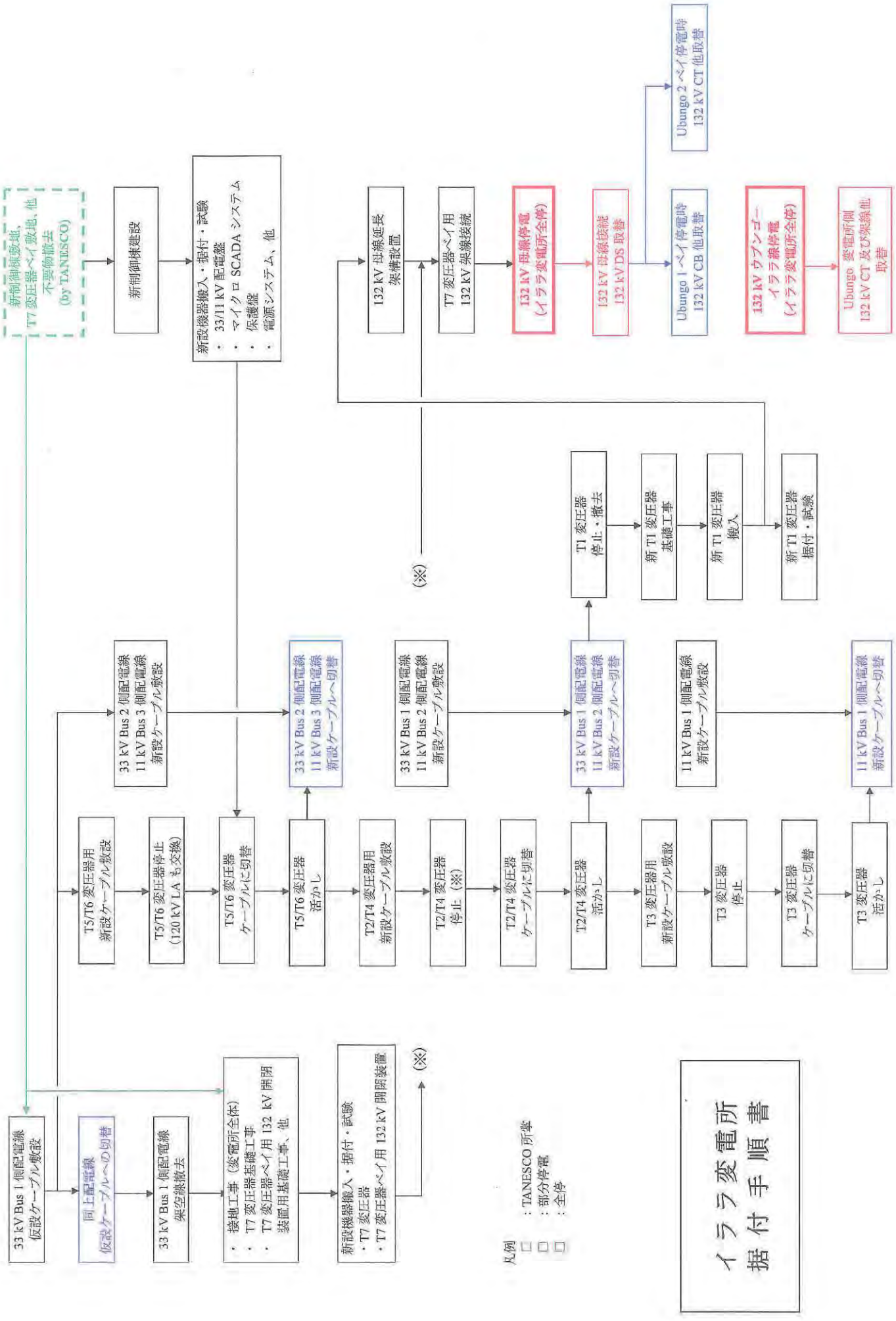
資料－８　イララ変電所増強に係る切換え手順検討

8. イララ変電所増強に係る切換え手順検討

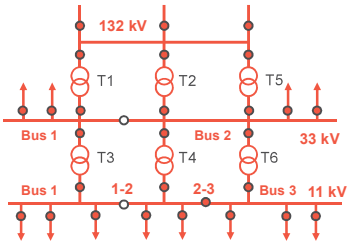


Construction Procedure for Ilala Substation

Normal Operation

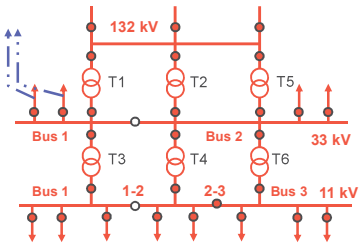
- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA

Normally open at 33 kV Bus section and 11 kV Bus 1-2 Section



33 kV Power Transmission by Temporary Cables (33 kV Bus 1 only)

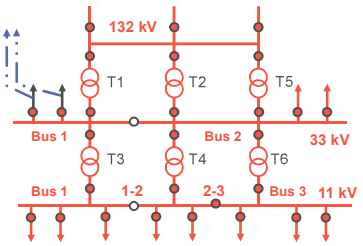
- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA
- Installation of temporary cables for 33 kV Feeders
- De-energization of 33 kV Feeders at Bus 1



33 kV Power Transmission by Temporary Cables (33 kV Bus 1 only)

- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA
- Installation of temporary cables for 33 kV Feeders
- De-energization of 33 kV Feeders at Bus 1

Energization of 33 kV Feeders at Bus 1 by temporary cables (one by one)

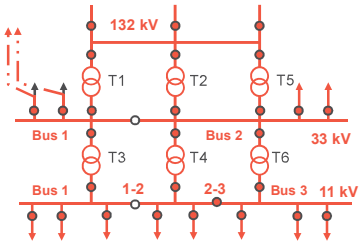


33 kV Power Transmission by Temporary Cables (33 kV Bus 1 only)

- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA
- Installation of temporary cables for 33 kV Feeders
- De-energization of 33 kV Feeders at Bus 1

Energization of 33 kV Feeders at Bus 1 by temporary cables (one by one)

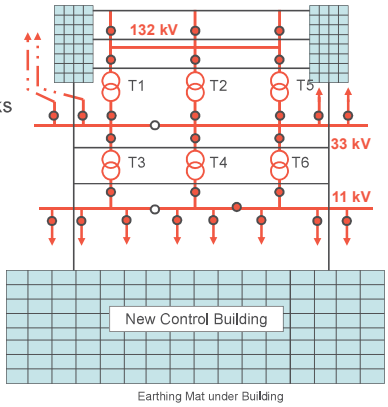
- Removal of 33 kV Overhead conductors (inside S/S)



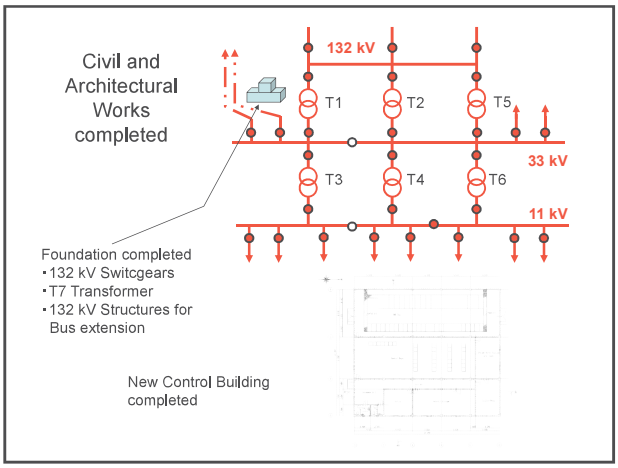
Start Earthing, Civil and Architectural Works

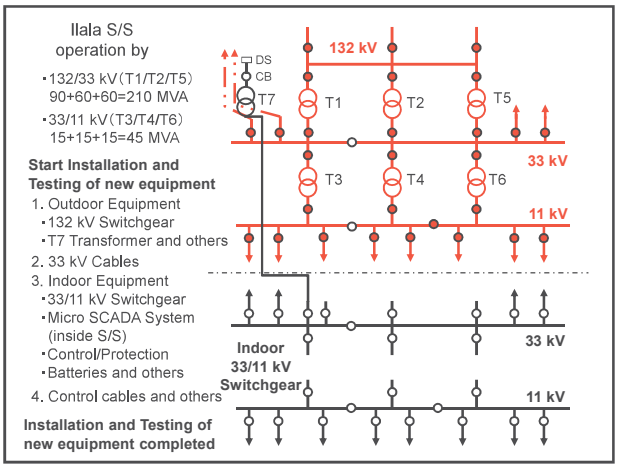
- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA

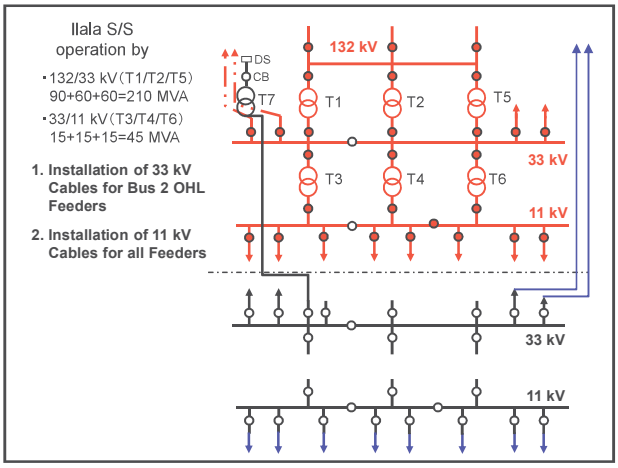
Start excavation for earthing work and foundations of New Control Building, 132 kV Switchgears, 132/33 kV Transformer, etc.

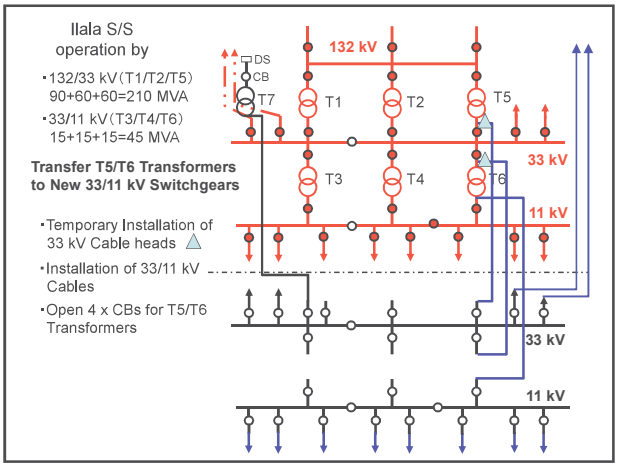


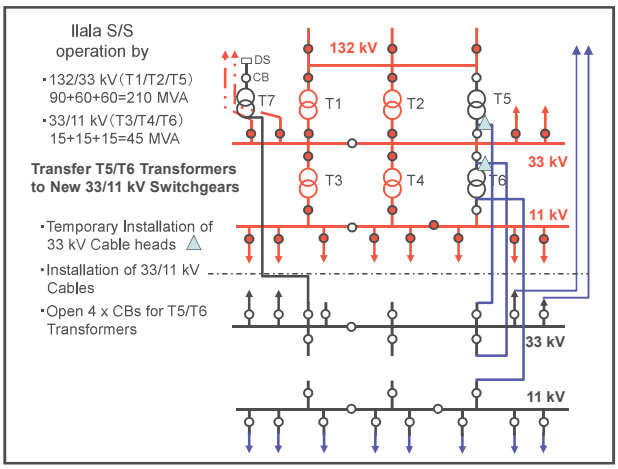
8. イララ変電所増強に係る切換え手順検討

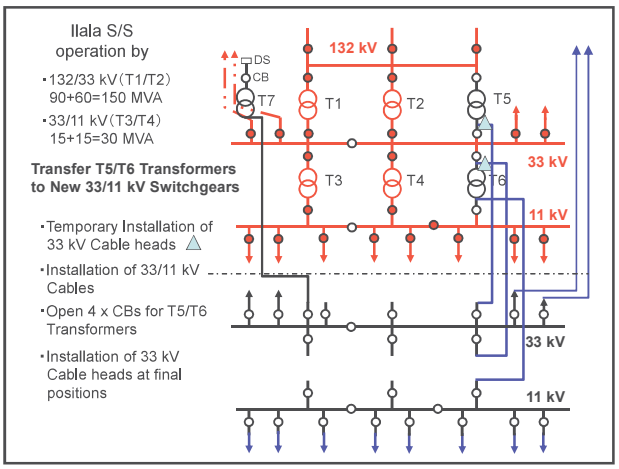




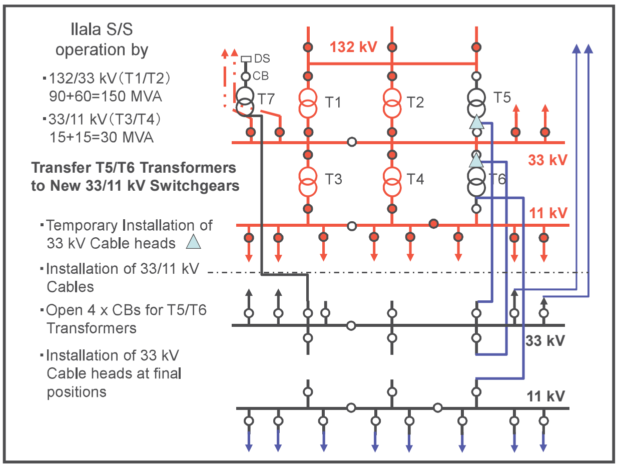


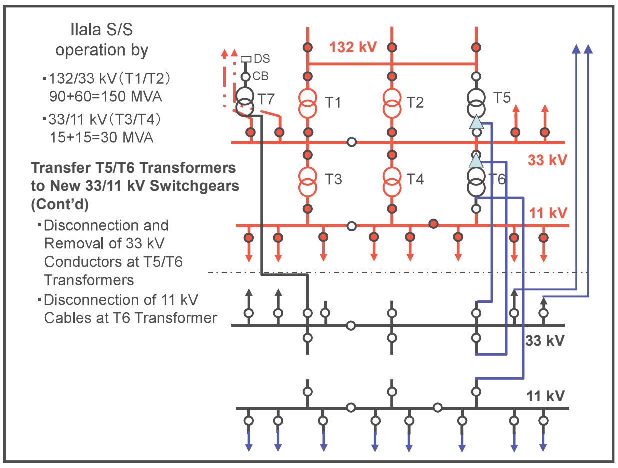


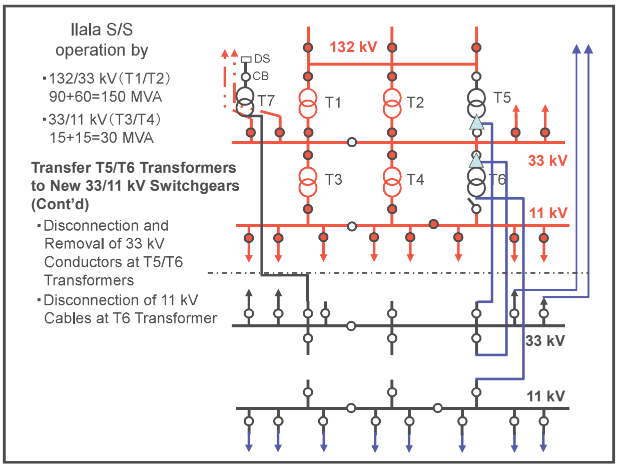


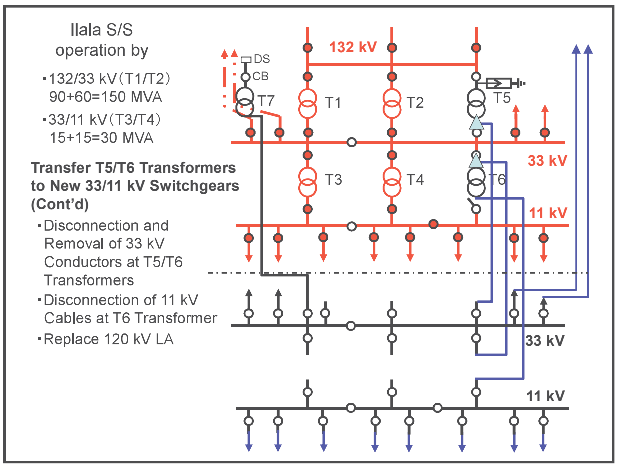


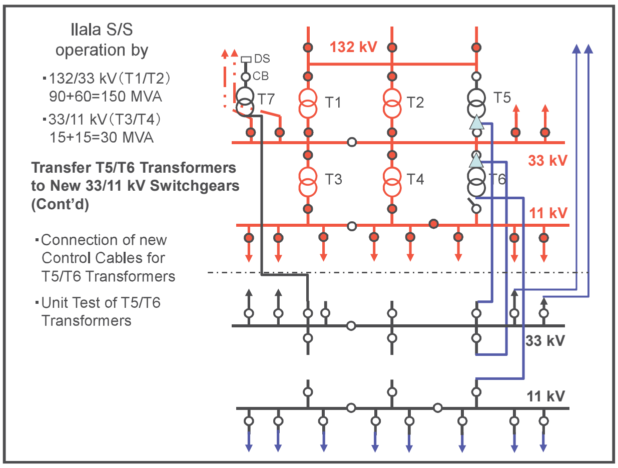
8. イララ変電所増強に係る切換え手順検討

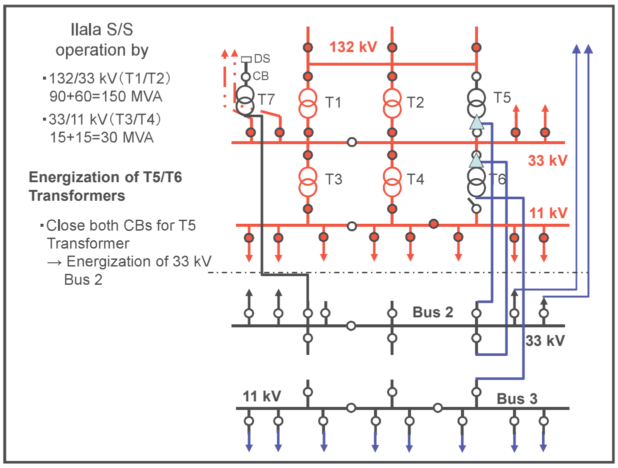




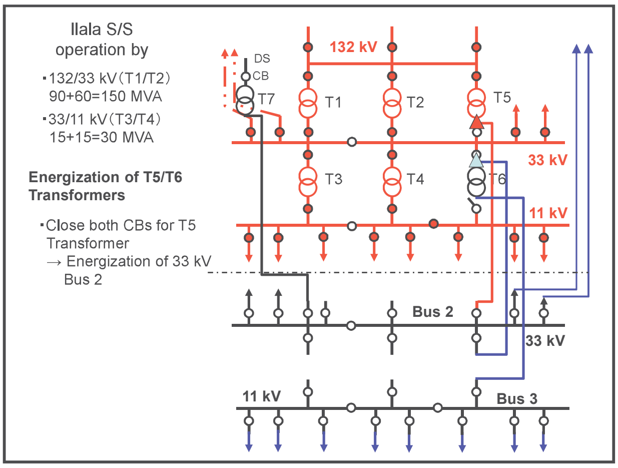


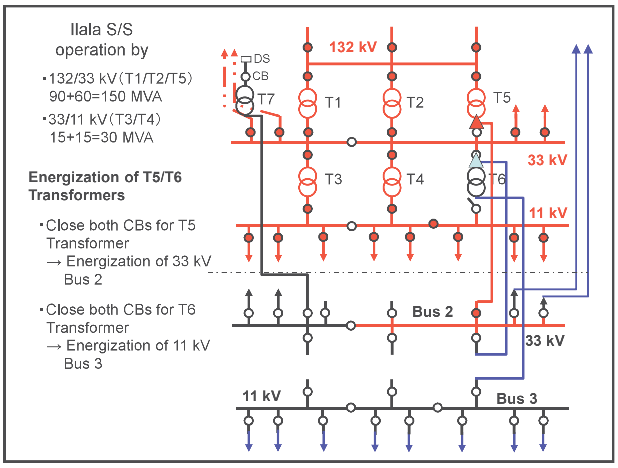


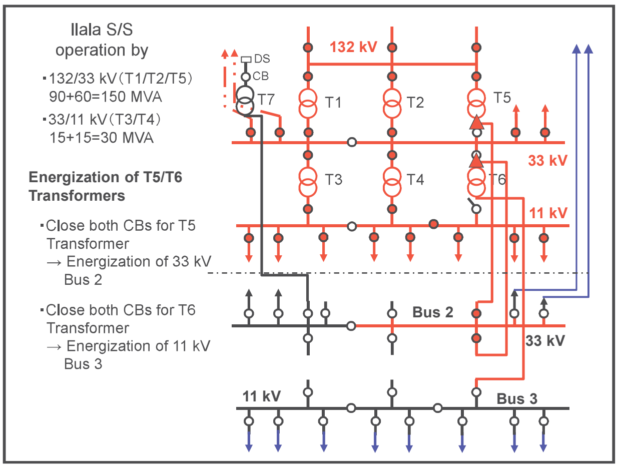


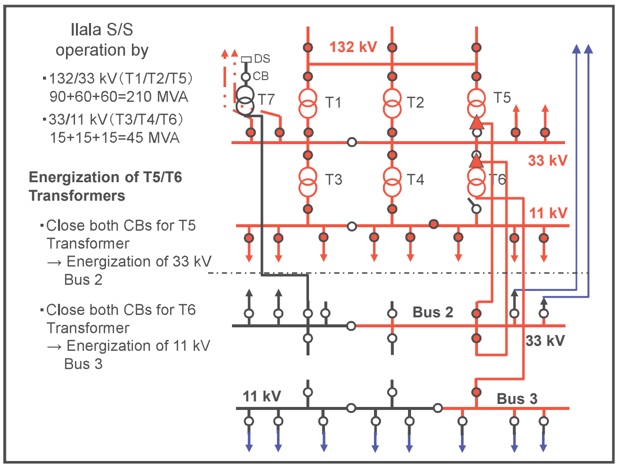


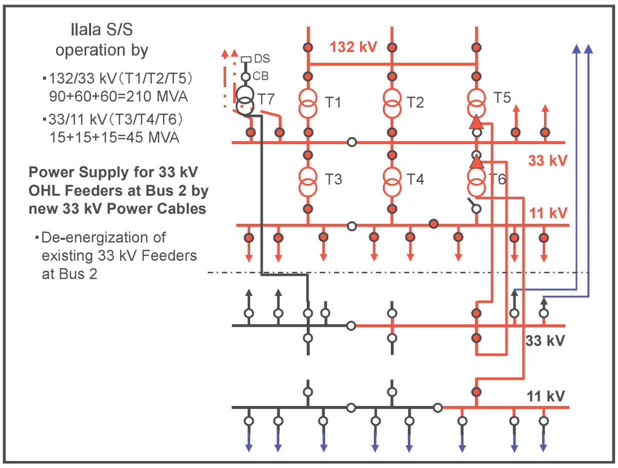
8. イララ変電所増強に係る切換え手順検討

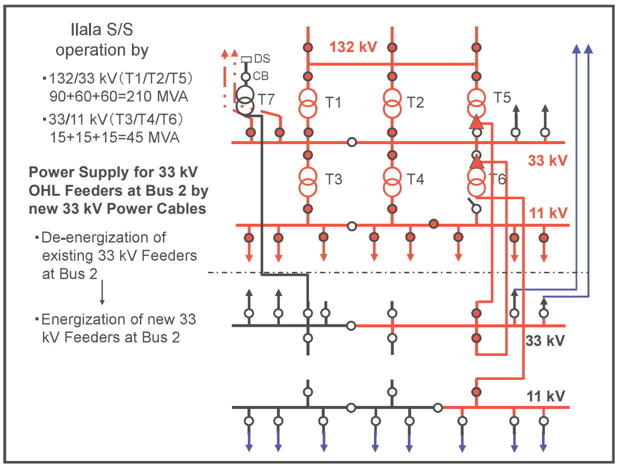




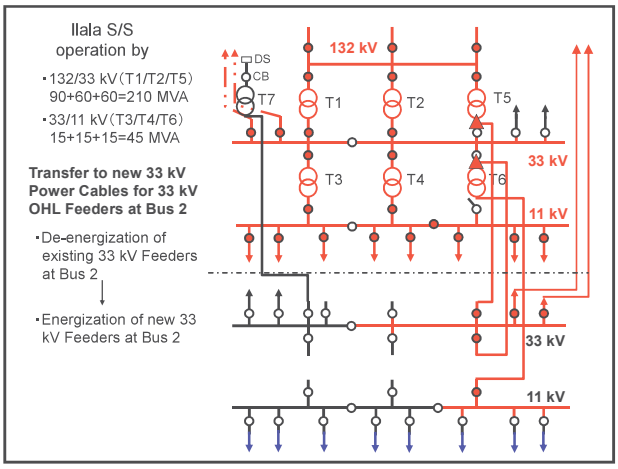


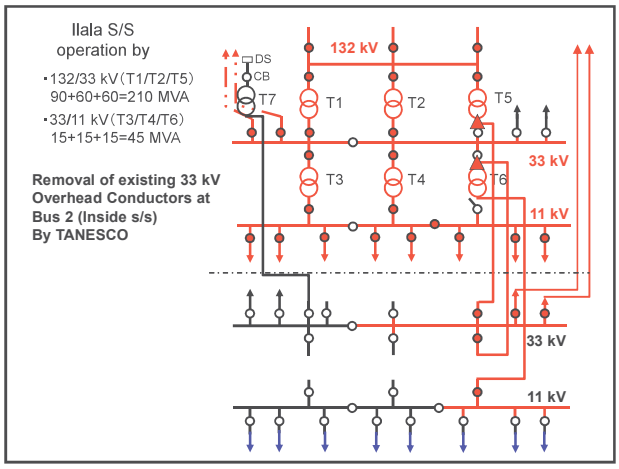


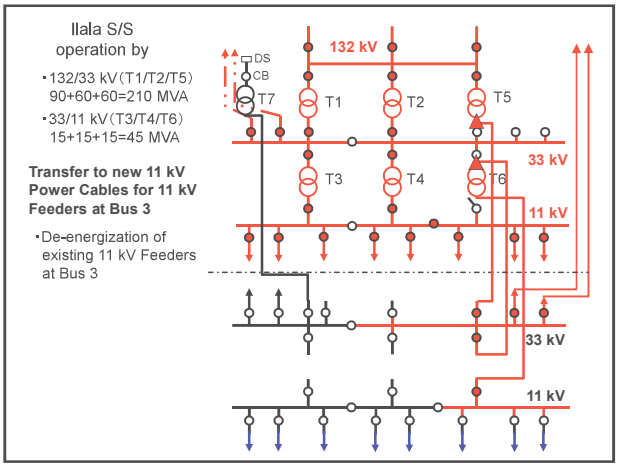


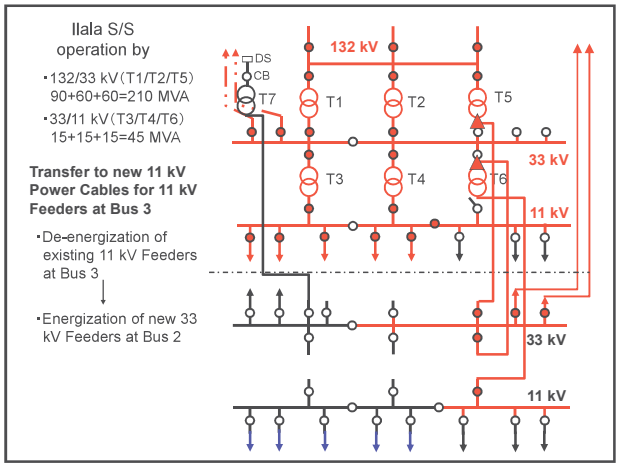


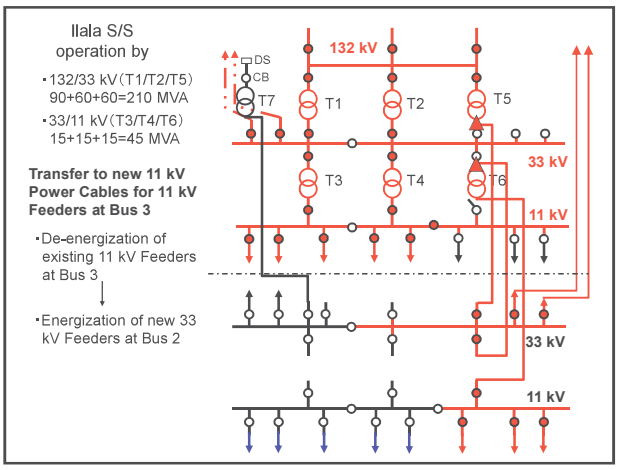
8. イララ変電所増強に係る切換え手順検討

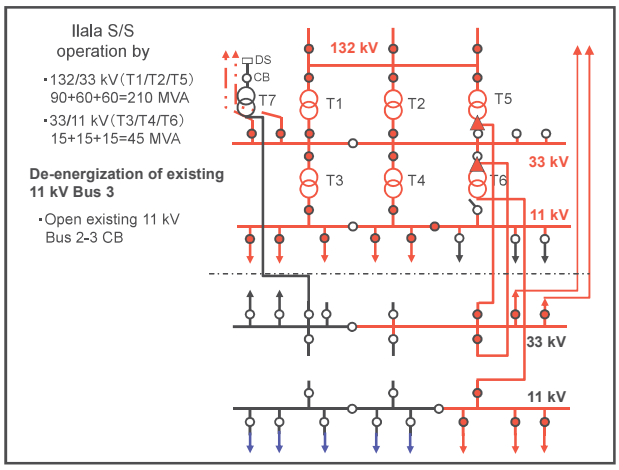




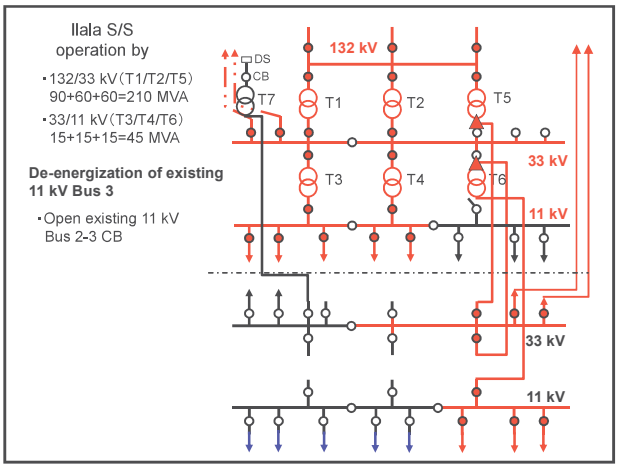


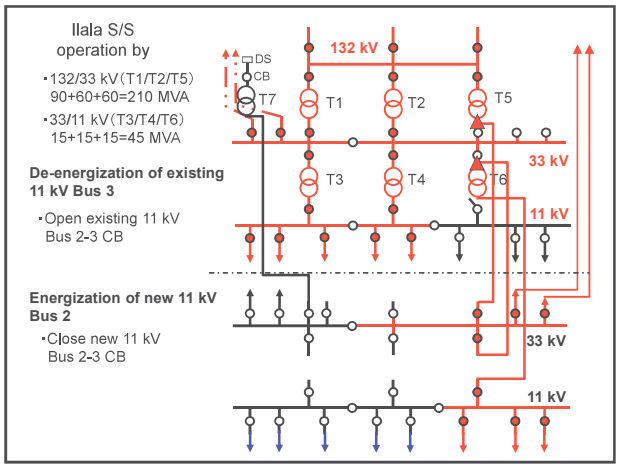


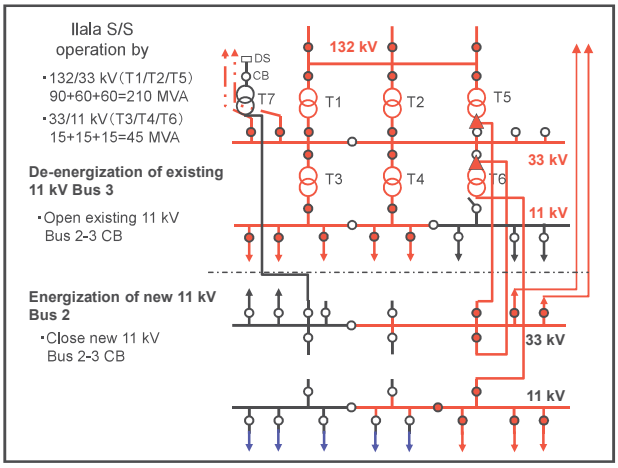


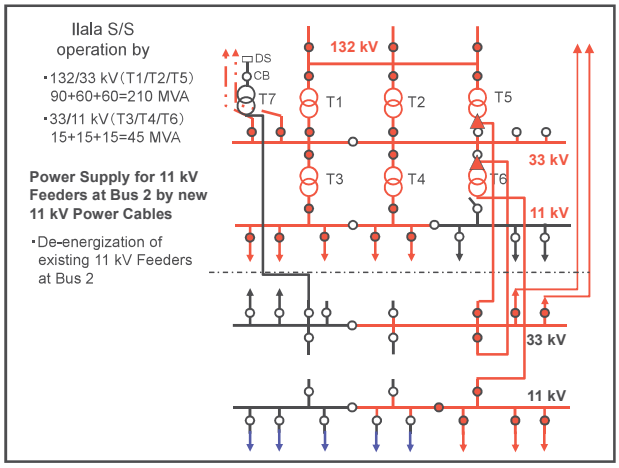


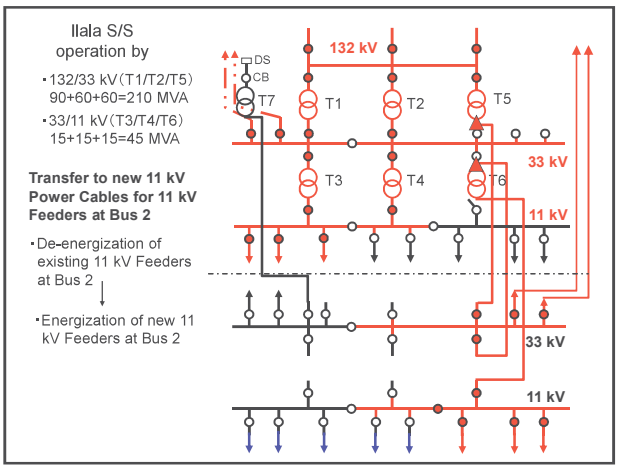
8. イララ変電所増強に係る切換え手順検討

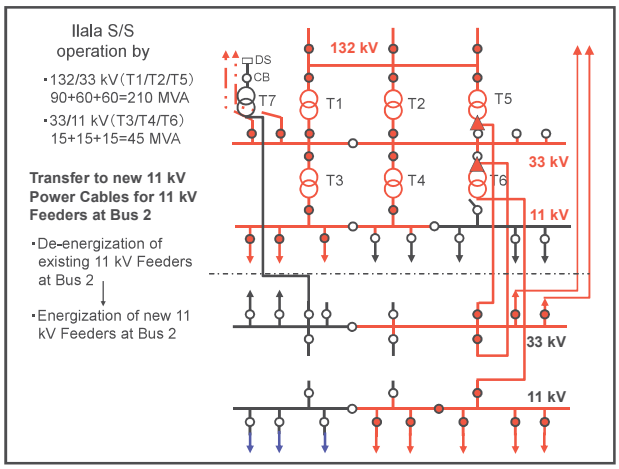












8. イララ変電所増強に係る切換え手順検討

Ilala S/S
operation by

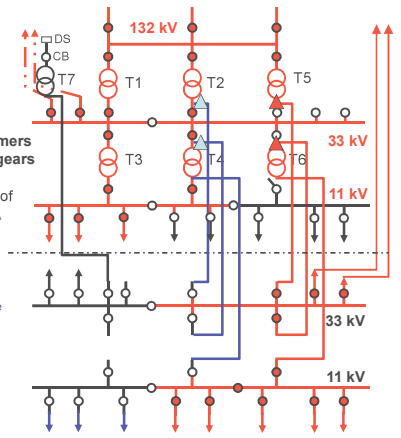
- 132/33 kV(T1/T2/T5)
  90+60+60=210 MVA
- 33/11 kV(T3/T4/T6)
  15+15+15=45 MVA

Transfer T2/T4 Transformers to New 33/11 kV Switchgears

- Temporary Installation of 33 kV Cable heads △
- Installation of 33/11 kV Cables

Note) Actually, this cable installation work should be done at a time of T5/T6 cable installation work.

- Open 4 x CBs for both T2/T4 Transformers



Ilala S/S
operation by

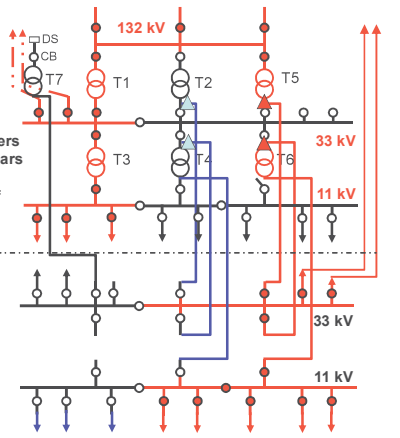
- 132/33 kV(T1/T5)
  90+60=150 MVA
- 33/11 kV(T3/T6)
  15+15=30 MVA

Transfer T2/T4 Transformers to New 33/11 kV Switchgears (Cont'd)

- Temporary Installation of 33 kV Cable heads △
- Installation of 33/11 kV Cables

Note) Actually, this cable installation work should be done at a time of T5/T6 cable installation work.

