.40	2	1,350		
	Sub Total	62.90		21,400	60	
Sub Total (1)		127.32		98,220	990	

Table 8.3: Summary of Preliminary Cost Estimate by Project (2/2)

Unit: Million Tsh.

Package No.	Name of Road	Length km	Lane No.	Construction Cost	Land Compensation Cost	Remarks	
A-6	Rehabilitation of Pavement Condition on Local Roads						
	- Local Roads in Temeke area	13.90	2	2,090			
	- Local Roads in Ilala area	10.30	2	1,550			
	- Local Roads in Tabata	9.20	2	1,380			
	- Local Roads in Sinza area	9.20	2	1,380			
	- Local Roads in Mwinjuma area	17.20	2	2,580			
	Sub Total	59.80		8,960			
A-7	Reconstruction of Existing Bridges on Major Roads						
	2 Lanes Bridges - 7 no.	185	2	655			
	Sub Total			655			
A-8	Strengthening of Road Network in Kigamboni Area						
	- Improvement Kigamboni Ferry Port	Sum		1,260			
	- Harbor Bridge Access Road	2.80	2	25,470	280	Br. 1,400 m	
	- Kurashini Bridge Access Road	5.30	3	18,210	130	Br. 600 m	
	- DRR-23 Kongowe - Mjimwema	5.00	2	2,050			
	- DRR-14 Kivukoni-Vijibweni	6.50	2	2,670			
	- DRR-29 Tungu-Kibada	5.90	2	2,420			
	- DRR-2 Mwongozo-Gomvu	12.50	1	750			
	- DRR-3 Chekeniwasonga-Buyuni	43.10	1	2,590			
	- DRR-8 Kimbiji-Chekeniwasonga	11.50	1	690			
	- DRR-12 Kimbiji-Tungi-Songani	18.00	1	1,080			
	- DRR-22 DRR23 intersection-Kimbiji	43.00	2	7,740			
	- Kimbiji-Mnazi	13.40	1	800			
	- DRR-30 Kibada-Cezauloe	14.50	1	870			
		Sub Total	181.50		66,600	410	
A-9	Strengthening of Road Network along Pugu Road						
	Pugu South - short-term	9.00	2	4,350	140	New Construction	
	Pugu South	9.50	2	3,710	140	New Construction	
	Pugu North (DRR-17) - short-term	7.50	2	2,930	110	Improvement	
	Pugu North (DRR-17) Extension	7.50	2	3,080		New Construction	
	North-South Access	7.70	2	3,410	120	New Construction	
	Sub Total	41.20		17,480	510		
A-10	Construction of Outer Ring Road						
	Sub Total	22.00	2	9,710	70		
	Sub Total			9,710	70		
A-11	Improvement of Important Roads in Rural Area						
	DTR-5 New Bagamoyo beyond Wazo Hill	14.10	2	2,540			
	DTR-3 Morogoro beyond	13.60	2	1,220			
	DRR-1 Kawe-Goba- Mbezi	16.00	1	960			
	DRR-4 Pugu-Msongola	20.00	1	1,200			
	DRR-5 Bunji-Mbeweni	6.40	2	1,730			
	DRR-6 Kwembe- Kisosa	13.90	1	830			
	DRR-7 Kibamba-Magowe mpiji	9.00	1	540			
	DRR-9 Mikwanbe-Gezaule	20.00	1	1,200			
	DRR-10 Kunduchi-Unio- Boko	11.40	2	2,050			
	DRR-11 Msongola- Byuni	16.00	1	960			
	DRR-13 Pugu-Kajungeni	8.30	1	500			
	DRR-15 Bunji-Mabwepande-Mpiji	24.10	1	1,450			
	DRR-16 DIA-C/Mboto	7.20	2	1,300			
	DRR-17 Pugu-Kinyerezi	5.00	1	300			
	DRR-18 Mbezi-Maramba-Kwembi	8.00	1	480			
	DRR-19 Temboni-Kinyerezeni	9.00	1	540			
	DRR-20 Temboni-Goba	5.70	1	340			
	DRR-21 Goba-Mpiji	8.30	2	500			
	DRR-23 Kongowe-Mjimwema	12.60	2	2,270			
	DRR-24 Pugu-Chanika-Mbagala	46.40	1	8,350			
	DRR-25 Mbezi-Kwembe	4.50	1	270			
	DRR-26 Morogoro Road-Kiluvia	2.30	1	140			
	DRR-27 Wazo Hill - Goba	11.30	1	680			
	DRR-28 Kibo-Msewe	1.50	1	90			
		Sub Total	294.60		30,440	0	
		Sub Total (2)	599.10		133,865	990	
		Total	726.62		232,095	1,980	

8.5 Road Network Master Plan in 2010

8.5.1 Introduction

As stated in paragraph 6.2 "Transportation Development Strategy", the target of the Dar es Salaam Road Development Master Plan for the year of 2010 is set up as follows:

- (i) Road and road network development in harmony with growing demand for traffic and its pattern,
- (ii) Transport development to strengthen urban function, and
- (iii) Dispersion of urban function in wider area and realization of homogeneous urban development

To achieve the above target, the following road development concepts have been established:

- (i) To enhance the urban traffic efficiency
- (ii) To promote urban function in the intensified urban development
- (iii) To induce the development of potential development areas
- (iv) To conduct ordered urban expansion

8.5.2 Road Network Master Plan for the Year 2010

In line with the above road development concepts, various road development projects have been discussed and recommended in the previous paragraph of 8.2. The road network master plan in Dar es Salaam for the year 2010 is established as shown in Fig. 8.16 based on these road development projects.

The accumulated road length by type of roads in the year 2010 is presented in Table 8.4.

Table 8.4 Road Network System in Dar es Salaam in 2010

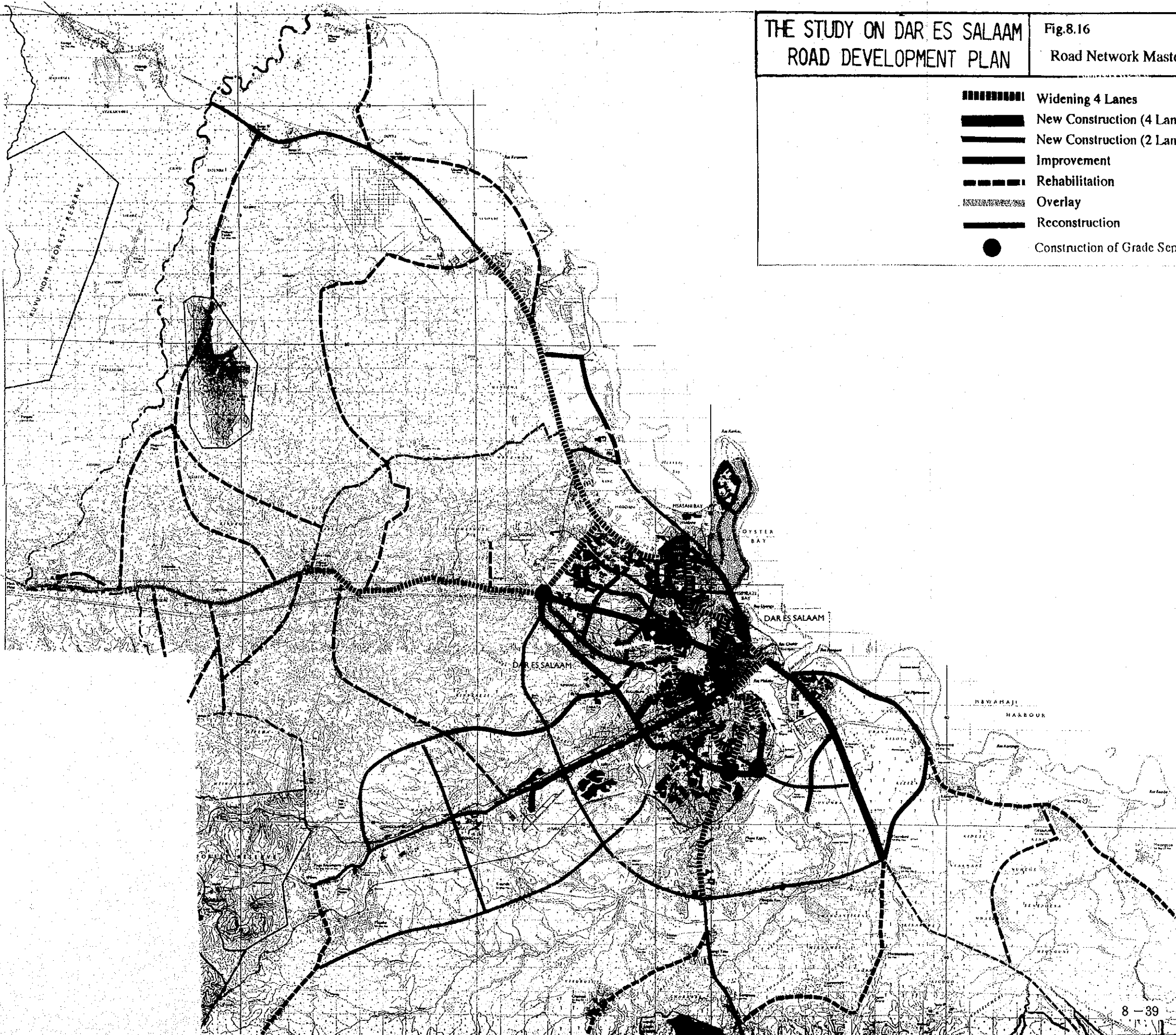
Road Classification	Present Road Network in 1994 (km)/*	New Const. Road (km)	Improvement Road (km)	Total Road Network in 2010 (km)	Difference (km)	Improvement Measures
Trunk Road	144.5	22.0	0.0	166.5	22.0	
4 lane roads (paved)	39.8	0.0	62.7	102.5	62.7	A-1,A-2,A-3
2 lane roads (paved)	104.7	22.0	-62.7	64.0	-40.7	A-10
Regional Road	314.0	0.0	61.2	375.2	61.2	
2 lane roads (paved)	60.7	0.0	205.0	265.7	205.0	A-5,A-8,A-11
2 lane roads (unpaved)	143.8	0.0	-143.8	0.0	-143.8	
1 lane roads (paved-SBST)	0.0	0.0	109.5	109.5	109.5	A-8,A-11
1 lane roads (unpaved)	109.5	0.0	-109.5	0.0	-109.5	
District Road	213.1	0.0	0.0	213.1	0.0	
1 lane roads (paved-SBST)	0.0	0.0	0.0	0.0	0.0	
1 lane roads (unpaved)	213.1	0.0	0.0	213.1	0.0	
Major Feeder Road	251.0	0.0	0.0	251.0	0.0	
2 lane roads (paved)	151.0	0.0	59.8	210.8	59.8	A-6
2 lane roads (unpaved)	100.0	0.0	-59.8	40.2	-59.8	
Minor Feeder Road	227.4	0.0	0.0	227.4	0.0	
1 lane (paved)	0.0	0.0	0.0	0.0	0.0	
1 lane (unpaved)	227.4	0.0	0.0	227.4	0.0	
Total Length	1,150.0	22.0	61.2	1,233.2	83.2	