- Open 4 x CBs for both T2/T4 Transformers

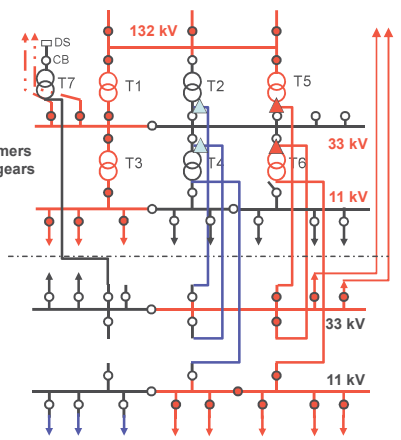


Ilala S/S
operation by

- 132/33 kV(T1/T5)
  90+60=150 MVA
- 33/11 kV(T3/T6)
  15+15=30 MVA

Transfer T2/T4 Transformers to New 33/11 kV Switchgears (Cont'd)

- Installation of 33 kV Cable heads at final positions △

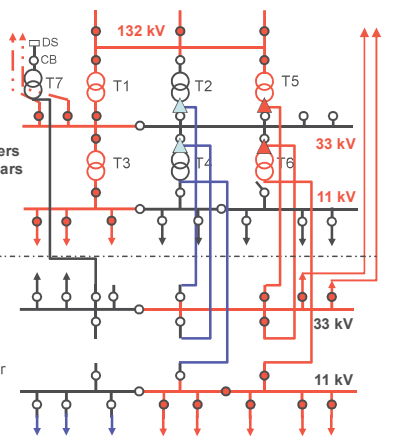


Ilala S/S
operation by

- 132/33 kV(T1/T5)
  90+60=150 MVA
- 33/11 kV(T3/T6)
  15+15=30 MVA

Transfer T2/T4 Transformers to New 33/11 kV Switchgears (Cont'd)

- Installation of 33 kV Cable heads at final positions △
- Disconnection and Removal of 33 kV Conductors at T5/T6 Transformers
- Disconnection of 11 kV Cables at T6 Transformer

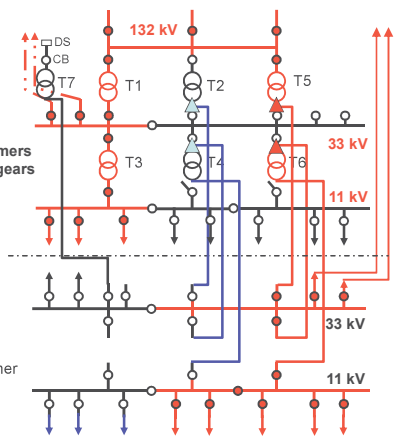


Ilala S/S
operation by

- 132/33 kV(T1/T5)
  90+60=150 MVA
- 33/11 kV(T3/T6)
  15+15=30 MVA

Transfer T2/T4 Transformers to New 33/11 kV Switchgears (Cont'd)

- Installation of 33 kV Cable heads at final positions △
- Disconnection and Removal of 33 kV Conductors at T2/T4 Transformers
- Disconnection of 11 kV Cables at T4 Transformer

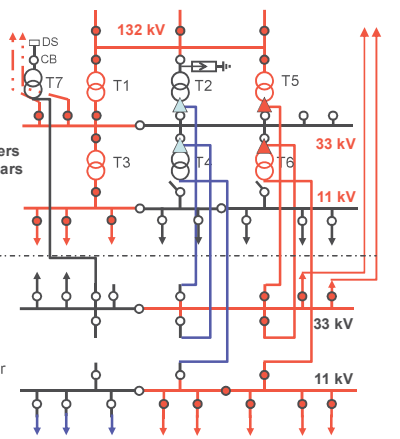


Ilala S/S
operation by

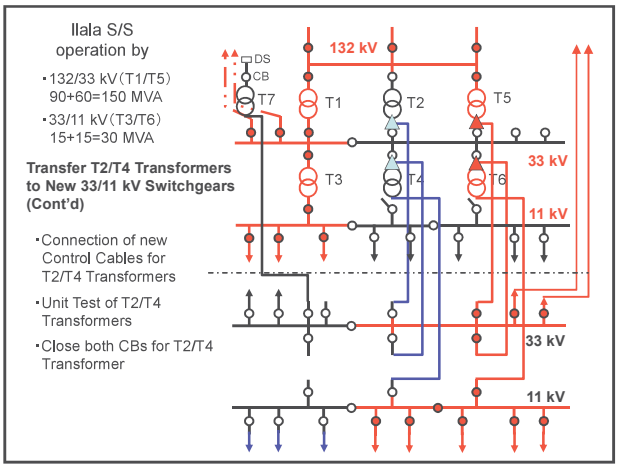
- 132/33 kV(T1/T5)
  90+60=150 MVA
- 33/11 kV(T3/T6)
  15+15=30 MVA

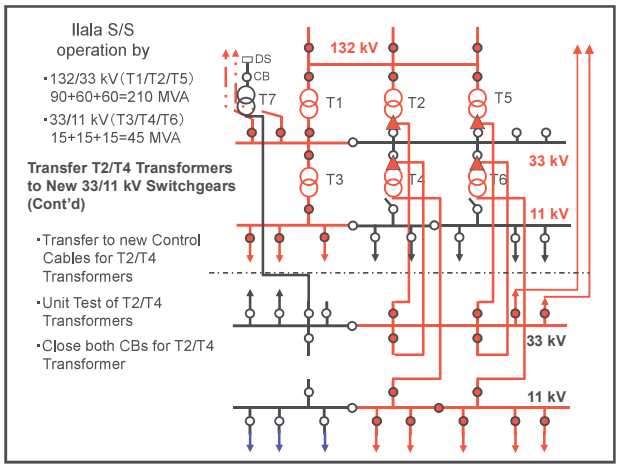
Transfer T2/T4 Transformers to New 33/11 kV Switchgears (Cont'd)

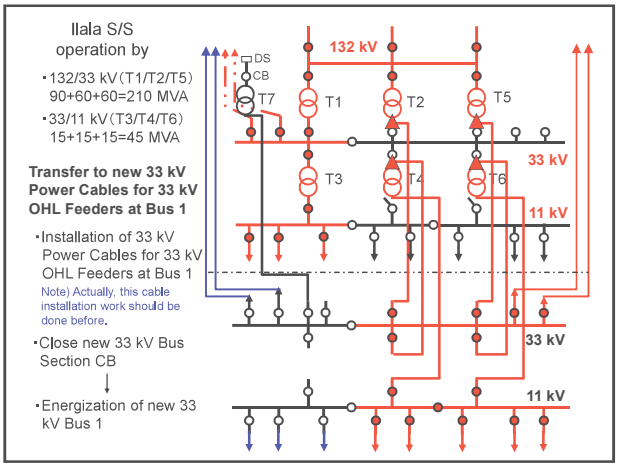
- Installation of 33 kV Cable heads at final positions △
- Disconnection and Removal of 33 kV Conductors at T2/T4 Transformers
- Disconnection of 11 kV Cables at T4 Transformer
- Replace 120 kV LA

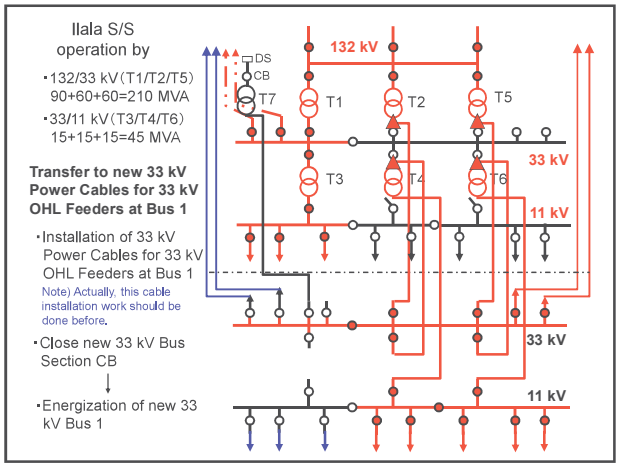


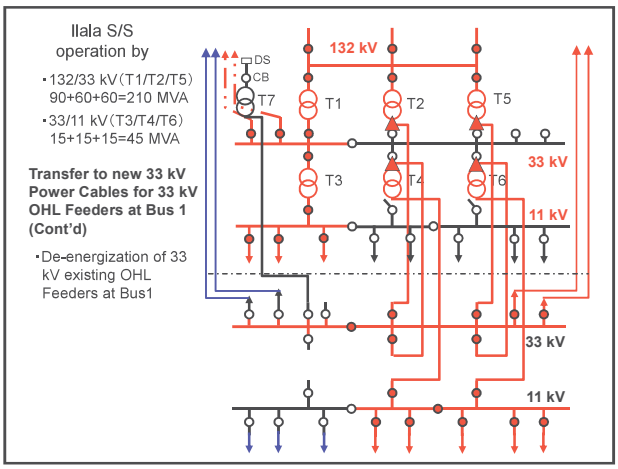
8. イララ変電所増強に係る切換え手順検討

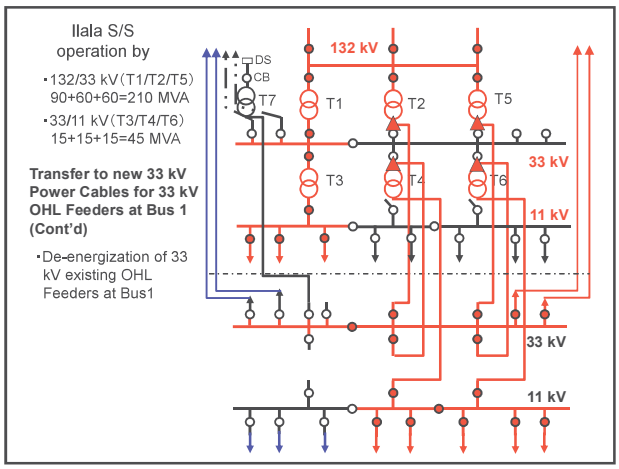












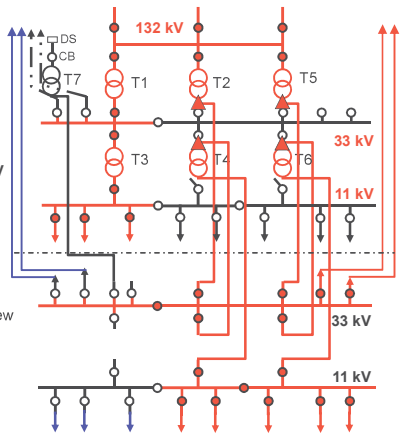
8. イララ変電所増強に係る切換え手順検討

Ilala S/S operation by

- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA

Transfer to new 33 kV Power Cables for 33 kV OHL Feeders at Bus 1 (Cont'd)

- De-energization of 33 kV existing OHL Feeders at Bus1
- Energization of 33 kV Feeders at Bus1 on new Switchgear

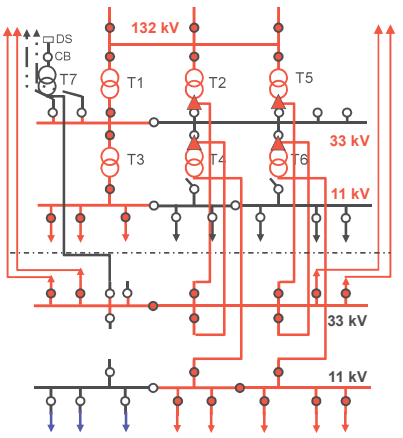


Ilala S/S operation by

- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA

Transfer to new 33 kV Power Cables for 33 kV OHL Feeders at Bus 1 (Cont'd)

- De-energization of 33 kV existing OHL Feeders at Bus 1
- Energization of 33 kV Feeders at Bus 1 on new Switchgear

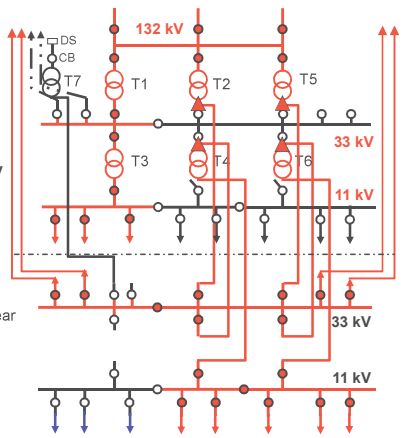


Ilala S/S operation by

- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA

Transfer to new 11 kV Power Cables for 11 kV Feeders at Bus 1

- Close Bus Section CB (Bus 1-2) on new 11 kV Switchgear
- Energization of 11 kV Bus1 on new Switchgear

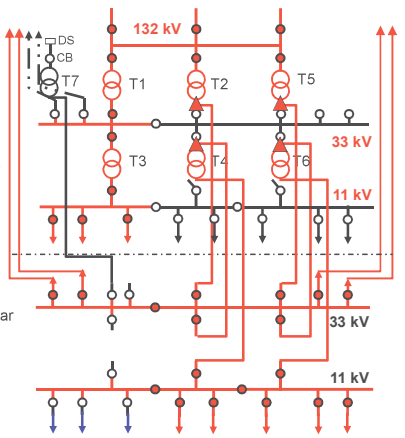


Ilala S/S operation by

- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA

Transfer to new 11 kV Power Cables for 11 kV Feeders at Bus 1

- Close Bus Section CB (Bus 1-2) on new 11 kV Switchgear
- Energization of 11 kV Bus1 on new Switchgear

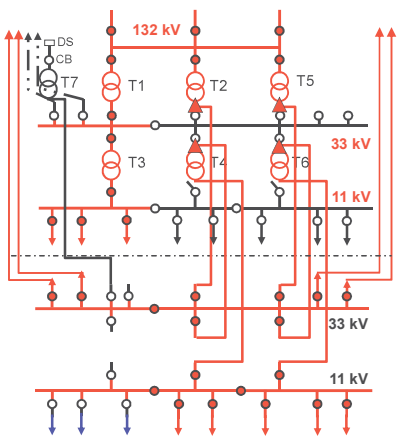


Ilala S/S operation by

- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA

Transfer to new 11 kV Power Cables for 11 kV Feeders at Bus 1 (Cont'd)

- De-energization of 11 kV existing OHL Feeders at Bus1

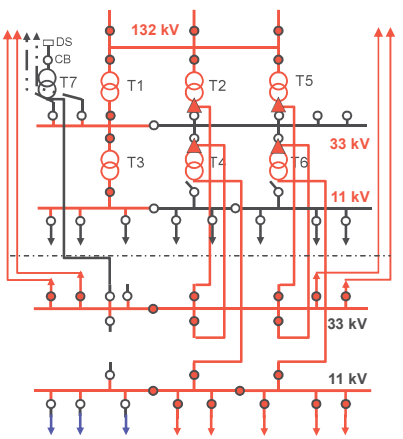


Ilala S/S operation by

- 132/33 kV (T1/T2/T5) 90+60+60=210 MVA
- 33/11 kV (T3/T4/T6) 15+15+15=45 MVA

Transfer to new 11 kV Power Cables for 11 kV Feeders at Bus 1 (Cont'd)

- De-energization of 11 kV existing OHL Feeders at Bus1



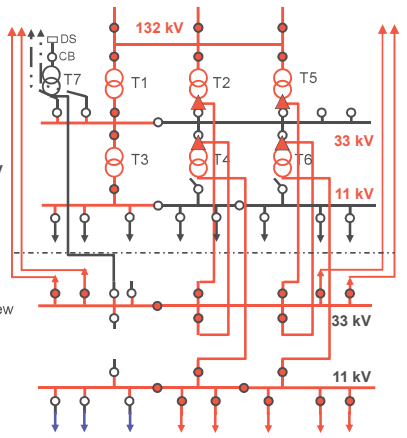
8. イララ変電所増強に係る切換え手順検討

Ilala S/S
operation by

- 132/33 kV(T2/T5) 60+60=120 MVA
- 33/11 kV(T4/T6) 15+15=30 MVA

Transfer to new 11 kV Power Cables for 11 kV Feeders at Bus 1 (Cont'd)

- De-energization of 11 kV existing OHL Feeders at Bus1
- Energization of 11 kV Feeders at Bus1 on new Switchgear

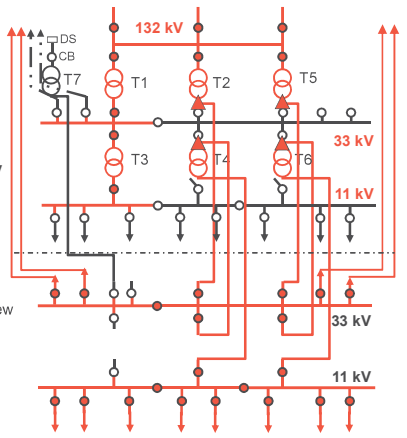


Ilala S/S
operation by

- 132/33 kV(T2/T5) 60+60=120 MVA
- 33/11 kV(T4/T6) 15+15=30 MVA

Transfer to new 11 kV Power Cables for 11 kV Feeders at Bus 1 (Cont'd)

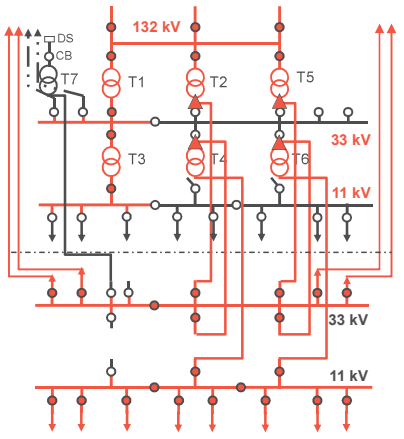
- De-energization of 11 kV existing OHL Feeders at Bus1
- Energization of 11 kV Feeders at Bus1 on new Switchgear



Ilala S/S
operation by

- 132/33 kV(T2/T5) 60+60=120 MVA
- 33/11 kV(T4/T6) 15+15=30 MVA

Transfer of all 33/11 kV Feeders to new Switchgear has been completed.

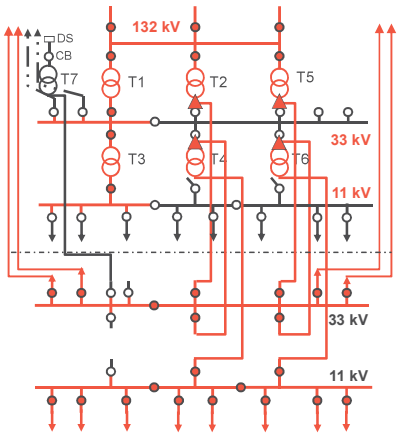


Ilala S/S
operation by

- 132/33 kV(T2/T5) 60+60=120 MVA
- 33/11 kV(T4/T6) 15+15=30 MVA

De-energization of Both 33/11 kV Bus 1

- Open all CBs for T1/T3
  ↓
- De-energization of T1/T3 and both 33/11 kV Bus 1 of existing 33/11/kV Switchgear



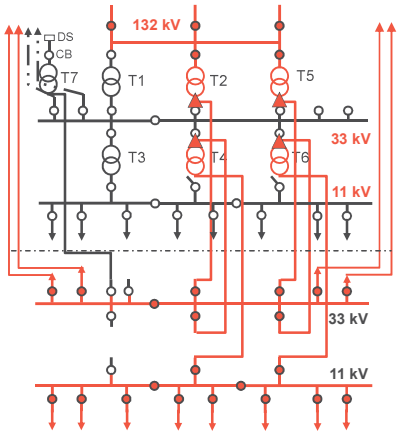
Ilala S/S
operation by

- 132/33 kV(T2/T5) 60+60=120 MVA
- 33/11 kV(T4/T6) 15+15=30 MVA

De-energization of Both 33/11 kV Bus 1

- Open all CBs for T1/T3
  ↓
- De-energization of T1/T3 and both 33/11 kV Bus 1 of existing 33/11/kV Switchgear

Removal of 33 kV Temporary Cables

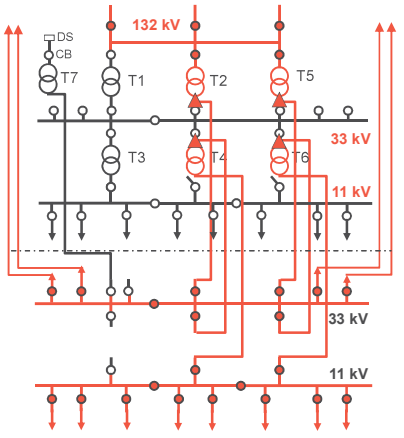


Ilala S/S
operation by

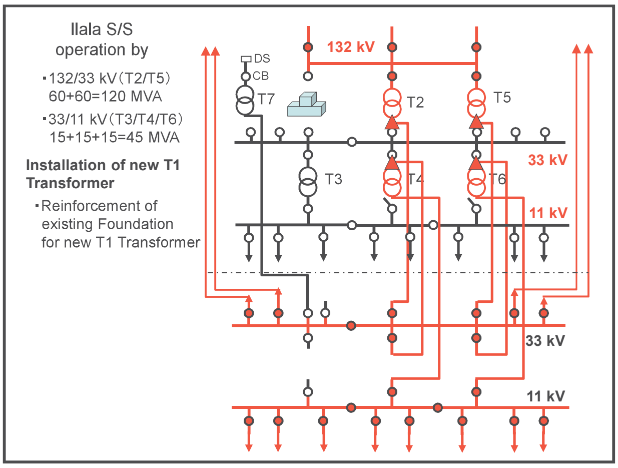
- 132/33 kV(T2/T5) 60+60=120 MVA
- 33/11 kV(T3/T4/T6) 15+15+15=45 MVA

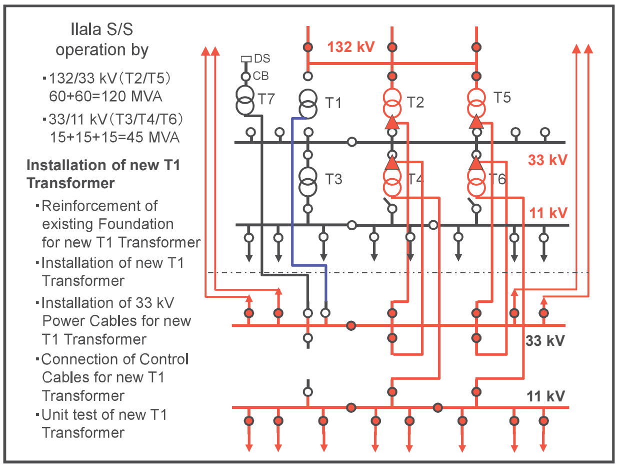
Removal of T1 Transformer

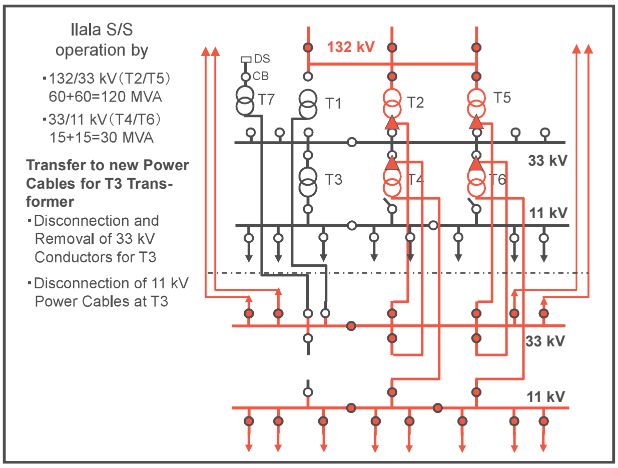
- Disconnection and removal of both 132/33 kV Conductors for T1 Transformer
- Removal of T1 Transformer

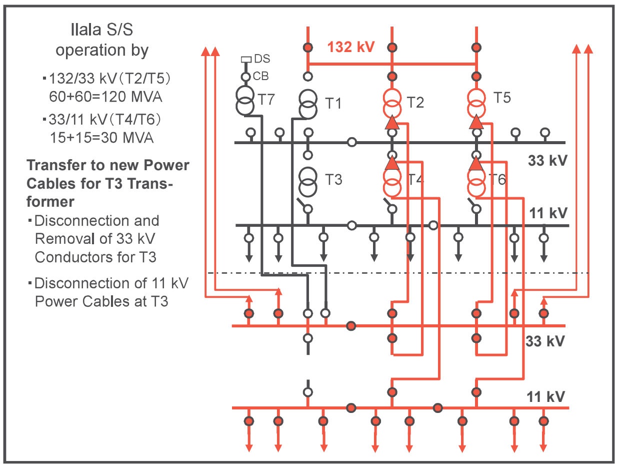


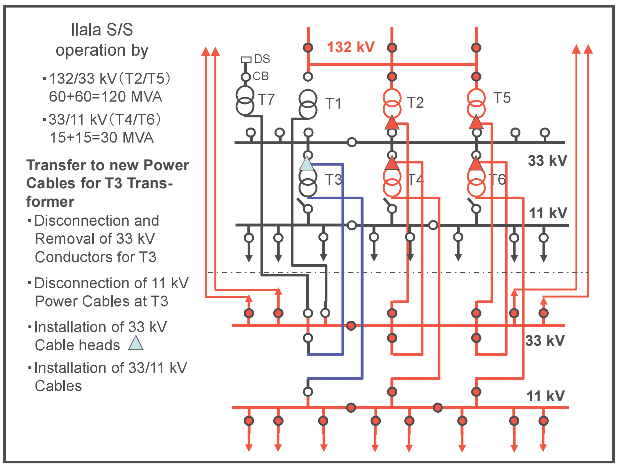
8. イララ変電所増強に係る切換え手順検討

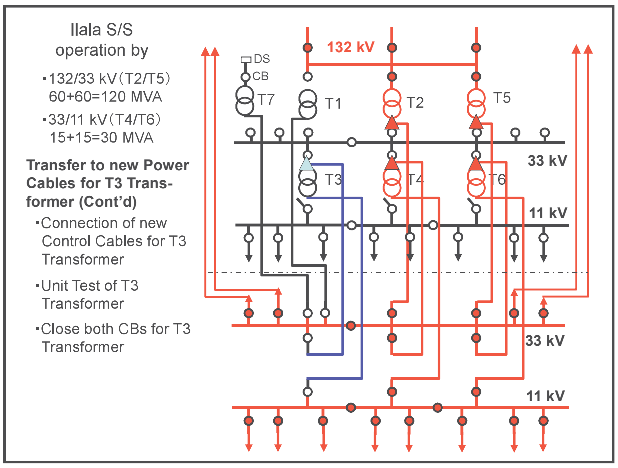


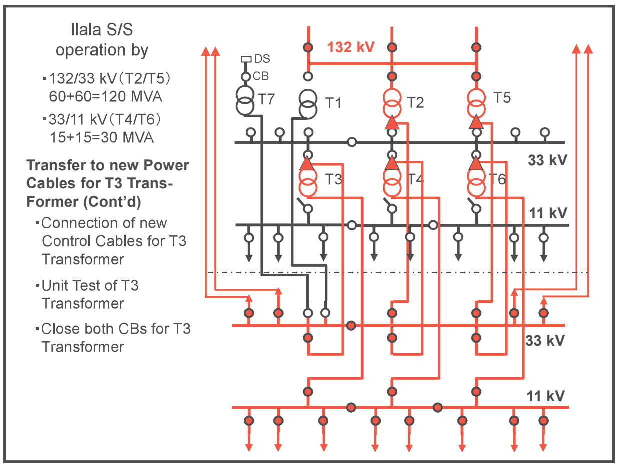


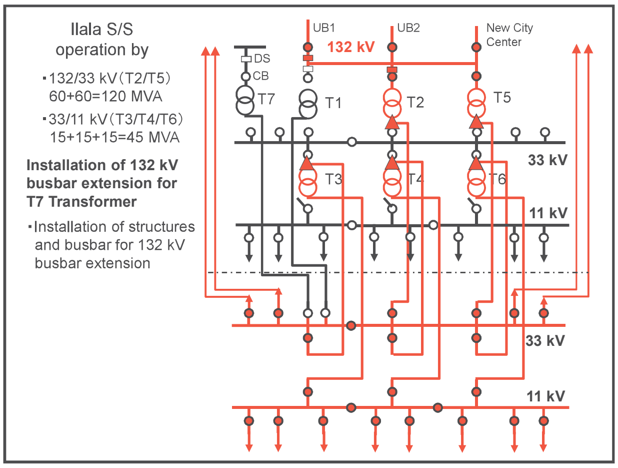


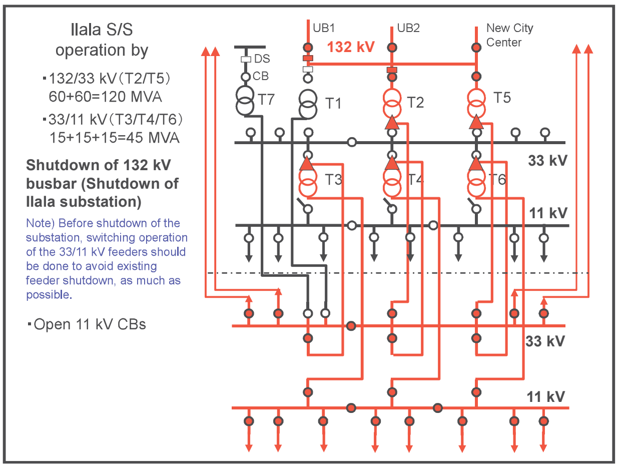


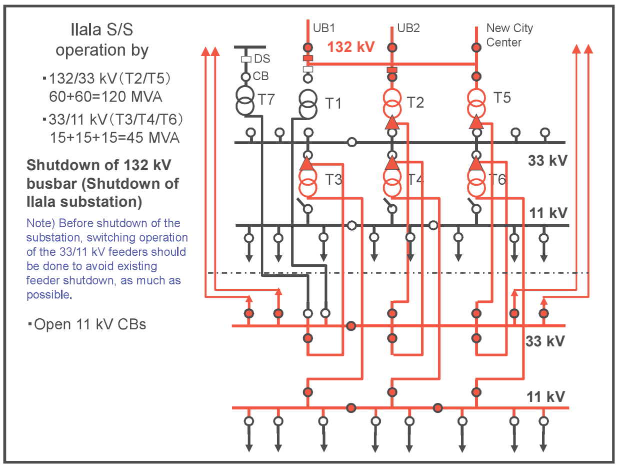


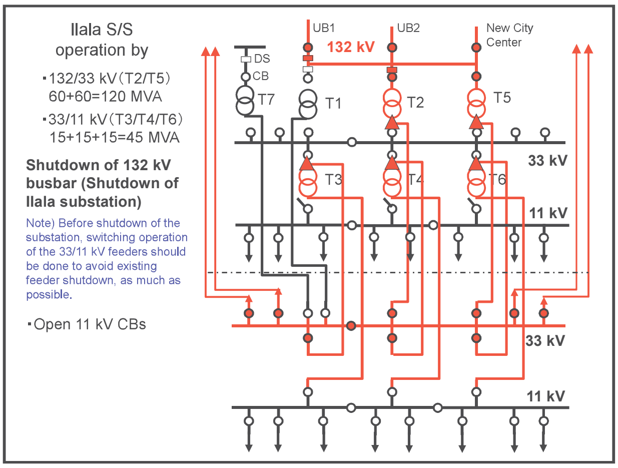


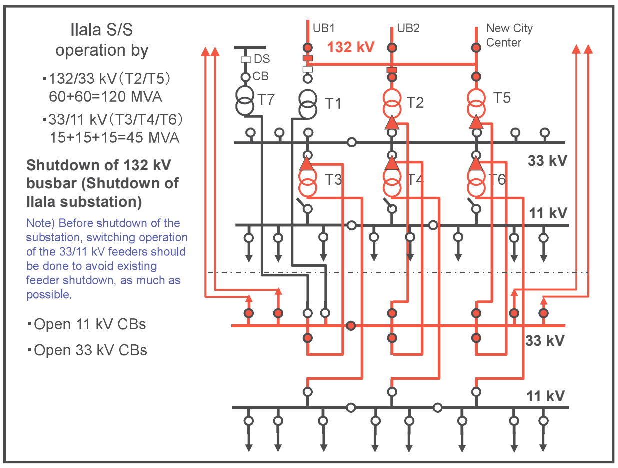

Ilala S/S
operation by
・132/33 kV (T2/T5)
60+60=120 MVA
・33/11 kV (T4/T6)
15+15=30 MVA
Transfer to new Power Cables for T3 Trans-Former (Cont'd)
・Connection of new Control Cables for T3 Transformer
・Unit Test of T3 Transformer
・Close both CBs for T3 Transformer
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV

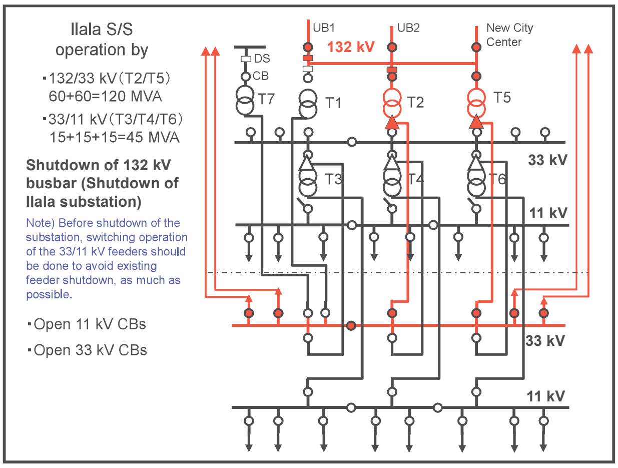

Ilala S/S
operation by
・132/33 kV (T2/T5)
60+60=120 MVA
・33/11 kV (T3/T4/T6)
15+15+15=45 MVA
Installation of 132 kV busbar extension for T7 Transformer
・Installation of structures and busbar for 132 kV busbar extension
UB1
UB2
New City Center
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV

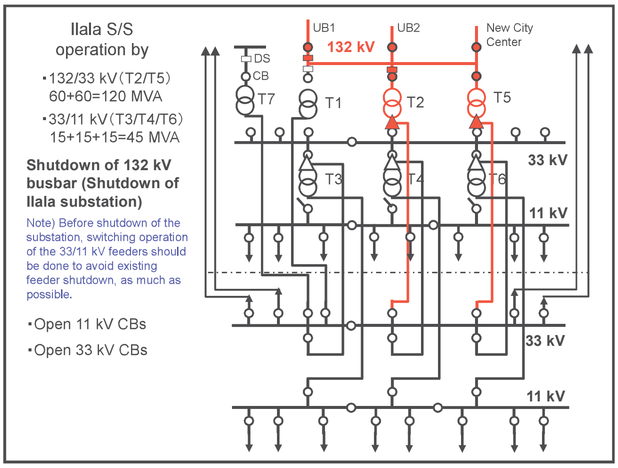

Ilala S/S
operation by
・132/33 kV (T2/T5)
60+60=120 MVA
・33/11 kV (T3/T4/T6)
15+15+15=45 MVA
Shutdown of 132 kV busbar (Shutdown of Ilala substation)
Note) Before shutdown of the substation, switching operation of the 33/11 kV feeders should be done to avoid existing feeder shutdown, as much as possible.
・Open 11 kV CBs
UB1
UB2
New City Center
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV

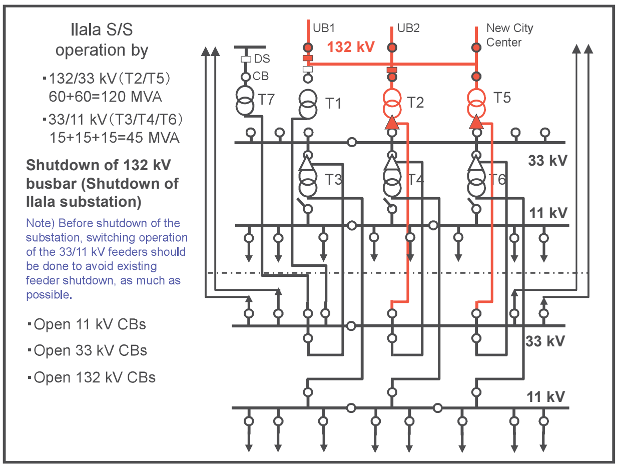

Ilala S/S
operation by
・132/33 kV (T2/T5)
60+60=120 MVA
・33/11 kV (T3/T4/T6)
15+15+15=45 MVA
Shutdown of 132 kV busbar (Shutdown of Ilala substation)
Note) Before shutdown of the substation, switching operation of the 33/11 kV feeders should be done to avoid existing feeder shutdown, as much as possible.
・Open 11 kV CBs
UB1
UB2
New City Center
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV

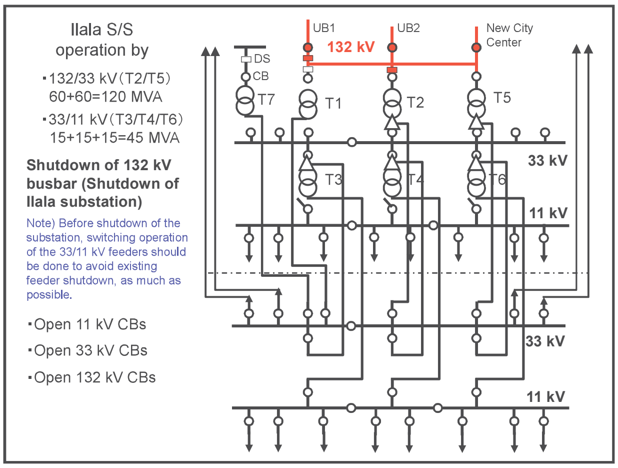

Ilala S/S
operation by
・132/33 kV (T2/T5)
60+60=120 MVA
・33/11 kV (T3/T4/T6)
15+15+15=45 MVA
Shutdown of 132 kV busbar (Shutdown of Ilala substation)
Note) Before shutdown of the substation, switching operation of the 33/11 kV feeders should be done to avoid existing feeder shutdown, as much as possible.
・Open 11 kV CBs
UB1
UB2
New City Center
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV

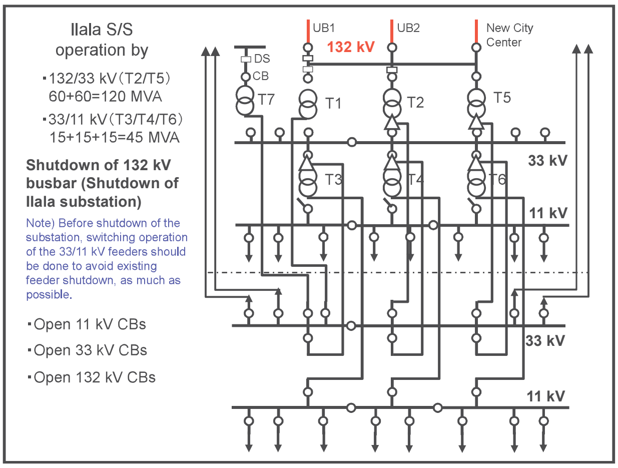

Ilala S/S
operation by
・132/33 kV (T2/T5)
60+60=120 MVA
・33/11 kV (T3/T4/T6)
15+15+15=45 MVA
Shutdown of 132 kV busbar (Shutdown of Ilala substation)
Note) Before shutdown of the substation, switching operation of the 33/11 kV feeders should be done to avoid existing feeder shutdown, as much as possible.
・Open 11 kV CBs
・Open 33 kV CBs
UB1
UB2
New City Center
DS
CB
T7
T1
T2
T5
T3
T4
T6
132 kV
33 kV
11 kV
33 kV
11 kV

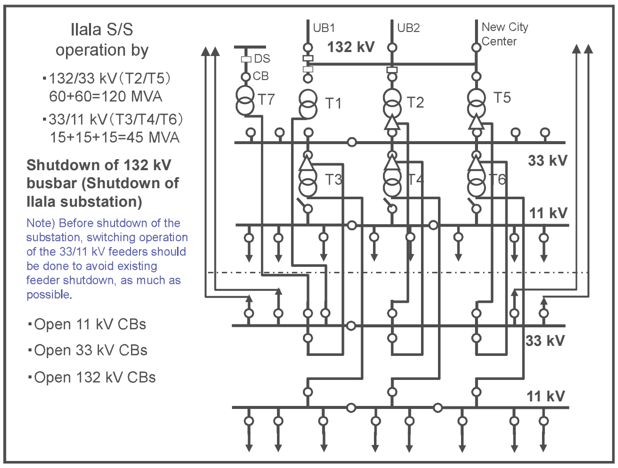

Ilala S/S
operation by
•132/33 kV (T2/T5)
60+60=120 MVA
•33/11 kV (T3/T4/T6)
15+15+15=45 MVA
Shutdown of 132 kV busbar (Shutdown of Ilala substation)
Note) Before shutdown of the substation, switching operation of the 33/11 kV feeders should be done to avoid existing feeder shutdown, as much as possible.
•Open 11 kV CBs
•Open 33 kV CBs
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
33 kV
11 kV


Ilala S/S
operation by
•132/33 kV (T2/T5)
60+60=120 MVA
•33/11 kV (T3/T4/T6)
15+15+15=45 MVA
Shutdown of 132 kV busbar (Shutdown of Ilala substation)
Note) Before shutdown of the substation, switching operation of the 33/11 kV feeders should be done to avoid existing feeder shutdown, as much as possible.
•Open 11 kV CBs
•Open 33 kV CBs
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
33 kV
11 kV


Ilala S/S
operation by
•132/33 kV (T2/T5)
60+60=120 MVA
•33/11 kV (T3/T4/T6)
15+15+15=45 MVA
Shutdown of 132 kV busbar (Shutdown of Ilala substation)
Note) Before shutdown of the substation, switching operation of the 33/11 kV feeders should be done to avoid existing feeder shutdown, as much as possible.
•Open 11 kV CBs
•Open 33 kV CBs
•Open 132 kV CBs
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
33 kV
11 kV


Ilala S/S
operation by
•132/33 kV (T2/T5)
60+60=120 MVA
•33/11 kV (T3/T4/T6)
15+15+15=45 MVA
Shutdown of 132 kV busbar (Shutdown of Ilala substation)
Note) Before shutdown of the substation, switching operation of the 33/11 kV feeders should be done to avoid existing feeder shutdown, as much as possible.
•Open 11 kV CBs
•Open 33 kV CBs
•Open 132 kV CBs
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
33 kV
11 kV


Ilala S/S
operation by
•132/33 kV (T2/T5)
60+60=120 MVA
•33/11 kV (T3/T4/T6)
15+15+15=45 MVA
Shutdown of 132 kV busbar (Shutdown of Ilala substation)
Note) Before shutdown of the substation, switching operation of the 33/11 kV feeders should be done to avoid existing feeder shutdown, as much as possible.
•Open 11 kV CBs
•Open 33 kV CBs
•Open 132 kV CBs
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
33 kV
11 kV


Ilala S/S
operation by
•132/33 kV (T2/T5)
60+60=120 MVA
•33/11 kV (T3/T4/T6)
15+15+15=45 MVA
Shutdown of 132 kV busbar (Shutdown of Ilala substation)
Note) Before shutdown of the substation, switching operation of the 33/11 kV feeders should be done to avoid existing feeder shutdown, as much as possible.
•Open 11 kV CBs
•Open 33 kV CBs
•Open 132 kV CBs
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV
33 kV
11 kV

8. イララ変電所増強に係る切換え手順検討

Ilala S/S operation by

- 132/33 kV（T2/T5） 60+60=120 MVA
- 33/11 kV（T3/T4/T6） 15+15+15=45 MVA

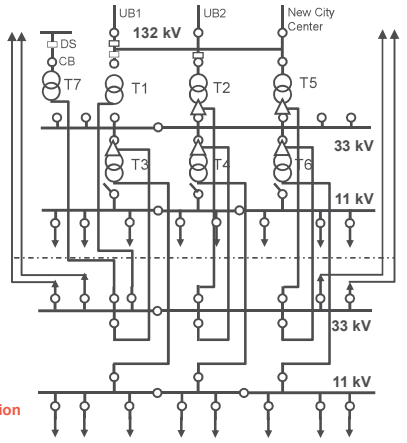
Shutdown of 132 kV busbar (Shutdown of Ilala substation)

Note) Before shutdown of the substation, switching operation of the 33/11 kV feeders should be done to avoid existing feeder shutdown, as much as possible.