Note: /* Refer to Table 4.14 "Summary of Road Network System Identified by the Study Team"

THE STUDY ON DAR ES SALAAM ROAD DEVELOPMENT PLAN






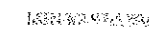


Fig.8.16
Road Network Master Plan in 2010

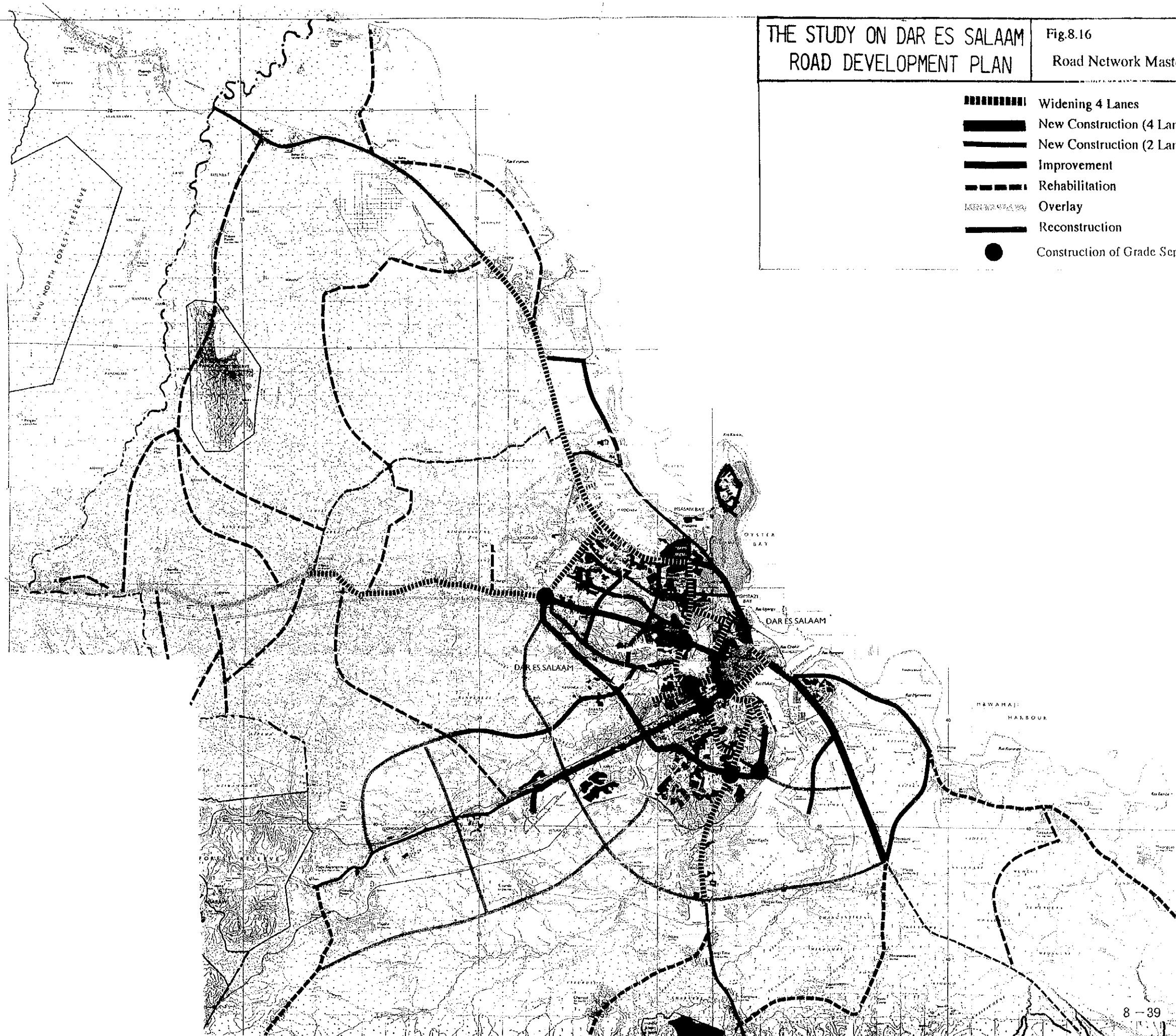
- ▬▬▬▬▬▬▬▬▬▬▬▬ Widening 4 Lanes
- ▬▬▬▬▬▬▬▬▬▬▬▬ New Construction (4 Lanes)
- ▬▬▬▬▬▬▬▬▬▬▬▬ New Construction (2 Lanes)
- ▬▬▬▬▬▬▬▬▬▬▬▬ Improvement
- ▬▬▬▬▬▬▬▬▬▬▬▬ Rehabilitation
- ▬▬▬▬▬▬▬▬▬▬▬▬ Overlay
- ▬▬▬▬▬▬▬▬▬▬▬▬ Reconstruction
- Construction of Grade Separated Intersection

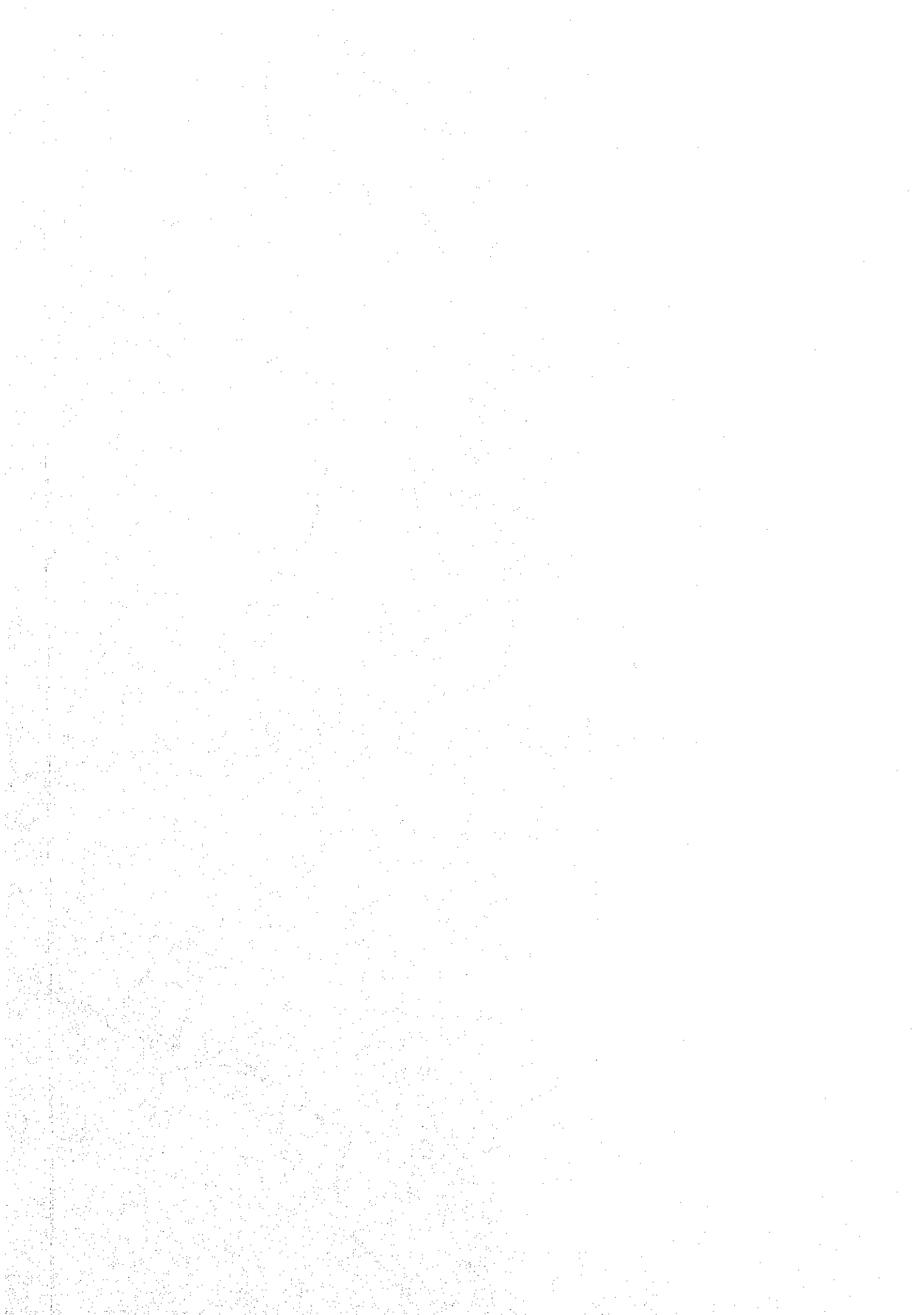


THE STUDY ON DAR ES SALAAM
ROAD DEVELOPMENT PLAN

Fig.8.16
Road Network Master Plan in 2010

-  Widening 4 Lanes
-  New Construction (4 Lanes)
-  New Construction (2 Lanes)
-  Improvement
-  Rehabilitation
-  Overlay
-  Reconstruction
-  Construction of Grade Separated Intersection





8.5.3. Congestion Ratio on the Proposed Road Network in 2000 and 2010

To examine the traffic condition of proposed road network system, traffic assignment has been made on the proposed network for the year 2010. Fig. 8.17 shows the forecasted traffic in 2010.

Fig. 8.18 shows the traffic congestion on each arterial roads calculated on the basis of the road capacity and traffic volume. The congestion level on the arterial roads inside the proposed outer ring road is moderate ranging from 1.0 to 1.75 and no serious congestion would be expected on the major roads in Dar es Salaam in the year 2010 with the exception of some urban roads in and around the city center.