- Open 11 kV CBs
- Open 33 kV CBs
- Open 132 kV CBs

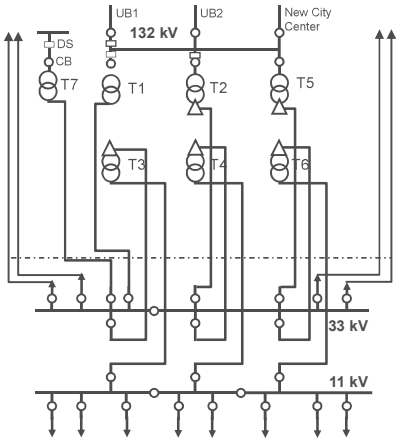
↓

Shutdown Ilala substation



Ilala S/S operation by

- 132/33 kV 0 MVA
- 33/11 kV 0 MVA

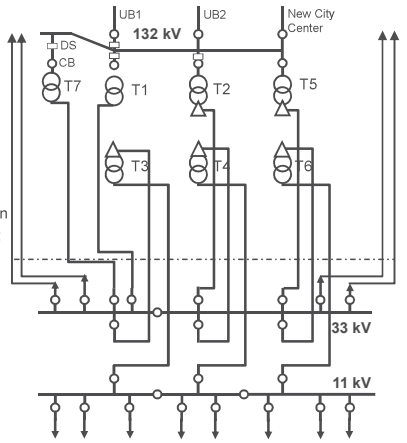


Ilala S/S operation by

- 132/33 kV 0 MVA
- 33/11 kV 0 MVA

Start Installation and replacement work of 132 kV equipment

- 132 kV busbar extension
- Replacement of 3 x 132 kV DS

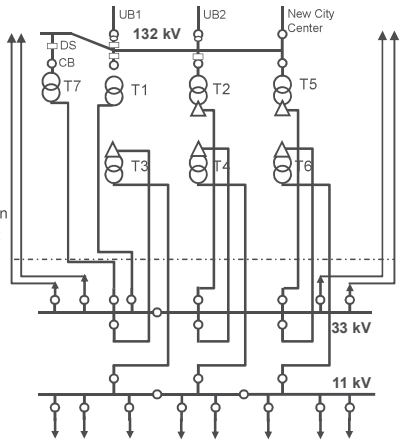


Ilala S/S operation by

- 132/33 kV 0 MVA
- 33/11 kV 0 MVA

Start Installation and replacement work of 132 kV equipment

- 132 kV busbar extension
- Replacement of 3 x 132 kV DS
- Replacement of 132 kV CB (UB1 bay) & CT (UB1 & UB2)

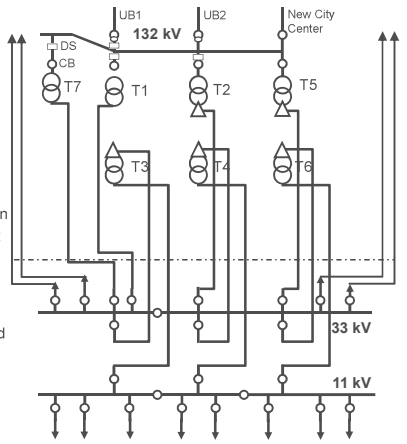


Ilala S/S operation by

- 132/33 kV 0 MVA
- 33/11 kV 0 MVA

Start Installation and replacement work of 132 kV equipment

- 132 kV busbar extension
- Replacement of 3 x 132 kV DS
- Replacement of 132 kV CB (UB1 bay) & CT (UB1 & UB2)
- Connection of Overhead conductors for T1

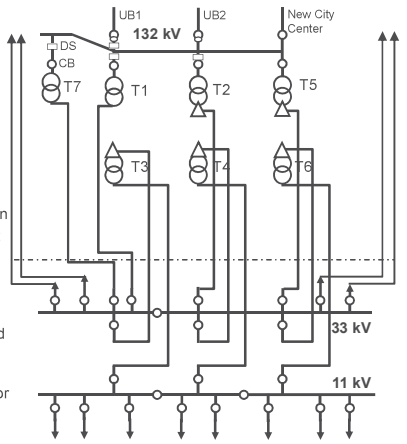


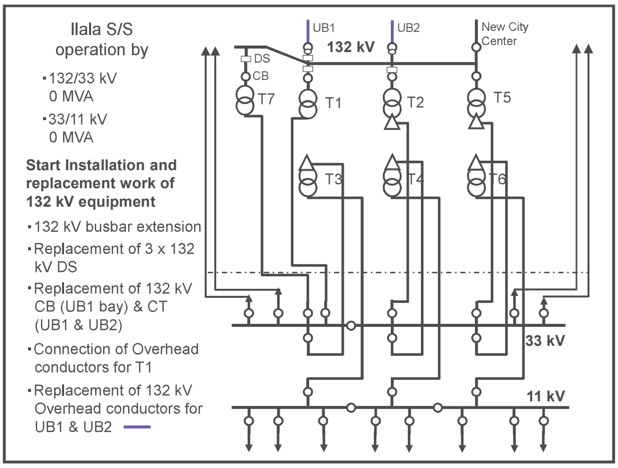
Ilala S/S operation by

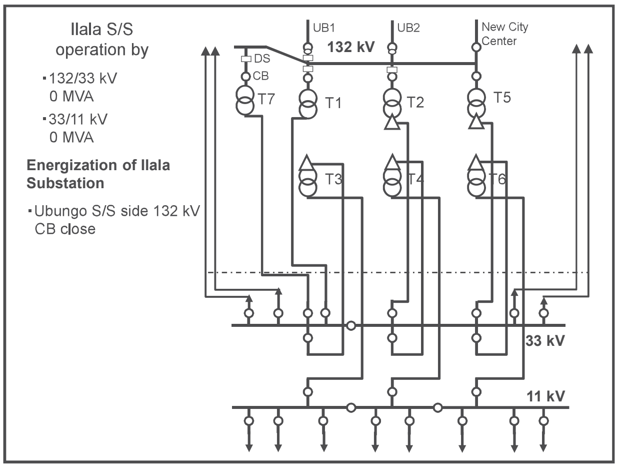
- 132/33 kV 0 MVA
- 33/11 kV 0 MVA

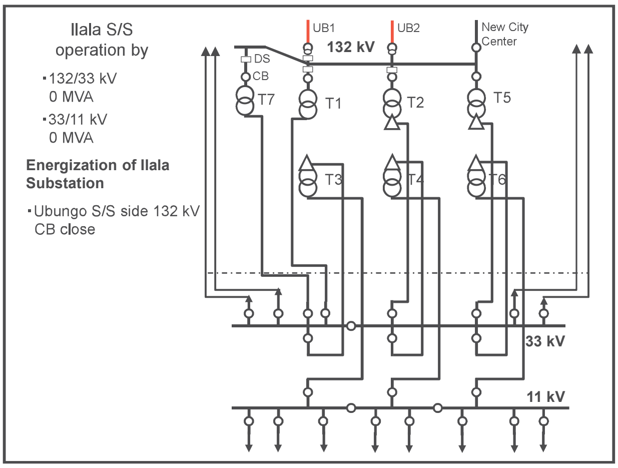
Start Installation and replacement work of 132 kV equipment

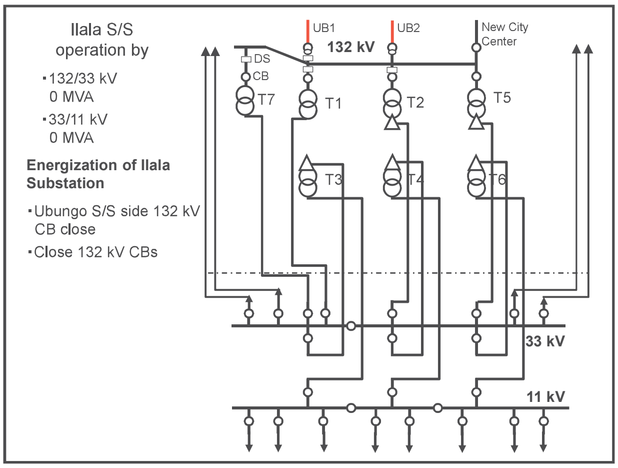
- 132 kV busbar extension
- Replacement of 3 x 132 kV DS
- Replacement of 132 kV CB (UB1 bay) & CT (UB1 & UB2)
- Connection of Overhead conductors for T1
- Replacement of 132 kV Overhead conductors for UB1 & UB2

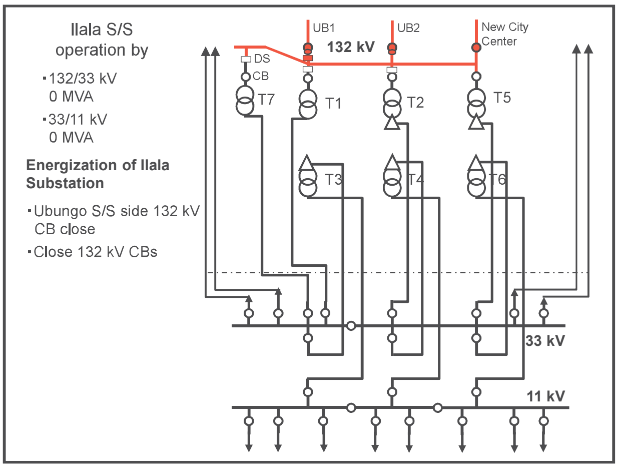


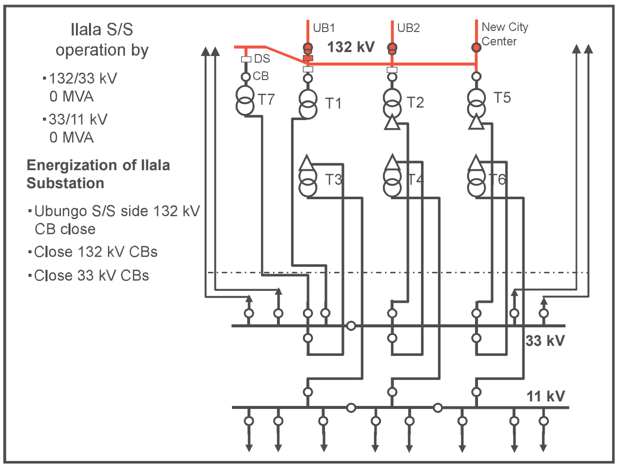

Ilala S/S
operation by
・132/33 kV
0 MVA
・33/11 kV
0 MVA
Start Installation and replacement work of 132 kV equipment
・132 kV busbar extension
・Replacement of 3 x 132 kV DS
・Replacement of 132 kV CB (UB1 bay) & CT (UB1 & UB2)
・Connection of Overhead conductors for T1
・Replacement of 132 kV Overhead conductors for UB1 & UB2
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV


Ilala S/S
operation by
・132/33 kV
0 MVA
・33/11 kV
0 MVA
Energization of Ilala Substation
・Ubungo S/S side 132 kV CB close
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV

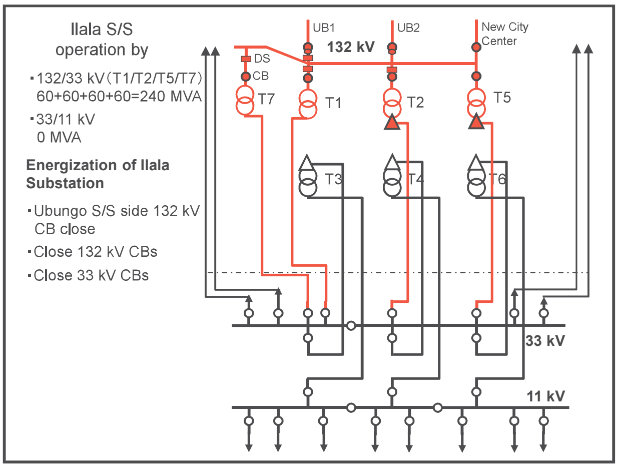

Ilala S/S
operation by
・132/33 kV
0 MVA
・33/11 kV
0 MVA
Energization of Ilala Substation
・Ubungo S/S side 132 kV CB close
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV

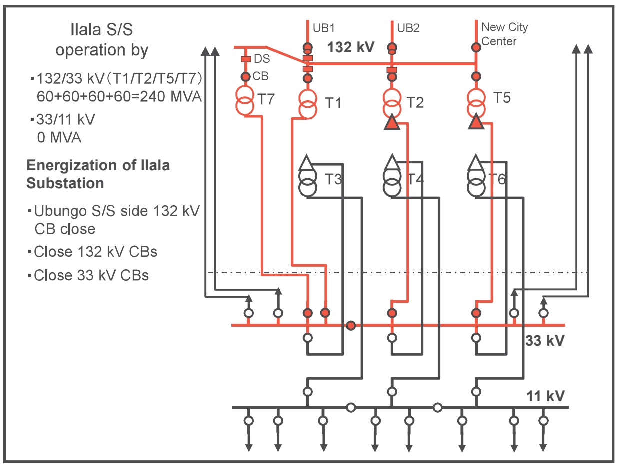

Ilala S/S
operation by
・132/33 kV
0 MVA
・33/11 kV
0 MVA
Energization of Ilala Substation
・Ubungo S/S side 132 kV CB close
・Close 132 kV CBs
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV

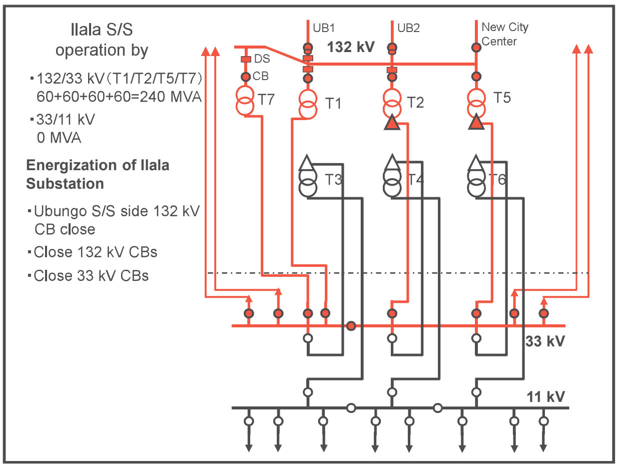

Ilala S/S
operation by
・132/33 kV
0 MVA
・33/11 kV
0 MVA
Energization of Ilala Substation
・Ubungo S/S side 132 kV CB close
・Close 132 kV CBs
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV

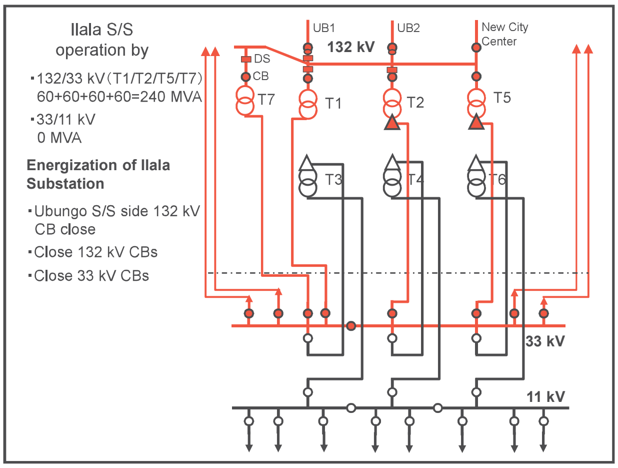

Ilala S/S
operation by
・132/33 kV
0 MVA
・33/11 kV
0 MVA
Energization of Ilala Substation
・Ubungo S/S side 132 kV CB close
・Close 132 kV CBs
・Close 33 kV CBs
UB1
UB2
New City Center
132 kV
DS
CB
T7
T1
T2
T5
T3
T4
T6
33 kV
11 kV

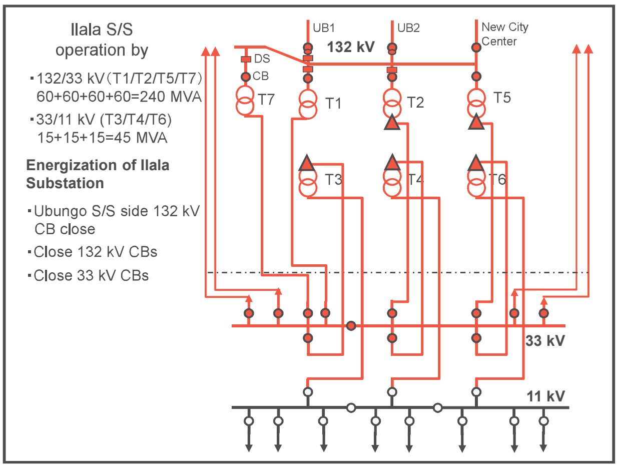
8. イララ変電所増強に係る切換え手順検討

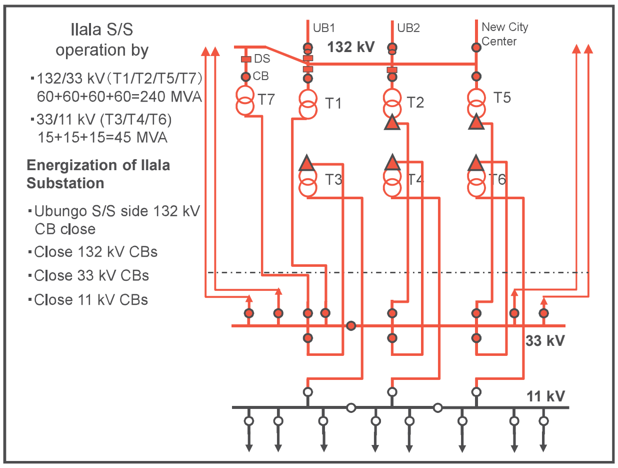




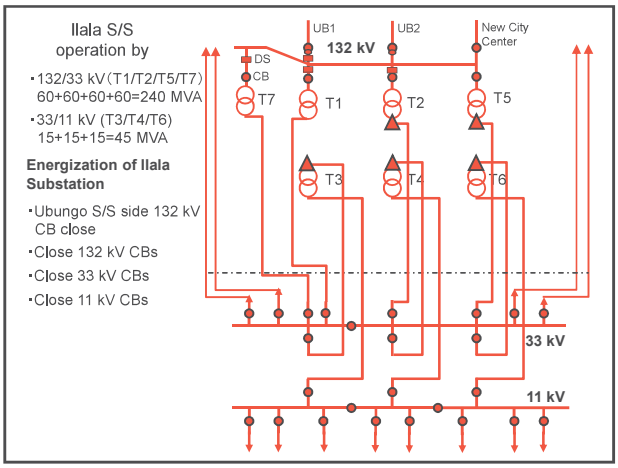


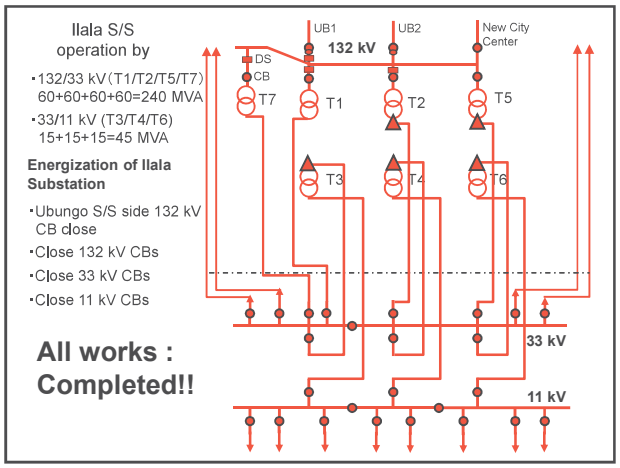






8. イララ変電所増強に係る切換え手順検討

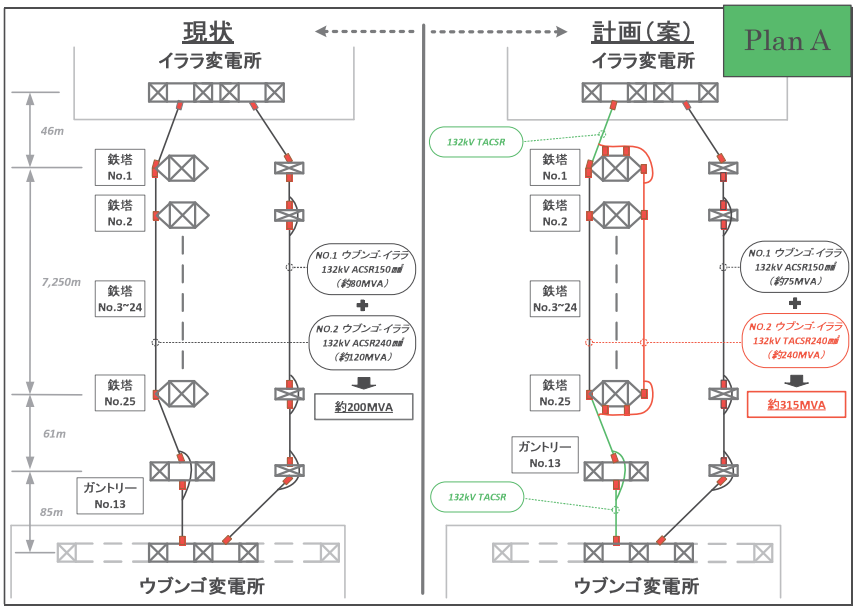


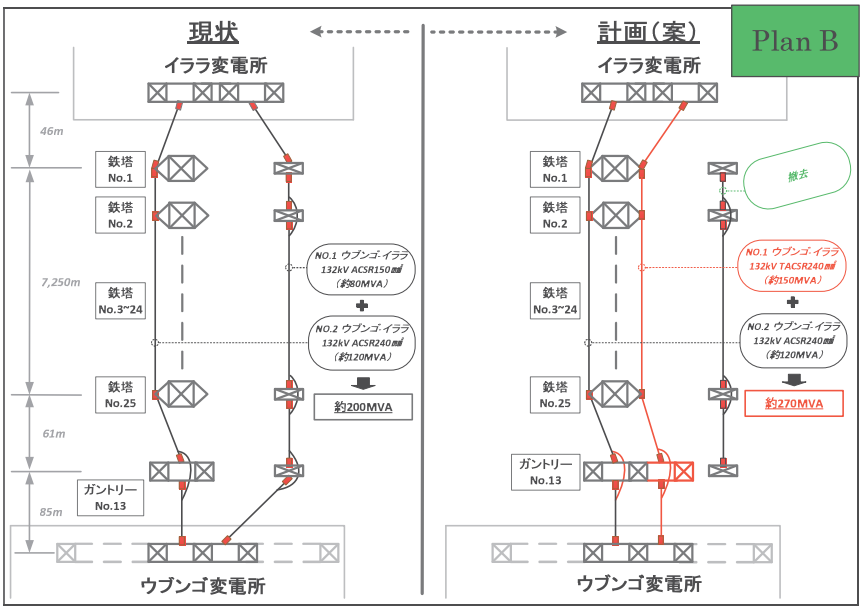


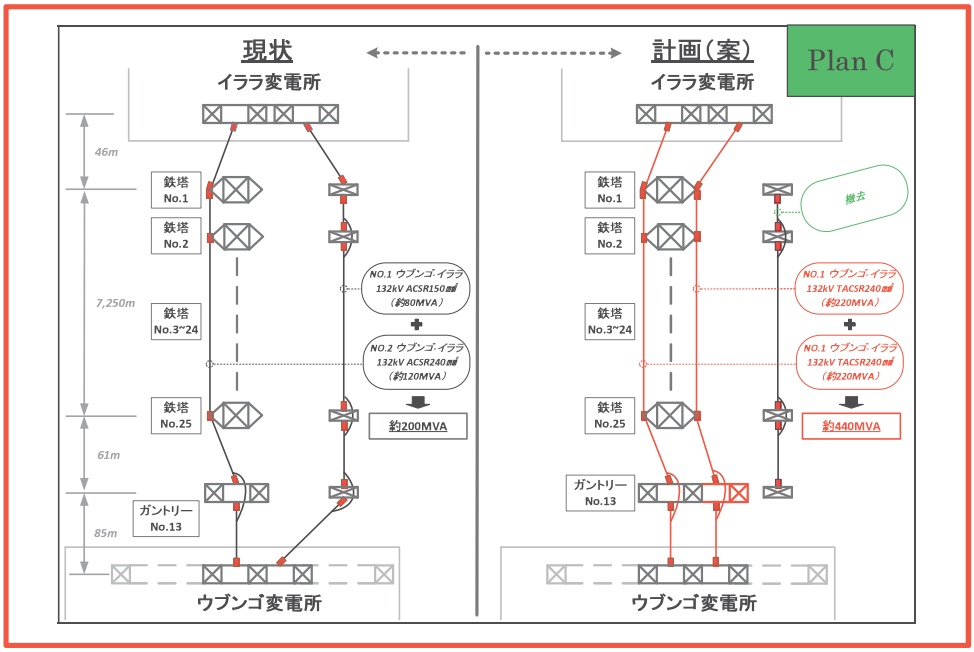
資料－９　**132kV** 送電線増強に係る切換え手順検討

9. 132kV 送電線増強に係る切換え手順検討

1. 132kV 送電線増強計画（Plan C を採用）



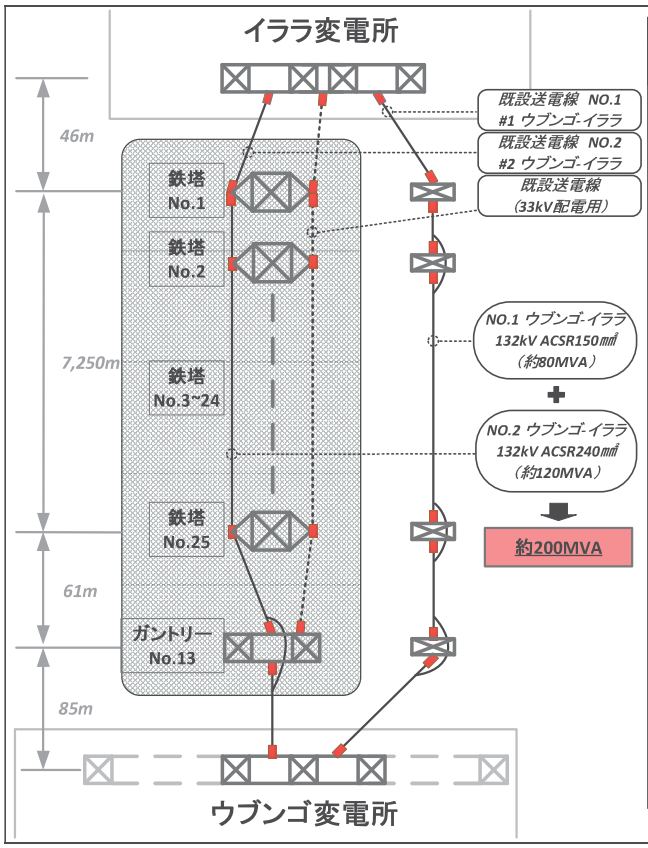




9. 132kV 送電線増強に係る切換え手順検討

2. 切換え手順

STEP-1



準備作業

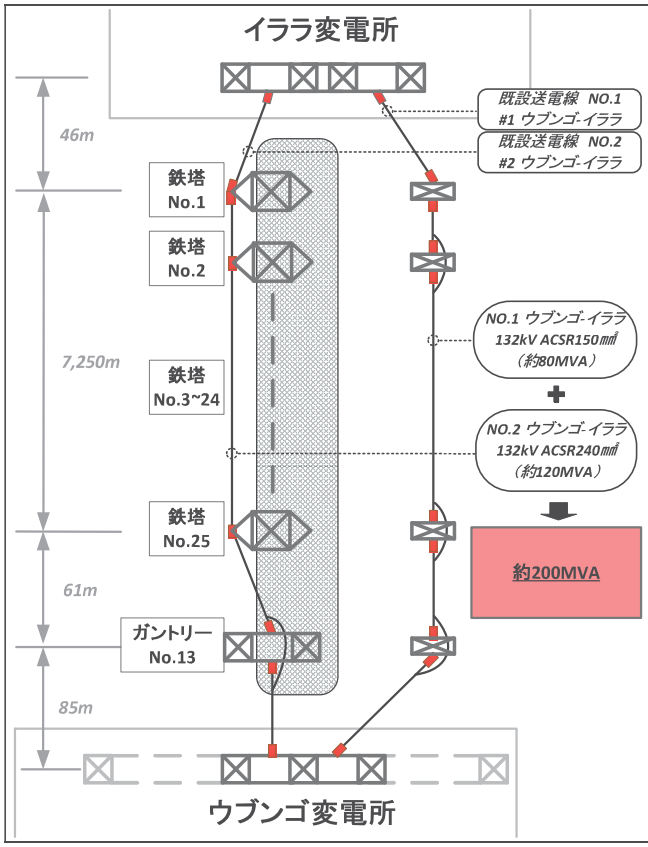
前提条件
-作業用地のクリアリング及び不法建築物などの撤去
-TANESCOによる必要な予算の確保
-09:00から17:00 (8h)/日の作業時間の確保
-作業用地使用許可の取得(Songas社敷地内作業のため)

TANESCO側の負担工事(作業スペース及びアクセス道路の確保)
-作業用地のクリアリング (case1)
: 5箇所×1箇所/日 = 5日
-作業用地のクリアリング (case2)
: 20箇所×2箇所/日 = 10日
-作業スペースの整地 (case1)
: 5箇所×1箇所/日 = 5日
-作業スペースの整地 (case2)
: 20箇所×2箇所/日 = 10日
-使用していない既設送電線の撤去
: 0.5km/日 ×7.5km = 15日
-使用していない既設送電線付属品(碍子など)の撤去
: 28箇所×2箇所/日 = 14日
-Songas社敷地内にあるガントリーNo.13付近のクリアリング
: 1箇所×5日 = 5日

日本側の負担工事(作業スペース及びアクセス道路の確保)
-アクセス道路の整備(必要な場合)
: 5箇所 (200㎡/1箇所)×5日= 25日

1/7

STEP-2



仮支線取付作業

前提条件
-作業用地のクリアリング及び不法建築物などの撤去
-TANESCOによる必要な予算の確保
-09:00から17:00 (8h)/日の作業時間の確保
-作業用地使用許可の取得(Songas社敷地内作業のため)

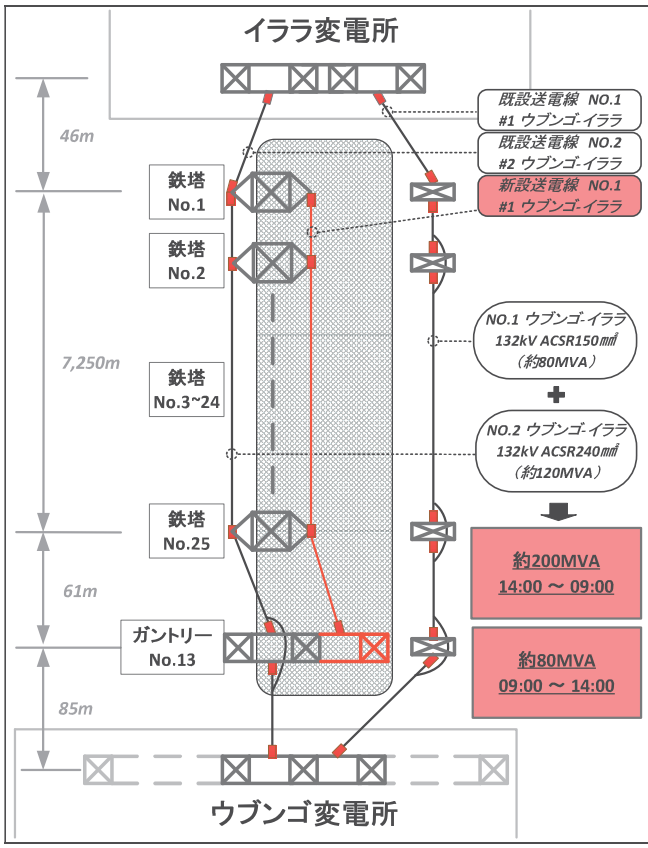
TANESCO側の負担工事
-停電の必要なし

日本側の負担工事
-新設送電線の仮支線取付及び防護足場設置
: 5箇所 ×3日 = 15日

2/7

9. 132kV 送電線増強に係る切換え手順検討

STEP-3



新設送電線（No.1）の延線作業

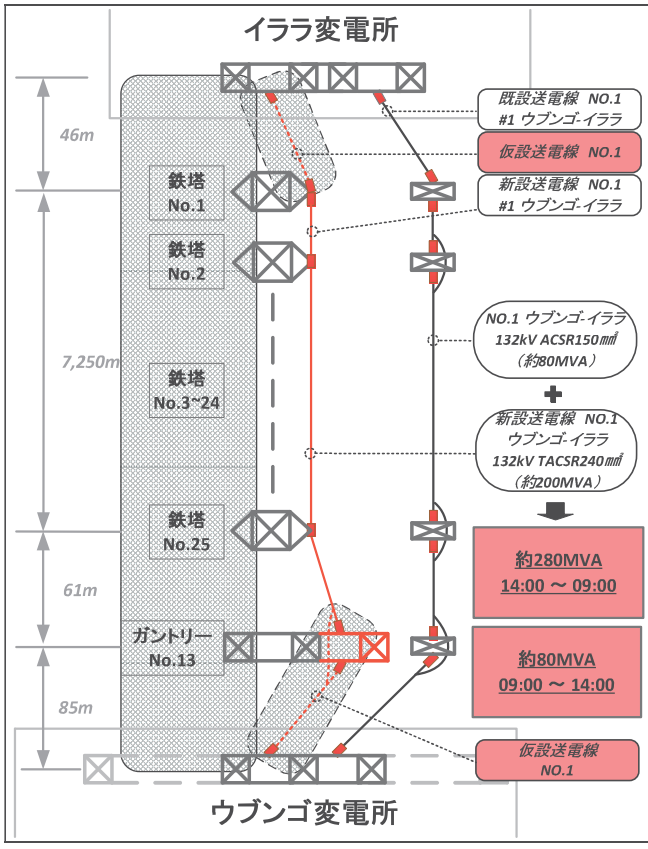
前提条件
-作業用地のクリアリング及び不法建築物などの撤去
-TANESCOによる必要な予算の確保
-09:00から14:00 (5h)/日の作業時間の確保
-作業時間中、既設送電線ACSR240mm²は送電停止。既設送電線ACSR150mm²は送電する。
-作業用地使用許可の取得（Songas社敷地内作業のため）

TANESCO側の負担工事
-必要な停電の実施
: 09:00～14:00 (5h)/日

日本側の負担工事
-ドラム場の準備
: 5箇所 ×1日 = 5日
-延線作業
: 0.5km/日 ×7.5km = 15日
-碍子、ダンパなどの付属品取付
: 0.5km/日 ×7.5km = 15日
-ガントリーNo.13の鉄構組立
: = 21日

3/7

STEP-4



既設送電線（No.2）の撤去

前提条件
-作業用地のクリアリング及び不法建築物などの撤去
-TANESCOによる必要な予算の確保
-09:00から17:00 (8h)/日の作業時間の確保
-作業用地使用許可の取得（Songas社敷地内作業のため）
-Ilala変電所とUbungo変電所間の送電停止後、新設送電線（No.1）TACSR240mm²を仮接続し、送電する。既設送電線（No.1）ACSR150mm²も使用して送電する。

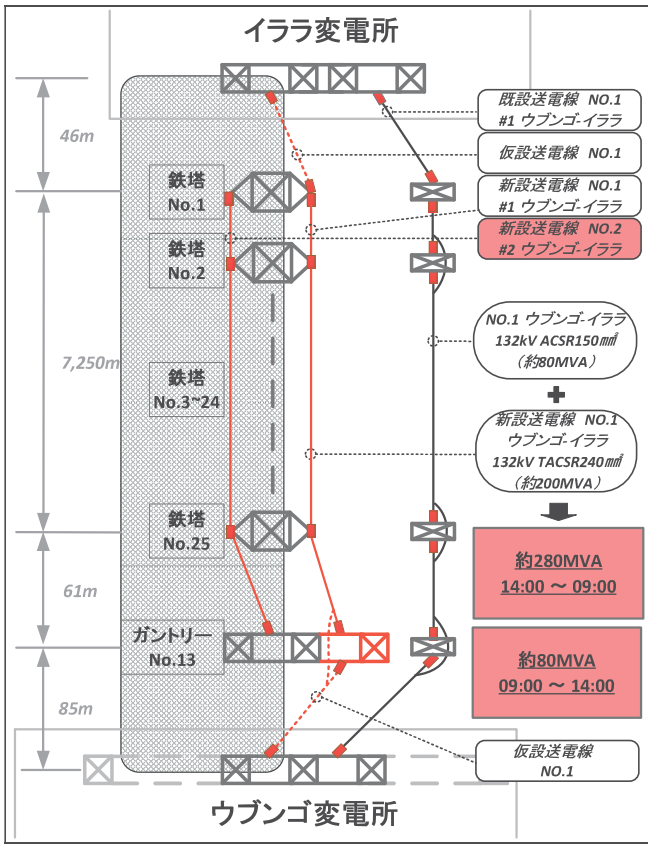
TANESCO側の負担工事
-必要な停電の実施
: 09:00～14:00 (5hrs)/日
-既設送電線（No.2）を撤去
: 0.5km/日 ×7.5km = 15日
-既設送電線（No.2）付属品の撤去
: 28箇所×2箇所/日 = 14日

日本側の負担工事
-新設送電線（No.1）の仮接続
: 2箇所 ×2日/1箇所 = 4日
-新設送電線（No.2）の仮支線取付
: 5箇所 ×1日 = 5日

4/7

9. 132kV 送電線増強に係る切換え手順検討

STEP-5



新設送電線（No.2）の延線作業

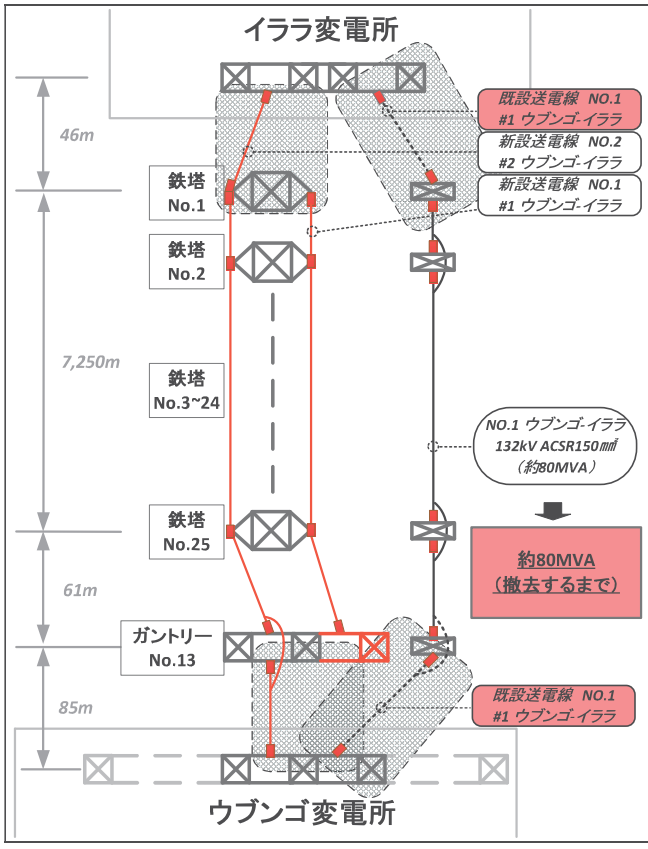
前提条件
-作業用地のクリアリング及び不法建築物などの撤去
-TANESCOによる必要な予算の確保
-09:00から14:00 (5h)/日の作業時間の確保
-作業用地使用許可の取得（Songas社敷地内作業のため）
-新設送電線（No.1）TACSR240mm²及び既設送電線（No.1）ACSR150mm²を使用して14:00～09:00まで送電する。

TANESCO側の負担事項
-必要な停電の実施
: 09:00～14:00 (5h)/日

日本側の負担事項
-ドラム場の準備
: 5箇所 ×1日 = 5日
-延線作業
: 0.5km/日 ×7.5km = 15日
-碍子、ダンパなどの付属品取付
: 0.5km/日 ×7.5km = 15日
-新設送電線（No.2）の仮支線を撤去
: 5箇所 ×2.5箇所/日 = 2日

5/7

STEP-6



既設送電線（No.1）の撤去

前提条件
-作業用地のクリアリング及び不法建築物などの撤去
-TANESCOによる必要な予算の確保
-09:00から14:00 (5h)/日の作業時間の確保
-作業用地使用許可の取得（Songas社敷地内作業のため）

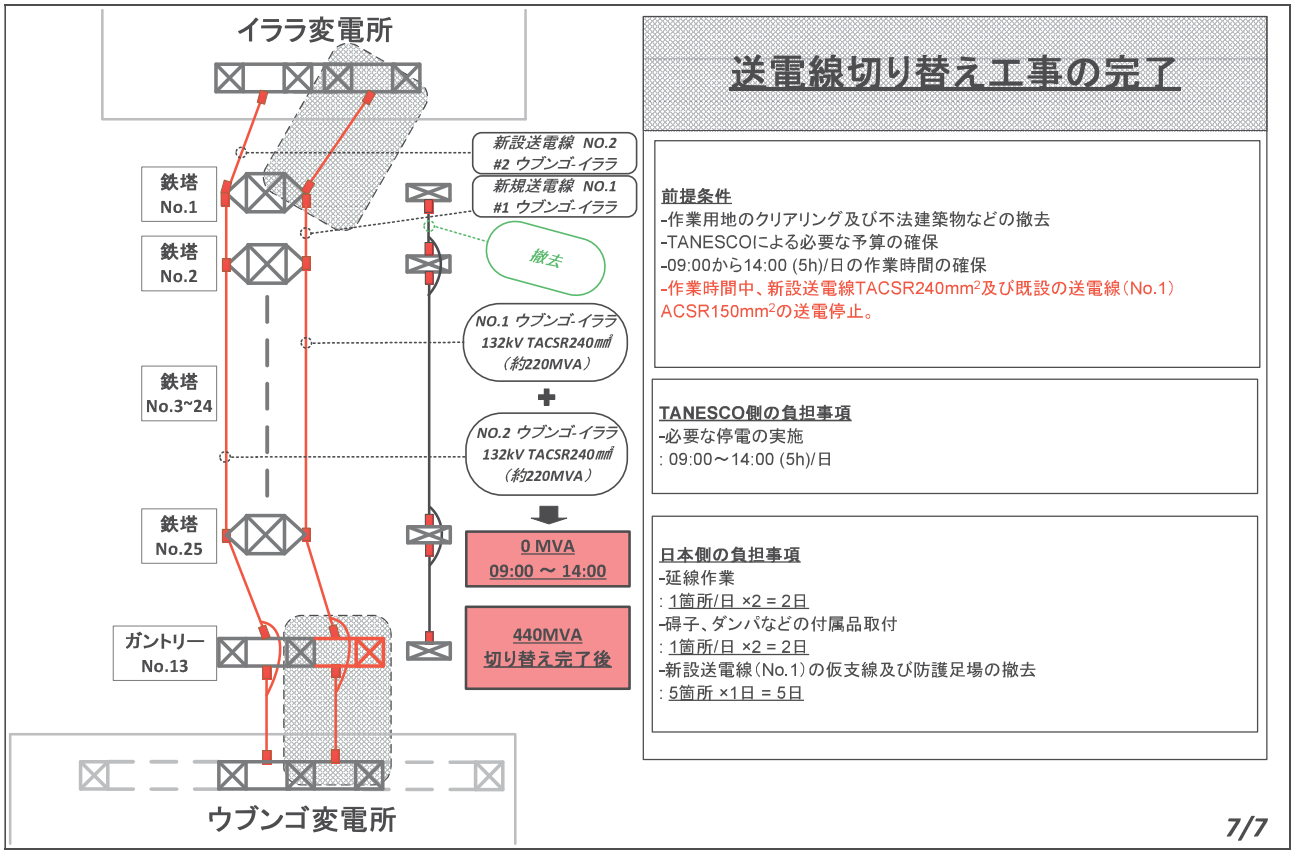
TANESCO側の負担事項
-必要な停電の実施
: 09:00～14:00 (5h)/日
-既設送電線（No.1）の撤去
: 1箇所/日 ×2 = 2日
-既設送電線（No.1）付属品の撤去
: 1箇所/日 ×2 = 2日

日本側の負担事項
-新設送電線（No.2）の仮接続（新設送電線（No.1）から移設）
: 2箇所 ×1日 = 2日

6/7

9. 132kV 送電線増強に係る切換え手順検討

STEP-7



資料－１０　EIA 登録申請時のプロジェクトブリーフ

10. EIA 登録申請時のプロジェクトブリーフ

REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW LINES AND SUBSTATIONS IN DAR ES SALAAM

Environmental and Social Impact Assessment Project Brief

Developer

Tanzania Electricity Supply Company Limited (TANESCO)
Umeme Park, Ubungo, P.O. Box 9024
Dar es Salaam
Phone: +255 22 2451 206, Fax +255 22 2451 206
Email: Aaron.Nanyaro@tanesco.co.tz

Consultant

Hamdun Mansur
P.O.Box 9024, Dar es Salaam
Tel: +255 22 245 1210
Email: Hamdun.Mansur@tanesco.co.tz

Submitted to:

National Environmental Management Council (NEMC)
P.O. Box 63154, Dar es Salaam
Tel: +255 22 277 4889
Email: nemc@nemctan.org

Submission Date: **12th April 2013**

10. EIA 登録申請時のプロジェクトブリーフ

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10. EIA 登録申請時のプロジェクトブリーフ

0.0 PREAMBLE

The following project brief is presented to the regulatory authority and various stakeholders to provide a brief overview of the undertaking and highlight the environmental and socio-economic issues of the project. The information provided is drawn from secondary information and a review of literature from the area, supported with stakeholder opinions and field observations.

1.0 THE PROPOSED UNDERTAKING/ DEVELOPMENT

The Government of Tanzania through Tanzania Electric Supply Company (TANESCO) is planning to undertake rehabilitation of substations and construction of new lines and substations in Dar es Salaam City. Under the Japanese International Corporation Agency (JICA) funding, TANESCO has completed carrying out a conceptual detailed design study of the proposed transmission and distribution line routes and substations, and preparation of the abbreviated resettlement action plan is in progress. Therefore this study intends to undertake Environmental and Social Impact Assessment (ESIA) study for the proposed project.

The overall objective of the project is to provide increased access to electricity with sustainable effects on poverty reduction by facilitating income generation and improved social services. The technical objective of the project is to stabilize the grid system, increase power supply, improve reliability of the power supplied in Dar es salaam city, as well as to increase the extent of TANESCO's distribution network in the city in order to be able to provide electricity to commercial business activities, water pumping, secondary schools, medical services, streetlights, residential houses, agro-processing activities etc. in the project area.

The proposed project has five (5) components which are:

1) Reinforcement of Ilala substation and existing 132 kV transmission line from Ilala substation to Ubungo substation (7.5 km)
2) Construction of new Jangwani Beach substation (33/11kV) and construction of distribution line (33kV) from Jangwani beach substation to Tegeta substation (6.6km)
3) Construction of Muhimbili substation (33/11kV) and construction of distribution line (33kV) from Muhimbili to City Center substation (1.3km)
4) Construction of Mwananyamala substation (33/11kV) and construction of distribution line (33kV) from Mwananyamala substation to Makumbusho substation (1.3km)
5) Expansion of Msasani substation (33/11kV) and expansion of distribution line (33kV) from Msasani substation to Makumbusho substation (7.9km)

In order to implement the above projects, a comprehensive Environmental and Social Impact Assessment (ESIA) has to be conducted and Resettlement Action Plan (RAP) established for the transmission and distribution lines of the project. For this project it has been established to prepare an Abbreviated Resettlement Action Plan (ARAP) due to the extent of the impacts caused by the project.