This result shows the future road network proposed in this study is totally proper.

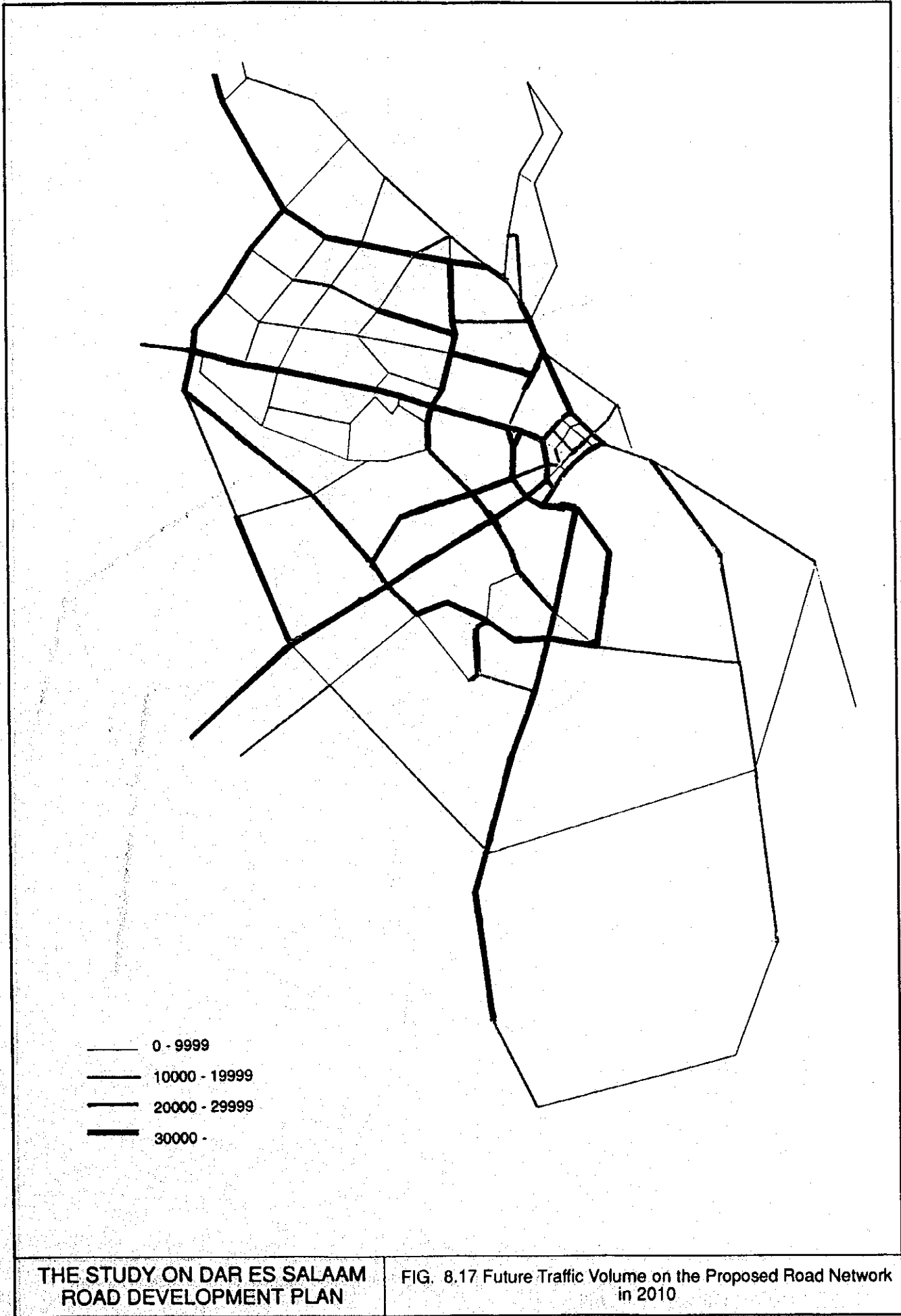
According to the result of traffic congestion analysis on the present road network system made in paragraph 3.8 of Chapter 3, the following roads are extremely congested with a congestion ratio exceeding 1.50, which are deemed over saturation level of traffic capacity: (Refer to Table 3.9 and Fig. 3.12)