1.1 Design

1.1.1 Transmission line sub-project

The proposed transmission line will use the existing transmission line (II) from Ilala to Ubungo which currently has double circuits of 33kV and 132kV. This will involve upgrading/reinforcing of the 33kV line to 132kV. The major activity will be stringing of the 132kV aluminum conductor in the existing towers and therefore the project will involve no new construction of towers. The ex-

isting transmission line uses steel lattice towers with concrete or grillage foundations. The existing transmission line route have a Right of Way (RoW) of 40 meters (20 meters each side of the center line) of land to be cleared however the new line will not acquire new way leave instead the same right of way (RoW) will be used. In the line route corridor neither settlements nor crops higher than 4 meters will be allowed for production.

Figure1 proposed transmission towers

1.1.2 Distribution

The planned design of the distribution lines is to use steel poles (slip joint type). The current design proposes the distribution line routes be located along existing roads reserves, that is TANROADS' and Municipal Councils' so as to minimize the environmental and social impacts i.e. resettlement of people along the proposed routes. The line route corridor will be 10 meters wide. The line route will be located so that no resettlement is required, however few of them found to be in the way leave will have to be relocated. On the other hand the construction of these new distribution lines will be associated with construction of new substations as well as reinforcing the old ones for selected sites, therefore mounting of transformers will also be involved.

Figure 0 15MVA transformer for 33/11kVsubstation

2.0 PROPOSED SITE

2.1 Location

The transmission line will be constructed from Ilala substation to Ubungo substation along the existing 132kV line II in Dar es salaam City crossing the two municipalities of Kinondoni and Ilala. Three new substations with respective distribution lines will be constructed in Kinondoni Minicipal Council while the remaining two substations with their respective lines are located in Ilala Municipal Council. The new ssubstations will be fenced off and public will not be allowed to enter.

3.0 INFRASTRUCTURE AND UTILITIES

Requirements during the construction phase include:

- Storage areas for equipment and material (approximately varying from 700 m^2 to 2100 m^2)
- Offices and housing for staff
- Skilled, semi and unskilled labour
- Access roads
- Water for domestic purposes
- Sewage and waste disposal
- Contractor camps

4.0 ENVIRONMENTAL AND SOCIAL IMPACTS

As per the Environmental Impact Assessment and Audit Regulations 2005 the project is under **Schedule A** development. Schedule A projects normally require a full ESIA as the developments are anticipated to have diverse significant impacts (projects in this category include forestry, large industrial plants, irrigation and drainage, mineral development (including oil and gas), pipelines (oil, gas, water) resettlement, rural roads, tourism, urban development, Energy-**production and distribution of electricity**, etc.). Input from the environmental impact assess-

ment team complemented by stakeholder input at the design stage can help to reduce adverse environmental impacts and to enhance the positive impacts.

4.1 Transmission Power Line Environmental and Social impacts

Positive:

- Improved and stabilized grid system.
- Improved quality of electricity supply and increased duration of supply in the city
- Temporary employment opportunities for unskilled labour during the construction phase
- Business opportunities in the vicinity of construction camps
- Potential for future industries electrification, that will increase employment opportunities and boost economic development.

Negative:

- Moderate risk of pollution to soils and water during construction from organic waste, discarded construction materials, oil and lubricants, and litter.
- Noise and vibration levels are expected to rise during construction from the use of heavy vehicles, machinery and equipment necessary for construction.
- Potential hazards related to worker health and safety associated with the electric power industry include electrocution, accidents i.e. falls, sprains, strains and fractures, confined spaces, fires and explosions, environmental stress, vehicular safety, and exposure to hazardous chemicals. Appropriate fencing and security is needed at substation locations to protect the public from electrical hazards.

- Air pollution (noise and dust) and pollution from accidental oil spills.

Note:

- Construction of transmission line will generally not entail land-take as it will use the current way leave.

4.2 Distribution power lines and substations Environmental impacts

Positive:

- Increased access to electricity will reduce the use of kerosene and candles for lighting, and the use of batteries for operating radios etc as a result of extending the distribution network in the city.
- Temporary employment opportunities for unskilled labour during the construction phase
- Increased business opportunities as a result of increased electrification
- Improved power supply and voltage level in the system network

Negative:

- Moderate risk of pollution to soils and water during construction from organic waste, discarded construction materials, oil and lubricants, and litter.
- Noise and vibration levels are expected to rise during construction from the use of heavy vehicles, machinery and equipment necessary for construction.
- Potential hazards related to worker health and safety is similar to those from transmission line construction.

- Noise pollution from transformers in the substations during operation.

OTHER ENVIRONMENTAL ISSUES

It is expected that Environmental and Social Impact Assessment (ESIA) to be conducted as part of this project will assess other potential environmental and social impacts to be associated with implementing this project as deemed necessary according to NEMC's approved Terms of Reference (TOR).

5.0 MITIGATION OF IMPACT AND ENVIRONMENTAL ENHANCEMENT MEASURES

Control of Gas Emissions

- Regular inspection and maintenance of all construction machines and vehicles
- Reduce machines and vehicles idling time
- Avoid burning of solid waste at the site

Controlling Soil Pollution

- Proper storage of waste materials remaining from construction and other activities
- Proper storage of oil, and lubricants in second containments to avoid spills

Controlling Vegetation Clearance

- Limit construction footprint to a minimum and focus only where required along the RoW.

Control of Noise Emission

- Restrict construction activities to normal working hours (8am - 5pm).
- Inform local residents beforehand, via notices and advisories, of pending noisy periods and solicit their tolerance well before the commencement of piling works.
- Operators of equipments that generate noise should be equipped with ear muffs/ear plugs to protect them from noisy.
- All transformers placed at substations near residential areas should be wall fenced to minimize noise generation effects to human beings.

Control of Dust Emissions

- Covering of all haulage vehicles carrying sand, aggregate and cement
- Stockpiles of fine materials (e.g. sand and ballast) should be wetted or covered with tarpaulin during windy conditions.

- Access roads and exposed ground must be watered frequently to keep the area dust free.
- Workers in dusty area site should be provided with dust masks for protection.

Control of Workers Accidents and Hazards

- Engage workers that are trained to operate specific machines and equipment.
- Proper signs on site to warn workers of safety requirements as regards machines with moving parts and other equipment at site.
- Provide a First Aid box and have a trained person to handle site emergencies and incidences.
- Train workers on health and safety issues
- Monitor and control illegal connection of electricity
- Educate local populations to safe behavior in the presence of high voltage power lines

Access roads

- Design drainage to reduce impact on nearby land and water resources (use ample culverts etc.)
- Use discontinuous maintenance roads
- Demolish temporary roads and storage areas
- Restore land to pre-construction conditions

DECLARATION

I, FILBERT MTONGA hereby declare that the information provided on this form is true to the best of our knowledge and shall provide any additional information that shall come to my notice in the course of processing this application

Signature

10/04/2013

Date

資料－１１　NEMC によるスクリーニング結果

11. NEMCによるスクリーニング結果

NATIONAL ENVIRONMENT MANAGEMENT COUNCIL (NEMC)

BARAZA LA TAIFA LA HIFADHI NA USHAURIMIZI WA MAZINGIRA

Tel Dir.: +255 22 277 4852
Tel +255 22 277 4889
Mobile: +255 713 - 608930
Fax: +255 22 277 4901
E-mail: dg@nemc.or.tz
Website: www.nemc.or.tz

Regent Estate / Migombani
Plot No 29 / 30
P.O.Box 63154
Dar es Salaam
Tanzania

In reply please quote:

Ref: NEMC/513/1/Vol.I/175 Date: 07/05/2013

Managing Director,
Tanzania Electric Supply Company Limited (TANESCO),
P.O. BOX 9024,
DAR ES SALAAM

RE: SCREENING DECISION ON THE PROPOSED REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW LINES AND SUBSTATIONS IN DAR ES SALAAM

Reference is made to the subject matter above.

We acknowledge receipt of your letter referenced SMR/MEnv/eia/19 of 10th April, 2013 submitted with an EIA Certificate application form, terms of reference and the Project brief in respect of the above mentioned project. The project has been registered and allotted Application Reference Number 2499.

Following the review of the submitted documents, the Council has noted that the submission of the documents has not followed the standard procedure stipulated in the EIA and Audit Regulations, 2005 regarding project registration and screening, also on the conduct of the EIA specifically Regulation 13 and 15.

However, the Council reached a decision that, this project requires a full Environmental Impact Assessment (EIA) study. Thus, you will be required to carry out the scoping exercise and submit a Scoping Report and comprehensive draft Terms of References (ToR) to the Council for review and approval before the beginning of the EIA study. Also, be reminded that the scoping report should conform to the EIA and Audit Regulations 2005 particularly Regulation 13 (3) and the Fourth Schedule made under Regulation 15 for the contents of the scoping report and the essence of the scoping exercise respectively.

Yours Sincerely,

K. P. Luteganya
For: Director General.

All correspondence should be addressed to the Director - General

資料－１２　スコーピング・レポート

SCOPING REPORT FOR REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW LINES AND SUBSTATIONS IN DAR ES SALAAM

Submitted to: National Environment Management Council (NEMC)
Plot No. 30, Migombani Street
P. O. Box 63154
Dar es salaam, Tanzania
Tel: +255 22 2134 603 / + 255 22 2127817
Fax: +255 22 2111579

Developer: TANZANIA ELECTRIC SUPPLY COMPANY LIMITED (TANESCO)
P.O. Box 9024
Dar es salaam, Tanzania
Tel: +255 22 2451131-9
Fax: +255 22 2451206

Consultant: Hamdun Mansur
P.O. Box 9024, Dar es Salaam
Tel: +255 22 245 1210
Email: Hamdun.Mansur@tanesco.co.tz

October, 2013

Table of Contents

Scoping Report for rehabilitation of substations and construction of new lines and substations in Dar es Salaam

SIGNED DECLARATION OF EXPERTS

We hereby certify that the particulars given to this scoping report are correct and true to the best of our knowledge and we shall provide any additional information that shall come to our notice in the course of the processing of this scoping report

S/N	NAME		SIGNATURE
1	Eng. Hamdun Mansur	Team Leader (Registered EIA Expert)	
2	Mr. Fikirini M. Mtandika	Environmental Engineer (Registered EIA Expert)	
3	Ms. Brigita Sylvester	Environmental Officer (Registered EIA Expert)	

CHAPTER ONE

1.0 INTRODUCTION

1.1 Purpose of the Scoping Report

Scoping is a consultative procedure that culminates in the determination of the extent and approach to an Environmental and Social Impact Assessment (ESIA). This report is thus intended to cover the scoping aspect which is an integral part in undertaking an Environmental and Social Impact Assessment (ESIA).

Scoping phase involves the following tasks:

- Identification and involvement of relevant authorities and interested and likely to be affected parties
- Identification and selection of project alternatives
- Description of ESIA study boundaries
- Developing effective methods and approach for undertaking the ESIA study
- Identification of significant issues to be examined in the ESIA
- Determination of the Terms of Reference (TOR) for undertaking the ESIA study

This report has been prepared to satisfy the requirements of Part III of the Environmental Impact Assessment and Audit Regulations G.N. No.349 of 2005 as a one step toward application of Environmental Impact Assessment Certificate to the National Environmental Management Council. The approval of this report will enable TANESCO to proceed with ESIA study for undertake rehabilitation of substations and construction of new lines and substations in Dar es Salaam City.

1.2 Objectives of the Scoping Report

The main objectives of scoping exercise were therefore:

- To provide an opportunity for the consultant, relevant authorities, interested and affected parties to exchange information and express their views and concern regarding the project before an ESIA is undertaken,
- To focus ESIA on reasonable alternatives and relevant issues so as to ensure that the ESIA is useful to decision makers and addresses the concern of the stakeholders.
- To facilitate an efficient assessment process that saves time and resources as well as reducing undue delays of this power project.

1.3 Scoping Methodology

Methodology used in carrying out this scoping activity were included a review of relevant documents such as Guidelines and Procedures for undertaking EIA in Tanzania as provided by NEMC and VPO (DoE), subsidiary regulations, and other technical literature relevant to the area. The review helped to identify areas where further information would be needed in order to focus the scoping exercise and the ESIA study in general.

Additionally, scoping methodology included field trip to the proposed area, consultation with authorities, interested and affected parties, reconnaissance survey and collection of views and opinions from various stakeholders. The information bulletin briefings about the project were distributed to the stakeholders and household questionnaires during consultation meeting to aid collecting their view regarding the project.

The scoping exercise was intended to determine the scope of the study by identifying stakeholders, defining the boundaries and the issues involved. The main objectives of this stage were:-

- Identification of main problems, constraints and issues associated with the projects;
- Identification of stakeholders;
- Identification and discussion of project alternatives.
- Identification of the likely positive and negative impacts of the project.
- Identification of data requirements.
- Determination of spatial, temporal and institutional boundaries of the project; and
- Development of appropriate study methods.

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1.3.1 Stakeholders Identification

Stakeholders were identified based on their role and their relevance in the project. Most of the stakeholders such as local leaders, house owners, nearby communities and government authorities that might be impacted by the project were pre-determined while others were identified by different stakeholders.

1.3.2 Scoping Data Collection

Public meeting, Focus Group Discussion and household questionnaires as a qualitative data gathering method were used in collecting data about the project. It based on the interviews and discussions with various groups, the community and other stakeholders. The study area was visited; interviews were conducted with stakeholders and made spot verification of the status of environmental and social issues in the study area.

CHAPTER TWO

2.0 PROJECT DESCRIPTION

2.1 Background of the Project and Rationale

The Government of Tanzania through Tanzania Electric Supply Company (TANESCO) is planning to undertake rehabilitation of substations and construction of new lines and substations in Dar es Salaam City. Under the Japanese International Corporation Agency (JICA) funding, TANESCO has completed carrying out a detailed design study of the proposed transmission and distribution line routes and substations, and preparation of the abbreviated resettlement action plan is in progress. Therefore, this study intends to undertake Environmental and Social Impact Assessment study for the proposed project.

The overall objective of the project is to provide increased access to electricity with sustainable effects on poverty reduction by facilitating income generation and improved social services. The technical objective of the project is to stabilize the grid system, increase power supply, improve reliability of the power supply in Dar es Salaam city, as well as to increase the extent of TANESCO's distribution network in the city in order to be able to provide electricity to commercial business activities, water pumping, secondary schools, medical services, streetlights, residential houses, agro-processing activities etc. in the project area.

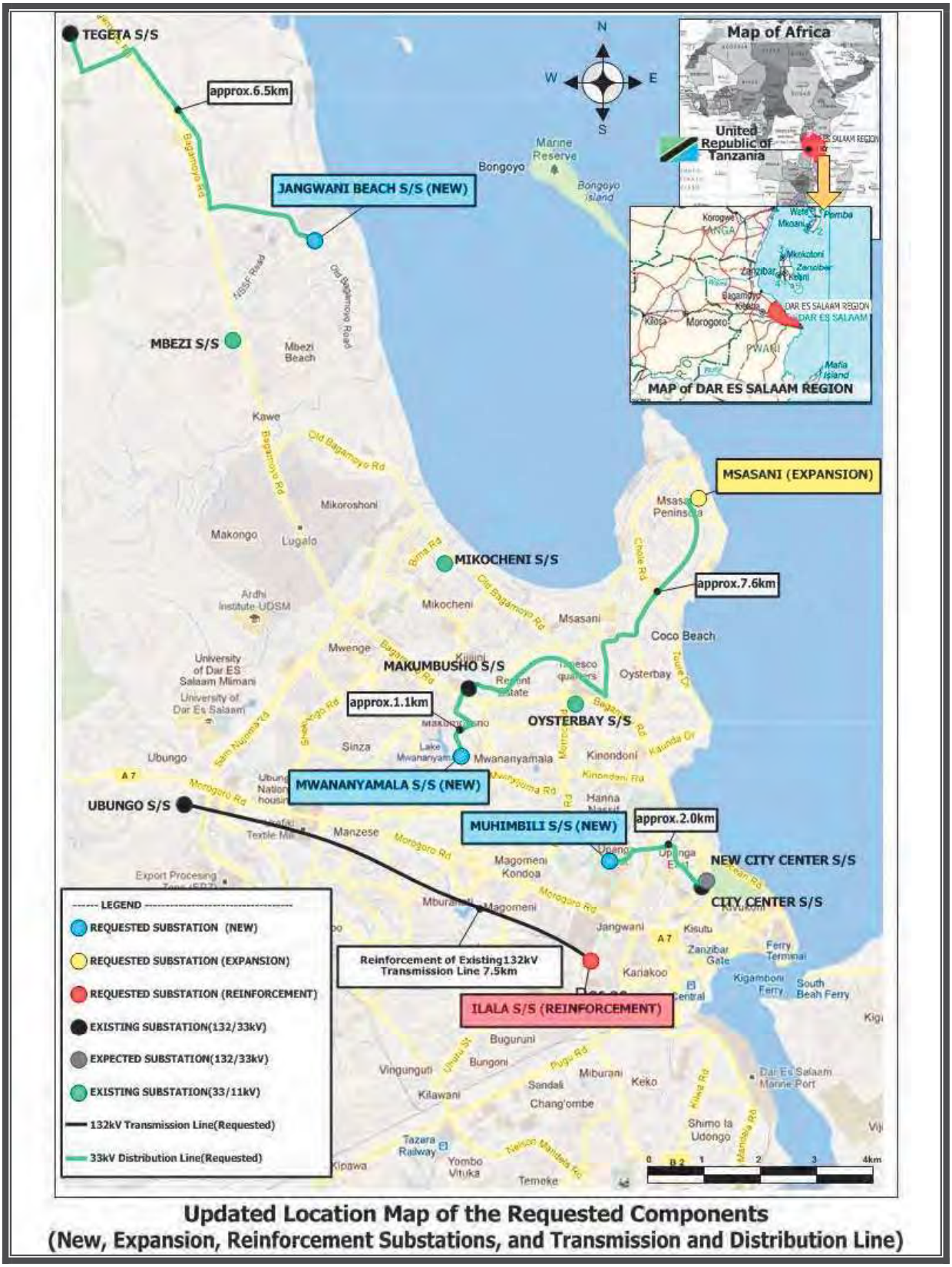
The proposed project has five (5) components which are:

- Reinforcement of Ilala substation and existing 132 kV transmission line from Ilala substation to Ubungo substation (7.5 km)
- Construction of new Jangwani Beach substation (33/11kV) and construction of distribution line (33kV) from Jangwani beach substation to Tegeta substation (6.5km)
- Construction of Muhimbili substation (33/11kV) and construction of distribution line (33kV) from Muhimbili to City Center substation (2km)
- Construction of Mwananyamala substation (33/11kV) and construction of distribution line (33kV) from Mwananyamala substation to Makumbusho substation (1.1km)
- Expansion of Msasani substation (33/11kV) and expansion of distribution line (33kV) from Msasani substation to Makumbusho substation (7.6km)

2.2 Site description:

The project area as a whole has mixed land use activities, the areas covered by the project are highly developed as settlements, or institutions such as hospitals, schools, churches etc. There are few planted trees alongside the road where by the project will pass and most of vegetation covers have been cleared for urban development activities. However, the detailed ESIA survey will confirm the specific land uses of the respective area.

Figure 2.1 Map Showing the project area and transmission line sections and substations



Updated Location Map of the Requested Components
(New, Expansion, Reinforcement Substations, and Transmission and Distribution Line)

2.3 Design

2.3.1 Transmission line sub-project

The proposed transmission line will use the existing transmission line (TL) from Ilala to Ubungo which currently has double circuits of 33kV and 132kV. This will involve upgrading/reinforcing of the 33kV line to 132kV. The major activity will be stringing of the 132kV aluminum conductor in the existing towers and therefore the project will involve no new construction of towers. The existing transmission line uses steel lattice towers with concrete or grillage foundations. Therefore the existing wayleave will be used for this project.

2.3.2 Distribution

The planned design of the distribution lines is to use wooden poles. The current design proposes the distribution line routes be located along existing road reserves, that is TANROADS' and Municipal Councils' so as to minimize the environmental and social impacts i.e. resettlement of people along the proposed routes. The line route corridor will be about 2.5 up to 10 meters wide depend on nature of the site. The line route will be located so that no resettlement is required, however few of them found to be in the way leave will have to be relocated. On the other hand the construction of these new distribution lines will be associated with construction of new substations as well as reinforcing the old ones for selected sites, therefore mounting of transformers will also be involved.

2.3.3 Ilala substation

Reinforcement of Ilala substation and 132kV transmission line from Ilala substation to Ubungo substation of about 7.5km, the transmission line will be constructed from Ilala substation to Ubungo substation along the existing 132kV line II in Dar es salaam City crossing the two municipalities of Kinondoni and Ilala

2.3.3 Jangwani Beach substation (33/11 kV)

New Construction of Jangwani beach substation and construction of 132 kV distribution line of approximately 6.5 km from Jangwani beach substation to Tegeta substation.

2.3.4 Muhimbili substation (33/11 kV)

Construction of Muhimbili substation and construction of a distribution line of 33 kV from Muhimbili substation to City centre S/S of approximately 2km.

2.3.5 Mwananyamala substation (33/11 kV)

Construction of Mwananyamala substation and construction 33 kV of distribution line of 1.1km from Mwananyamala substation to Makumbusho substation.

2.3.6 Msasani substation (33/11 kV)

Expansion of Msasani substation and expansion of 33 kV distribution line of approximately 7.6km from Msasani substation to Makumbusho substation.

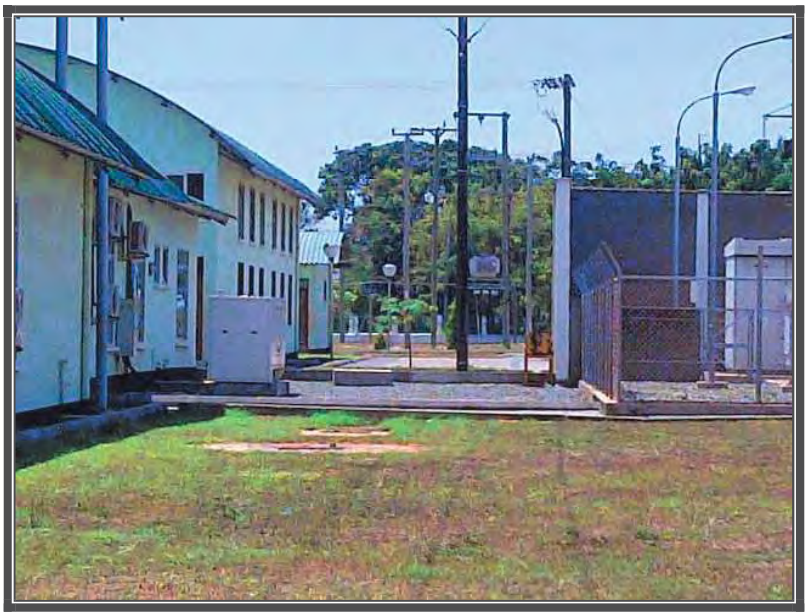


Figure 2.2: Site for the proposed expansion of Msasani S/S

2.4 Clearing of Right of Way (ROW)

The existing transmission line route have a Right of Way (RoW) of 40 meters (20 meters each side of the center line) of land to be cleared however the new line will not acquire new way leave instead the same right of way (RoW) will be used. In the line route corridor neither settlements nor crops higher than 4 meters will be allowed for production.

2.5 Project Activities

The implementation of this project involves various phases such as planning phase construction, demobilization and operation phase. Decommissioning of the project is expected after 10-15 years of operation and will be in the form of major rehabilitation that will involve changing poles and conductors. The following are activities expected in each phase:

2.5.1 Pre- construction Phase

Prior to commencement of any construction activity, topographical survey shall be carried out to identify the distribution line centreline, define the right-of-way (ROW) boundaries, identify areas of road and other infrastructure crossings, and identification of properties to be affected and their owners (PAPs). Important also is to generate the distribution line route profiles. During this phase no major impact to the environment is expected.

2.5.2 Construction Phase

The following are activities that are going to be conducted during construction phase:

Excavation of holes

Depending on the nature of the terrain and materials, different methods of excavation holes for pole erection may be used. For this distribution network manual excavation is expected though in hard rock areas machine drills may be used.

Poles erection

The wooden poles will be erected using available manpower and by hoisting equipment mounted on special vehicles.

Conductors stringing

The process of attaching conductor wire to the insulators attached to the poles or cross bar is called conductor stringing. It involves pulling the conductor off a truck mounted spool. For the proposed distribution line the materials to be used in executing this work include:

- Aluminium Conductors
- Galvanised Steel Sections
- Anchor Bolts
- Line Insulators

The arrangement of the conductors on the poles will vary according to the design.

Transformer installation and service line construction

Upon completion of 33kV line construction, transformers of different sizes depending on the size and expected loads will be installed following by construction of service line to all service line applicants.

2.5.3 Demobilization phase

Following the completion of construction activities, there will be a demobilization phase to remove the equipment from the worksites and removal of all unwanted temporary structures in order to leave the site clean. This will also be accompanied by removal of all materials left and all kinds of waste (used timber, wooden poles, cross bars, broken conductors, and insulators) from the working sites.

2.5.4 Operational Phase

The activities expected to be executed during operational phase include:

- Maintenance of 33 kV distribution line and 132kV transmission line to the project areas
- Safety management of the distribution and service lines
- Maintenance and safeguard of the RoW

2.6 Construction Materials

Construction materials will include but not limited to the following:

- Wooden poles in standard height
- Aluminium conductors with cross section of 25mm2, 50mm2 and 100mm2 ACSR, and AAC
- Insulators
- Cross arms
- Transformers

Building materials such as sand, aggregates, and cement, shall be sourced locally via certified suppliers. However, the quantity and quality required shall dictate the material sources. The poles shall be sourced from Mufindi Iringa Region or imported from abroad. Power conductors, transformers and insulators shall be imported from abroad when not available locally. Water shall be fetched to the nearest water source.

2.7 Distance to nearest residential and/or other facilities:

The Transmission and Distribution lines traverse settled and non-settled areas, with the latter being closer to settlements to facilitate delivery of electricity, also three substations (Mwananyamala, Muhimbili and Jangwani S/S) are near residential/institutions.

2.8 Project Boundaries

Scoping is the most critical step in an EIA and in order to provide an accurate project appraisal appropriate project boundaries i.e. spatial, temporal and institutional boundaries are to be established for the rehabilitation of substations and construction of new lines and substations in Dar es Salaam as some of impacts might be confined or spread beyond the geographic boundaries of the project site. All potentially serious environmental and social impacts are to be identified and documented according to its boundaries.

Generally in EIA and scoping study three types of boundaries will be considered i.e. institutional, temporal and spatial boundaries of the project.

2.8.1 Institutional boundaries

These are institutions sectoral boundaries in which the project lies or interacts. These can be determined from political boundaries, acts, regulations and institutional mandates.

The proposed development is about rehabilitation of substations and construction of new lines and substations in Dar es Salaam regions at Ilala and Kinondoni Municipals and will be implemented in urban areas. The development is expected to touch the interest of several institutions and organizations and is in relation to several policies, laws and regulations in Tanzania.

Examples of the key stakeholders are:

- Vice President Office – Division of Environment
- NEMC
- Ministry of Energy and Minerals
- Tanzania Electric Supply Company-TANESCO,
- Energy and Water Utilities Authority (EWURA)
- Dar es Salaam Regional Secretariat,
- Ilala and Kinondoni Municipals including Ward and Street Governments.
- local NGOS and CBOs, as well as international organizations operating in the area,

Some of the institutions have been consulted and the remaining will have to be consulted during the EIA processes as they are key stakeholders in this project.

2.8.2 Temporal boundaries

Temporal boundaries refer to the lifespan and reversibility of impacts. The temporal impacts can be either short term or long term. The short-term impacts are considered to be those which will be apparent only for a short period and as such will include mainly construction activities related impacts. The long-term impacts are considered to be those which will be apparent after construction has been completed (but may include also impacts which may become apparent during the construction phase). Consideration will also be given to what happens when the project ends, where there is need for site restoration and decommissioning.

Short-term impacts include noise, dust and vehicle movements, spillage of hazardous materials and pollution of water bodies that will disappear as soon as construction is finished but existence of the power line and substations will last for many years to come. Long-term impacts include reduced biotic viability and existence of sensitive plants and impact on public health and spread of HIV, AIDS and other STDs, impact on vegetation**,** boost to the local economy through employment and other benefits to the local communities in relation to accessibility to the electricity.

2.8.3 Spatial boundary

The spatial dimension encompasses the geographical spread of the impacts i.e. local, regional, national or international regardless of whether they are short term or long term. The spatial scale considers the receptor environmental components.

Spatial boundaries are crucial to decide on whether impacts are likely to occur at local, regional, national or international level. The rehabilitation of substations and construction of new lines and substations in Dar es Salaam will have wide ranging implications that could be felt locally, regionally, and probably nationally thus, causing impacts as far as to those areas. In the case of this project, the core impact area consists of communities and institutions. This core impact area is surrounded by an immediate impact area, an area that is outside but plays important role or bears relatively some of the impacts (positively or negatively).

CHAPTER THREE

3.0 STAKEHOLDERS CONSULTATION AND ANALYSIS

3.1 Stakeholders Consultation

Consultation of stakeholders is a very important component in the EIA process. It is one of the key factors that enhance environmental governance. Stakeholders are individuals, groups of individuals or institutions that have interest in the proposed project. This includes those positively and negatively affected by the project. Stakeholders' participation involves processes whereby all those with an interest in the outcome of a project actively participate in decisions on planning and management of the proposed development.

It is a Government policy that beneficiaries of and members of public living near new project sites (both public and private) are consulted to seek their views and opinions regarding the projects before they are implemented. To that end, this scoping exercise was carried out in line with NEMC requirements, JICA guidelines for Environmental and Social considerations and in general good practice by the Proponent to remain compliant with the law. The Public consultation process involved visiting the areas along which the proposed distribution lines and substations will be constructed. The stakeholders were identified and consulted with the objective of describing the existing socio-economic conditions within the proposed project area of influence and the immediate surroundings.

Specific objectives was to Consult and gather recommendations from the local administration which involves Regional Commissioner, District Commissioners, Municipal Directors, Municipal Officers, Ward and Mtaa leaders and communities that have a stake in the project and provide an opportunity to all the stakeholders and communities in the areas where the proposed project is expected to pass to raise issues and concerns pertaining to the project, and allow the identification of alternatives and recommendations. The study involved a participatory approach in the preparation of the scoping exercise. This entailed seeking information/experience from stakeholders such as ward and Mtaa leaderships, local representatives and other institutions who have been involved in one way or another in the implementation of the project.

In order to get views in the ward and Mtaa level the team opted to use the Focus Group Discussion method which involves different people such as ward leaders, Mtaa leaders, youth representatives, women representatives and old people representatives. Open-ended questionnaires were also administered to households and small business enterprises neighbouring the site. Concerns, views and opinions from the respondents were received.

Consultation with stakeholders has been initiated and will be continued through the ESIA process to ensure regular communication between the project proponent and PAPs. This allows for the provision of updates, changes, alteration, and new concerns where necessary from both the project proponent and PAPs such that both parties have a common perception as to what the project entails.

The team conducted FGD (Focus Group Discussion) in these wards which will be affected by the project and public meeting in some street. The meetings aimed at informing the community about the project and the associated impacts. FGD members were informed of the positive and adverse impacts of the project include loss of land, possibilities of increase spread of HIV/AIDS especially during construction phase, as well as other Environmental and social impacts associated with the project. FGD members were also sensitized on their right to be compensated and applicable compensation norms if they will be affected. Further they were given an opportunity to ask questions, raise their concerns and provide information to the team on different issues concerning the project. Identified Issues of Concern during Meetings with Stakeholders are as follows:-

3.1.1 Consultation Meetings with Municipal Authorities

Consultation meetings with RAS office Ilala, Municipal authorities Ilala and Kinondoni, DC'S office Ilala and Kinondoni were held and the aim of the meeting was to discuss the project with officials and obtain relevant data and information from the respective offices.

Most of the consulted district councils and municipal officials agreed to the importance of the proposed development project to the regional and local communities' development. They had the following concerns:-

- TANESCO should now opt using the underground cables instead of overhead transmission lines.
- Another concern was the issue of compensation. If TANESCO project is going to affect people compensation procedures should be done in order to avoid misunderstanding with the community and communication should pass through Municipal offices, ward and Mtaa levels in order to make them aware of what is going on about the project.
- TANESCO should educate the community about the project in order to avoid conflict, there might be different challenges but if education will be clearly provided the project will be successful.

3.1.2 Consultation Meetings with TANROADS

During scoping exercise consultation meeting with Manager TANROADS Dar region was done and he had different opinion as follows:-

- TANESCO should have good plan with their project in order to avoid using road reserve. Using road reserve is not a proper plan so the company should prepare for compensation when implementing the project regardless the cost. Using underground cables is the best option nowadays so the company should opt using this method.
- Those who will be found in the road reserve are encroachers and are not entitled for compensation. But if TANESCO is going to use area which is out of the road reserve then compensation should be paid.
- TANESCO have a big challenge concerning theft of their properties and these thieves do cooperate with TANESCO staff so security should be increased in the transformers and other properties.
- TANESCO should be friendly to environment, the behavior of cutting trees during clearance of the line and leave trees is bad and it bring bad reputation to the company. After pruning trees cleaning should be done.

3.1.3 Consultation Meetings with DAWASA

Consultation meeting was conducted with Eng. Bunyese who had different views as follows:-

- Surveyor from TANESCO should observe what is inside the proposed route and it will be good to have a joint survey with DAWASA officers in order to observe what is in the proposed route and advice accordingly.
- He insisted that there must be cooperation between TANESCO and other stakeholders so as to eye mark other property inside road reserves which belongs to other companies.

- In order to make a project success they advice TANESCO to pass the distribution line (from Tegeta S/S on the way to Bagamoyo road project) on the left side of the road from the substation because they have another large water pipe project on the right side which is expected to start soon. But if that option will not be good for TANESCO then the company will have to wait until we are done with our water project.

3.1.4 Consultation Meetings with TTCL

During scoping exercise consultation meeting with TTCL was done and they had these concern:-

- The project is good in order to make it successful there must be cooperation between TTCL, DAWASA, TANROADS and respective municipals. He advised TANESCO to arrange a day so as to have site visit to conduct joint survey with all stakeholders as this will enable the company to have a good plan with the project after identifying all properties which belongs to other companies in the proposed route.

3.1.5 Consultation Meetings with Local Communities

Public participation process followed the guidelines as stipulated in the Environmental Management Act No. 20 of 2004, Part XIV regarding public participation in environmental decision-making. To facilitate an open and transparent process, interested and likely to be affected persons were identified all along the proposed route and later informed of the proposed project development and subsequent phases of the project. The positive impacts and negative impacts of the project and the corresponding mitigation measures were also described in details. Finally, at the end of the meeting, the communities were given an opportunity to ask questions, give comments, warnings, observations and opinions. These comments, observations, questions and opinions received from each person have been summarized and are addressed below. The meetings involved many people, among others, from 15 wards of 2 Municipals in Dar es Salaam region in which proposed project pass through. List of their names and signature is shown in **Appendix III.**

Consultation meeting with local communities was conducted through focus group discussion meetings, public meeting and open ended questionnaires. These meetings involved local leaders, community members (representative of women, youth, and old people) and TANESCO team.

The consulted wards based on the proposed routes were:

- Mchikichini, Upanga East and Upanga West in Ilala Municipal Council,
- Makurumla, Kawe, Mzimuni, Kunduchi, Wazo, Msasani, Mabibo, Ubungo, Mikocheni and Makumbusho ward in Kinondoni Municipal Council.

Consultation in each ward commenced by stating the objective of the consultation meeting i.e. inform the FGD members about the project and what the proponent will do to address the potential impacts of the project.

Summary of the main issues raised during the consultation meetings and their responses

- How the project would be beneficial to the community.
  The ESIA team thanked the residents for their participation and responded to their questions informing them that the project has its benefits and drawbacks. Some of the benefits highlighted were:
  - Gains in the local and national economy thus leading to increase in revenue.

- Access to reliable power.
- Informal sector benefits.
- Improved security in the area due to street lightning.
- Direct and indirect skilled and non-skilled employment opportunities

- How safe would one be if he/she lives near the substation?
  - For safety issues, it is highly recommended that no one lives too close to the substation and this would be adhered to. In addition the following is done:
  - It will be built by experienced personnel.
  - Perimeter fencing, Security and lightning.
  - Entry to the substation is restricted, only authorized officers are allowed.
- Some of the drawbacks of the projects identified were:
  - Air and noise pollution during construction.
  - Oil spillage during construction.
  - Possibility of occurrence of accidents on the site during construction.
  - Presence of the substation may expose people to accidents and health hazards.
  - It was responded that In view of occupational health and safety concerns, the proponent will ensure health, safety and welfare of workers to prevent accidents in the course of employment and additionally provision of PPE would reduce the impacts of dust and minimize exposure to a variety of hazards respectively.
- Wanted to know whether the locals would be employed during the construction and operation phase of the project. The community expressed fear that local youths may be side lined in securing employment opportunities especially during the construction phase of the proposed project. “The contractor may decline to employ youths here and use his staff” the community asserted.
  - The team emphasized that locals will be given first priority in employment especially casual employment, the contractor will be advised to contract locals in the project area.
- Compensation of the properties to the affected people to be done before construction of the project and that proper valuation of properties and payment be made in time and should be adequate to enable PAPs get alternative housing.
  - It was responded that in deed compensation will be paid before construction starts according to Land Acts 1999.
  - The valuation process is vested to Chief Government Valuer and TANESCO being public company cannot pay beyond the Chief Government Valuer’s opinion
- Awareness on the valuation and compensation of the properties procedures to the affected people by the project. This is because most people are unaware of the procedures involved during valuation and compensation exercise.
  - TANESCO agreed that is the problem during the valuation exercise and promised to continue raising awareness during the detailed ESIA study. Further, TANESCO will ensure that engaged valuers conduct awareness meetings with PAPs before the valuation of properties starts.
- Wanted to know how will issues relating HIV/AIDS to the construction workers and community be dealt.
  - It was responded that HIV/AIDS awareness within the community is very high but the project will continue to educate and sensitize workers and the community on how to avoid HIV/AIDS during the project implementation.

- Adverts and brochures will be erected and distributed to workers to warn and to remind people to take care for themselves. In addition condoms will be put at special areas for self-help.

The main issues that were raised by the community through questionnaires included the following:

- The project will enhance the reliability and security of electricity supply in the region in addition to increasing the region's power supply. This will help meet the increasing demand for power supply and minimize the frequency of power outages.
- The construction, operation and decommissioning of the proposed substation will create employment opportunities for both skilled and unskilled personnel.
- Some stakeholders especially the community was concerned about the possibility of occurrence of accidents such as electrocution and machine/vehicle misses during the construction and operation phase of the proposed project.
- Increase in reliability and security of power supply in the region will enhance efficiency and productivity of other sectors including health, education, water supply, livestock production and industry.
- With increased lighting in the area and presence of guards on the project site the security of the area will be enhanced.
- Electricity supply to hospitals and dispensaries in the project area would enhance delivery of services such as laboratory, surgical, immunization, among others.
- Improved health and education sector.

Disadvantages of the projects were identified as follows through questionnaires:

- Noise pollution during construction. The construction and decommissioning works of the substation will most likely be noisy due to the moving machines (mixers, tippers, drilling etc.) and incoming vehicles to deliver construction materials to site or take away debris.
- Exhaust emissions are likely to be generated by the motored equipment during the construction and decommissioning phase of the proposed substation. Motor vehicles that will be used to ferry construction materials, take away debris during decommissioning phase or those used for general operation activities (operation phase) will also have impacts on air quality.
- Dust emission is likely to occur during the site clearance, excavation and spreading of the topsoil during construction. They are also likely to occur during the decommissioning phase. Motor vehicles accessing the site may also lead to dust emissions.
- Motorized machinery on the proposed site may be containing moving parts which will require continuous oiling to minimise the usual corrosion or wear and tear. There is also a potential for oil spills and accidents during oil transportation, storage and operations of the transformers and batteries.
- Possibility of occurrence of accidents on the site during construction.
- Presence of the substation may expose people to accidents and health hazards.

Therefore, all these concerns will be addressed in the EIA document that will include the preparation of Environmental and Social Management and Monitoring Plans (ESMP).

CHAPTER FOUR

4.0: IDENTIFICATION OF ISSUES AND PROBLEMS

This chapter describes existing problems and issues identified during scoping study that will make a reference frame to mark out the potential environmental impacts that might arise during implementation of the proposed project. The information is based on the information collected from the secondary and primary sources including documentary review, interview with key informants, household questionnaires, community meetings and experts' observations.

4.1: Administration

The transmission line will be constructed from Ilala substation to Ubungo substation along the existing 132kV line II in Dar es Salaam City crossing the two municipalities of Kinondoni and Ilala. Three new substations (Jangwani S/S, Msasani S/S, Mwanyamala S/S) with respective distribution lines will be constructed in Kinondoni Municipal Council while the remaining one new substation (Muhimbili S/S) with their respective lines are located in Ilala Municipal Council.

4.2: Physical Features at Site

- Flora

Currently in the project area there is planted species of Mwarobaini (*Neem Azederachta indica)*, Mkrismas (*Deronix regia).* Other part vegetation covered by shrubs, short grasses and few tall trees with little part of indigenous tree species. The surrounding area of the project area is not covered with any endanger trees species since project area is located in town. The currently existing vegetation cover along the project area is as illustrated in the Figure 4.1 below.

Figure 4.1: Part of flora along the proposed project alongside to Oysterbay road

- Fauna

According to interviews with members of the community, Ilala and Kinondoni municipal records and physical inspection in the industry areas does not have any major wildlife since

project area in that place. Common animals on the project site seen include birds ("*Kunguru"*), lizards, butterflies, grasshoppers, ants of various kinds and many other invertebrates. But more details about fauna found alongside the proposed project will be presented in ESIA study.

4.3: Current zoning:

The Substations, Transmission and Distribution lines are in Dar es Salaam city covering Kinondoni and Ilala Municipalities.

4.4: Energy and water supply

Since the project will be in the urban areas, it is expected to have no camps constructed, and the power source during construction is mainly expected to be TANESCO's electric power. However, diesel generators shall be available as standby source during blackouts. Existing water sources and DAWASCO will be exploited, minimal water is required for construction of the substations, transmission and distribution lines.

CHAPTER FIVE

5.0 SYNTHESIS OF RESULTS OF SCOPING EXERCISE

This Chapter will give an overview of some of the relevant and potential environmental and social issues with their impacts that will be addressed in the next ESIA process. The description is based on a general overview of potential impacts analyzed from the consultation and field trip made in the project areas.

5.1 Potential environmental and social impacts

Power project usually involves survey and design, mobilization, construction, demobilization operation and decommissioning. These phases are likely to have some impacts on certain aspects of the biophysical and social economic environment either positively or negatively and sometime neutral. Therefore, it is anticipated that there will be environmental and social impacts affecting various groups socially and economically. It is further anticipated that the communities will have to be protected from any negative impacts, while opportunities to be offered by the project need to be made visible to the communities. Those various groups likely to be affected by the project were closely involved in raising their concerns of the project which are addressed in the previous chapters of this scoping report.

The prediction of impacts is based on the entitlement matrix, knowledge of the expert on such project and their secondary and synergetic/ cumulative effects for the biophysical environment and local community. The assessment and valuation of impacts for different project components is characterized based on the following parameters:

- **A+/-:** significant positive/negative impact is expected
- **A+/-:** Positive/negative impact is expected to some extent.
- **C+/-:** Extent of positive/negative impact is unknown. (A further examination is needed, and impact could be clarified as the study progresses).
- **D:** No impact is expected

Table 5.1 below provides a list of foreseen environmental and social impacts of the rehabilitation of substation and construction of new lines and substations.

Table 5.1: Summaries of Possible Environmental and Social Impacts of the Proposed Project

Category	No.	Item	Degree of Potential Impacts in project phases			Potential Impacts
			Pre-Construction	Construction	Operation	
Pollution Control	1.	Air Quality	B-	B-	D	Pre-Construction and Construction: -Generation of Dust and Exhaust gas from construction machine and vehicles. Operation: -There will be no emissions of air pollutants from the operation.
	2.	Water Quality	D	D	D	Pre-Construction, Construction and Operation: -There will be no pollution of water during both phases since project area is far away from source of water.
	3.	Soil Erosion	B-	B-	D	Pre-Construction and Construction: -The construction works associated with the site preparation, vegetation clearance for RoW involve minor earthworks which include excavation of foundations (in substation_, excavation of holes for wooden poles and backfilling will lead to soil erosion and pollution. Operation: -There will be no soil erosion during this phase.
	4.	Waste	B-	B-	B-	Pre-Construction and Construction: -Generation of domestic and industrial waste from construction sites. Operation: - If Waste Oil in transformers is not properly handled, waste oil will be carried outside the site with storm water.
	5.	Soil Contamination	B-	B-	B-	Pre-Construction and Construction: -If waste Oil for construction machine and vehicle is not properly handled, waste oil will contaminate the soil and leach into underground water. Operation: -If Waste Oil in transformers is not properly handled, it will contaminate the soil and leach into underground water.
	6.	Noise &Vibration	B-		D	Pre-Construction and Construction: -Generation of noise and vibration due to movement of machine and vehicles.

Category	No.	Item	Degree of Potential Impacts in project phases			Potential Impacts
			Pre-Construction	Construction	Operation	
				B-		Operation: -There will be no noise/vibration pollutants during the operation phase.
	7.	Land Subsidence	D	D	D	Pre-Construction/Construction/Operation: -There will be no extensive underground water use for the construction work that will cause land subsidence.
	8.	Odor	D	D	D	Pre-Construction/Construction/Operation: - There are no activities anticipated in this project that might cause odor complaints.
	9.	Sediment	D	D	D	Pre-Construction/Construction/Operation: - There are no activities anticipated in this project that might affect the quality of sediment(e.g. Contamination by Heavy Metal)
Natural Environment	10.	Ecosystem	A-	A-	A-	Pre-Construction/Construction: -There are some Important Bird Areas that might be affected by the construction work. Operation: -There are other migratory birds in this area and the modification of transmission line might cause electrocution and collision.
	11.	Hydrology	D	D	D	Pre-Construction/Construction/Operation: There will be no extensive cutting and filling in the construction work that will cause impacts on surface water and underground water flow.
	12.	Topography and Geology	D	D	D	Pre-Construction/Construction/Operation: There will be no extensive cutting and filling in the construction work that will cause impacts on topography and geology nature of the project area.
	13.	Impact on Vegetation	B-	B-	B-	Pre-Construction and Construction: -Some clearance of vegetation cover will occur during both phases although impacts will be small since the project will pass in road reserves. Operation: - Low maintenance of the RoW will involve clearing of vegetation using mechanical methods. This will lead to permanent control of vegetation within RoW.

Category	No.	Item	Degree of Potential Impacts in project phases			Potential Impacts
			Pre-Construction	Construction	Operation	
Social Environment	14.	Resettlement	A-	A-	D	Pre-Construction and Construction -There are number of Project Affected Families (PAFs) in which will be determined RAP study. Operation: -There are no activities anticipated in this project that might cause resettlement
	15.	Poor	A-	A-	D	Pre-Construction and Construction: -The poor who are affected by this project need to be included in the Resettlement Action Plan and HIV/AIDs Prevention Plan. Operation: -There are no activities anticipated in this project that might cause resettlement
	16.	Local economy such as Employment and improvement of livelihood	B+	B+	B+	Pre-Construction: -There would be little opportunities for employment and economic activities in this stage. Construction: -There will be employment opportunities and demand for construction materials during construction. Operation: -Business opportunities will be created with the newly delivered of stable electricity.
	17.	Cultural Heritage	C-	C-	D	Pre-Construction and Construction: There are no heritage sites along the proposed project area that are already confirmed by the relevant authorities. However, local archeological, historical, cultural, and religious heritage sites might be found during construction. Operation: -There will be no activities having impacts on local archeological, historical, cultural, and religious heritage sites.
	18.	Gender	B-		D	Pre-Construction/Construction -Gender issues that might be caused in Resettlement and HIV/AIDS prevention activities will be addressed in the

Category	No.	Item	Degree of Potential Impacts in project phases			Potential Impacts
			Pre-Construction	Construction	Operation	
				B-		Resettlement Action Plan and HIV/AIDs prevention plan. Operation: There will be no activities having impacts on Gender issues.
	19.	Infectious Disease such as HIV/AIDS	B-	B-	D	Pre-Construction/Construction - HIV and STDs might be brought due to immigration of workers associated with the project. Operation: There will be no activities having impacts on infectious diseases
	20.	Accident and Safety Issues	B-	B-	B-	Pre-Construction/Construction -Without proper measures for construction, accidents on the public roads might happen. Operation: -The power lines might be cut by accident or natural disaster.
	21.	Water use	B-	B-	D	Construction -Water for construction work will be necessary and taken from nearest water sources, boreholes or rivers. Pre-Construction/Operation: -Water will not be necessary for the operation

Note:

- **A+/-:** significant positive/negative impact is expected
- **A+/-:** Positive/negative impact is expected to some extent.
- **C+/-:** Extent of positive/negative impact is unknown. (A further examination is needed, and impact could be clarified as the study progresses).
- **D:** No impact is expected

CHAPTER SIX

6.0 PROJECT ALTERNATIVES

Project alternative refers to the considerations made in the course of developing the project that would achieve the same project objectives. Consideration of project alternatives is crucial in ensuring that the developer and decision–makers have a wider base from which they can choose the most appropriate option and more proactive sides of environmental assessment. This process serves to enhance the project design through an examination of the potential options instead of only focusing on the more defensive task of reducing adverse impacts of a single design. This calls for the comparison of feasible alternatives for the proposed project site, technology, and/or operational alternatives. In this scoping report, the following alternatives are considered and will be examined in detail during the EIA process

6.1 No project alternative:

The no project alternative entails retaining the current status quo without developing the project and therefore foregoing such investment. Based on the analysis of current situations of electricity, power demand and network reasonability in the City, that is to say Dar es Salaam City will not solve the problem of low power supply capacity of the existing power infrastructures.

Also it will not improve power availability in Dar es Salaam City and failed to help the development of socio-economic activities, industries and big investment in Dar es Salaam region. Quality of life of residents who restricted on energy use will not improve. All will still spending lot money for fuel, maintenance and spares which could have been spend on other social benefits.

In fact this decision will not disturb the existing environment and will not take any land of the PAPs. However, it will deny the economic gains through employment, government revenues indirectly from development of socio-economic activities, industries and big investment around project regions and social development in the region. TANESCO will not gain the benefits accrued from solve the problem of low power supply capacity in Dar es Salaam City.

In other words the “Zero Option” is not in line with the Government policies of improving the investment development in order to achieve the requirements of National Strategy for Growth and Reduction of Poverty (NSGRP/MKUKUTA) as envisaged in the Tanzania’s Development Vision (Vision 2025) which stresses on development and commitment to regional and other international initiatives for social and economic development.

6.2 Transmission and distribution lines Alternatives

The transmission and distribution lines can be constructed overhead lines and underground cables. However, the choice of the transmission and distribution lines depends on many factors including the costs and time factors. The major advantage of overhead lines is that cheap, less time consumption and does not require more knowledge especially during construction compared to other forms of power lines. The proposed project has only underground cables alternatives.

6.2.1 Underground cables

Underground cables are more expensive, time consumption and require more knowledge especially during laying down of the cables compared to overhead power lines. This option is ruled out due to investment costs and other viewpoint as explain above.

6.3 Alternative Transmission Line Routes Selection

Currently there is only one route selection which based on construction costs and reduced anticipated environmental and social-economical impacts. The current design proposes the distribution line routes be located along existing roads reserves, that is TANROADS' and Municipal Councils' so as to minimize the environmental and social impacts i.e. resettlement of people along the proposed routes. Detail evaluation of TL will be undertaking during ESIA study.

6.4 Alternative Locations for Substations

Currently there are no preliminary alternative locations for substations since upgrading of Ilala and Msasani substation will take place inside the existing Substations owned by TANESCO and others new substations will be constructed within located areas as per proposed designed.

These existing locations of substations have been proposed in order to reduce social-economical impacts since and environmental impacts will be low.

CHAPTER SEVEN

7.0 CONCLUSION

This Scoping report has been developed in a careful, open consensus process that involves extensive review at several levels and opportunity for comment from both interested and affected parties. The analysis of the project has evidenced that the proposed project of rehabilitation of substations and construction of new lines and substations in Dar es Salaam will improve power availability in Dar es salaam and help the development of socio-economic activities, industry and improvement of livelihood in Dar es salaam.

The project will accelerate economic growth in project area and the country at large due to socio-economic benefits that are credited with this electricity project. Although there are potential impacts that shall be associated with the development of this project, the EIA study will assess these impacts in detail according to the developed and approved Terms of Reference (ToR) and address all the environmental and social issues found during field visit and raised by interested and affected parties. However, there will be negative impacts as well that nevertheless proposed mitigation measures to improve or eliminate the potential effects can be mitigated accordingly during planning of the project and during the implementation phases of the project. The final EIA study should analyse the potential impacts and present the detailed mitigation measures. The final report will have a chapter on the environmental and social management and monitoring plans.

The impacts will include employment to local community members, increase in Government revenue and improvement of standards of living. However, despite the outlined positive impacts, the proposed project will have some negative impacts such as soil erosion and landslides, pollution to (Air, Water, soil) mostly during construction phase, and increased waste (solid and liquid) generation among others. The extent and significance of these impacts will be assessed during ESIA study and their mitigation measures will be addressed in the Environmental Management Plan (EMP) of the project.

CHAPTER EIGHT

8.0 DRAFT TERMS OF REFERENCE FOR UNDERTAKING THE ESIA STUDY

Environmental and Social Impact Assessment Study for the rehabilitation of substations and construction of new lines and substations in Dar es Salaam

1.0 Introduction

TANESCO is a Parastatal Company that is wholly owned by the government of Tanzania. The company's core business is generation, transmission, distribution and sale of electricity to the Tanzania mainland and bulk power to Zanzibar.

The Government of Tanzania through Tanzania Electric Supply Company (TANESCO) is planning to undertake rehabilitation of substations and construction of new lines and substations in Dar es Salaam City. Under the Japanese International Corporation Agency (JICA) funding, TANESCO has completed carrying out a conceptual detailed design study of the proposed transmission and distribution line routes and substations.

The overall objective of the project is to provide increased access to electricity with sustainable effects on poverty reduction by facilitating income generation and improved social services. The technical objective of the project is to stabilize the grid system, increase power supply, improve reliability of the power supplied in Dar es salaam city, as well as to increase the extent of TANESCO's distribution network in the city in order to be able to provide electricity to commercial business activities, water pumping, secondary schools, medical services, streetlights, residential houses, agro-processing activities etc. in the project area.

The proposed project has five (5) components which are:

- Reinforcement of Ilala substation and existing 132 kV transmission line from Ilala substation to Ubungo substation (7.5 km)
- Construction of new Jangwani Beach substation (33/11kV) and construction of distribution line (33kV) from Jangwani beach substation to Tegeta substation (6.5km)
- Construction of Muhimbili substation (33/11kV) and construction of distribution line (33kV) from Muhimbili to City Center substation (2km)
- Construction of Mwananyamala substation (33/11kV) and construction of distribution line (33kV) from Mwananyamala substation to Makumbusho substation (1.1km)
- Expansion of Msasani substation (33/11kV) and expansion of distribution line (33kV) from Msasani substation to Makumbusho substation (7.6km)

2.0 Project Area

The transmission line will be constructed from Ilala substation to Ubungo substation along the existing 132kV line II in Dar es salaam City crossing the two municipalities of Kinondoni and Ilala. Three new substations with respective distribution lines will be constructed in Kinondoni Municipal Council while the remaining two substations with their respective lines are located in Ilala Municipal Council.

The current design proposes the distribution line routes be located along existing roads reserves, that is TANROADS' and Municipal Councils' so as to minimize the environmental

and social impacts i.e. resettlement of people along the proposed routes. The project areas are accessible by road.

3.0 Objective

The purpose of this Terms of Reference (ToR) is to provide guidance to the consultant or study team to carry out a comprehensive Environmental and Social Impact Assessment (ESIA) for the proposed project according to the financier guidelines (JICA), national laws and regulations (Environmental Management Act CAP 191 of 2004 and Environmental Impact Assessment and Audit Regulation of 2005).

The ESIA is intended to identify potential impacts of the project (physical, biological and social economic), justify optimal choices that would minimize or avoid potential negative impacts and design appropriate environmental and social management plan (ESMP) to address and mitigate impacts that cannot be avoided.

ESIA will also identify opportunities for environmental enhancement and sustainable development that could be implemented. The ESMP will describe in detail the mitigation measures to be implemented, including the estimated cost, schedule and organization needed to implement it. The monitoring process schedule and any social and environmental management capacity building and institutional strengthening that may be required for responsible institutions involved in the project.

The specific objectives of ESIA study are:-

- Review and documents the baseline data and information on both the natural environment i.e. physical, biological and man – made environment including social economic conditions of the proposed project areas;
- To identify, predict and evaluate potential positive and negative impacts of proposed transmission line power project including substations;
- To develop mitigation measures that aim at eliminating or minimizing the potential negative impact and promote the positive ones and recommended appropriate mitigating measures to be incorporate in the engineering designs;

4.0 Approach

In order to achieve the objectives outlined above and taking the matter as an urgent with NEMC decision, the ESIA study are envisaged to be pursued in the following three main stages:

Stage I: Project registration and submission of project brief to National Environment Management Council. The client in collaboration with consultant shall fill the registration forms; prepare project briefs of the project for carrying out ESIA study to be submitted to NEMC for approval.

Stage II: Carrying out Scoping Study and preparation of ToR: The Consultant shall carry out an environmental scoping exercise and should comply with existing environmental standards in the country i.e. Environmental Management Acts CAP 191 of 2004 and Environmental Assessment and Audit Regulation of 2005.

Stage III: Carrying out full ESIA study after NEMC approve scoping report and ToR for all project components, including infrastructural works, power line and substation.

5.0 Requirements

The ESIA and ESMP must comply with local standards in Tanzania i.e. Environmental Management Act Cap 191 of 2004 and its Environmental Impact Assessment and Audit regulation of 2005 and should meet financier's guideline, current internationally accepted standards of information gathering, reporting and analysis.

Environmental and Social Impact Assessment (ESIA) will be carried out in the proposed project area of probable project influence as already defined and delineated, covering both the construction and operation phases of the project and by using both qualitative and quantitative methods.

6.0. Environmental and Social Impact Assessment

For the Environmental and Social Impact Assessment the consultant(s) will:

- Describe the proposed project by providing a synthetic description of the project relevant components and presenting plans, maps, figures and tables.
- Identify and describe the policy, legal and administrative (institutional) framework relevant to the project.
- Define and justify the project study area for the assessment of environmental and social impacts.
- Describe and analyse the physical, biological and human (social) environment conditions in the study area before project implementation. This analysis shall include the interrelations between environmental and social components and the importance that the society and local populations attach to these components, in order to identify the environmental and social components of high value or presenting a particular interest.
- Describe and analyse potential environmental impacts i.e. negative and positive and propose / recommend mitigation measures to minimize or avoid the impacts.
- Present and analyse alternatives to the proposed project, including the "without project" option, by identifying and comparing the alternatives on the basis of technology, location, design, economic, construction technique, maintainability, environmental and social criteria, capital, and operating cost, institutional and monitoring requirement.
- Conduct resource evaluation or cost benefit analysis of the project

7.0 Environmental and Social Management Plan (ESMP)

Define appropriate mitigation/enhancement measures to prevent, minimise, mitigate, or compensate for adverse impacts or to enhance the project environmental and social benefits, including responsibilities and associated costs. The ESMP should include (but not limited to) the following:

- Recommendation of feasible and cost-effective measures to prevent or reduce significant negative impacts to acceptable levels
- Estimate of the magnitude of impacts and costs of mitigation measures.

- Consideration for compensation to affected parties for impacts that cannot be mitigated
- Set of *best practices* measures to be followed in order to avoid some of the impacts during construction and operation phases of the project
- Identification of institutional needs to implement environmental and social assessment recommendations including a review of the authority and capability of relevant institutions. Recommend steps to strengthen or expand these institutions to ensure that effective environmental management and monitoring will occur.
- Description of detailed arrangements required for monitoring implementation of mitigating measures and the impacts of the project during construction and operation.
- Proposed work programs, budget estimates, schedules, responsibilities for implementation, and other necessary support services to implement the ESMP.

As appropriate, prepare an environmental hazard plan including an analysis of the risk of accident, the identification of appropriate security measures and the development of a preliminary contingency plan.

8.0 Public Participation

Carry out consultations with primary and secondary stakeholders in order to obtain their views on and preoccupations about the project. These consultations shall occur during the preparation of the ESIA report to identify key environmental and social issues and impacts, and after completion of the draft ESIA Report to obtain comments from stakeholders on the proposed mitigation/enhancement measures.

The consultant will prepare a thorough consultation program and a record (with evidence of picture, adverts and signatures) of meetings, communications and comments to be part of ESIA study and presented to the environmental authority (NEMC).

9.0 Reporting

The ESIA Report shall be presented in a clear and concise manner and focus on relevant and significant environmental and social issues that assist in understanding the project and its impacts. The scope and level of details of the Report shall be proportional to the project's potential impacts.

The ESIA Report shall describe the scientific approach adopted to carry out the studies. In particular, the models, methods and criteria used in the studies shall be presented and explained. The Report shall also include maps and drawings at the appropriate scale and refer to all consulted documents.

ESIA Report shall contain items and arrangement according to the Environmental Impact Assessment and Audit Regulations, 2005. In addition, all relevant consults should have signatures against their names.

I. **Draft final report** 1 soft and 15 hard copies to be submitted to NEMC for review, comments and further actions regarding this draft report. The consultant shall produce Report in English with non technical executive summary in English and Kiswahili languages.

II. **Final report** 1 soft and 5 hard copies amended in response to opinions / comments given by TAC meeting will be submitted to NEMC as final ESIA report. The consultant shall produce report in English with separate bound non technical executive summary in both English and Kiswahili languages.

10.0 ESIA Study Team

The study team will involve consultant and experts with demonstrable practical experience in conducting EIA studies for linear projects.

The study team shall in briefly comprise of at least the following key personnel with the specializations listed below:

- Team Leader – Environmental Expert – Registered with NEMC as EIA expert
- Sociologist – Economic expert
- Ecologist
- Land use and land management expert
- Mapping / GIS expert
- Surveyors
- Other experts including but not limited to: Waste management expert, Transmission and Distribution line expert, RAP expert etc.

11.0 Time Frame

It is anticipated that the duration of the study commencing from the date of approval of these terms of references by NEMC to the date of submission of final ESIA report for the proposed project will be two (2) month calendar.

REFERENCES

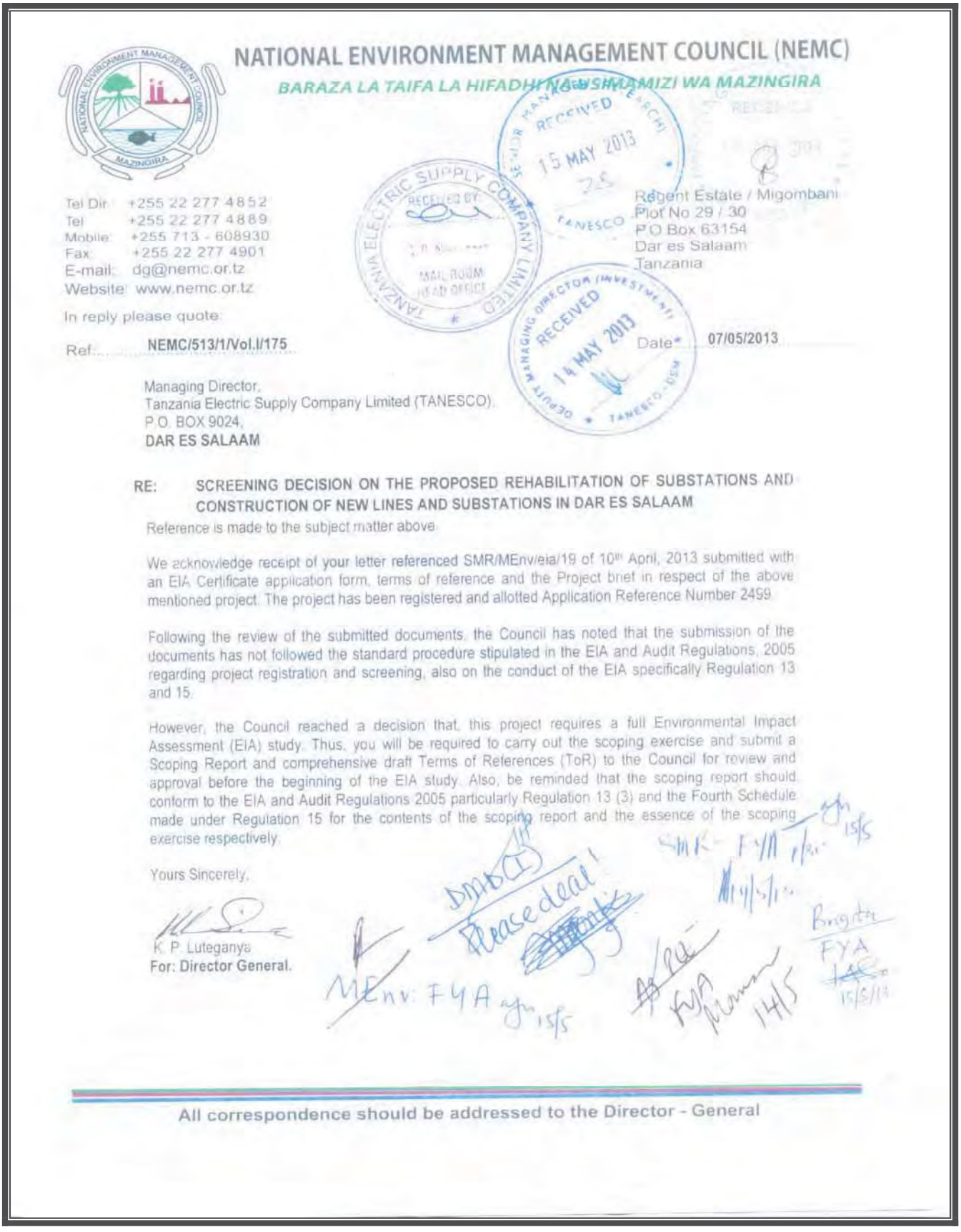
- JICA PREPARATORY SURVEY TEAM-Yachiyo Engineering Co. Ltd and West Japan Engineering Consultants, Inc. (April, 2013). *Field Report Preparatory Survey On The Project For Rehabilitation Of Substations And Construction Of New Lines And Substations In Dar Es Salaam In The United Republic Of Tanzania-Part 1*

- JICA (April, 2004). *Japan International Cooperation Agency Guidelines for Environmental and Social considerations*

- United Republic of Tanzania (URT) (2004). *Environmental Management Act (EMA)*. Government Printers, Dar es Salaam.

- United Republic of Tanzania (URT) (2005). *Environmental Impact Assessment and Audit Regulations G.N. No 339*. Government Printers, Dar es Salaam.

Appendix I: Screening Decision from NEMC for undertaking Scoping Exercise



NATIONAL ENVIRONMENT MANAGEMENT COUNCIL (NEMC)

BARAZA LA TAIFA LA HIFADHI NA USHAMIZI WA MAZINGIRA

RECEIVED 15 MAY 2013 TANESCO

TANZANIA ELECTRIC SUPPLY COMPANY LIMITED RECEIVED BY MAIL ROOM HEAD OFFICE

DEPUTY MANAGING DIRECTOR (INVESTMENT) RECEIVED 14 MAY 2013 TANESCO - DSM

Tel Dir +255 22 277 4852
Tel +255 22 277 4889
Mobile +255 713 - 608930
Fax +255 22 277 4901
E-mail: dg@nemc.or.tz
Website: www.nemc.or.tz

Regent Estate / Migombani
Plot No 29 / 30
P O Box 63154
Dar es Salaam
Tanzania

In reply please quote:

Ref: NEMC/513/1/Vol.I/175 Date: 07/05/2013

Managing Director,
Tanzania Electric Supply Company Limited (TANESCO),
P.O. BOX 9024,
DAR ES SALAAM

RE: SCREENING DECISION ON THE PROPOSED REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW LINES AND SUBSTATIONS IN DAR ES SALAAM

Reference is made to the subject matter above.

We acknowledge receipt of your letter referenced SMR/MEnv/eia/19 of 10th April, 2013 submitted with an EIA Certificate application form, terms of reference and the Project brief in respect of the above mentioned project. The project has been registered and allotted Application Reference Number 2499.

Following the review of the submitted documents, the Council has noted that the submission of the documents has not followed the standard procedure stipulated in the EIA and Audit Regulations, 2005 regarding project registration and screening, also on the conduct of the EIA specifically Regulation 13 and 15.

However, the Council reached a decision that, this project requires a full Environmental Impact Assessment (EIA) study. Thus, you will be required to carry out the scoping exercise and submit a Scoping Report and comprehensive draft Terms of References (ToR) to the Council for review and approval before the beginning of the EIA study. Also, be reminded that the scoping report should conform to the EIA and Audit Regulations 2005 particularly Regulation 13 (3) and the Fourth Schedule made under Regulation 15 for the contents of the scoping report and the essence of the scoping exercise respectively.

Yours Sincerely,

K. P. Luteganya
For: Director General.

All correspondence should be addressed to the Director - General

Appendix II: Photo Documentation during Scoping Exercise

Figure 1: Community members raising their concerns during Scoping study at Kigogo ward

Figure 2: Focus group Discussion with people living near the proposed 33kV Distribution line from City centre S/S to Muhimbili S/S at Upanga-West ward.

Figure 3: Environmental Expert explaining about the project to the people around proposed project

Figure 4: Vegetation coverage found at proposed site of Muhimbili S/S

Appendix III: Attendance Register for the Consulted People during Scoping Exercise

資料－１３　スコーピング・レポートに関してのNEMCからの通知文書

13．スコーピング・レポートに関してのNEMCからの通知文書

NATIONAL ENVIRONMENT MANAGEMENT COUNCIL (NEMC)

BARAZA LA TAIFA LA HIFADHI NA USIMAMIZI WA MAZINGIRA

Regent Estate Plot No. 29/30,
P.O.Box 63154,
DAR ES SALAAM
TANZANIA

Tel: Dir: +255 22 277 4852
Tel: +255 22 277 4889
Mob: +255 713 - 608930
Fax: +255 22 277 4901
E-mail:nemc@nemctan.org

In reply please quote:
NEMC/656/1/Vol.I/9
Ref:.....

Date: **21/11/2013**

Managing Director,
Tanzania Electric Supply Company Limited (TANESCO),
P.O. BOX 9024,
DAR ES SALAAM

RE: APPROVAL OF TERMS OF REFERENCE FOR UNDERTAKING AN EIA STUDY ON THE PROPOSED REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW LINES AND SUBSTATIONS IN DAR ES SALAAM

Reference is made to the subject matter above.

We acknowledge receipt of your letter referenced SMR/MEnv/EIA/19 of 21st October, 2013 submitted with Scoping report and Terms of Reference for undertaking an EIA study for the aforementioned project.

The scoping report and Terms of Reference were reviewed and found to be generally adequate and therefore can be used to guide the Environmental Impact Assessment (EIA) study for the named project. In this regard, you will be required to submit to NEMC 15 copies of the EIS accompanied by a Non Technical Executive Summary in Kiswahili and English versions as required by Regulation 19(2) of EIA and Audit Regulations, 2005. Also, you will be required to ensure that:

- All applicable legal and policy frameworks and their respective requirements are addressed in the EIA report;
- All identified key stakeholders including TANROADS, Municipal and local Authorities are exhaustively consulted and their views and concerns addressed
- The land requirements, components and operations of the substations along with anticipated impacts and mitigation measures are explained in the EIS.

Upon submission of the EIS, you will be required to pay to the Council charges for the review of the EIS and approval processes amounting to Tshs. **5,244,000/=.** The funds can be paid by cheque/cash or deposited in the NEMC Account with the following details:

Bank/Branch: NMB/Bank House.
A/C Name: National Environment Management Council
A/C No: 2011100084
Swift Code: NMIBTZTZ

SENIOR MANAGER (RESEARCH) RECEIVED 27 NOV 2013 TANESCO - DSM

DIRECTOR (INVESTMENT) RECEIVED 25 NOV 2013 TANESCO - DSM

TANZANIA ELECTRIC SUPPLY COMPANY LIMITED RECEIVED BY: 27 NOV 2013 MAIL ROOM HEAD OFFICE

All correspondence should be addressed to the Director - General

13．スコーピング・レポートに関してのNEMCからの通知文書

Attached herewith, please find the budget breakdown for your reference.

Should there be any clarification required on this matter, please contact us through mobile numbers 0754611333 or 0784302464.

Yours Sincerely,

Eng. K. P. Luteganya
For: Director General.

BUDGET FOR THE REVIEW OF THE EIA REPORT ON THE PROPOSED REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW LINES AND SUBSTATIONS IN DAR ES SALAAM

S/N	ITEM/ACTIVITY	COSTS (Tshs)
1	Site Visit to the Project Area (Allowances for 4 officers for 4 days)	**1,280,000**
2	Transport to the project site	**Transport to be arranged by TANESCO**
3	Review meetings charges	3,180,000
4	Administrative charges	**784,000**
	Total	**5,244,000**

資料－１４　**EIA** レポート（案）

（**TANESCO→NEMC**）

ENVIRONMENTAL IMAPACT ASSESSMENT REPORT

FOR

REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW LINES AND SUBSTATIONS IN DAR ES SALAAM

Submitted to:

The National Environment Management Council
Regent Estate, Plot No. 29/30
P.O. Box 63154, Dar es Salaam, Tanzania
Tel: +255 (022)2134603 Fax: +255 (022)2111579
E-mail: nemc@nemctan.org
nemctz@yahoo.org

Project Proponent:

TANZANIA ELECTRIC SUPPLY COMPANY LIMITED
P. O. Box 9024
Dar es Salaam, Tanzania
Phone: +255 22 2451131-9
Fax: +255 22 2451206

Consultants:

Eng. Hamdun Mansur
P.O. Box 9024, Dar es Salaam
Tel: +255 22 245 1210
Email: Hamdun.Mansur@tanesco.co.tz

23rd December, 2013

`

DECLARATION OF EXPERTS

We hereby certify that the particulars given to this ESIA report are correct and true to the best of our knowledge and we shall provide any additional information that shall come to our notice in the course of the processing of this ESIA report.

S/N	NAME	Expertise
1	Eng. Hamdun Mansur	Team Leader (Registered EIA Expert)
2	Mr. Fikirini M. Mtandika	Environmental Engineer (Registered EIA Expert)
3	Ms. Brigita Sylvester	Environmental Specialist (Registered EIA Expert)
4	Mr. Nyamboge Chacha	Ecological Expert (Registered EIA Expert)

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EXECUTIVE SUMMARY

PROJECT TITLE:
THE PROPOSE PROJECT FOR REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW LINES AND SUBSTATIONS IN DAR ES SALAAM

DEVELOPER:
TANESCO
Ubungo Head Office
P.O.Box 9024,
Dar es Salaam

EIA Consultant:
Eng. Hamdun Mansur
TANESCO Environment Section
P.O. Box 9024,
Dar es Salaam

Outline and Justification of Project

Project Description
The Government of Tanzania through Tanzania Electric Supply Company (TANESCO) is planning to undertake rehabilitation of substations and construction of new lines and substations in Dar es Salaam City. Under the Japanese International Corporation Agency (JICA) funding, TANESCO has completed carrying out a detailed design study of the proposed transmission and distribution line routes and substations, and preparation of the abbreviated resettlement action plan is in progress.

The overall objective of the project is to provide increased access to electricity with sustainable effects on poverty reduction by facilitating income generation and improved social services. The technical objective of the project is to stabilize the grid system, increase power supply, improve reliability of the power supply in Dar es Salaam city, as well as to increase the extent of TANESCO's distribution network in the city in order to be able to provide electricity to commercial business activities, water pumping, secondary schools, medical services, streetlights, residential houses, agro-processing activities etc. in the project area.

The proposed project has five (5) components which are:

- ✓ Reinforcement of Ilala substation and existing 132 kV transmission line from Ilala substation to Ubungo substation (7.5 km)
- ✓ Construction of new Jangwani Beach substation (33/11kV) and construction of distribution line (33kV) from Jangwani beach substation to Tegeta substation (6.5km)
- ✓ Construction of Muhimbili substation (33/11kV) and construction of distribution line (33kV) from Muhimbili to City Center substation (2km)
- ✓ Construction of Mwananyamala substation (33/11kV) and construction of distribution line (33kV) from Mwananyamala substation to Makumbusho substation (1.1km)
- ✓ Expansion of Msasani substation (33/11kV) and expansion of distribution line (33kV) from Msasani substation to Makumbusho substation (7.6km)

The Environmental Management Act, 2004 (Act No. 20 of 2004) requires that EIA be undertaken for all new projects that may cause adverse environmental and social impacts. Under the Environment Impact Assessment and Audit Regulations, 2005 (third Schedule, list 9 (i)), construction projects are categorized as EIA mandatory projects for which a full EIA is required. Thus upon registration of the

project at National Environmental Management Council (NEMC), TANESCO was directed to carry out an EIA study starting with the scoping exercise (in NEMC Letter No. NEMC/513/1/Vol I/175 dated 07th May, 2013).

Description of the Environment

The proposed project area is in the Dar es salaam City. The area has flat terrain which is much influenced by coastal climatic condition and normally experiences a modified type of equatorial climate. It is generally hot and humid throughout the year with an average temperature of 29ºC. The hottest season is from October to March during which temperatures can raise up to 35ºC.

The area becomes relatively cool between May and August, with temperature around 25ºC. There are two main rain seasons; a short rain season from October to December and a long rain season between March and May. The average rainfall is 1000mm (lowest 800mm and highest 1300mm). Humidity is around 96% in the mornings and 67% in the afternoons. The climate is also influenced by the southwesterly monsoon winds from April to October and northwesterly monsoon winds between November and March.

The City is divided into three ecological zones, namely the upland zone comprising of the hilly areas to the west and north of the City, the middle plateau, and the low lands including Msimbazi valley, Jangwani, Mtoni, Africana and Ununio areas. The main natural vegetation includes coastal shrubs, Miombo woodland, coastal swamps and mangrove trees.

Dar es salaam City is vulnerable to floods, sea level rise and coastal erosion, water scarcity and outbreak of diseases. Vulnerability to climate change effects is largely contributed by:

- ✓ Poor planning: About 70 % of settlements are not planned.
- ✓ Poverty: Encroachment of hazardous lands is caused by lack of cash to access land in planned areas.
- ✓ Lack of infrastructure: The existing infrastructure such as storm water drainage system is not proportional to the population size.
- ✓ Corruption: Development in areas which have been identified as hazardous lands such as storm water channels.
- ✓ Location: Closer to Indian Ocean.

The city falls on the coastal forests belt an area under the Eastern Arc and Coastal forests biodiversity hotspot. The city itself is rich in biodiversity in its own right. Most of the vegetation and fauna have been lost or displaced due to intensive urban development of residential areas, infrastructures and gardens. Nevertheless the city still maintains a good number of species in all taxa. The dominant groups of fauna in the project area were birds and insects.

Stakeholder Consultations

Stakeholders including all individuals, groups, all organization that might be affected or might affect positively or negatively the project in one way or other found at both national and local levels, ranging from the government authorities to local community members including, national environmental protection agency have been contacted. Stakeholders groups of relevance to this project are listed below. Details about the stakeholders (name of institution, person contacted etc. is found in Appendix VI. The main stakeholders were identified to be:

a. Central Government: Ministries, Departments and Agencies. These include Vice President's Office (Division of Environment, NEMC), Ministry of Lands, Ministry of Housing and Human Settlements Development,

b. Project Proponent: Tanzania electric supply company (TANESCO)

c. Tanzania roads agency (TANROADS)

d. Local Government Authorities: Kinondoni and Ilala Municipal Council: Municipal Executive Director, and Management Team (Municipal Town Planner and Municipal Environmental Officer)

e. Local stakeholders included

- ✓ Mchikichini, Upanga East and Upanga West in Ilala Municipal Council, Makurumla, Kawe, Mzimuni, Kunduchi, Wazo, Msasani, Mabibo, Ubungo, Mikocheni and Makumbusho ward in Kinondoni Municipal Council Ward Executive Officers (Ward Development Committee consisting of Ward Councillors, Ward Executive Officers, Ward Extensionists, Ward Environment Committees) and people around the ward areas

f. Utilities providers: DAWASA/ DAWASCO, TTCL,

Consultations were conducted by organizing ward consultative meetings, during which the participants were also asked to fill- in the questionnaires related to the project social issues. Observations, Questionnaires and interviews were conducted in order to collect useful data.

Consultations were also conducted through focus group discussion and public meetings at ward level for 13 project wards where the project area residents attended these meetings. The meetings were attended by different categories of representatives focusing on their occupations, gender readiness to attend and contribute later-on among their *mitaa* communities by creating awareness about the project. These meetings were planned and executed with purpose of disseminating information about the project as such issues like the objective of the project, how it will executed or implemented. These meetings were always formalized by being presided either a ward councilor, or *Mtaa* chairperson nominated by the councilor. The Ward Executive Officer (WEO) of the respective ward was always the secretary for recording the proceedings.

From consultations it was observed that all consulted peoples showed interest on the project in view that in the long run, the project will improve the reliability of electric supply and stability of power supply to the city. Also removing of the steel poles with steel poles will reduce danger and unnecessary power cut off due to falling of the poles and disconnections caused by the current system. Other concerns were as addressed on chapter five regarding stakeholders consultation.

Conclusion the acceptance level of the project was assessed and all of them accepted the project. In almost all consultations, they all approved or agreed with the development since they mentioned that advantages are many including increase power supply quality, security and reliability, upgrading of their properties, employment, housing etc.

Major Significant Impacts
The conclusion of the Environmental Impact Assessment is that, most of the negative impacts identified can be mitigated using engineering solutions during the design and construction phases. However, there is a good number of stakeholders who expressed strong reservations.

Alternatives Considered
Alternative consideration was only limited to site selection and “no project” option. As for other aspects such as technology, design of depot, types of materials used are almost standard. The current

route choice as it is within the road reserve (Municipal and TANROADS) was the safest option with environmentally friendly.

Mitigation of Impacts
The following measures are recommended to be taken by the developer, to minimize negative impacts (both real and perceived impacts):-

Site Selection Phase
Damage to wetland habitat and contained biodiversity and other facilities

The project should be limited to the demarcated area; i.e excavations only along the road reserves and substation built at the TANESCO and privately owned plots.

Conflict of interest among the stakeholders
In order to mitigate the perceived negative impacts and potential conflict among stakeholders TANESCO shall, with immediate effect, embark on awareness raising and information dissemination on the project. Special emphasis shall be given to the issues raised by the stakeholders.

Cost of compensation and relocation disturbances
Authenticity of ownership of facilities along the route shall be established if any and compensation shall be made according to the land and compensation acts.

Design Phase
Depletion of construction materials at points of source
- ✓ The project shall procure construction materials from licensed suppliers.

Mobilization /Construction Phase

Contamination and /impaired quality of receiving body – land and water
Disposal of overburden
- ✓ Excavated soil to be used as back filling material for the trenches while the excess to be disposed off.

Disposal of domestic and office solid waste
- ✓ Dispose solid through Kinondoni and Ilala Municipal Council disposal system.

Disposal of metal parts
- ✓ Metal parts will be sold to metal recyclers.

Disposal of broken glass
- ✓ Glass and broken bottles will be sold to recycling companies e.g. Kioo ltd.

Disposal of car batteries
- ✓ Batteries will be collected and sent to recycling companies e.g. YUASA batteries.

Disposal of plastic bottles
- ✓ Plastic bottles will be collected and transported to plastic recycling plant or recycling dealers.

Deteriorated / Impairment of local air quality
- ✓ TANESCO to make sure the contractor use High quality Engine specification (Euro III) which has low emissions.

- ✓ TANESCO to make sure the contractor uses vehicles that are serviced after every 5000km and gaseous emission free.

Occupation health and safety

- ✓ provide health and safety training to all workers
- ✓ put in place emergency plan
- ✓ provide first aid services
- ✓ provide proper personal protective gear
- ✓ ensure suitable working conditions

Public health hazards/safety

- ✓ Awareness campaigns on HIV/AIDS
- ✓ Sensitization of workers to undergo voluntary testing

Compromised Security

- ✓ the project site shall be fenced and controlled access shall be instituted
- ✓ Make use of hired security guards
- ✓ Security tapes and lights shall be put in place

Contamination / Impairment of quality of receiving bodies

- ✓ All petroleum products, used oil and other chemical shall have secondary containment
- ✓ Areas enclosed by secondary containment shall be maintained
- ✓ All accumulated water within secondary containment areas shall be disposed of through oil traps
- ✓ Collected oils shall be disposed of in boilers and/or furnaces

Decommissioning phase

Contamination/impaired quality of receiving body due to management of decommissioning wastes and social impacts

- ✓ The site shall be demolished and returned to its original state
- ✓ The demolished debris shall be disposed off safely
- ✓ Awareness and SACCOS creation so that people can cope when project come to an end
- ✓ All employee should be members of social security funds

Environmental and Social Management Plan

The EIS presents an outline Environmental and Social Management Plan (ESMP). Much of the day to day responsibility during construction will be the role of TANESCO Environmental unit to supervise the contractor.

Monitoring and Auditing

The EIS presents an outline Environmental and Social Monitoring Plan (EMP). This will assist TANESCO and stakeholders to monitor (1) Implementation of the proposed mitigation measures and (2) the efficacy of the proposed mitigation measure.