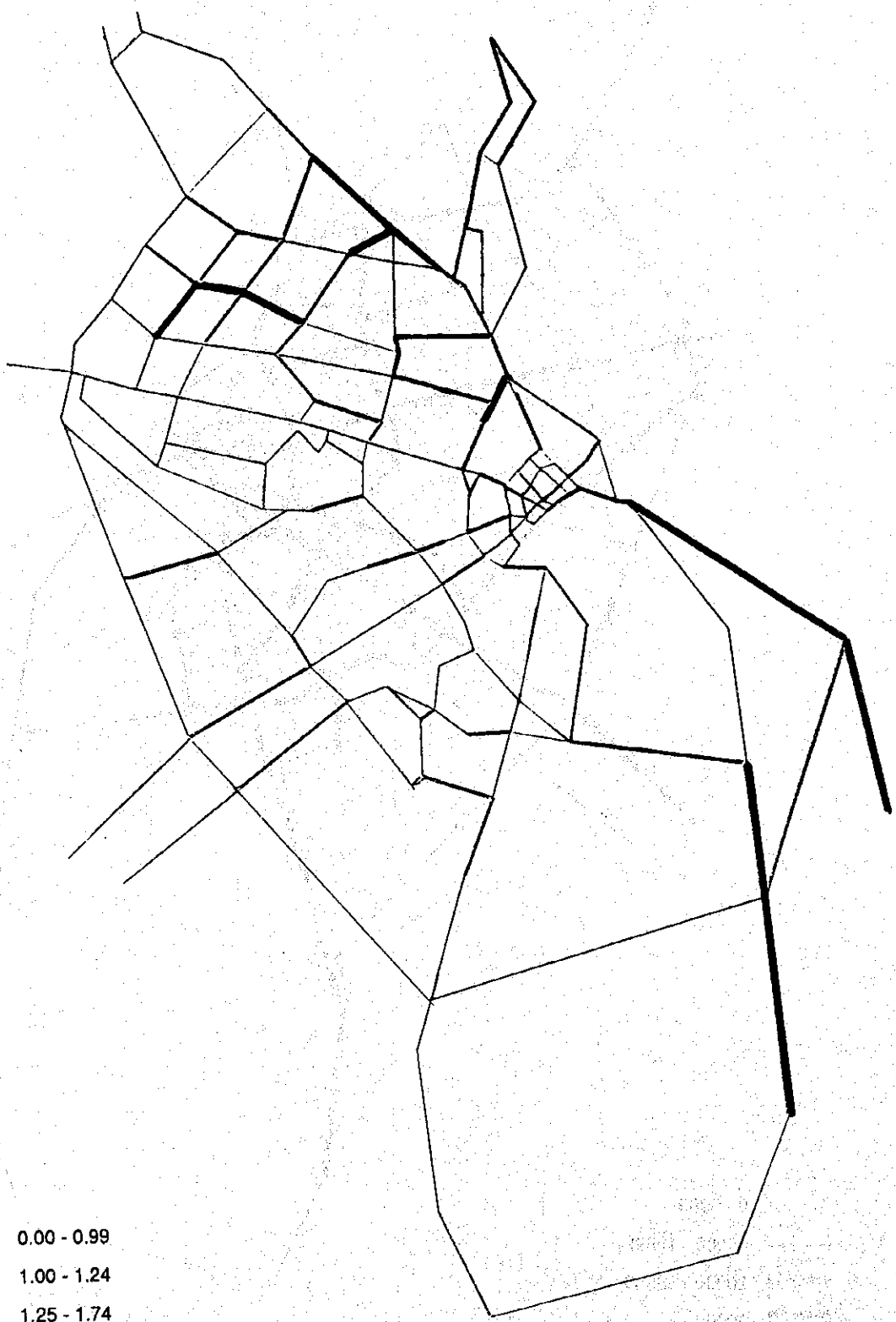
<u>Name of Roads</u>	<u>Congestion Ratio</u>
Bandari Road	2.13
Sokoine Road	2.08
Morocco Road	2.07
Uhulu Road	1.97
Bagamoyo Road	1.75
New Kigogo Road	1.74
Morogoro Road	1.70

These roads should be widened to 4 lanes road in the short-term plan in order to solve the traffic congestion on the trunk roads in the city due to rapid increase of traffic demand. Fig. 8.19 shows the road network proposed in year 2000 and traffic assignment made on this network.

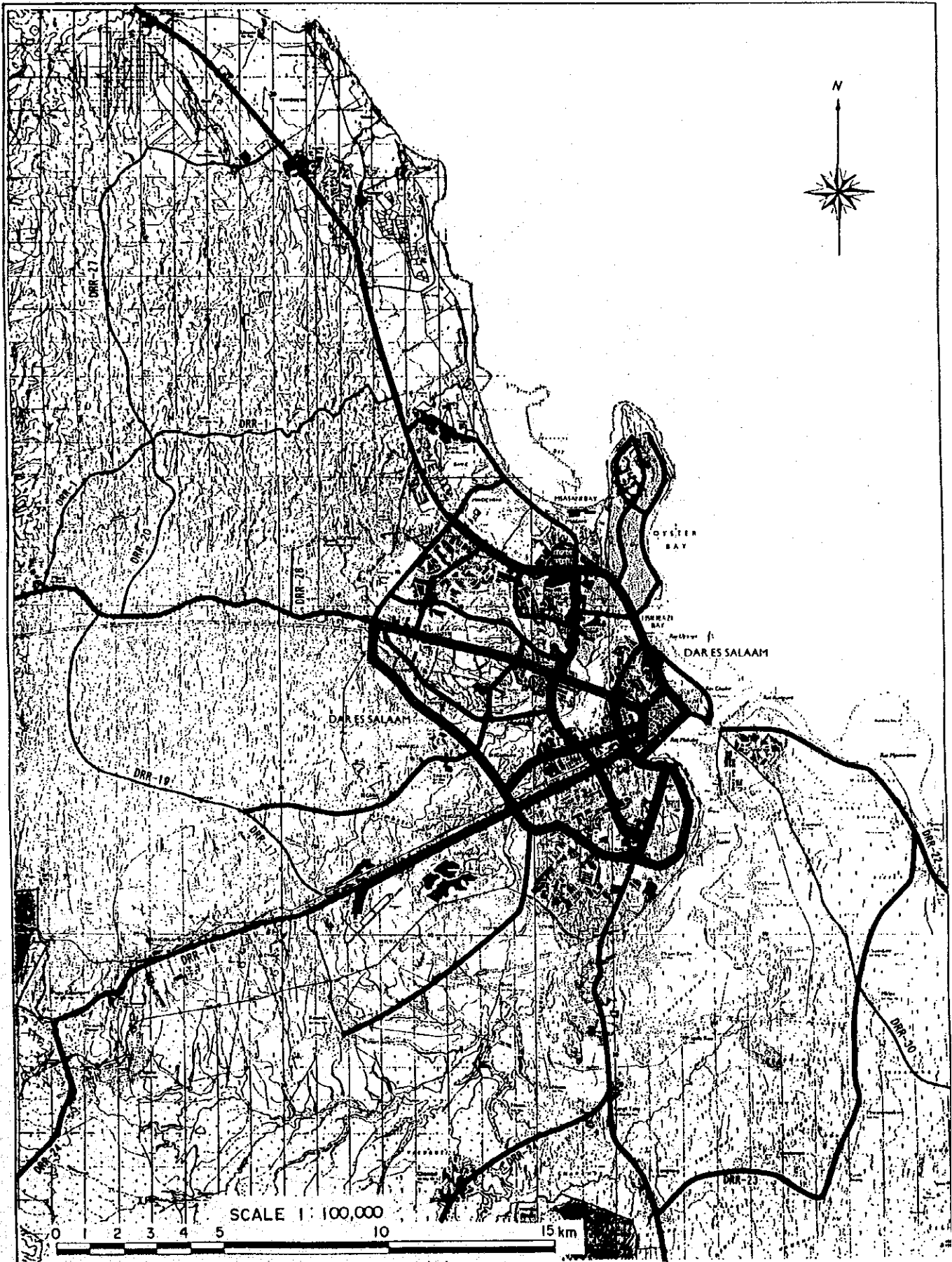
Forecasted traffic demand and the congestion ratio on the road network system in year 2000 are presented in Fig. 8.20 and Fig. 8.21 respectively.

As a result, no serious congestion is expected on the road network in Dar es Salaam in year 2000 in case if the widening of above roads is implemented by year 2000.





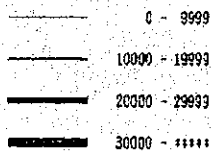
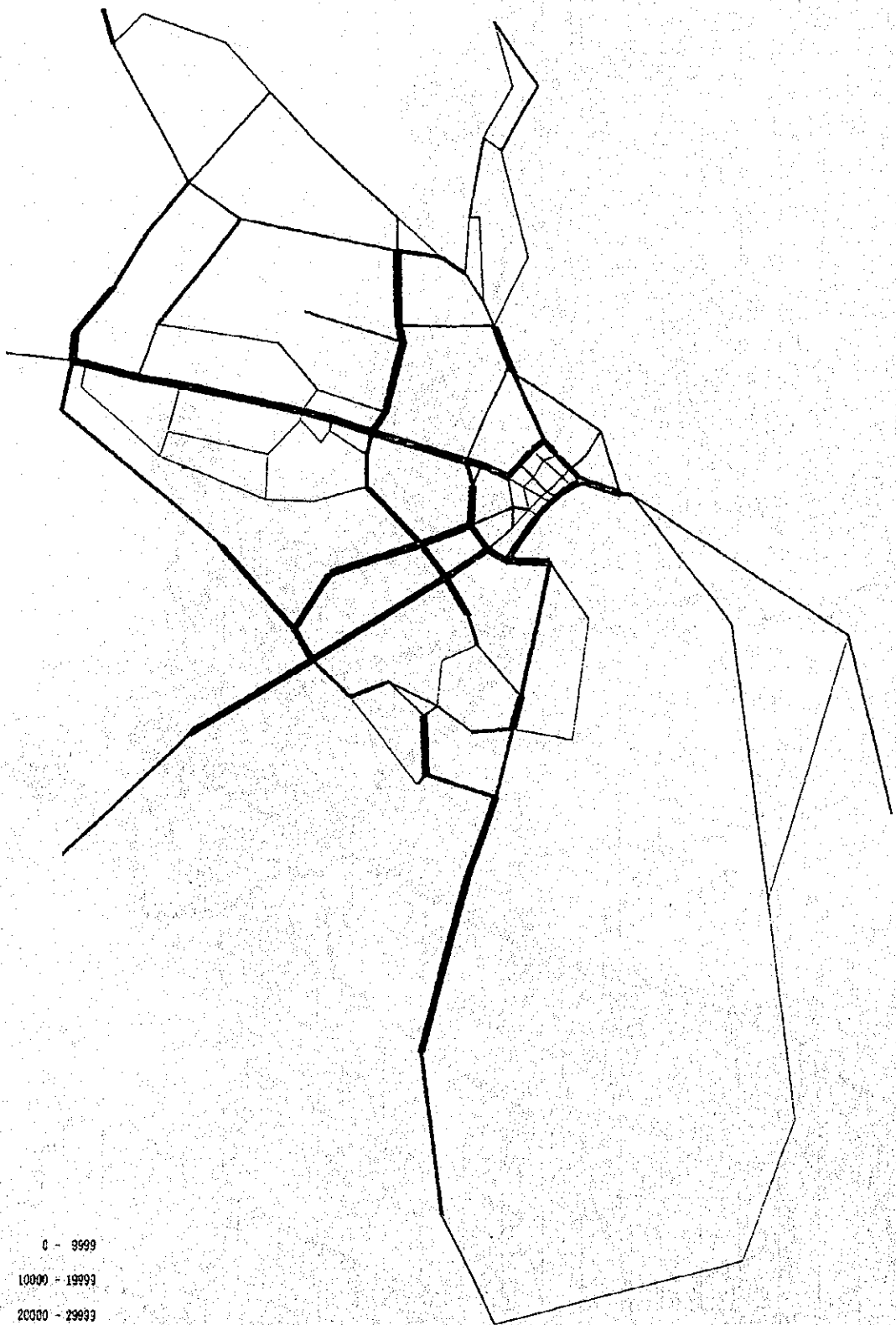
- 0.00 - 0.99
- 1.00 - 1.24
- 1.25 - 1.74
- 1.75 -