Cost Benefit Analysis

The EIS presents an assessment of the project, in terms of negative impacts, compared to the socio-economic benefits that will not happen if the project is not implemented. Environmental cost benefit analysis is assessed in terms of the negative versus positive impacts. The potential benefits of the project, in terms of financial and social benefit are substantial. Similarly, the environmental impacts can be reasonably mitigated and the financial resources needed to mitigate negative impacts, when

compared to the required investment, are relatively small. The EIS has demonstrated that the benefits outweigh the costs.

Conclusion

This report presents the results of the environmental impact assessment study for the proposed power network rehabilitation, rehabilitation of substations and construction of new lines and substations in Dar es Salaam. The results of the study have shown that the project activities from construction up to operation stages will not have significant negative impact to the environment. Most of the impacts are minor but should not be ignored. Few impacts that are relatively can be mitigated as described on ESMP and EMP. Therefore, the project is considered to be environmentally viable provided that the recommended mitigation measures adhered and implemented during all phases.

LIST OF ACRONYMS/ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
CBD	Convention on Biological Diversity
CBD	Convention on Biological Diversity
DAWASCO	Dar es Salaam Water Supply& Sewerage Company
DAWASA	Dar es Salaam Water Supply and Sewerage Authority
DC	District Commissioner
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
ESMP	Environmental and Social Management Plan
EMA	Environmental Management Act
EMP	Environmental and Social Monitoring Plan
ESIA	Environmental and Social Impact assessment
FDG	Focus Group Discussion
HIV	Human Immunodeficiency Virus
IUCN	International Union for Conservation of Nature
IPTL	Independent Power Tanzania Limited
JICA	Japan International Cooperation Agency
kV	Kilo Volt
LGA	Local Government Authority
NAWAPO	National Water Policy
NEMC	National Environment Management Council
NGOs	Non-governmental Organizations
O & M	Operation and maintenance
OSHA	Occupational Safety and Health Administration
S/S	Substation
TAC	Technical Advisory Committee
TANESCO	Tanzania Electric Supply Company
TANROADS	Tanzania National Roads Agency
TL	Transmission Line
ToR	Terms of Reference
TPDF	Tanzania People’s Defense Force
TTCL	Tanzania Telecommunication Company Limited
TZS	Tanzanian Standards
WEO	Ward Executive Officer
SCADA	Supervisory, Control and Data Acquisition

ACKNOWLEDGEMENT

EIA team wish to express a sincere gratitude to all individuals and institutions that in one way or another contributed to the successful completion of this work, key Stakeholders who provided their time and shared their knowledge are highly appreciated

Special thanks are due to the management and staff of the Ilala and Kinondoni Municipal Councils, Dar es Salaaam for their valuable inputs and guidance during the study. We wish to mention few institutions and individuals like TANROADS, TTCL, DAWASA, Ward Executive Officers and Mtaa Chairpersons in project areas for providing valuable information and support, which enabled the study team to conduct the ESIA study smoothly.

CHAPTER ONE

1.0 GENERAL BACKGROUND

1.1 INTRODUCTION

The Government of Tanzania through Tanzania Electric Supply Company (TANESCO) is planning to undertake rehabilitation of substations and construction of new lines and substations in Dar es Salaam City. Under the Japanese International Corporation Agency (JICA) funding, TANESCO has completed carrying out a detailed design study of the proposed transmission and distribution line routes and substations, and preparation of the abbreviated resettlement action plan is in progress.

The overall objective of the project is to provide increased access to electricity with sustainable effects on poverty reduction by facilitating income generation and improved social services. The technical objective of the project is to stabilize the grid system, increase power supply, improve reliability of the power supply in Dar es Salaam city, as well as to increase the extent of TANESCO's distribution network in the city in order to be able to provide electricity to commercial business activities, water pumping, secondary schools, medical services, streetlights, residential houses, agro-processing activities etc. in the project area.

The proposed project has five (5) components which are:

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- ✓ Expansion of Msasani substation (33/11kV) and expansion of distribution line (33kV) from Msasani substation to Makumbusho substation (7.6km)

The Environmental Management Act, 2004 (Act No. 20 of 2004) requires that EIA be undertaken for all new projects that may cause adverse environmental and social impacts. Under the Environment Impact Assessment and Audit Regulations, 2005 (third Schedule, list 9 (i)), construction projects are categorized as EIA mandatory projects for which a full EIA is required. Thus upon registration of the project at National Environmental Management Council (NEMC), TANESCO was directed to carry out an EIA study starting with the scoping exercise (in NEMC Letter No. NEMC/513/1/Vol I/175 dated 07th May, 2013).

TANESCO has commissioned **Eng. Hamdun Mansur** under TANESCO-Environmental Section to conduct the Environmental and Social Impacts Assessment assignment. This include the filling of EIA registration form as well as preparation of the project brief for the project, scoping report and ESIA study for final submission to the Council. This report presents the Environmental and Social Impact Assessment covering both phases

1.2 SCOPING STUDY

Scoping study was conducted to make sure that relevant key environmental and social economic issues are identified hence a focused EIA is undertaken. The objectives of the scoping study for the project of improving the reliability of electric supply in the city centre were to ascertain key issues

that are likely to be important during EIA and to identify and involve all stakeholders in the EIA process. This process afforded opportunity to these stakeholders to express their views and concerns to be included in the EIA study and subsequent project designs and project implementation. Specific objectives of scoping were to:

- ✓ Identify EIA study scope and boundaries;
- ✓ Identify required information for the study;
- ✓ Identify project alternatives;
- ✓ Develop effective methods of approaching the EIA study; and
- ✓ Define the Terms of Reference (ToR) for the EIA study.

1.3 OBJECTIVES OF THE ENVIRONMENTAL IMPACTS STUDY

ELECTRIC POWER SUPPLY Project, which involves Excavations of holes for steel poles and building substation falls under the mandatory list of projects that are required by the Environmental Management Act Cap 191Cap 191 to develop EIA. Part IV of the EIA Regulations G.N. No. 349 of 2005 provides the general objectives for carrying EIA. Among others the following are main objectives:

- ✓ To ensure that environmental considerations are clearly addressed and incorporated into the development of the project.
- ✓ To anticipate and avoid, minimise or offset the adverse significant biophysical, social and relevant effects of developmental proposal.
- ✓ To protect the productivity and carrying capacity of natural systems and ecological processes.
- ✓ To promote development that is sustainable and optimizes resources use and management opportunities.
- ✓ To establish impacts that are likely to affect the environment before a decision is made to authorize the project.
- ✓ To enable information exchange, notification and consultations between stakeholders.

Consequently, TANESCO undertook Environmental Assessment so as to decipher the principles of sustainable development and environmental protection into strategies and actions that can be practically applied to the proposed Electric Power Rehabilitation Project.

1.4 METHODOLOGY AND APPROACH OF THE STUDY

This study followed procedures stipulated in the Environment Impact Assessment and Audit Regulations, 2005. The study was done partly as a desktop study involving review of literature and by field study at the project site in thirteen wards in Kinondoni and Ilala Municipals, Dar es Salaam City to gather information and data on various aspects of the project site as well as consultations with key stakeholders. Consultations with key stakeholders identified during scoping, intended to collect their concerns so that they are addressed by the EIA and subsequently by the project designs and project implementation. The study adopted the following approach

1.4.1 Communication with Stakeholders

The study adopted a participatory approach in preparation of the EIA study. This entailed seeking information/experience from stakeholders, i.e. ward leadership, business persons, private sector institutions, other local representatives and other institutions who have been involved in one way or another in implementation of the project and other activities related. Their views are incorporated in the report on chapter of stakeholder consultation.

1.4.1.1 Identification of stakeholders

The stakeholders were identified based on the role and relevance of the implementation of the project especially excavation of holes for steel poles, replacement of 33kV with 132 kV wires. Most of the stakeholders such as house owners, road reserves owners and government authorities that might be impacted by the project were pre-determined while others were identified by different stakeholders.

1.4.1.2 Involvement of Stakeholders

The study team made trips across the construction site/area. Observations, Questionnaires and interviews were conducted in order to collect useful data.

1.4.2 Baseline Data and Information

The study made use of primary and secondary data sources. Primary data were collected based on the interviews and discussions with various groups, the community, local resource users at the area earmarked for laying of underground cable for 132 kV and 33 kV and other stakeholders. Secondary data were obtained from various reports that were found relevant. The study area was visited; interviews were conducted with the stakeholders and made spot verification of the status of environmental issues in the study area.

1.4.3 Field Data / Information Collection

The study applied various participatory approaches to accomplish the study. The ecosystem approach that not only focused on the construction area but on the whole ecosystem and associated factors, which have cumulative effects on communities around was also applied.

1.5 REPORT STRUCTURE

This report is organized in twelve chapters. **Chapter 1** gives a general background to the study; **Chapter 2** deals with the project background and description; **Chapter 3** gives a description of policy, administrative and regulatory framework within which the project will operate; and **Chapter 4** presents the baseline or existing conditions of the project site. **Chapter 5** presents the findings from Stakeholders' consultations.

Chapter 6, presents the assessment of environmental and social impacts and identification of alternatives for the project and project operations. This chapter presents an assessment of aspects of the project that can cause environmental and socio-economic impacts. The chapters also determine the extent of the impacts and evaluate the significance of each in terms of defined criteria. Sources of both negative and positive impacts are presented. This is followed by impact quantification. Mitigation measures are provided for impacts considered to be of medium or high significance.

Chapter 7 gives details of mitigation measures which are summarised in **Chapter 8** as Environment and Social Management Plan (ESMP). **Chapter 9** presents the Environment and Social Monitoring Plan (EMP), **Chapter 10** discusses cost benefit analysis, while **Chapter 11** presents an initial decommissioning plan. **Chapter 12** provides conclusions and recommendations of the project.

1.6 STUDY TEAM

This ESIA report was prepared by a team of EIA experts consisted of:

S/N	Name	Responsibility
1	Eng. Hamdun Mansur	Team Leader (Registered EIA Expert)
2	Mr. Fikirini M. Mtandika	Environmental Engineer (Registered EIA Expert)
3	Ms. Brigita Sylvester	Environmental Officer (Registered EIA Expert)
4	Ms. Vaileth Kimaro	Sociologist
5	Mr. Nyamboge Chacha	Ecological Expert (Registered EIA Expert)
6	Mr. Lugano Wilson	Noise, Air, Dust and Vibration Expert
7	Mr. David Mwakambonja	Land Surveyor

1.7 PROJECT COST

The total cost of the Project in the event where it is implemented based on the Japan's Grant Aid scheme and costs to be borne by the government of Tanzania.

Costs to be borne by the Tanzanian side 2,043,000 US$ (approximately 196.8 million yen) Tanzania itemized details and their amounts are as given below:

- ✓ Securing of land for material storage: **16,000 US$ (1,500,000 JPY)**
- ✓ Payment of bank commission based on banking: **52,000 US$ (5,000,000 JPY)**
  i) Commission of an Authorization to Pay (AlP)
  ii) Payment commission
- ✓ Registration for Japanese supervisors and engineers for construction period: **35,000 US$ (3,400,000 JPY)**
- ✓ Expenses for necessary power outages during construction period: **15,000 US$ (1,400,000 JPY)**
- ✓ RAP Compensation: **270,000 US$ (26,000,000 JPY)**
- ✓ Expenses for relocation of grave sites: **110,000 US$ (11,000,000 JPY)**
- ✓ Expenses for EIA procedures: **30,000 US$ (2,900,000 JPY**)
- ✓ Excess weight charges for domestic transport: **66,000 US$ (6,400,000 JPY)**
- ✓ Expenses for substations: **790,000 US$ (76,100,000 JPY)**

(Leveling the land, removing the un-used equipment, Construction of fences and gates, etc)

- ✓ Expenses for 132kV transmission lines: **55,000 US$ (5,300,000 JPY)**

(Leveling the land for the work space, removing the un-used conductor, insulators and accessories, etc)

- ✓ Expenses for 33kV distribution lines: **604,000 US$ (58,200,000 JPY)**

(Replacement of the existing 11kV D/L interfered with the new 33kV D/L, Construction of 11kVD/L from new 33/11kV substations)

Costs to be borne by the Japanese side (based on the Japan's Grant Aid scheme) will be determined on January, 2014 when Japanese officials will come to Tanzania to negotiate with side of government of Tanzania and TANESCO.

CHAPTER TWO

2. PROJECT BACKGROUND AND DESCRIPTION

2.1 THE PROJECT PROPONENT AND PROJECT HISTORY

The Tanzanian Power System comprised about 1200 MW installed capacity in 2007 and it is expected to be raised up to 1400 MW in 2010 (permanent plants). It is characterized by dependence on hydropower generation (47% of installed capacity). In addition to permanent thermal plants, especially Songo Songo Gas, there are several diesel generating stations in Dar es Salaam, Mpanda, Kigoma, Songea, Mwanza, Tabora, Musoma and Mbeya. The National Grid only covers a part of the country, leaving a significant part of the population without access to electricity. TANESCO's distribution network has a number of serious problems.

There have been insufficient investments for the expansion and maintenance of the existing facilities. In Dar es Salaam access to electricity is highest, but even there less than 50% of all households are connected. Out of the 118 districts in the 2002 population census, only in 18 districts do more than 20% of households have access to electricity. The overall government policy instrument is the National Strategy for Growth and Reduction of Poverty (NSGRP or MKUKUTA). The main energy challenge is to reverse the reliance on firewood and charcoal. Currently about 90% of the total energy consumption is from this source. The Government Plan and Budget for 2009/2010 reflect the Government's efforts to implement the Millennium Development Goals (MDGs) and the MKUKUTA strategies. However, the target of connecting 20% of population to grid electricity is very ambitious. Improvement of the operation and efficiency of the most important power distribution area of the country will not only benefit central Dar es Salaam but also help expand electricity services to poor settlements and rural areas through the improved financial situation of TANESCO.

In Dar es Salaam an estimated 19 % of the population is poor, most of them living in slums and other informal settlements. There has been a massive migration from rural areas to urban areas where economic activities have been stimulated by trade liberalization. The proposed power distribution project is an important contribution to the situation. So far the financial and technical constraints have severely hampered extension of the distribution grid and the connection of poor households to the grid. Several background studies are available. The key technical issues repeatedly identified in these studies are:

- ✓ obsolete equipment
- ✓ overloaded transmission and distribution system components
- ✓ bad voltage profile on the medium and low voltage network
- ✓ bad power factor
- ✓ numerous outages due to overloaded transformers and line tripping
- ✓ high technical and non-technical losses in the distribution networks
- ✓ suppressed demand
- ✓ missing network monitoring

The response by the Tanzanian Government, TANESCO and the donor such as JICA has been designed to undertake rehabilitation of substations and construction of new lines and substations in Dar es Salaam City as improvement of the capacity of existing networks in Dar es Salaam by reducing technical and nontechnical losses and improving the overall reliability of the system.

2.2 Objective and purpose of the project

The overall objective of the project is to provide increased access to electricity with sustainable effects on poverty reduction by facilitating income generation and improved social services. The technical objective of the project is to stabilize the grid system, increase power supply, improve reliability of the power supply in Dar es Salaam city, as well as to increase the extent of TANESCO's distribution network in the city in order to be able to provide electricity to commercial business activities, water pumping, secondary schools, medical services, streetlights, residential houses, agro-processing activities etc. in the project area.

The proposed project has five (5) components which are:

- ✓ Reinforcement of Ilala substation and existing 132 kV transmission line from Ilala substation to Ubungo substation (7.5 km)
- ✓ Construction of new Jangwani Beach substation (33/11kV) and construction of distribution line (33kV) from Jangwani beach substation to Tegeta substation (6.5km)
- ✓ Construction of Muhimbili substation (33/11kV) and construction of distribution line (33kV) from Muhimbili to City Center substation (2km)
- ✓ Construction of Mwananyamala substation (33/11kV) and construction of distribution line (33kV) from Mwananyamala substation to Makumbusho substation (1.1km)
- ✓ Expansion of Msasani substation (33/11kV) and expansion of distribution line (33kV) from Msasani substation to Makumbusho substation (7.6km)

2.3 Site description and project area:

The project area as a whole has mixed land use activities, the areas covered by the project are highly developed as settlements, or institutions such as hospitals, schools, churches etc. There are few planted trees alongside the road where by the project will pass and most of vegetation covers have been cleared for urban development activities. All the proposed 33kV distribution lines will be constructed along road reserves.

The 132kV transmission line from Ubungo S/S to Ilala S/S will be on the existing steel poles which are along the TANESCO line corridor parallel to the first 132kV interconnector. Apart from upgrading this interconnector to 132kV TL, reinforcement of Ilala substation and construction of new system control building will be done.

There are four distribution lines to be constructed in this project, three lines in Kinondoni municipality and one in Ilala municipality with their respective substations namely;

- ✓ **Tegeta substation - Jangwani Beach proposed substation**

The distribution line will be constructed from Tegeta substation which is opposite IPTL through Skanska road, Oilcom Tegeta, New Bagamoyo road up to Africana then will continue through Bagamoyo road to Jangwani Beach 15MVA, 33/11kV proposed substation. The substation plot is located opposite Tanzania Peoples Defence Forces rifle range pitch along Old Bagamoyo road (now Mwai Kibaki road); it was part of recreational area for TPDF.

- ✓ **Makumbusho substation - Msasani substation**

The 33kV line construction will start from Makumbusho 132/33/11kV substation through Regent Street, Migombani Street, Old Bagamoyo road along with US Embassy, Kimweri road, Oysterbay

Street, Haile Selassie road to Msasani substation at Masaki. In this project there will also be expansion of Msasani substation; a 15MVA, 33/11kV substation is going to be constructed closer to the existing one.

- ✓ **Makumbusho substation - Mwananyamala proposed substation**

Construction of the line will start from Makumbusho substation passing through Victoria Primary School area, Makumbusho Secondary and Primary School area respectively, Kwa Mama Zakaria Belege Street up to the Mwananyamala 15MVA, 33/11kV proposed substation. The substation plot is situated in a residential area.

- ✓ **City Centre substation - Muhimbili proposed substation**

The distribution line for this project will be constructed from City Centre substation situated at Bibi Titi Mohamed road/Magore Street junction through Magore Street and Maliki road at Upanga to Muhimbili 15MVA, 33/11kV proposed substation situated in the hospital compound.

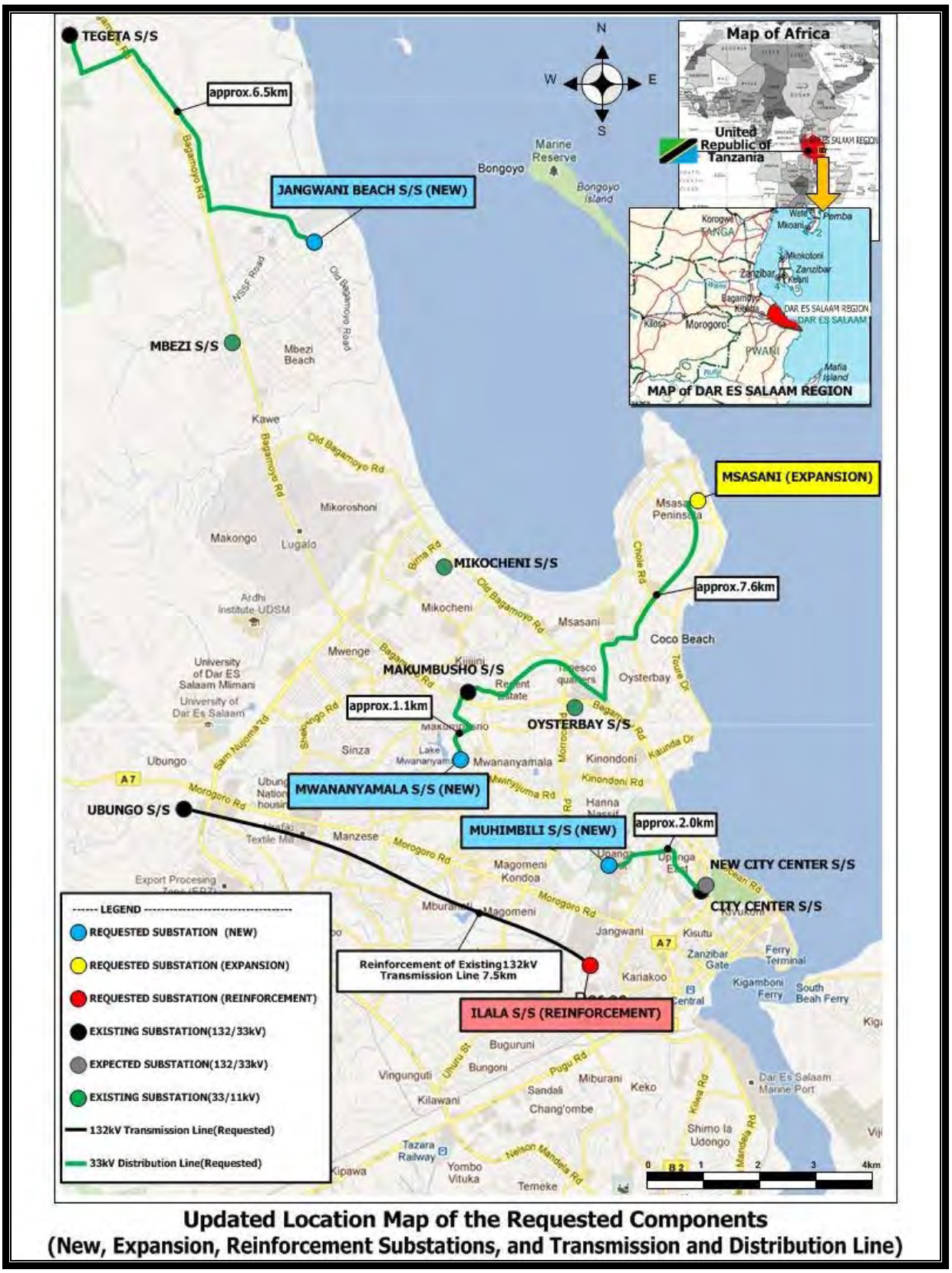

Figure 2.1 Map Showing the project area and transmission line sections and substations

2.4 Design

2.4.1 Transmission line sub-project

The proposed transmission line will use the existing transmission towers from Ilala to Ubungo which currently has double circuits of 33kV and 132kV. This will involve upgrading/reinforcing of the 33kV line to 132kV. The major activity will be stringing of the 132kV aluminum conductor in the existing towers and therefore the project will involve no new construction of towers. The existing transmission line uses steel lattice towers with concrete or grillage foundations. Therefore the existing wayleave will be used for this project.

2.4.2 Distribution

The planned design of the distribution lines is to use steel poles. The current design proposes the distribution line routes be located along existing road reserves, that is TANROADS' and Municipal Councils' so as to minimize the environmental and social impacts i.e. resettlement of people along the proposed routes. The line route corridor will be about 2.5 up to 10 meters wide depend on nature of the site. The line route will be located so that no resettlement is required, however few of them found to be in the way leave will have to be relocated. On the other hand the construction of these new distribution lines will be associated with construction of new substations as well as reinforcing the old ones for selected sites, therefore mounting of transformers will also be involved.

2.4.3 Ilala substation

Reinforcement of Ilala substation and 132kV transmission line from Ilala substation to Ubungo substation of about 7.5km, the transmission line will be constructed from Ilala substation to Ubungo substation along the existing 132kV line II in Dar es salaam City crossing the two municipalities of Kinondoni and Ilala.

2.4.4 Jangwani Beach substation (33/11 kV)

New Construction of Jangwani beach substation and construction of 132 kV distribution line of approximately 6.5 km from Jangwani beach substation to Tegeta substation. The Jangwani S/S will be located in plot owned by TPDF.

2.4.5 Muhimbili substation (33/11 kV)

Construction of Muhimbili substation and construction of a distribution line of 33 kV from Muhimbili substation to City centre S/S of approximately 2km. The Muhimbili S/S will be located in plot owned by Muhimbili hospital.

2.4.6 Mwananyamala substation (33/11 kV)

Construction of Mwananyamala substation and construction 33 kV of distribution line of 1.1km from Mwananyamala substation to Makumbusho substation. The Mwananyamala S/S will be located in plot owned by TANESCO after compensate two houses.

2.4.7 Msasani substation (33/11 kV)

Expansion of Msasani substation and expansion of 33 kV distribution line of approximately 7.6km from Msasani substation to Makumbusho substation. The Msasani S/S will be located in plot owned by TANESCO.

Figure 2.2: Site for the proposed expansion of Msasani S/S

2.5 Clearing of Right of Way (ROW)

The existing transmission line route have a Right of Way (RoW) of 40 meters (20 meters each side of the center line) of land to be cleared however the new line will not acquire new way leave instead the same right of way (RoW) will be used. In the line route corridor neither settlements nor crops higher than 4 meters will be allowed for production.

2.6 Existing facilities

2.6.1 Current Land uses

The current use of the land for the project, is road reserve with some few improvements in some areas where people are using as garden, decorated with paving.

2.6.2 Land required

Steel poles will be constructed along the road reserve thus no need of land acquisition. The Sub-stations will be constructed in the plots which some are owned by TANESCO (Msasani S/S and Ilala S/S), others such as Jangwani S/S will be under TPDF plot, Muhimbili S/S will be under Muhimbili hospital plot in which already TANESCO acquire permits. Lastly Mwananyama S/S will be on residential plots which TANESCO already compensate two houses.

2.6.3 Water

As the project area is at the city centre where there are no other source of water like lakes or rivers then the main source of water used for domestic and other uses come from water authority (DAWASCO) and/or Boreholes.

Water comes mainly from the Ruvu River; production capacity as at 2003 was judged to be sufficient to supply a population of 3 million of the whole Dar es salaam city, though there are problems with transmission, storage capacity and treatment quality (World Bank 2003). The UN currently projects water stress for Tanzania in 2025 (UNEP/GRID-Arendal 2002). A 2001 household survey estimated that about 85% of the city's population has some sort of access to piped water supply; however, the service is erratic, and most households buy water from neighbours, truck vendors or small vendors. It is estimated around 67.9% of population have access to safe drinking water.

2.6.4 Power

Most power used for generating machine and other uses come from TANESCO, and Generators which use diesel/petroleum products will used as backup.

2.6.5 Major utilities

Major utilities available at site include infrastructures belongs to DAWASCO/DAWASA, TTCL and TANESCO.

2.7 Waste generation and management

The project implementation activities will generate liquid wastes and various solid wastes. Liquid waste will include lubricant, used oils, which will be removed from the machines and vehicles and effluents to be generated from the workshop and campsite. Solid wastes will include, wood, metal, tins, paper, plastic materials, drums, containers and other packaging materials.

At campsites soak away pits will be constructed to treat sewage before released to water bodies. All used oils, bitumen and lubricants will be properly handled, collected and packed in the containers or drums and disposed off safely to a damping site. Degradable solid wastes will be burnt or buried whilst non-degradable wastes will be taken back to the suppliers such as bitumen containers and others will be disposed off to the recommended dumping place.

2.8 Overall proposed activities and management

The project works will comprise the excavation of trenches, holes for steel poles and construction of new sub-station building. During construction, the execution of all project work is the responsibility of the contractor. The contractor will:

- ✓ Develop a project plan
- ✓ Acquire approval of plan
- ✓ Manage the implementation of all activities described in it
- ✓ Update the plan as changes occur
- ✓ Communicate the changes to project manager and consultant

The contractor will also be responsible for the employment of the required personnel and preparation of schedule of works. There will be planned site meetings under the project manager and/or consultant to assess the progress of the works. During these meetings the contractor will present progress reports including plans for the next phase.

I. Pre-construction Phase:
During this phase, the project activities to be performed include:

- ✓ Detailed engineering design and specification of cable material;
- ✓ Land acquisition or plot acquisition for new sub-station
- ✓ Identification borrow pits, quarry sites, and sources of water
- ✓ Construction of temporary contractor's offices

II. Mobilization Phase
This will involve preparations for construction works including moving equipment, construction materials and crew to site; setting base/crew camp and site clearance.

Site preparation activities

- ✓ Camp for contractor approximately 0.5 ha of land from construction area.
- ✓ Removal/stripping of top soil average 150 mm depth within the sight and access/right of way.
- ✓ Clearance of vegetation and removal of top soil by using motor grader machines as well as removal of some bricks on road reserve.
- ✓ Overburden from borrow pits will be deposited adjacent to opened pits and later on will be used as part of backfill material.
- ✓ Top soil will be spread during site tidying up

Construction materials required, equipments, crew, and sources.
This will involve preparations for construction works including moving equipment, construction materials and crew to site; setting base/crew camp and site clearance. The project will require various standard construction materials including: compaction/fill materials, aggregates, sand, bitumen and water as narrated below:

- ✓ Cement will be purchased in Dar es Salaam and used for construction of substations and drainage structures whenever they are required. Sand will be obtained in Dar es salaam or whenever it is available in nearby places
- ✓ Hard stones for construction of drainage structures and channels will be sourced.
- ✓ At the quarry site and burrow pits, materials such as gravels and aggregates of different sizes will be excavated by excavator and wheel loader machine and loaded into trucks.
- ✓ Water to be extracted from DAWASA/DAWASCO as well as boreholes for construction activities and campsite
- ✓ Timbers will be needed for construction of form works and shutters for concrete works

All construction materials will be stored at the specific area at the site and campsites close to the roadwork site, whereby, fuels and bitumen will be stored in the drams or tanks, gravels and sand will be pilled on the backyard and water ponds will be constructed to keep water for construction work.

Storage
Materials will be used immediately after delivery/piled up. On site-workshop will be set. Materials to be used for construction and others will be stored within the project area. Services and repair facilities will be initiated at project site.

Construction crew
Approximately 100 people both skilled and unskilled labor force will be employed to work for the project. Majority of the semi-skilled personnel will be hired locally (from Kinondoni and Ilala municipals and neighbouring areas). Accommodation of senior staff will be within Kinondoni and Ilala Municipal Councils. Junior staff will also be stationed on camp site while labourers will be residing in their homes.

Local supplies and services (food, medicals, fuel, water etc.)
Food supplies will be from the local suppliers. Medical supplier will be from local registered medical practitioner. Fuel will be supplied from internal suppliers and water for domestic purpose will be from the project area.

III. Construction Phase

Construction work will be the implementation of the project which is essentially civil works in nature mainly consisting of;

- ✓ Construction of contractor site offices
- ✓ Earth works, trenches (including vegetation clearance and moving of soils)
- ✓ Extraction of construction materials such as gravel, sand, aggregates and rocks and transportation;
- ✓ Buildings construction and installation of equipments
- ✓ Construction of drainage system and installation of drainage structures.
- ✓ Installation of signboards.

IV. Demobilization or closure of the construction activities will involve the following activities:

- ✓ Handing over of the permanent structures and facilities in the camp site to the client;
- ✓ Remove temporary infrastructure, installations and equipments from the temporary office
- ✓ Clearance of all sorts of waste including used oil, sewage, solid wastes (plastics, wood, metal, drams, papers, etc). Deposit all wasted to the authorized dumping place

CHAPTER THREE

3. RELEVANT POLICY, LEGAL AND INSTITUTIONAL ASPECTS

3.1 INTRODUCTION

Design, construction/mobilization, operation and final decommissioning of the Power network rehabilitation project will have both positive and negative impacts on the ecology and social environment. These impacts need to be addressed so that the envisaged operations do not unnecessarily cause detrimental social and ecological environmental impacts, and also to ensure that they are in line with policies and/or legal regime operating in Tanzania. Furthermore, there are international agreements and/or conventions, to which Tanzania is a Party, which also need to be considered during project construction and operation. The following sections discuss Tanzania national and sectoral policies, legislation and institutional framework, which are relevant to this project.

3.2 NEED FOR ENVIRONMENTAL IMPACT ASSESSMENT

Environment Impact Assessment is an important planning tool which is used to facilitate and promote sustainable development by integrating environmental conservation and management in the decision making process. As such, most sector policies and legislation have incorporated the requirement of undertaking EIA in designing and implementing development project. The purpose of EIA is to evaluate the environmental and related social implications (negative and positive) of carrying out a development project. Such an evaluation can then be set alongside socio-economic objectives of the proposal in order to make balanced decisions.

3.3 RELEVANT POLICIES

Clarifying relevant policies is important in setting boundaries for the EIA in line with national interests and future prospects. The following are relevant sectoral and cross – sectoral policies which stipulate the need for EIA and provide directives on how projects should be operated in Tanzania. The project proponent will need to observe these policies in the course of designing and implementing the proposed project activities.

3.3.1 National Environmental Policy (1997)

The National Environment Policy provides a framework for environmental protection in Tanzania. The policy requires that project development be done in a way that it does not compromise the environmental integrity. It stipulates that the chosen technologies should be environmentally sound, socially acceptable and economically viable. Relevant provisions of this policy to Power Network Rehabilitation are:

- ✓ Sections 28 and 29, which states that in all projects, environmentally sound technologies (i.e. those that generate no or low waste or protect environment) should be used.
- ✓ Section 48 (c), which advocates for technologies that use water efficiently, provides wastewater treatment.
- ✓ Section 56 (f), which states that workers' health shall be adequately protected from environmental health hazards.

TANESCO in the implementation of the project shall comply with all of the above and other relevant provisions.

3.3.2 The National Land Policy (URT, 1995)

The National Land Policy advocates for the protection of land resources from degradation for sustainable development. Among other things the policy requires that project development should take due consideration the land capability, ensures proper management of the land to prevent erosion, contamination and other forms of degradation. Important sections of the policy relevant to the Developer are 2.4 (on use of land to promote social economic development), section 2.8 (on protection of land resources) and section 4 (on land tenure). TANESCO in land usage and plot acquiring for the project shall observe these provisions.

3.3.3 The National Human Settlements Development Policy (2000)

One of the objectives of National Human Settlement Development Policy (2000) is to protect human settlements, the environment and embedded ecosystem thereof from environmental pollution, environmental degradation and destruction of loss of biodiversity in order to attain sustainable development. The planning and design of the proposed power network rehabilitation shall observe this requirement.

3.3.4 National Water Policy (2002)

The National Water Policy (NAWAPO) calls for the adoption of holistic basin approach integrating multi-sectoral planning and management to minimize negative impacts on water resources development to ensure sustainability and protection of the environment. NAWAPO recognises the following, among others:

- ✓ There is a growing scarcity, misuse and wastage of water resources in many places of Tanzania, which may become a serious threat to sustainable availability of the resource.
- ✓ That uncontrolled abstraction of water resources from different water basins is taking place.

NAWAPO requires the developer to observe judicious use of water by putting in place water conservation measures. Power network rehabilitation project intends to use, relatively, small amount of water - about 100m3 of water per day during construction and 2 – 5 m3 per day during operation, mainly for substation usage.

3.3.5 The National Construction Industry Policy (2003)

This policy promotes among other things, application of cost effective and innovative technologies and practices to support socio-economic development including utilities and ensure application of practices, technologies and products which are not harmful to both the environment and human health. This EIA is undertaken to ensure that the project proponent uses technologies, materials and products not harmful to both the environmental and human health by providing appropriate mitigation measures. During the design and operation environmentally friendly cables will be used.

3.3.6 The National Transportation Policy (2003)

The policy aims at guiding the development of an efficient, well integrated and coordinated transport infrastructure and operations, which are economically financially, socially and environmentally sustainable. Relevant sections of the policy are:

- ✓ 2.6.1 - which recognises that road accidents are on the increase due to non-adherence and enforcement of rules and regulations. And that environmental problem (noise, air, water pollution) are on the increase due to traffic congestion. The construction vehicles shall be controlled to hinder the traffic and cause any pollution
- ✓ 4.1.1 (vi) on the intention of the policy to facilitate sustainable development by ensuring all aspects of environmental protection and management are given sufficient emphasis at the design antidevelopment stages of transport infrastructure and when providing services

- ✓ 5.3.2.5 - which shows that the policy advocates for developing and operating mode of transport in urban centres on the basis of economic savings on fuel use, operation efficiency, including reducing traffic congestion, environmental protection and safety.

3.3.7 The Energy Policy of Energy of 2003

Section 5.4 states that Environmental implications of energy consumption need to be considered in all sectors. All stages of energy resources (be it fossil or non-fossil) exploitation, production, conversion, *transportation, storage and end-use* can have negative impact on the environment. Health, safety and environmental consequences of energy production and utilisation have become a major concern. Some of pertinent polices are "To promote environmental impact assessment as a requirement for all energy programmes and projects" and "To promote energy efficiency and conservation as a means towards cleaner production and pollution control measures" This has been observed closely with even views from the stakeholder especially on their safety. The project implementation will observe these provisions.

3.4 RELEVANT LEGISLATION AND REGULATIONS

This section addresses the legal and regulatory conditions which are relevant to the proposed Power rehabilitation network project. This EIA has been conducted in general compliance with these legislations in mind.

3.4.1 Environmental Management Act Cap 191

The Environmental Management Act Cap 191 seeks to provide for legal and institutional framework for sustainable management of the environment in the implementation of the National Environmental Policy.

The Environmental Management Act Cap 191 provides for continued existence of the National Environmental Management Council (NEMC). Under this Act, NEMC is mandated to undertake enforcement, compliance, review and monitoring of environmental impact assessment and has a role of facilitating public participation in environmental decision making, exercise general supervision and coordinating over all matters relating to the environment. The Act also requires the Council to determine whether the proposed project should be subjected to an EIA, approves consultants to undertake the EIA study, invites public comments and also has the statutory authority to review EIS and recommend to the Minister for approval and issuance of EIA certificate. This new Act imposes an obligation on developers to conduct an EIA prior to the commencement of the project to determine whether the project may/or is likely to have, or will have a significant impact on the environment. Article 82 makes EIA mandatory to all projects that fall under the EIA mandatory list (Schedule 3). TANESCO has complied with relevant provisions of the Act in carrying out this EIA.

3.4.2 The Environment Impact Assessment and Audit Regulations, G.N. No. 348 of 2005

According to this regulation, the developer first registers the project, by submitting Form EIA to NEMC, with outline details of the project and its likely impacts. The regulations advocate for periodic and independent reassessment and that the outcome of such assessment will serve to provide instructive feedback into the environmental management process. Environmental Impact Statement (EIS) is then submitted to the Technical Advisory Committee (TAC) coordinated by NEMC for review. The proponent to meet the costs of the review. In carrying out this EIA, the requirement of these regulations is observed.

3.4.3 The Land Use Planning Act No. 6 of 2007

The National Land Use Commission (NLUPC) was established under this Act as the principal advisory organ of the Government on all matters related to land use. Among other functions, it recommends measures to ensure that Government policies, including those for development and

conservation of land are in harmony. It also takes adequate account of their effects on land use and seeks the advancement of scientific knowledge of changes in land use. It encourages development of technology to prevent, or minimize adverse effects that endanger man's health and his/her welfare; it also specifies standards, norms and criteria for beneficial uses and maintenance of the quality of land.
In accordance with the functions mentioned above, the Commission can indirectly help to prevent or minimize pollution by restricting location of potential and actual pollution sources. The Power network rehabilitation project is planned in accordance with the requirement of this Act as only road reserves will be used and the substation to be constructed to a privately owned plot.

3.4.5 The Urban Planning Act No. 8 of 2007

The town and Country Planning Ordinance Cap 378, part IV provides for control of urban development while implementing a scheme of land development. Important aspects include the designation and allocation of adequate land for solid waste disposal in any urban site. The law further stipulates design of a good sewerage system to manage liquid waste from various major consumers. The law empowers local authorities to enforce such schemes and punishments as stipulated in the Act. The law further empowers neighbours and any individual to take to court anyone who injuriously affects others due to his/her unhygienic activities. The developer will observe provisions of this Act during construction and operation of Power network rehabilitation Project.

3.4.6 The Local Government (Urban Authorities) Act No. 8 of 1982

This Act establishes urban authorities for the purposes of local government, to provide for the functions of those authorities and for other matters connected with or incidental to those authorities.
Section 55 of the Act enumerates basic functions of the urban authorities. The functions that are relevant to the Power network rehabilitation Project are:

- ✓ to provide for the prevention and abatement of public nuisances or of nuisances, which may be injurious to the public health or to the good order of the area of the authority;
- ✓ to regulate any trade or business, which may be noxious, injurious to the public health or a source of public danger, or which otherwise it is in the public interest expedient to regulate, and to provide for the issue of licenses or permits to facilitate the regulation of any such trade or business, and for the imposition of fees in respect of such licenses or

Section 59 lists the powers of the Urban Authorities. The following powers are considered relevant to the Project activities:

- ✓ to undertake the abatement of fire and the prevention of the spread thereof and for such purposes to enter any premises;
- ✓ to provide for the imposition and fixing of charges to be paid in respect of services rendered by the authority.

Section 80 of the Act empowers the urban authorities to set by-laws. TANESCO shall observe these and other relevant provisions in this Act.

3.4.7 The Occupational Health and safety Act No 5 of 2003

This deals with the protection of human health from occupational hazards. It specifically requires the employer to ensure the safety of workers by providing safety gear at the work place. Relevant sections of the ordinance to the project activities include Part IV which deals with general health provision, such as provision of regular medical examination of employees; safe means of access and safe working place; prevention of fire etc.; and Part V on health and welfare provisions, which includes provision of supply of clean and safe to workers, sanitary convenience, washing facilities and first aid facility. Section 50 deals with fire prevention issues. Part III requires that the Project Proponent submits the drawing of the facility to the Chief Inspector.

Section 15 gives powers to the Registrar of Factories and workplace to enter any factory or workplace to perform his duties as provided by the Act. Section 16 requires that factories and workplace should register with Registrar of factories and workplaces before commencing operations. TANESCO and the Contractor will observe the provision of this act during construction and running of the network and substation. Part VI is dealing with special safety provisions for working places involving handling hazardous chemicals, hazardous processes or hazardous equipment.

3.4.8 The Road act No. 13 of 2007: Cap 15, Paragraph 17 (2) and (3).

Steel poles will be along the road reserve. Section 30.-(1) of the act specifies that for the purposes of sub section (2) and (3) of' section 29 of the Act, terms and conditions of alternative use of road reserve are that;

- ✓ the management and control of the road and the road reserve shall be the responsibility of the road authority
- ✓ a person' shall not use the road reserve of a public road without a written approval from the roads authority;
- ✓ where, the road authority has approved the use of the road reserve for utilities such as placing of public telegraph, telephone, electric supply, sewers and water supply, such utilities shall be located at the edge of the road reserve or a distance from the end of the road reserve as may be authorized in writing by the road authority;
- ✓ application for approval shall be in writing prescribing the purposes and use for which the approval is sought;
- ✓ application is submitted to the road authority within thirty days prior to the days on which the purpose and use is due;
- ✓ where the road authority refuses application it shall within fourteen days and in writing give reasons to the applicant for refusal; and
- ✓ the approval shall expire within six months from the date of Issuance.

Sub section (2) state that "Where the application is granted a written approval as specified in the Second Schedule to these Regulations shall be issued authorizing" The client and the contractor in this project will observe this act.

3.4.9 Land and Village Land Acts (1999)

Essentially, the land Act, No 4 of 1999 regulates the urban land while Village Land Act, No 5 of 1999 regulates land in rural areas., Land Regulations and government standing order on expropriation for public utilities prescribes that holders of occupancy rights on land pre-empted for the public works must be compensated and assisted in relocating their assets to the nearest suitable place. The project is basically intended to use the road reserve, where other public utilities are located thus this act is not applicable except the reinstatement of paved blocks and other facilities interfered in the road reserve

3.4.10 The Forest act No 14 of 2002

The act has identified the "sensitive area" to mean

- ✓ catchment area;
- ✓ an area renowned for its high bio-diversity;
- ✓ mangrove area;

Section 18.(1) specifies that " any Proposed development in a forest reserve, Private forest or sensitive forest area including watersheds to which this section applies, whether that development is Proposed by, or is to be implemented by, a person or organisation in the public or Private sector, the proposer of the development shall prepare and submit to the Director an Environmental Impact Assessment of the proposed development for sustainability of mangroves.

3.4.11 The Water Resource Management Act No. 11 of 2009: Cap 388:

Part II section 4.-(1) of the act specifies the objective of the Act that is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways which takes into account a number fundamental principles, including- " preventing and controlling pollution and degradation of water resources;" The issues of laying underground cables, the use of liquid and solid wastes have been considered to make sure the water resources and especially underground water is not polluted. That cable cannot emit pollution to the underground and the wastes are environmentally disposed off.

3.4.12 The Water and Sanitation Act no. 12 of 2009, Cap 437:

Part XIV section 52 provides that any person who deposit or allow or causes to be deposited any earth, material or liquid in such manner or place that it may be wasted, fall or be carried out into the waterworks commits an offence and shall be liable on conviction to a fine or to imprisonment. Observing this act the solid and liquid waste to be generated are recommended to be disposed off in environmental friendly manner.

3.5 INTERNATIONAL AGREEMENTS AND CONVENTIONS

Tanzania is a Party to a number of Conventions. International agreements convention and treaties which are relevant to this project are:

3.5.1 Convention on Biological Diversity (1992)

Tanzania signed the CBD in 1992 and ratified it in March 1996, thereby committing to the conservation and sustainable use of biological diversity. The objective of the Convention on Biological Diversity (CBD; 1992) is to conserve biological diversity, promote the sustainable use of its components, and encourage equitable sharing of the benefits arising from the utilization of genetic resources (see *www.biodiv.org*). Article 8 of the CBD addresses in situ conservation, stating that each Contracting Party shall:

- ✓ Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity;
- ✓ Promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings; and
- ✓ Subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application.

Article 6 provides general measures for conservation and sustainable use of biodiversity. Article 9 deals with ex-situ conservation strategies. Article 14 requires parties to carry out EIA on all projects and development in protected areas. As was reported in Sections 4.3.1 75% of the fauna in the area is grassland. This EIA study has established that there are no rare or endangered species on the site. However, whenever possible TANESCO and the Contractor shall conserve natural biodiversity by avoiding unnecessary land clearance and wetland drainage.

3.5.2 Convention on Wetlands of International Importance Especially as Waterfowl Habitat (the Ramsar Convention) (1971)

The Convention on Wetlands is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. It was adopted in the Iranian city of Ramsar in 1971 and came into force in 1975, and it is the only global environmental treaty that deals with a particular ecosystem. The Convention's member countries cover all geographic regions of the planet.

The Convention's mission is "the conservation and wise use of all wetlands through local, regional and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world.

Each Party to the Convention has a right to list its wetland to be included in the Ramsar List as stated in the Convention "…..*Each Contracting Party shall designate suitable wetlands within its territory for inclusion in a List of Wetlands of International Importance, hereinafter referred to as "the List" which is maintained by the bureau [secretariat of the Convention] established under Article 8…."*
Wetlands included in the List acquire a new status at the national level and are recognized by the international community as being of significant value not only for the country, or the countries, in which they are located, but for humanity as a whole. However, the project areas there are no lists of the Ramsar List.

3.5.3 African Convention on the Conservation of Nature and Natural Resources, September (1968)

This covers measures for the countries, including Tanzania, Party to the agreement to conserve nature and natural resources and specifies rare and endangered species in specific areas of the continent. This EIA was carried out to identify if there is any rare or endangered species within the project site. The study has identified none.

3.5.4 Other International Conventions Ratified by Tanzania

- ✓ ILO Convention: C138 Minimum Age Convention, 1973 (Ratified by Tanzania (United Republic of) on 16:12:1998) which prohibits Child labour. TANESCO and The Contractor shall ensure no child is employed in its activities.

- ✓ ILO Convention: C148 Working Environment (Air Pollution, Noise and Vibration) Convention, 1977 (Ratified by Tanzania (United Republic of) on 30:05:1983) which protects Workers against Occupational Hazards in the Working Environment Due to Air Pollution, Noise and Vibration. TANESCO and the Contractor shall ensure workers are protected against occupational hazards.

3.6 GUIDELINES AND STANDARDS

Following guidelines are considered to be relevant to the project and are discussed below:

3.6.1 JICA Guidelines for Environmental and Social Considerations (April 2010)

In principle, JICA confirms that projects meet the requirements for environmental and social considerations stated in the Guidelines in the following ways. JICA confirms that projects comply with lawa or standards related to the environment and local communities in the central and local governments of host countries; it also confirms that projects conform to those governments` policies and plans on the environment and local communities.

JICA confirms that project do not deviate significantly from World Bank`s safeguard policies and refers as a benchmark to the standards of Intrenational Financial organizations, to internationally recognized standards, or international standards, treaties and declarations etc and to the good practices etc of developed natons including Japan when appropriate.

JICA takes note of the importance of good governance surrounding projects in order that measures for appropriate environmental and social considerations are implemented. JICA discloses information with reference to the relevant laws of project proponents and of the government of Japan.

JICA classifies the proposed project into one of four categories (A, B, C, and FI) depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts. The government is responsible for the assessments required by the guidelines while the JICA is responsible for overall compliance with these policies.

3.6.2 World Bank Safeguards Policies (OP 4.00 2005)

The World Bank has developed a series of safeguard policies to help staff promote socially and environmentally sustainable approaches to development as well as to ensure that Bank operations do not harm people and the environment. These safeguard policies include, among others, the Bank's policy on Environmental Assessment (EA).

The World Bank conducts Environmental Assessments (EA) of each proposed investment loan to determine the appropriate extent and type of environmental impact analysis to be undertaken, and whether or not the project may trigger other safeguard policies. The Bank classifies the proposed project into one of four categories (A, B, C, and FI) depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

The government is responsible for the assessments required by the Safeguard Policies while the World Bank is responsible for overall compliance with these policies. While the objectives of these safeguard policies are many the following are relevant objectives to Power Network Rehabilitation Project.

- ✓ To help ensure the environmental and social soundness and sustainability of investment projects.
- ✓ To support integration of environmental and social aspects of projects into the decision making process.
- ✓ To promote environmentally sustainable development by supporting the protection, conservation, maintenance, and rehabilitation of natural habitats and their functions.
- ✓ To avoid or minimize involuntary resettlement and, where this is not feasible, to assist displaced persons in improving or at least restoring their livelihoods and standards of living in real terms relative to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

The safeguard policies also recommend operational principles. The following is a list of those principles the Consultant consider very key to this project.

- ✓ Assess potential impacts of the proposed project on physical, biological, socio-economic and physical cultural resources, including transboundary and global concerns, and potential impacts on human health and safety.
- ✓ Assess the adequacy of the applicable legal and institutional framework, including applicable international environmental agreements, and confirm that they provide that the cooperating government does not finance project activities that would contravene such international obligations.
- ✓ Provide for assessment of feasible investment, technical, and siting of alternatives, including the “no action” alternative, potential impacts, feasibility of mitigating these impacts, their capital and recurrent costs, their suitability under local conditions, and their institutional, training and monitoring requirements associated with them.
- ✓ Prevent and, where not possible to prevent, at least minimize, or compensate for adverse project impacts and enhance positive impacts through environmental management and

planning that includes the proposed mitigation measures, monitoring, institutional capacity development and training measures, an implementation schedule, and cost estimates.

- ✓ Involve stakeholders, including project-affected groups and local nongovernmental organizations, as early as possible, in the preparation process and ensure that their views and concerns are made known to decision makers and taken into account. Continue consultations throughout project implementation as necessary to address EA-related issues that affect them.
- ✓ Use independent expertise in the preparation of EA where appropriate. Use independent advisory panels during preparation and implementation of projects that are highly risky or contentious or that involve serious and multi-dimensional environmental and/or social concerns.
- ✓ Disclose draft EA in a timely manner, before appraisal formally begins, in an accessible place and in a form and language understandable to key stakeholders.
- ✓ Where projects adversely affect non-critical natural habitats, proceed only if viable alternatives are not available, and if appropriate conservation and mitigation measures, including those required to maintain ecological services they provide, are in place. Include also mitigation measures that minimize habitat loss and establish and maintain an ecologically similar protected area.
- ✓ Consult key stakeholders, including local nongovernmental organizations and local communities, and involve such people in design, implementation, monitoring, and evaluation of projects, including mitigation planning.
- ✓ Provide for the use of appropriate expertise for the design and implementation of mitigation and monitoring plans.

3.6.3 The Tanzania Bureau of Standards Act No. 3 of 1975

The Tanzania Bureau of Standards is the designated national authority (TBS Act 1975) for developing all kinds of national standards, including environmental standards. The TBS Act establishes the National Environment Standards Committee (NESC) which is responsible for developing environmental standards. The National Environment Management Act 2004, recognises the existence of the NESC. Part X enumerates the types of environmental standards to be established, they include water quality, discharge of effluent into water, air quality, control of noise and vibration pollution, sub-sonic vibrations, soil quality, control of noxious smells, light pollution, and electromagnetic waves and microwaves. Development of national environmental standards is still at its infancy stage. Only 9 compulsory environmental standards (those that require compulsory compliance) have been developed so far. Although, it is not stated in the Acts, in the absence of national standards, project proponents are encouraged to use international standards such as those of WHO, World Bank, BS, EU, American Public Health Association (APHA), US EPA etc.

Relevant national environmental standards (to a limited extent though) include:
TZS 860: 2005 Municipal and Industrial Wastewaters – General Tolerance Limits for Municipal and *Industrial Wastewaters.* This standard provides permissible limits of important environmental parameters such as BOD, COD, pH, Colour, Temperature range, Total suspended solids and turbidity. It also gives permissible limits of a range of inorganic and organic components.

TZS 845:2005 Air Quality – Specification: This standard gives permissible emission limits of sulphur oxides, carbon monoxide, hydrocarbons (as total organic carbon), Dust, Nitrogen oxides and lead.
EMDC 2(1758): Air Quality - Vehicular Exhaust Emissions Limits and This standard is mainly derived from EU Directives 96/69/EC, 91/542/EEC and 97/24/EC. This Tanzania Standard gives permissible limits of some common substances found in exhaust emissions of motor vehicles, namely carbon monoxides, suspended particulate matter (PM), oxides of nitrogen, and hydrocarbons. The standard covers all types of vehicles namely, passenger cars, light commercial vehicles, heavy-duty

vehicles, and two and four strokes motorcycles and scooters. AESL need to ensure that the hired vehicles or its own meets this standard.

EMDC 6 (1733) P 2: ACOUSTICS - General Tolerance Limits for Environmental Noise: This standard focuses on urban environmental noise, and does not cover occupation environment. In the absence of other standards it may be used to give indication of permissible noise levels in factory/workshop environment.

TANESCO shall observe these standards during construction and operation of the project.

3.7 INSTITUTIONAL FRAMEWORK

Table 3.1 shows a list of relevant institutions and groups of stakeholders and their responsibilities as stipulated in various policy and legal documents and articulated by stakeholders during consultation.

Table 3.1: Districts within the Internal Drainage Basin.

Level	Stakeholders group	Responsibilities
National level	Vice President's Office- Division of Environment	✓ Co-ordinate environmental management policy, act and guidelines ✓ Environmental monitoring and auditing. ✓ Advise Government on all environmental matters
	Prime Minister's office	✓ Improved and Reliable Power ✓ Provide standards for operations ✓ Funds for resettlement /Compensation (if any) ✓ Project monitoring and internal auditing
	Ministry of Lands, Housing and Human Settlement Development	✓ Advice government on land use issues ✓ Allocation of plots and sites for projects
	NEMC	✓ Reviewing of EIA reports ✓ Enforcement and compliance of EMA Act,No.20 of 2004
Regional level	Dar s salaam Regional Commissioners office	✓ Oversee and advice on implementation of national policies at Regional level ✓ Oversee enforcement of laws & regulations ✓ Advice on implementation of development projects and activities at Regional level
Municipal Level	Kinondoni and Ilala Municipal Councils	✓ Plan and coordinate activities on the Municipality. ✓ Enforcement of laws and regulations

		✓ Baseline data on health, social and economic conditions ✓ Provides guidelines for management of land within project area and area of influence, ✓ Land use planning ✓ Environment management ✓ Land valuation and compensation procedures
Ward level	Mchikichini, Upanga East and Upanga West in Ilala Municipal Council Makurumla, Kawe, Mzimuni, Kunduchi, Wazo, Msasani, Mabibo, Ubungo, Mikocheni and Makumbusho ward in Kinondoni Municipal Council.	✓ Oversee general development plans for the Ward. ✓ Provide information on local situation Extension services
Utilities service providers	DAWASA TTCL	✓ Providing water and sewerage services ✓ Providing telecommunication services
Public and interested/affected groups	✓ Residents around the project site ✓ Primary schools near the project site. ✓ secondary schools near the project site	✓ Information on local social, economic, environmental situation ✓ View on socio-economic and cultural value of the sites

CHAPTER FOUR

4. BASELINE DATA AND INFORMATION

Baseline data and information on physical, biological and socio economic for the proposed project provides an important background for a well organized EIA. This chapter provides physical, biological and socio-economic characteristics pertaining in the core project area and area of influence for the construction of the proposed project. Information provided in this chapter will be superimposed in the project concept and components for impact identification, evaluation and development of mitigation measures during the impact assessment.

4.1 PHYSICAL CHARACTERISTICS

4.1.1 Climate and Hydrology

The proposed project area is in the Dar es salaam City. The area has flat terrain which is much influenced by coastal climatic condition and normally experiences a modified type of equatorial climate. It is generally hot and humid throughout the year with an average temperature of 29ºC. The hottest season is from October to March during which temperatures can raise up to 35ºC.

The area becomes relatively cool between May and August, with temperature around 25ºC. There are two main rain seasons; a short rain season from October to December and a long rain season between March and May. The average rainfall is 1000mm (lowest 800mm and highest 1300mm). Humidity is around 96% in the mornings and 67% in the afternoons. The climate is also influenced by the southwesterly monsoon winds from April to October and northwesterly monsoon winds between November and March.

The City is divided into three ecological zones, namely the upland zone comprising of the hilly areas to the west and north of the City, the middle plateau, and the low lands including Msimbazi valley, Jangwani, Mtoni, Africana and Ununio areas. The main natural vegetation includes coastal shrubs, Miombo woodland, coastal swamps and mangrove trees.

Dar es salaam City is vulnerable to floods, sea level rise and coastal erosion, water scarcity and outbreak of diseases. Vulnerability to climate change effects is largely contributed by:

- ✓ Poor planning: About 70 % of settlements are not planned.
- ✓ Poverty: Encroachment of hazardous lands is caused by lack of cash to access land in planned areas.
- ✓ Lack of infrastructure: The existing infrastructure such as storm water drainage system is not proportional to the population size.
- ✓ Corruption: Development in areas which have been identified as hazardous lands such as storm water channels.
- ✓ Location: Closer to Indian Ocean.

Areas prone to floods

i) Msimbazi valley:
The area floods frequently. However the area continues to be populated exposing residents to life threatening floods and flood related health problems. The influx of people has been accelerated by number of factors such as easy access to unregulated farming and building plots, proximity to the city centre, low level of education and low cost housing.

(ii) Jangwani:
This is a slum area found on the left hand side of Morogoro road on the way to city centre from Magomeni. Low lying area which is characterized by floods during rainy season almost every year. The Msimbazi River passes through this valley increasing the risk of dwellers that are at the mouth of the river. The areas were declared not a residential by the former minister for lands and Human Settlement Development due to its susceptibility to environment threats.

(iii) City Centre:
This is the most flooded area in the city. The problem is exacerbated by poor infiltration and outdated unfunctioning storm water drainage system.

(v) Mikocheni:
The problem has been exacerbated by diversion of natural storm water drainage channel.

4.1.2 Topography and Soils

Altitude of Dar es Salaam is less than 200 m.a.s.l. The area is generally flat to gentle undulating plains, slopes ranges between 0-3percent developed on old alluvial terrace no longer flooded. Major soils are well drained, moderately deep to deep, red, yellowish red or orange sands and loamy sands with sandy loams in subsoil, weak structure, very low natural fertility; and moderately well to imperfectly drained, deep, brown, pale yellow, light grey or white mottled sands and loamy sands with weak structure and very low natural fertility; and imperfectly to poorly drained due to flat topography and ponding above ironstone pans in subsoil (0-7 to 1.5 m deep) which prevent deep percolation and are able to maintain perched water tables stable enough rice cultivation.

Mixed alluvial deposits occur on recent flood plains along Msimbazi river valley. The areas are subject to frequent flooding. This type of soil is marginally suitable for arable agriculture. There is also mixed soil on sub-recent or old alluvial deposits which are no longer flooded by river overflows. Fruits and vegetables are grown in the valleys.

4.1.3 Waste Management

Waste management, in principle, is directly the responsibility of Local Authorities. The Local Government (Urban Authority) Act 1982 imposes on urban authorities the mandate “to remove refuse and filth from any public or private place” and to provide and maintain public refuse containers for the temporary deposit and collection of waste.

The Municipal Councils play an important role in the financing, planning and providing waste collection and disposal services. According to the present management structure, waste management services are placed under Waste Management Department, but other departments such as Works, Health, and Urban Planning are also involved in one way or another.

The proposed project will have a number of laborers approximately 100 including skilled and unskilled employees. During construction and operation they are expected to produce various kinds of wastes such as papers, plastics bottles, plastics bags, food waste etc. It is also considered that sewage

waste will be generated from these areas therefore sanitary facilities such as portable toilets should be distributed.

During construction of the 33kV lines as well as stringing of the wires on the 132kV line, heavy machines are expected to be used these include vehicles, excavator, bulldozers, etc. These machines and vehicles are assumed to have low impact to the air quality as they will have regular checks and maintenance. This will minimize emissions such as NOx and SOx and noise pollution to the permissible level, therefore reducing adverse health effects to the workers, and nearby communities.

4.2 Air Quality, Noise, Dust and Vibration at Proposed project areas.

4.2.1 Ambient Air Quality

The assessment of ambient air quality at the four proposed substation locations was done using a portable desktop gas analyzer type KANE900 Plus. The gas analyzer recorded the air composition characteristics by establishing the proportions of oxygen (O_2) [%], carbon monoxide (CO) [mg/nm^3], nitrogen oxide (NO) [mg/nm^3], nitrogen oxides (NO_x) [mg/nm^3], sulphur dioxide (SO_2) [mg/nm^3], carbon dioxide (CO_2) [%], and ambient temperature [°C]. Three air samples were averaged to establish the characteristic air quality per sampling point.

The summarized findings on the ambient air quality assessment of air contaminants are presented in Table 4.1. The findings show that the four sites had an average oxygen level of 20.88% ranging from 20.8 to 20.9%. The average temperature level was 34.56°C. On the other hand, air gaseous contaminants of carbon monoxide (CO), carbon dioxide (CO_2), and sulphur dioxide (SO_2) were not detected whereas the concentration of nitrogen oxides (NO_x) was sparse. The NO_x were observed along Jangwani and Mwananyamala sites that are busy with motor vehicle traffic. With reference to Tanzania's Environmental Management (Air Quality Standards) Regulations (2007) the observed air quality at all these sites is within acceptable level.

Table 4.1: The average air quality per assessed substation

SNO	SITE NAME	O_2 [%]	CO [mg/m^3]	CO_2 [%]	AMBIENT TEMP. [°C]	SO_2 [mg/m^3]	NO [mg/m^3]	NO_x [mg/m^3]
1	Jangwani Beach	20.8	-	-	33.3	-	0.0	0.01
2	Oysterbay	20.9	-	-	34.0	-	-	-
3	Muhimbili	20.9	-	-	34.6	-	-	-
4	Mwananyamala	20.9	-	-	36.4	-	0.0	0.02
	MEAN VALUE:	**20.88**	**-**	**-**	**34.56**	**-**	**0.01**	**0.01**
HIGHEST LIMIT (TANZANIA			**10.00**					**0.12**

STANDARD)*							

* The Environmental Management (Air Quality Standards) Regulations, 2007

4.2.2 Noise Level

Noise level measurement along the pre-selected points was done using a Clas Ohlson digital sound level meter type 36-1604, model ST-805 with measurement range of 30 to 130 dB(A). The meter meets ANSI S1.4 type 2 standards and conforms to IEC 651 type 2. Accuracy of the meter is ±1.5 dB of reading. The meter is calibrated using electrical calibration with built in oscillator (1 kHz sine wave).

On taking measurements, the meter was set to the "A" weighed measurement scale, which enables the meter to respond in the same manner as the human ear. The "A" scale is applicable for workplace compliance testing, environmental measurement, and workplace design and law enforcement. The meter was held approximately 1.5 m above the ground and at least 0.5 m away from hard reflecting surfaces such as trees and walls. A set of four readings were taken per point.

4.2.3 Substations' Noise Level

Generally, the noise levels to all assessed areas alongside the proposed substations were within acceptable level below the threshold value of 90 dB (A). As presented in Table 2 the mean noise level was 55.81 dB (A) and it ranged, amongst the sites, from 49 to 63 dB (A). Appendix III details the noise as assessed from the four proposed sites.

Table 4.2: The average noise level per assessed point

SNO	SITE NAME	NOISE LEVEL, dB(A)	HIGHEST LIMIT, dB(A)*
1	Jangwani Beach	62.62	90
2	Oysterbay	55.40	
3	Muhimbili	49.00	
4	Mwananyamala	56.21	
	MEAN VALUE:	**55.81**	

* Occupational Safety and Health Administration; Occupational Noise Exposure Standard (OSHA – 29 CRF 1910.95)

4.2.4 Dust – Total Suspended Particulates (TSP)

Dust levels were assessed using the Casella Microdust Pro particulate monitor model 176000A. The equipment is capable to sample dust in the range from 0.01 to 2500 mg/m^3 with a resolution of 0.001 mg/m^3 (1µg/m^3). The Microdust Pro measures particulate concentrations using a near forward angle light scattering technique. Infrared light of 880nm wavelength is projected through the sampling volume where contact with particles causes the light to scatter. The amount of scatter is proportional to the mass concentration and is measured by the photo detector. Samples were collected at a breathing height of approximately 1.5 metres above the ground. A total of three samples were

collected for each of the eleven assessed points the average of which was the measured TSP value to the individual point.

4.2.5 Dust – Total Suspended Particulates (TSP)

As detailed in Appendix V, the survey findings on the average particulates (dust) level along the proposed sites at Jangwani Beach, Oysterbay, Muhimbili and Mwananyamala showed that the dust particulates emissions were below the threshold value set by the World Health Organization (0.23 mg/m^3).

4.2.6 Ground Vibration

XTECH SDL-800 vibration meter data logger was utilized to quantify the ground vibration at the proposed sites. With a resolution of 0.1 m/s^2, accuracy of ±5%, acceleration of 200 m/s^2, the data logger has a wide frequency range of 10 Hz to 1 kHz for capturing almost all possible vibrations for workplace assessments.

4.2.7 Ground Vibration Level

After capturing the ground vibration level to the individual substation locations, the exposure action value (EAV) and exposure limit value (ELV) were computed based on the assumption of 2 hours duration of exposure to the vibration per day.

The findings show that all the four sites had minimal vibration levels. However, Mwananyamala site had a relatively higher level of vibration. While none of the points along the other sites reached the EAV, two out of the six measured locations at Mwananyamala recorded vibration above the EAV. This is due to the nature of activities close to the site that generated vibration too. The overall vibration level at Mwananyamala, however this was within acceptable range.

- ✓ **Data Analysis**

Data collected under each measurement was compiled and analyzed with spreadsheet software, MS Excel. Interpretation of the data utilized various standards and norms and was compared to the specific threshold limits from the Tanzania standards or an alternative international standard.

4.3 BIOLOGICAL CHARACTERISTICS

This involves assessment of Biological Environment mainly including Flora and Fauna, ecological interaction as well as species diversity. Ecologically sensitive areas, rare-endangered-endemic species shall be considered and if encountered, proper mitigation shall be considered for the impacts.

4.3.1 Vegetation categories in the study area.

Vegetation is an integrator of environmental factors in that it reflects the climatic, physiographic, edaphic and biotic features pertaining to the land on which it grows. An understanding of the vegetation and plants of an area can therefore give good insights into the agricultural or biological potential of that area. Some land uses also depend directly on the vegetation resource and in this case an inventory of vegetation is obviously of great importance (Timberlake, Nobanda and Mapoure, 1993). From the survey findings it has been noted that the proposed project area covers a very little part of natural vegetation types as it pass through the urban areas. Since the project foot prints aims to clear tree within the existing transmission lines, it is anticipated that the project activities will have very minimum negative impact into the vegetation.

The survey was conducted along Ubungo-Ilala 132kV transmission line, the proposed distribution lines along road reserves and on the proposed 33kV substations. During the survey it was noted that the areas which are covered by natural vegetation to be cleared are mainly dominated with shrubs of maximum height of 5mertres of which will not be affected by the project activities for erecting distribution poles and it was noted that the vegetations of the study areas are locally and regionally common.

In the project areas a total number of three types of vegetation units have been classified: **Secondary bushland, *Typha capensis* wetland, and Settlements with alien species.**

4.3.2 Secondary bushland

This vegetation type is being characterized by a land which is dominated by shrubs with scattered small trees less that 5m tall and subjected to regular disturbance especially slashing during road maintenance.

In the project area it is found on a small patch at Mbuyuni hill near the junction to IPTL along the road side.

It is being dominated with shrubs includes; *Harrisonia abyssinica, Dalbergia vaccinifolia, Marhkamia lutea* and *Hoslundia opposita.* The ground is covered by grass species of *Dichanthium annulatum, Sporobolus pyramidalis* and herbs of the species *Tridax procumbens, Euphorbia hirta* and *Ocimum baqcilicum* as shown on Figure 4.1.

In the entire project areas, this is the only part covered with natural vegetation and it hosts the life of IUCN threatened plant species of the category Vulnerable (VU) *Dalbergia vaccinifolia* of the family Papilionaceae (Figure 4.1).

It is anticipated that the project activities will not affect the life of this shrub as it involves clearing of trees with height above 5metre high and this shrub does not reach that height.

However, this IUCN red listed shrub is locally and regionally common in the coastal habitats and it grows in protected areas such as Pande forest, Saadani National Park and Pugu Hills. Therefore, the species can be mitigated and avoid the loss of biodiversity.

Figure 4.1: Secondary bushland vegetation type at Mbuyuni area along Bagamoyo Road. On the right side *Dalbergia vaccinifolia* an IUCN Red Listed plant species grows in this vegetation along the road side.

4.3.3 *Typha capensis* wetland

This vegetation category is being characterized by a wetland which is dominated by reed species of *Typha capensis* in association with other grass species and few aquatic hers and shrubs. In the project area this vegetation type is found at Jangwani substation the end point of the line from Tegeta substation. Common grass species growing in this hahbitat includes; *Panicum maximum, Dactyloctenium aegyptium, Heteropogon contortus* and *Rhynchelytrum repens.* Dominant sedge species becomes *Cyperus prolifer, Fuirena calolepis* and *Mariscus luteus.* Common shrub is *Pluchea disoscoridis* as shown on Figure 4.2 below.

Although the project activities will have no negative impact onto this vegetation type as the species composing it are at lower height below 5metre tall, but also this vegetation type is locally and regionally common with no species of conservation significance. However, this vegetation type will be removed in the area measuring 1325 m^2 which has been proposed for construction of Jangwani Beach substation

Therefore there is no risk of loss of biodiversity due to project activities.

Figure 4.2: *Typha capensis* wetland vegetation type at the proposed Jangwani Beach substation

4.3.4 Alien trees with plant nurseries

This vegetation type occurs along the road side and road reserve where planted trees and shrubs are dominant in association with flying plant nurseries owned by flower and tree seedling vendors**.** In the project sites this vegetation type is the largest occupying almost 95% cover of the entire area covered by plants as shown on Figure 4.3 below.

This vegetation category will be affected by project activities as it is being dominated by trees with height above 5m tall which all will be cleared to allow power distribution lines to pass through.

Dominant tree exotic tree species includes; *Polyalthia longifolia*(Ashok), *Azidarachta indica* (Neem tree/Mwarobaini), *Terminalia catappa* (Bengal Almond Mkungu) *Terminalia mantaly* (Madagascar Almond), *Cocos nucifera* (Coconut/Mnazi) and Mangifera indica (Mango/Muembe) as shown.

Hence this vegetation type is composed of planted exotic plant species; there is no risk of loss of biodiversity due to project activities locally and regionally.

Figure 4.3: Alien trees with plant nurseries vegetation type at Jangwani Beach along Mwai Kibaki Road and Msasani area near Msasani peninsula

Figure 4.4: Existing way leave from Ubungo to Ilala Substation, the existing towers will be used for replacing lines (Left side) and on rightside the road reserve on Mwaki kibaki road in which the Tegeta to Jangwani line will pass through.

4.3.5 Fauna

There were observed no big and wild animals around the proposed project area, this is due to urbanized development of the city. Most animals observed during the survey included birds, lizards, butterflies, grasshoppers, ants of various kinds and many other invertebrates. Some domestic animals were also found where, most of cattles are zero grazing (indoor grazing especially cows and hens, however goats were mostly found grazing openly were there are grasses, the goats are tied with a string on big trees till evenings. These were mainly observed along the transmission line from Ubungo to Ilala and the proposed distribution lines.

Birds

Few species of birds were observed in the project areas during the site visits conducted, however Wildlife Conservation Society of Tanzania has listed over 100 species sighted within the city. Many are water birds seen frequently on the beaches and other aquatic environments. Notably the city is

infested with the Indian crow which is an introduced species that has affected a number of native avian species which were previously abundant along the coast of the city. Indian crows appear in thousands in the city and are a serious pest. There are also pigeons which have become semi wild and inhabit residential areas. Additionally the house sparrow is very common species in all parts of the city.

4.5 SOCIO-ECONOMIC CHARACTERISTICS

This section describes the socioeconomic baselines of all the municipal affected by the project. The project covers one region namely Dar es Salaam and two municipals Ilala and Kinondoni. Generally, all streets that will be affected by the project have most of the basic social services as described in each Municipal socioeconomic profile. The services include schools (primary and secondary), water, health and communications (roads and telephone).

- ✓ **Dar es Salaam Region**

4.5.1 Ilala Municipality

Ilala Municipality is one of the Municipal in Dar es Salaam Region. The Municipality is bordered by the Indian Ocean on its Eastern part with distance of about 10 kilometers. On the southern part it is bordered by Temeke Municipality, whereas on its Western part it is bordered by Kisarawe District and on its Northern is bordered by Kinondoni Municipality. Ilala Municipality bears the status of an Administrative district lies between longitude 39^{o} and 40^{o} east and between latitude 6^{0} and 7^{0} south of the Equator. It has an area of 210 km^2.

- ✓ **Population**

According to the 2002 National Household Census, Ilala Municipality had a population of 634,924 with an average growth rate of 4.6 percent. The inhabitants are of mixed tribes with different dialects. The Census of 2012, a preliminary result shows Ilala population has increased up to **956,471.** Population density now is 4555 while 2002 was 3923.

- ✓ **Economy**

The Municipality has several economic activities that include Office work, Fishing, Tourism, Hotels, Live story keeping especially chicken and dam cattle, Import and export businesses, Transportation and Banking.

4.5.1.1 Demographic profile

According to 2002 National Population Census and the 2012 National Population census the projection data for 2012 collected at site during the site visit, the population of the proposed project area is as follows:

Table 4.3: Population in the villages in project area

Street Name	Ward Name	Household	Street Population	
			Male	Female
Kilongawima	Kunduchi	2153	3217	3162
Mtongani	Kunduchi	4901	10124	9433

Street Name	Ward Name	Household	Street Population	
Kwa Jongo	Makurumula	3065	2788	4005
Mianzini	Makurumula	5689	2905	4438
Mtambani	Mzimuni	700	12000	12500
Mwinyimkuu	Mzimuni	1200	25000	30000
Fire	Upanga Magharibi	605	1532	2540
Charambe	Upanga Magharibi	3714	3318	3218
Mfaume	Upanga Magharibi	540	1192	2011
Ilala Kota	Mchikichini	1707	3459	3411
Makumbusho	Makumbusho	4600	24000	36000

Table 4.4: Primary, Secondary Schools and dispensaries in the project area

Street Name	Number of Primary school	Number of Secondary school	Number of Dispensary & Health centres
Kilongawima	4	-	1
Mtongani	4	4	5
Kwa Jongo	1	-	2
Mianzini	-	-	-
Mtambani	2	-	1
Mwinyimkuu	2	-	-
Fire	-	-	-
Charambe	4	5	2
Mfaume	4	-	3
Ilala Kota	1	1	-
Makumbusho	2	1	3
	24	**11**	**17**

4.5.1.2 Education Services

Ilala Municipal Council for the year 2012 had managed to establish **76** pre-primary centres out of 105 public primary schools. While for private sectors there are **52** registered pre-primary centres. In total there are **3, 656** children (**1,780** boys and **1,876** girls) in Public schools and for non Government pre schools **4,636** children (**2,464** boys and **2,172** girls).

The Municipal Council has **105** public primary schools and **53** non-government schools. Expected enrolment in public schools for 2012/2013 was **20,279** pupils; **9,999** boys and **10,680** girls. The actual enrolment is **10,032** boys and **10,531** girls which totals to **20,563**. The enrolment shows access of **101.4%**. This indicates community awareness on Education.

There are **95** secondary schools of which **49** are for government and **46** owned privately. The total students for secondary schools are **44,543** among of them **20,852** are girls and boys are **23,791.**

4.5.1.3 Health sector

There are one hundred and fifteen (115) dispensaries of which sixteen (16) are government. Refer the table below that shows the distribution and location of these facilities.

NA	**Health type**	**Ownership**		**TOTAL**
		Public	**Private/Public institution**	
1.	National Ref	1	1	2
2.	Ref	1	0	1
3.	Hospitals	1	8	9
4.	Health centers	2	20	22
5.	Dispensaries	20	148	168
6	Public Inst(Military	9	0	9
7.	Special clinics	1	14	15
	Total	34	190	224

Source: Ilala Municipal annual report, 2013

4.5.1.4 Water Supply

Ilala Municipality has **304** wells as amongst the sources of water for human consumption. There are 170 deep wells of which 146 are in operation and the remaining 158 have stopped functioning due to technical problems. The wells which are in operation have the capacity of generating **1,231,439** liters that could have served **490,434** people by at least three buckets a day.

4.5.1.5 Telecommunication

Telecommunication is well covered with TTCL. There are cellular phones operators namely Zain, Tigo, Zantel, Vodacom and the new one in business being introduced by TTCL -Sasatel. A number of Internet services providers are also available.

4.5.1.6 Energy Supply

Charcoal is the most important form of energy used for domestic purpose such as cooking. Electricity is mainly used for domestic, commercial and industrial use. Other sources of energy are firewood, gas for cooking and biogas in a small case.

4.5.2 Kinondoni Municipal

The Municipality is bordered by the Indian Ocean to the North East, Ilala Municipal to the South, Bagamoyo District to the North, Kibaha District to the West and Kisarawe District to the South West. The Municipality has a total area of **531**square kilometers.

4.5.2.1 Population

According to the 2012 population Census, the Municipality has a population of **1,775,049** being the most populous local authority in the country, with the population growth rate of **5.0%** per annum and population density **3,343** people per square kilometer.

4.5.2.2 Employment and economic activities

It is estimated that 841,551 residents of Kinondoni Municipality are employed in private, public sectors and self employed. 513,346(61%) are employed in the private sector, 300,434 are self employed while the rest 27,771 are employed in the public sector. The majority of the residents are street vendors, service and shop sales workers, craftsmen fisheries, livestock keepers and farmers. Only 3% of the working force is engaged in subsistence agriculture in the peri-urban areas. There are no big farms but small plots ranging from 2.5 to 6 acres. Others make small gardens around their houses in which various vegetables and root crops like cassava and sweet potatoes are grown for family food and the surplus for income generating.

4.5.2.3 Health Services

The Council currently has a total of 304 health facilities of which 87 are government owned, while the remaining 217 are owned by Parastatal, Private and Faith Based Organizations. There are 25 hospitals, 14 health centres, 163 dispensaries and 102 reproductive and child health clinics.

4.5.2.4 Education Services

With regard to education, the Municipal Council has a total of 232 Pre primary school of which 127 are for Government and 105 are for private owners, 229 Primary school of which 139 are for Government and 90 for private owners, 5 Teachers college of which all belongs to Private Owners and 8 Universities of which 3 are for Government and 5 private Universities. There are **145** secondary schools of which **46** are for government and **99** owned privately.

4.5.2.5 Water Supply

The main source of water for Kinondoni residents is from Lower and Upper Ruvu which managed by Dar-es-salaam Water and Sewerage Authority (DAWASA). The water from DAWASA systems contributes 68% of water being consumed daily and the rest is contributed by shallow and deep wells

which are owned by both private and community. The estimated population of Kinondoni Municipality is 1,627,355 out of that only 65% have direct access to clean and safe water while the rest which is 35% have no smooth access.

4.5.2.6 Infrastructures

Kinondoni Municipality enjoys good services of all important infrastructures. It can be easily accessed from all parts of the country by well maintained tarmac roads, railway line and by air.

4.5.2.7 Telecommunication

Telecommunication is well covered with TTCL. There are cellular phones operators namely Zain, Tigo, Zantel, Vodacom and the new one in business being introduced by TTCL -Sasatel. A number of Internet services providers are also available.

4.5.2.8 Energy Supply

Charcoal is the most important form of energy used for domestic purpose such as cooking. Electricity is mainly used for domestic, commercial and industrial use. Other sources of energy are firewood, gas for cooking and biogas in a small case.

CHAPTER FIVE

5.0 STAKEHOLDERS CONSULTATION AND ANALYSIS

5.1 Stakeholders Consultation

Consultation of stakeholders is a very important component in the EIA process. It is one of the key factors that enhance environmental governance. Stakeholders are individuals, groups of individuals or institutions that have interest in the proposed project. This includes those positively and negatively affected by the project. Stakeholders' participation involves processes whereby all those with an interest in the outcome of a project actively participate in decisions on planning and management of the proposed development.

It is a Government policy that beneficiaries of and members of public living near new project sites (both public and private) are consulted to seek their views and opinions regarding the projects before they are implemented. To that end, this ESIA study was carried out in line with NEMC requirements, JICA guidelines for Environmental and Social considerations and in general good practice by the Proponent to remain compliant with the law. The Public consultation process involved visiting the areas along which the proposed distribution lines and substations will be constructed. The stakeholders were identified and consulted with the objective of describing the existing socio-economic conditions within the proposed project area of influence and the immediate surroundings.

Specific objectives was to Consult and gather recommendations from the local administration which involves Regional Commissioner, District Commissioners, Municipal Directors, Municipal Officers, Ward and Mtaa leaders and communities that have a stake in the project and provide an opportunity to all the stakeholders and communities in the areas where the proposed project is expected to pass to raise issues and concerns pertaining to the project, and allow the identification of alternatives and recommendations.

The study involved a participatory approach in the preparation of the ESIA study. This entailed seeking information/experience from stakeholders such as ward and Mtaa leaderships, local representatives and other institutions who have been involved in one way or another in the implementation of the project.

In order to get views in the ward and Mtaa level the team opted to use the Focus Group Discussion method which involves different people such as ward leaders, Mtaa leaders, youth representatives, women representatives and elders representatives. Open-ended questionnaires were also administered to households and small business enterprises neighbouring the site. Concerns, views and opinions from the respondents were received.

Consultation with stakeholders has been initiated and will be continued throughout the project life to ensure regular communication between the project proponent and PAPs. This allows for the provision of updates, changes, alteration, and new concerns where necessary from both the project proponent and PAPs such that both parties have a common perception as to what the project entails.

The team conducted FGD (Focus Group Discussion) in these wards which will be affected by the project and public meeting in some street. The meetings aimed at informing the community about the project and the associated impacts. FGD members were informed of the positive and adverse impacts

of the project include loss of land, possibilities of increase spread of HIV/AIDS especially during construction phase, as well as other Environmental and social impacts associated with the project. FGD members were also sensitized on their right to be compensated and applicable compensation norms if they will be affected. Further they were given an opportunity to ask questions, raise their concerns and provide information to the team on different issues concerning the project. Identified Issues of Concern during Meetings with Stakeholders are as follows:-

5.1.1 Consultation Meetings with Municipal Authorities

Consultation meetings with RAS office Ilala, Municipal authorities of Ilala and Kinondoni, DC'S office at Ilala and Kinondoni were held and the aim of the meetings were to discuss the project with officials and obtain relevant data and information from the respective offices.

Most of the consulted district councils and municipal officials agreed to the importance of the proposed development project to the regional and local communities' development. They had the following concerns:-

- ✓ TANESCO should now opt using the underground cables instead of overhead transmission lines.
- ✓ Another concern was the issue of compensation. If TANESCO project is going to affect people compensation procedures should be done in order to avoid misunderstanding with the community and communication should pass through Municipal offices, ward and Mtaa levels in order to make them aware of what is going on about the project.
- ✓ TANESCO should educate the community about the project in order to avoid conflict, there might be different challenges but if education will be clearly provided the project will be successful.

5.1.2 Consultation Meetings with TANROADS

During scoping exercise consultation meeting with Manager TANROADS Dar region was done and he had different opinion as follows:-

- ✓ TANESCO should have good plan with their project in order to avoid using road reserve. Using road reserve is not a proper plan so the company should prepare for compensation when implementing the project regardless the cost. Using underground cables is the best option nowadays so the company should opt using this method.
- ✓ Those who will be found in the road reserve are encroachers and are not entitled for compensation. But if TANESCO is going to use area which is out of the road reserve then compensation should be paid.
- ✓ TANESCO have a big challenge concerning theft of their properties and these thieves do cooperate with TANESCO staff so security should be increased in the transformers and other properties.
- ✓ TANESCO should protect the environment, the behavior of cutting trees during clearance of the line and leave trees is bad and it brings bad reputation to the company. After pruning trees cleaning should be done.

5.1.3 Consultation Meetings with DAWASA

Consultation meeting was conducted with Eng. Bunyese who had different views as follows:-

- ✓ Surveyor from TANESCO should observe what is inside the proposed route and it will be good to have a joint survey with DAWASA officers in order to observe what is in the proposed route and advice accordingly.
- ✓ He insisted that there must be cooperation between TANESCO and other stakeholders so as to eye mark other property inside road reserves which belongs to other companies.
- ✓ In order to make a project success they advice TANESCO to pass the distribution line (from Tegeta S/S on the way to Bagamoyo road project) on the left side of the road from the substation because they have another large water pipe project on the right side which is expected to start soon. But if that option will not be good for TANESCO then the company will have to wait until we are done with our water project.