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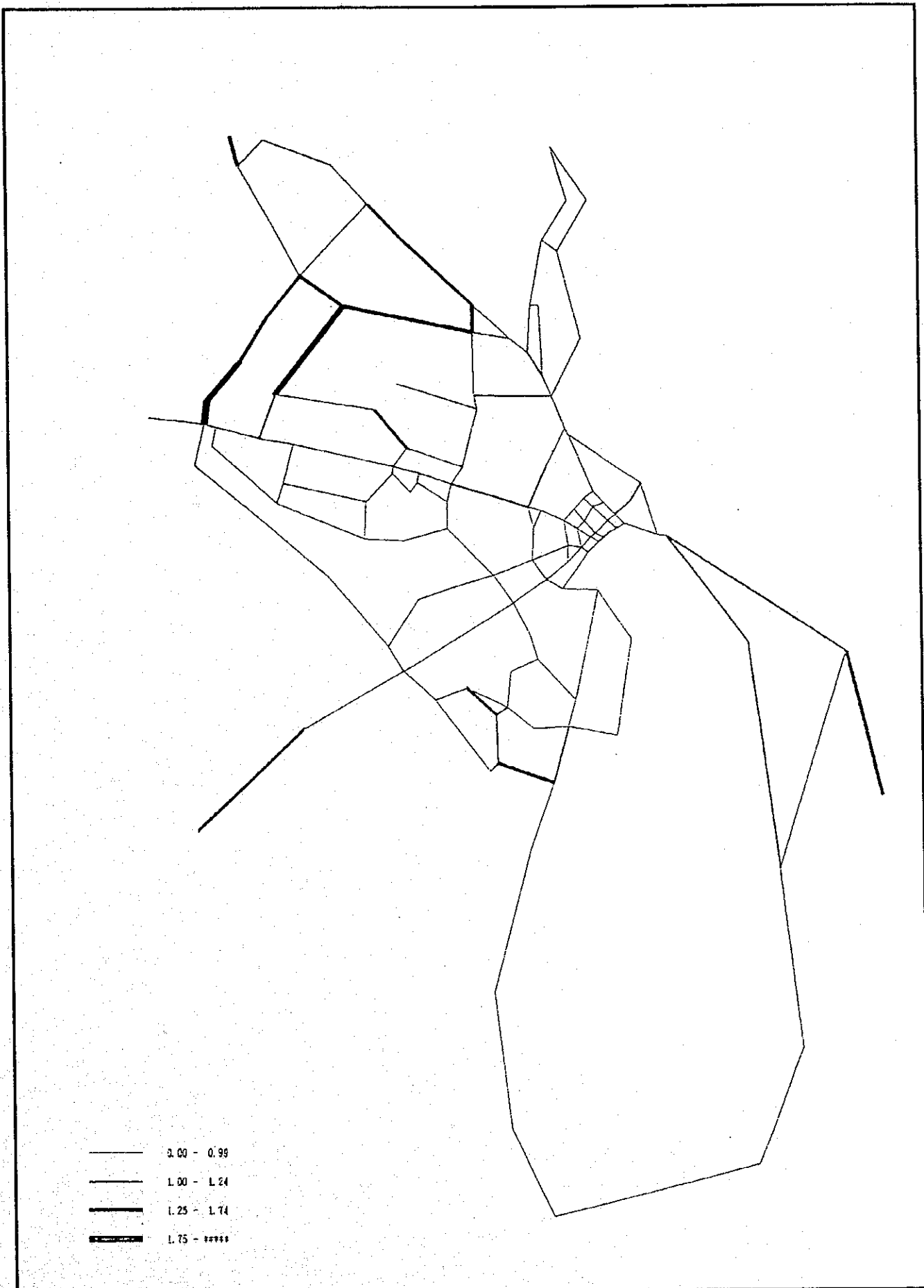
Fig.8.19 Road Network System in 2000

- 4 Lanes Road
- 2 Lanes Road
- 1 Lane Road



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ROAD DEVELOPMENT PLAN

FIG. 8.20 Future Traffic Volume on the Proposed Road Network
in 2000



**THE STUDY ON DAR ES SALAAM
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**FIG. 8.21 Congestion Ratio of the Proposed Road Network
in 2000**