5.1.4 Consultation Meetings with TTCL

During scoping exercise consultation meeting with TTCL was done and they had these concern:-

- ✓ The project is good in order to make it successful there must be cooperation between TTCL, DAWASA, TANROADS and respective municipals. He advised TANESCO to arrange a day so as to have site visit to conduct joint survey with all stakeholders as this will enable the company to have a good plan with the project after identifying all properties which belongs to other companies in the proposed route.

5.1.5 Consultation Meetings with Local Communities

Public participation process followed the guidelines as stipulated in the Environmental Management Act No. 20 of 2004, Part XIV regarding public participation in environmental decision-making. To facilitate an open and transparent process, interested and likely to be affected persons were identified all along the proposed route and later informed of the proposed project development and subsequent phases of the project. The positive impacts and negative impacts of the project and the corresponding mitigation measures were also described in details. Finally, at the end of the meeting, the communities were given an opportunity to ask questions, give comments, warnings, observations and opinions. These comments, observations, questions and opinions received from each person have been summarized and are addressed below. The meetings involved many people, among others, from 15 wards of 2 Municipals in Dar es Salaam region in which proposed project pass through. List of their names and signature is shown in **Appendix VI.**

Consultation meeting with local communities was conducted through focus group discussion meetings, public meeting and open ended questionnaires. These meetings involved local leaders, community members (representative of women, youth, and old people) and TANESCO team.

The consulted wards based on the proposed routes were:

- ✓ Mchikichini, Upanga East and Upanga West in Ilala Municipal Council,
- ✓ Makurumla, Kawe, Mzimuni, Kunduchi, Wazo, Msasani, Mabibo, Ubungo, Mikocheni and Makumbusho ward in Kinondoni Municipal Council.

Consultation in each ward commenced by stating the objective of the consultation meeting i.e. inform the FGD members about the project and what the proponent will do to address the potential impacts of the project.

Summary of the main issues raised during the consultation meetings and their responses

- ✓ How the project would be beneficial to the community.

  The ESIA team thanked the residents for their participation and responded to their questions informing them that the project has its benefits and drawbacks. Some of the benefits highlighted were:
  - Gains in the local and national economy thus leading to increase in revenue.
  - Access to reliable power.
  - Informal sector benefits.
  - Improved security in the area due to street lightning.
  - Direct and indirect skilled and non-skilled employment opportunities
- ✓ How safe would one be if he/she lives near the substation?
  - For safety issues, it is highly recommended that no one lives too close to the substation and this would be adhered to. In addition the following is done:
  - It will be built by experienced personnel.
  - Perimeter fencing, Security and lightning.
  - Entry to the substation is restricted, only authorized officers will be allowed
- ✓ Some of the drawbacks of the projects identified were:
  - Air and noise pollution during construction.
  - Oil spillage during construction.
  - Possibility of occurrence of accidents on the site during construction.
  - Presence of the substation may expose people to accidents and health hazards.
  - It was responded that In view of occupational health and safety concerns, the proponent will ensure health, safety and welfare of workers to prevent accidents in the course of employment and additionally provision of PPE would reduce the impacts of dust and minimize exposure to a variety of hazards respectively.
- ✓ Wanted to know whether the locals would be employed during the construction and operation phases of the project. The community expressed fear that local youths may be side lined in securing employment opportunities especially during the construction phase of the proposed project. “The contractor may decline to employ youths here and use his staff” the community asserted.
  - The team emphasized that locals will be given first priority in employment especially casual employment, the contractor will be advised to contract locals in the project area.
- ✓ Compensation of the properties to the affected people to be done before construction of the project and that proper valuation of properties and payment be made in time and should be adequate to enable PAPs get alternative housing.
  - It was responded that in deed compensation will be paid before construction starts according to Land Acts 1999.
  - The valuation process is vested to Chief Government Valuer and TANESCO being public company cannot pay beyond the Chief Government Valuer’s opinion
- ✓ Awareness on the valuation and compensation of the properties procedures to the affected people by the project. This is because most people are unaware of the procedures involved during valuation and compensation exercise.
  - TANESCO agreed that is the problem during the valuation exercise and promised to continue raising awareness during the detailed ESIA study. Further, TANESCO will ensure that engaged valuers conduct awareness meetings with PAPs before the valuation of properties starts.
- ✓ Wanted to know how will issues relating HIV/AIDS to the construction workers and community be dealt.

- It was responded that HIV/AIDS awareness within the community is very high but the project will continue to educate and sensitize workers and the community on how to avoid spread HIV/AIDS during the project implementation.
- Adverts and brochures will be erected and distributed to workers to warn and to remind people to take care for themselves. In addition condoms will be put at special areas for self-help.

The main issues that were raised by the community through questionnaires included the following:

- The project will enhance the reliability and security of electricity supply in the region in addition to increasing the region's power supply. This will help meet the increasing demand for power supply and minimize the frequency of power outages.
- The construction, operation and decommissioning of the proposed substation will create employment opportunities for both skilled and unskilled personnel.
- Some stakeholders especially the community was concerned about the possibility of occurrence of accidents such as electrocution and machine/vehicle misses during the construction and operation phase of the proposed project.
- Increase in reliability and security of power supply in the region will enhance efficiency and productivity of other sectors including health, education, water supply, livestock production and industry.
- With increased lighting in the area and presence of guards on the project site the security of the area will be enhanced.
- Electricity supply to hospitals and dispensaries in the project area would enhance delivery of services such as laboratory, surgical, immunization, among others.
- Improved health and education sector.

Disadvantages of the projects were identified as follows through questionnaires:

- Noise pollution during construction. The construction and decommissioning works of the substation will most likely be noisy due to the moving machines (mixers, tippers, drilling etc.) and incoming vehicles to deliver construction materials to site or take away debris.
- Exhaust emissions are likely to be generated by the motored equipment during the construction and decommissioning phase of the proposed substation. Motor vehicles that will be used to ferry construction materials, take away debris during decommissioning phase or those used for general operation activities (operation phase) will also have impacts on air quality.
- Dust emission is likely to occur during the site clearance, excavation and spreading of the topsoil during construction. They are also likely to occur during the decommissioning phase. Motor vehicles accessing the site may also lead to dust emissions.
- Motorized machinery on the proposed site may be containing moving parts which will require continuous oiling to minimise the usual corrosion or wear and tear. There is also a potential for oil spills and accidents during oil transportation, storage and operations of the transformers and batteries.
- Possibility of occurrence of accidents on the site during construction.
- Presence of the substation may expose people to accidents and health hazards.

Therefore, all these concerns is addressed in this EIA document that will include the preparation of Environmental and Social Management (ESMP) and Monitoring Plans (EMP).

Photo Documentation during ESIA study

Figure 5.1: Community members raising their concerns during ESIA study at Upanga West ward

Figure 5.2: Focus group Discussion with people living near the proposed 33kV Distribution line from Makumbusho to Msasani Line at Msasani ward.

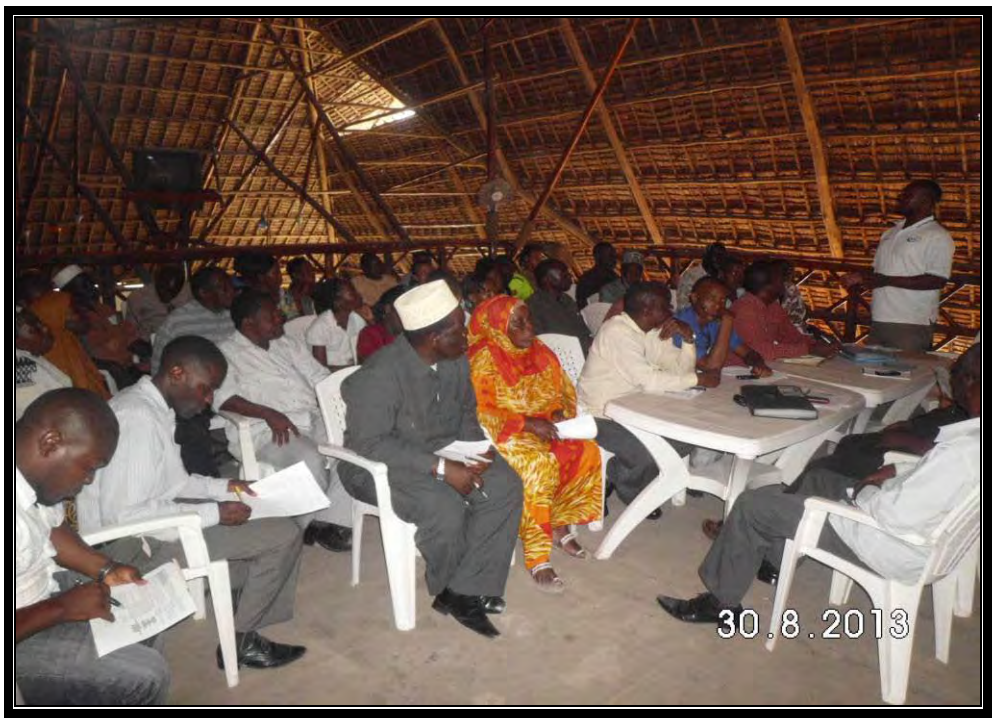

Figure 5.3: Environmental Expert explaining about the project to the people around proposed project in Mabibo ward

Figure 5.4: Sociologist Expert explaining about the project to the people around proposed project in Kunduchi ward

Figure 5.5: Household Questionnaires with people around proposed project in Mwananyamala ward

Figure 5.6: Household Questionnaires with people around proposed project in Kunduchi ward

CHAPTER SIX

6.0 POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND ALTERNATIVES

The project will comprise of the following phases: Survey and design, mobilization, construction, demobilization, operation and decommissioning. These phases will have some impacts on certain aspects of the biophysical and social-economic environment either positively or negatively and sometimes neutral.

A checklist was used to assess the effects of the project on the topics grouped into landform, water resources, ecological resources, aesthetic values, cultural environment, public health and safety and socio-economic factors. These impacts are substantiated during consultations. The impacts can be local, regional or international nature, thus boundaries need to be defined.

6.1 Project Boundaries

Determining the boundaries within which the EIA to be undertaken is an important step in the identification of impacts since this will also determine the extent in which the impacts will be experienced. Three types of boundaries that are considered in this scoping are: institutional, spatial and temporal boundaries.

6.1.1 Institutional boundaries

Institutional boundaries refer to those institutions and sectoral boundaries in which the project interacts with. These can be determined from political boundaries, Acts, regulations and institutional mandates. The proposed network enhancement/rehabilitation will bring energy in the Kinondoni and Ilala municipals. This proposed development touches the interest of many institutions and administrative structures in relation to several policies, laws and plans in Tanzania and outside Tanzania, including the development partners.

Administrative institutions such as Dar Es Salaam City Councils and Kinondoni and Ilala Municipal Councils form part of the institutional boundaries for this development. Other institutions that will be touched by the proposed development include the Ministry of Energy and Minerals, Vice President's Office (Division of Environment), NEMC, Ministry of Finance, Ministry of Water, Ministry of Health, TANESCO and several other government agencies; that support and promote energy development in Tanzania.

6.1.2 Spatial boundary

Though spatial boundaries are difficult to determine accurately, but it is crucial to decide whether impacts are likely to occur at local, regional, national or international level. The construction of the proposed power project will have far reaching implication: that could be felt locally, regionally and outside Tanzania, thus causing impact to as far as those areas. For example, the power line and installation of steel poles may create demand for goods and services that are obtained within the district, other districts in the country and the countries outside and also enhance energy services. In this report we consider the project area along the road reserve to the selected roads in the City and where the construction material will come from and pass by like our roads, railways or ports. Many investors may be attracted from different parts of the world just to hear better power services in the area. The impacts (positives and negatives) in the nearby areas include the rest of the Ilala, and nearby districts, where most of the labour force, some building materials, food and goods are likely to be obtained from

6.1.3 Temporal boundaries

Temporal boundaries refer to the lifespan and reversibility of impacts and project phase (Pre-construction, during construction, during operation and decommissioning phases). Some impacts may be short-lived, some could be persistent and might be different depending on the phases of the project. The full EIA should identify these impacts clearly and suggest the mitigation measure.

6.2 Possible Impacts Identification

Power project usually involves survey and design, mobilization, construction, demobilization operation and decommissioning. These phases are likely to have some impacts on certain aspects of the biophysical and social economic environment either positively or negatively and sometime neutral. Therefore, it is anticipated that there will be environmental and social impacts affecting various groups socially and economically. It is further anticipated that the communities will have to be protected from any negative impacts, while opportunities to be offered by the project need to be made visible to the communities. Those various groups likely to be affected by the project were closely involved in raising their concerns of the project which are addressed in the stakeholder's consultation chapters of this ESIA report.

The prediction of impacts is based on the entitlement matrix, knowledge of the expert on such project and their secondary and synergetic/ cumulative effects for the biophysical environment and local community. The assessment and valuation of impacts for different project components is characterized based on the following parameters:

- ✓ **A+/-:** significant positive/negative impact is expected
- ✓ **B+/-:** Positive/negative impact is expected to some extent.
- ✓ **C+/-:** Extent of positive/negative impact is unknown. (A further examination is needed, and impact could be clarified as the study progresses).
- ✓ **D:** No impact is expected

Table 6.1 below provides a list of foreseen environmental and social impacts of the rehabilitation of substation and construction of new lines and substations.

Category	No	Item	Degree of Potential Impacts in project phases			Potential Impacts
			Pre-Construction	Construction	Operation	
Pollution Control	1.	Air Quality	B-	B-	D	Pre-Construction and Construction: -Generation of Dust and Exhaust gas from construction machine and vehicles. Operation: -There will be no emissions of air pollutants from the operation.

	2.	Water Quality	D	D	D	Pre-Construction, Construction and Operation: -There will be no pollution of water during both phases since project area is far away from source of water.
	3.	Soil Erosion	B-	B-	D	Pre-Construction and Construction: -The construction works associated with the site preparation, vegetation clearance for RoW involve minor earthworks which include excavation of foundations (in substation, excavation of holes for steel poles and backfilling will lead to soil erosion and pollution. Operation: -There will be no soil erosion during this phase.
	4.	Waste	B-	B-	B-	Pre-Construction and Construction: -Generation of domestic and industrial waste from construction sites. Operation: - If Waste Oil in transformers is not properly handled, waste oil will be carried outside the site with storm water.
	5.	Soil Contamination	B-	B-	B-	Pre-Construction and Construction: -If waste Oil for construction machine and vehicle is not properly handled, waste oil will contaminate the soil and leach into underground water. Operation: -If Waste Oil in transformers is not properly handled, it will contaminate the soil and leach into underground water.
	6.	Noise &Vibration	B-	B-	B-	Pre-Construction and Construction: -Generation of noise and vibration due to movement of machine and vehicles. Operation: -There will be some noise pollution during the operation phase.
	7.	Land Subsidence	D	D	D	Pre-Construction/Construction/Operation: -There will be no extensive underground water use for the construction work that will cause land subsidence.
	8.	Odor	D	D	D	Pre-Construction/Construction/Operation: - There are no activities anticipated in this project that might cause odor complaints.
	9.	Sediment	D	D	D	Pre-Construction/Construction/Operation: - There are no activities anticipated in this project that might affect the quality of sediment(e.g. Contamination

						by Heavy Metal)
Natural Environment	10.	Ecosystem	A-	A-	A-	Pre-Construction/Construction: -There are some Important Bird Areas that might be affected by the construction work. Operation: -There are other migratory birds in this area and the modification of transmission line might cause electrocution and collision.
	11.	Hydrology	D	D	D	Pre-Construction/Construction/Operation: There will be no extensive cutting and filling in the construction work that will cause impacts on surface water and underground water flow.
	12.	Topography and Geology	D	D	D	Pre-Construction/Construction/Operation: There will be no extensive cutting and filling in the construction work that will cause impacts on topography and geology nature of the project area.
	13.	Impact on Vegetation	B-	B-	B-	Pre-Construction and Construction: -Some clearance of vegetation cover will occur during both phases although impacts will be small since the project will pass in road reserves. Operation: - Low maintenance of the RoW will involve clearing of vegetation using mechanical methods. This will lead to permanent control of vegetation within RoW.
Social Environment	14.	Resettlement	A-	A-	D	Pre-Construction and Construction -There are number of Project Affected Families (PAFs) in which will be determined by RAP study. Operation: -There are no activities anticipated in this project that might cause resettlement
	15.	Poverty	A-	A-	D	Pre-Construction and Construction: -The poor who are affected by this project need to be included in the Resettlement Action Plan and HIV/AIDs Prevention Plan. Operation: -There are no activities anticipated in this project that

						might cause resettlement
	16.	Local economy such as Employment and improvement of livelihood	B+	B+	B+	Pre-Construction: -There would be little opportunities for employment and economic activities in this stage. Construction: -There will be employment opportunities and demand for construction materials during construction. Operation: -Business opportunities will be created with the newly delivered of stable electricity.
	17.	Cultural Heritage	C-	C-	D	Pre-Construction and Construction: There are no heritage sites along the proposed project area that are already confirmed by the relevant authorities. However, local archeological, historical, cultural, and religious heritage sites might be found during construction. Operation: -There will be no activities having impacts on local archeological, historical, cultural, and religious heritage sites.
	18.	Gender	B-	B-	D	Pre-Construction/Construction -Gender issues that might be caused in Resettlement and HIV/AIDS prevention activities will be addressed in the Resettlement Action Plan and HIV/AIDs prevention plan. Operation: There will be no activities having impacts on Gender issues.
	19.	Infectious Disease such as HIV/AIDS	B-	B-	D	Pre-Construction/Construction - HIV and STDs might be brought due to immigration of workers associated with the project. Operation: There will be no activities having impacts on infectious diseases
	20.	Accident and Safety Issues	B-	B-	B-	Pre-Construction/Construction -Without proper measures for construction, accidents on the public roads might happen.

						Operation: -The power lines might be cut by accident or natural disaster.
	21.	Water abstraction	B-	B-	D	Construction -Water for construction work will be necessary and taken from nearest water sources, boreholes or rivers. Pre-Construction/Operation: -Water will not be necessary for the operation

Note:

- ✓ **A+/-:** significant positive/negative impact is expected
- ✓ **B+/-:** Positive/negative impact is expected to some extent.
- ✓ **C+/-:** Extent of positive/negative impact is unknown. (A further examination is needed, and impact could be clarified as the study progresses).
- ✓ **D:** No impact is expected

6.3 PROJECT ALTERNATIVES

Project alternative refers to the considerations made in the course of developing the project that would achieve the same project objectives. Consideration of project alternatives is crucial in ensuring that the developer and decision–makers have a wider base from which they can choose the most appropriate option and more proactive sides of environmental assessment. This process serves to enhance the project design through an examination of the potential options instead of only focusing on the more defensive task of reducing adverse impacts of a single design. This calls for the comparison of feasible alternatives for the proposed project site, technology, and/or operational alternatives. Both the viability and economic considerations were born in mind when assessing the alternatives. Different project alternatives have varying characteristics, in this report, alternatives consideration was made on the location/demand and input options. Despite being a range of methods, which were used in evaluating different alternatives, this report relied on consultations with stakeholders and field visits to locations that were felt to provide close characteristics to the alternative proposed by this study. The following alternatives were considered but where found either to have high investment and operational costs, not meeting the project objectives or environmentally unfriendly as compared to the proposed ones.

6.3.1 No project alternative

The no project alternative entails retaining the current status quo without developing the project and therefore foregoing such investment. Based on the analysis of current situations of electricity, power demand and network reasonability in the City, that is to say Dar es Salaam City will not solve the problem of low power supply capacity of the existing power infrastructures. Also it will not improve power availability in Dar es Salaam City and failed to help the development of socio-economic activities, industries and big investment in Dar es Salaam region. Quality of life of residents who restricted on energy use will not improve. All will still spending lot money for fuel, maintenance and spares which could have been spend on other social benefits.

In fact this decision will not disturb the existing environment and will not take any land of the PAPs. However, it will deny the economic gains through employment, government revenues indirectly from development of socio-economic activities, industries and big investment around project regions and social development in the region. TANESCO will not gain the benefits accrued from solving the problem of low power supply capacity in Dar es Salaam City.

In other words the "Zero Option" is not in line with the Government policies of improving the investment development in order to achieve the requirements of National Strategy for Growth and Reduction of Poverty (NSGRP/MKUKUTA) as envisaged in the Tanzania's Development Vision (Vision 2025) which stresses on development and commitment to regional and other international initiatives for social and economic development.

6.3.2 Transmission and distribution lines Alternatives

The transmission and distribution lines can be constructed overhead lines and underground cables. However, the choice of the transmission and distribution lines depends on many factors including the costs and time factors. The major advantage of overhead lines is that cheap, less time consumption and does not require more knowledge especially during construction compared to other forms of power lines. The proposed project has only underground cables alternatives.

6.3.2.1 Underground cables

Underground cables are more expensive, time consumption and require more knowledge especially during laying down of the cables compared to overhead power lines. This option is ruled out due to investment costs and other viewpoint as explain above.

6.3.2.2 Distribution line from Ilala to Muhimbili

This alternative was disregarded after site visit to the area. The design of the line was observed to be more expensive considering the environmental factors of the area since the area is swampy limiting accessibility during construction and operation of the line. More over the line would pose risk to people around in case of emergency on the line. Therefore this option was replaced with an alternative line from City centre to Muhimbili.

6.4 Alternative Transmission Line Routes Selection

Currently there is only one route selection which based on construction costs and reduced anticipated environmental and social-economical impacts. The current design proposes the distribution line routes be located along existing roads reserves, that is TANROADS' and Municipal Councils' so as to minimize the environmental and social impacts i.e. resettlement of people along the proposed routes. All road reserves owners gives TANESCO permits to pass through it.

6.5 Alternative Locations for Substations

Currently there are no preliminary alternative locations for substations since upgrading of Ilala and Msasani substation will take place inside the existing Substations owned by TANESCO and others new substations will be constructed within located areas as per proposed designed and TANESCO have permit for both new constructed substation from plots owners. These existing locations of substations have been proposed in order to reduce social-economical impacts since and environmental impacts will be low.

CHAPTER SEVEN

7. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

7.1 General overview

The Environmental and Social Management Plan (ESMP) presents the implementation schedule of the proposed mitigation measures to both environmental and social impacts as well as planning for long-term monitoring activities. In order to be effective, Environmental Management Plan must be fully integrated within the overall project management efforts at all levels, which itself should be aimed at providing a high level of quality control, leading to a project which has been properly designed and functions effectively throughout its determined life span. The sited responsible institution should be ready to monitor indicators and fully supervise to fully minimize the impacts level.

Essentially, ESMP is an integral part of the environmental project management process. It checks the implementation and success of mitigation measures during construction and operation/ maintenance of the project. It is the monitoring system/tool that will reveal changes and trends brought about by the construction and operation of the project under development.

For the rehabilitation of substations and construction of new lines and substations in Dar es Salaam Project, the ESMP is given in Table 7.1. The ESMP also includes the associated environmental costs needed to implement the recommended mitigation measures. The recommended ESMP have been made to enable the project implementation to be more environmental friendly.

To facilitate smooth implementation of the project, all parties involved in the design and those to be involved in construction of the transmission line will have to take into consideration the mitigation measures recommended in this study.

The implementation steps will involve the contractor, the Resident engineer, TANESCO, and the local/nearby communities at large. An Environmental Control Officer (ECO) to be appointed by the consultant/contractor will ensure and monitor the implementation of the (ESMP).

Table 7.1 shows the environmental management plan and estimated costs. Estimated costs are only indicative and therefore, should the proposed development go on with the suggested changes, the developer (TANESCO) will have to work out actual costs and include them in the overall cost of the project. In accordance with EMA, (URT, 2004) NEMC will be responsible to ensure implementation and compliance of the proposed environmental management and monitoring plans.

Table 7.1: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

Phase	Potential Direct Impacts	Management/Mitigation Measures	Significance	Target Level/Standard	Responsibility	Estimated Costs (T.shs)
SITE SELECTION	Damage/Loss of valuable natural habitat, and contained biodiversity if any	✓ Proper route/site selection mainly along the road reserve limited ✓ The TANESCO shall ensure natural regeneration at all degraded areas and species enrichment.	Negative and short term	As minimum loss as possible	TANESCO	5,000,000 per year
	Loss of land/property and disruption of land use and economic activities	✓ Proper route/site selection mainly along the road reserve limited ✓ Reallocation of land to nucleated settlement if the need arises ✓ All the procedures of acquiring land from the former owner to be followed and TANESCO to have title deed for plot on substation	Negative and short term	Land and title deed have been acquired and no compensations needed.	TANESCO, Ilala and Kinondoni LGAs	Part of project costs
	Conflict with other users on the proposed project area.	✓ Conduct proper consultations and awareness. ✓ Meetings will be conducted regularly to discuss any arising issues.	Negative and short term	Conflicts as minimum as possible	TANESCO , Kinondoni and Ilala LGA	10,000,000 per year
DESIGN	Nuisance and Disturbance to on/offsite noise pollution receptors	✓ The contractor shall maintain machinery and vehicles in good running conditions by ensuring that any construction equipment to be used undergoes weekly preventive maintenance to minimize noise and air pollution and leakages. ✓ The TANESCO in collaboration with the contractor shall enforce vehicle road restrictions to avoid excess emissions from engine. ✓ The TANESCO shall consider the routine inspection of all machinery and construction equipments	Negative and short term	As minimum noise /emission as possible	TANESCO, Contractor.	Part of project costs
	Deteriorated of local air quality	Same as row above	Negative and short term	As minimum noise /emission as possible	TANESCO, Contractor.	Part of project costs
	Increased income to locals from employment opportunities and reliable and stable power	✓ The TANESCO to collaborate with the Kinondoni and Ilala LGA to allocate job fairly among suitable people available in the project area, service lines connected.	Positive and Long term	Less poverty	TANESCO, Kinondoni and Ilala LGA	50,000,000 per year

	Public health hazards, nuisance and loss of aesthetics	✓ The Contractor shall prepare and submit with tender a Waste Management Plan for proper handling and storage of materials; proper treatment of waste and sewerage. ✓ During earthworks, i.e. excavation, digging pits, etc. contractor shall ensure the top soil is pilled aside at one place, and used to fill the borrow pits and any bare land surfaces to allow regeneration of the indigenous plants of which their seed bank always stays with the top soil and make sure to reinstate all paved blocks ✓ During construction mobile/portable toilets shall be used by all workers ✓ At completion of each day, site shall be left clean and tidy; debris, scrap and spill materials removed. ✓ Domestic waste shall also be buried in pits or toilets to be dug at the site	Negative and short term	No haphazard disposal of domestic wastes	TANESCO	Part of project costs
	General public health and safety hazards	✓ Drivers of heavy equipments to use ear plugs – protection from exposure of excessive noise levels e.g. ear plugs; alternatively exposures shall be limited to 8 hour only ✓ Day time movement; drivers of vehicles shall be instructed to observe speed limits, particularly when passing through settlements and schools. Speed bumps could be constructed if necessary to limit the speed of moving vehicles to 50 km/hr. ✓ The contractor to employ drivers with authenticated class C licence and with a minimum of 3 years of driving after obtaining the class C licence ✓ The contractor to sensitize all drivers on the importance of observing traffic regulations ✓ All workers to be provided with safety gears ✓ Communities shall be sensitized on safety issues, how to protect themselves from	Negative and short term	Health and Safety Induction course including Personal Protective Equipment (PPE) to all workers.	Contractor, TANESCO and mtaa leaders	Part of project costs

		danger and accidents				
	Occupational health and safety hazards	As two rows above	Negative and short term	Health and Safety Induction course including personal protective equipment to all workers.	contractor	Part of project costs
	Public health / safety hazards	✓ TANESCO in collaboration with the Contractor to conduct awareness campaigns among workers and tenants to mitigate HIV/AIDS spread if the need arises.	Negative and short term	No or minimum HIV/AIDS victims	TANESCO, Kinondoni and Ilala LGA, contractor	5,000,000 per year
	Compromised Security	✓ TANESCO shall device a system of safeguarding the project items from theft and vandalism	Negative and short term	No vandalism cases	TANESCO	5,000,000 per year
MOBILIZATION AND CONSTRUCTION	Loss of vegetation cover / Land degradation for re-aligning various agricultural operations	✓ Close unnecessarily temporally cleared areas ✓ Route adjustment to avoid high valued features(habitats) ✓ Open minimal access roads	Negative and short term	As minimum vegetation clearance as possible	Contractor	Part of project cost
	Soils Damage/disturbance to surface and sub-surface organisms	✓ During construction, low-pressure equipments shall be used and sensitive soils (water logged, prone to erosion) shall be avoided.	Negative and short term	No degradation	Contractor	Part of project cost
	Impaired local air quality, disturbance/ nuisance to workers and offsite-receptors	As above	Negative and short term	As minimum noise /emission as possible	TANESCO. Contractor	Part of project cost
	Contamination/impaired quality of receiving body – land and water sources	✓ Both TANESCO and contractor shall undertake training and instruction to crew in proper handling and clean up of contaminating spills	Negative and short term	No haphazard disposal of solid waste/domestic waste	TANESCO, Contractor	Part of project costs
	Hazards to workers-injuries, accidents and electrocution	✓ Code of conduct at work place should be instituted to assure safe working environment. Proper underground depth	Negative and short term	As minimum as possible	TANESCO Contractor	Part of project cost

OPERATION	Increased incomes to local government authority	✓ The project will add to the government economy by generating tax revenue Kinondoni and Ilala LGA	Positive and Long term	Improved project implementation	Kinondoni and Ilala LGA	Part of project cost
	Improved household economy and livelihoods , Improved power security and Induced development	✓ Improved household economy ✓ Improved power security ✓ Induced development	Positive and Long term	Improved project implementation	Kinondoni and Ilala LGA	Part of project cost
DECOMISSIONING	Loss of employment and contaminations	✓ Awareness and SACCOS creation ✓ Removal of machines/plant and waste materials,	Negative and short term	As minimum as possible	TANESCO	Part of project cost

CHAPTER EIGHT

8. ENVIRONMENTAL AND SOCIAL MONITORING PLAN (EMP)

Table 8.1 shows the environmental and social monitoring plan (EMP), which includes monitoring indicators, frequency and estimated costs. Estimated costs are only indicative and therefore, should the proposed development go on with the suggested changes, the developer (TANESCO) will have to work out actual costs and include them in the overall cost of the project. In accordance with EMA, (URT, 2004) NEMC will be responsible to ensure compliance of all the agreed conditions for authorization.

Table 8.1: ENVIRONMENTALAND SOCIAL MONITORING PLAN (EMP)

Phase	Potential Direct Impact	Parameter to be Monitored	Monitoring frequency	Monitoring Area	Measurement unit	Target Level/Standard	Responsibility	Estimated costs (TShs)
SITE SELECTION	Damage/Loss valuable of natural habitat and contained biodiversity if any	Number of endemic species	Once before project initiation.	Project site	Numbers and names	IUCN list CITES list	TANESCO	5,000,000 per year
	Loss of land/property and disruption of land use and economic activities	Number of affected people	Once before initiation	Project site	Numbers	All that are affected, (If any)	TANESCO	5,000,000 per year
	Conflict with other project area users.	Number of conflicts	Once every 4 months	Project site	Number of conflicts	None	TANESCO, Kinondoni and Ilala LGA	5,000,000 per year
DESIGN	Nuisance and Disturbance to on/offsite noise pollution receptors	Noise levels	Once at the start of the project and during agricultural activities seasons.	Project site	dB g/l	<55 dB TBS	TANESCO Contractor	5,000,000 per year
	Increased income to locals from employment opportunities and reliable power	Sustainable economy	Once every year	Project site	Standard of living	Less poverty	TANESCO, Kinondoni and Ilala LGA	5,000,000 per year
	General public health and safety hazards	Number of accidents	Once every year	Health Centre records	Number of accidents involving project vehicles	No or minimum accidents	TANESCO	2,500,000 per year

	Occupational health and safety hazards	Induction courses PPE	Once every year	Health Centre Company records	Number of Patients and types of ailments	No or minimum incidences of occupational related diseases	TANESCO	2,500,000 per year
	Public health / safety hazards	Health status of communities and workers	Once every six months	Health Centre Company records	Number of HIV/AIDS cases	As minimum as possible	TANESCO, Kinondoni and Ilala LGA	5,000,000 per year
	Compromised Security	Theft incidences	Once before construction	Project area site	Numbers and names	No theft	TANESCO, Kinondoni and Ilala LGA	5,000,000 per year
MOBILIZATION/CONSTRUCTION	Loss of vegetation cover / Land degradation for re-aligning various agricultural operations	Ecological components	Once before construction	Project area site	Numbers and names	Endangered components / endemic components are protected	TANESCO	5,000,000 per year
	Impaired local air quality.	Vegetation growth	Once every year	River banks	Rate of growth	No vegetation growth	TANESCO	5,000,000 per year
	Contamination/impaired quality of receiving body – land and water sources	Water quality (oils)	Once every six months	project area	Mg/l ppm	TBS standard	NEMC and TANESCO	5,000,000 per year
	Contamination/impaired quality land and disruption of local species composition	Species diversity	Once after one year of commissioning	project area	Type of species	None	TANESCO and NEMC	2,000,000 per year
	Hazards to workers-injuries, accidents	Induction courses PPE	Once every year	Health Centre Company records	Number of Patients and types of ailments	No or minimum incidences of occupational related diseases	TANESCO and OSHA	2,000,000 per year
OPERATION	Increased incomes to local government authority	Number of times taxes are collected	Once every year	Project area	Increase of taxes	Less poverty	TANESCO Kinondoni and Ilala DC	5,000,000 per year
	Improved household economy and livelihoods Improved power security Induced development	Number of times taxes are collected	Once every year	Project area	Increase of taxes	Less poverty	TANESCO Kinondoni and Ilala LGA	5,000,000 per year

DECOMMISSIONING	Loss of employments and contaminations	Number of people deployed Air quality Wastes	Once after six months of decommissioning	Project Area	Numbers of employee Dust particles, fumes Tones of Conductors, Cables, Metal scrapers	Less number of job losers Air quality parameters within standards No waste remains on site	TANESCO NEMC Kinondoni and Ilala LGA	10,000,000 per year

CHAPTER NINE

9. COST BENEFIT ANALYSIS

9.1 Financial cost benefit analysis to the project

Cost-benefit analysis is normally done in the framework of feasibility study of an activity. The aim of cost-benefit analysis is to inform the project developer to make a decision on:

- ✓ Whether it makes economic sense to continue with the project;
- ✓ Whether the chosen option is cost effective alternative; and
- ✓ Whether the size of a project is appropriate.

In this project the costs includes:

- ✓ capital expenditures;
- ✓ operating and maintenance costs;
- ✓ staff costs;
- ✓ operation materials; and
- ✓ environment, health and other social costs.

Benefits include:

- ✓ Income generation to TANESCO and the Government as whole;
- ✓ Accurate operation schedule to avoid unnecessary costs;
- ✓ Protection of environment and health; and
- ✓ Provision of other social benefits.

The TANESCO and JICA have undertaken a feasibility study of the rehabilitation of substations and construction of new lines and substations in Dar es Salaam and confirmed that the project is economically viable.

9.2 Quantifiable and non-quantifiable benefits to communities

There will be direct and indirect benefits to the communities as follows:

- ✓ The project will employ about 100 people and almost all staff will be recruited locally apart from the international
- ✓ With stable power this will attract other social economic activities such as food vending, shops, etc.
- ✓ With stable power also will attract more Investment Resources thus to generate funds to the Tanzania
- ✓ This property is going to cater for the problems which are associated to the most rapid growing cities in the world and Dar es Salaam is one of them in reducing congestion in the present condition of the existing offices. Reduce disturbance that were caused by the congestion,
- ✓ Also intended to improve security to workers, to creates adequate parking, to create essential facilities for conferences, function and catering, strictly consider security, privacy and need for disabled and raise revenue.

9.3 Possible costs to communities

Construction of distribution lines will be along road reserves and transmission line on the existing way leave corridor which means no land acquisition, however few compensations will be paid for some of community members inside the road reserves and the transmission line corridor. Therefore no any

activities that will be disrupted. Other impacts are as elaborated above. However, TANESCO is committed to mitigate the negative social and environmental impacts.

9.4 Possible costs to government

The power rehabilitation project was initiated by TANESCO under the Ministry of Energy and Minerals. TANESCO managing the development of the project on behalf of the Government. All the funds needed to construct the infrastructure will be obtained as a grant from the Government of Japan through Japanese International Cooperation Agency (JICA)

9.5 Environmental costs and benefits analysis

Environmental cost benefit analysis is assessed in terms of the negative and positive impacts. Furthermore, the analysis is considering whether the impacts can be mitigated and the costs of mitigating the impacts are reasonable. One of the major significant negative environmental impacts is that of the interactions with other utility facilities (TTCL, DAWASA etc.). The project contractor has to work in coordination with other facilities provider so as to minimise disturbances.

CHAPTER TEN

10.0. DECOMISSIONING

10.1. Introduction

Section 102.-(1) of EMA (20) requires that upon expiry of a project or undertaking stipulated under the Second Schedule to this Act, the proponent or operator shall, at his own cost undertake safe decommissioning, site rehabilitation and ecosystem restoration before the closure of the project or undertaking. The main challenge will be to deal with the situation whereby beneficiaries have already improved their lifestyle and already adjusted to the use of the stable power suddenly these services are stopped. This action will impact negatively the already advantaged society socially, psychologically and economically. The only and possible mitigation measure is to inform the client and prepare them psychologically before effecting decommissioning. Another challenge is on how to dispose of the demolitions if the building has to be pulled down.

From the design, the life-time (economic) of the transmission line, distribution lines and substations is about 30 years but in practice even more than that. Once the lines are built can stay there for a good number of years, however when removed they should be handled in environmentally friendly ways.

10.2 Decommissioning Plan

At the end of the project span, there should be arranged decommissioning plan that caters for the project owner and respective community, authority organ or body responsible for environmental management, conservation and protection in the conservation area to ensure that the project does not continue to further generate negative impacts. However, the most discussed impacts come to an end after construction phase remaining with few impacts that also end in the operation phase. Such impacts expected to end in construction and operation phase include: Level of accidents, Diseases (HIV) and human health, Level of traffic, Use of local resources, Liquid waste generation, Vibration and noise, and Employment opportunities.

CHAPTER ELEVEN

11. CONCLUSION AND RECOMMENDATION

11.1 Conclusion

This EIA report presents the results of the environmental impact assessment study for the proposed power network rehabilitation, rehabilitation of substations and construction of new lines and substations in Dar es Salaam. The results of the study have shown that the project activities from construction up to operation stages will not have significant negative impact to the environment. Most of the impacts are minor but should not be ignored. Few impacts that are relatively can be mitigated as detailed in tables 7.1 and 8.1. Therefore, the project is considered to be environmentally viable provided that the recommended mitigation measures adhered and implemented during all phases.

11.2 Recommendation

The proposed ESMP will require the TANESCO to make a close supervision of the contractor to ensure that she/he abides to the environmental obligation during execution of the tasks assigned during construction. A contract document should state environmental responsibility of the contractor and should package the proposed supervision costs of the environmental supervisor.
The following are strongly recommended:

- ✓ Enhancement measures for all the identified positive impacts should be undertaken in order to ensure that the project yields maximum benefits
- ✓ After the completion of the construction phase, measures should be taken to restore/reinstate the degraded environment.
- ✓ The project management including contractor and his work team, should undertake seriously the implementation of the proposed mitigation measures and monitoring plan with the aim of minimizing the potential negative environmental impacts in the project area
- ✓ Site meeting should in all costs, table and discuss the environmental issues including implementation plan and achievement made so far to preserve the environment as suggested in the ESMP.

Finally, all relevant stakeholders and interested parties should be allowed to provide their views during all the project phases provided that they aim at improving the project and that they are informed accordingly during different levels of project implementation.

REFERENCES

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- ✓ United Republic of Tanzania (URT) (2004). *Environmental Management Act (EMA)*. Government Printers, Dar es Salaam.
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Appendix I: Approval Terms of Reference for Undertaking the ESIA Study

Environmental and Social Impact Assessment Study for the rehabilitation of substations and construction of new lines and substations in Dar es Salaam

1.0 Introduction

TANESCO is a Parastatal Company that is wholly owned by the government of Tanzania. The company's core business is generation, transmission, distribution and sale of electricity to the Tanzania mainland and bulk power to Zanzibar.

The Government of Tanzania through Tanzania Electric Supply Company (TANESCO) is planning to undertake rehabilitation of substations and construction of new lines and substations in Dar es Salaam City. Under the Japanese International Corporation Agency (JICA) funding, TANESCO has completed carrying out a conceptual detailed design study of the proposed transmission and distribution line routes and substations.

The overall objective of the project is to provide increased access to electricity with sustainable effects on poverty reduction by facilitating income generation and improved social services. The technical objective of the project is to stabilize the grid system, increase power supply, improve reliability of the power supplied in Dar es salaam city, as well as to increase the extent of TANESCO's distribution network in the city in order to be able to provide electricity to commercial business activities, water pumping, secondary schools, medical services, streetlights, residential houses, agro-processing activities etc. in the project area.

The proposed project has five (5) components which are:

- ✓ Reinforcement of Ilala substation and existing 132 kV transmission line from Ilala substation to Ubungo substation (7.5 km)
- ✓ Construction of new Jangwani Beach substation (33/11kV) and construction of distribution line (33kV) from Jangwani beach substation to Tegeta substation (6.5km)
- ✓ Construction of Muhimbili substation (33/11kV) and construction of distribution line (33kV) from Muhimbili to City Center substation (2km)
- ✓ Construction of Mwananyamala substation (33/11kV) and construction of distribution line (33kV) from Mwananyamala substation to Makumbusho substation (1.1km)
- ✓ Expansion of Msasani substation (33/11kV) and expansion of distribution line (33kV) from Msasani substation to Makumbusho substation (7.6km)

2.0 Project Area

The transmission line will be constructed from Ilala substation to Ubungo substation along the existing 132kV line II in Dar es salaam City crossing the two municipalities of Kinondoni and Ilala. Three new substations with respective distribution lines will be constructed in Kinondoni Municipal Council while the remaining two substations with their respective lines are located in Ilala Municipal Council.

The current design proposes the distribution line routes be located along existing roads reserves, that is TANROADS' and Municipal Councils' so as to minimize the environmental and social impacts i.e. resettlement of people along the proposed routes. The project areas are accessible by road.

3.0 Objective

The purpose of this Terms of Reference (ToR) is to provide guidance to the consultant or study team to carry out a comprehensive Environmental and Social Impact Assessment (ESIA) for the proposed project according to the financier guidelines (JICA), national laws and regulations (Environmental Management Act CAP 191 of 2004 and Environmental Impact Assessment and Audit Regulation of 2005).

The ESIA is intended to identify potential impacts of the project (physical, biological and social economic), justify optimal choices that would minimize or avoid potential negative impacts and design appropriate environmental and social management plan (ESMP) to address and mitigate impacts that cannot be avoided.

ESIA will also identify opportunities for environmental enhancement and sustainable development that could be implemented. The ESMP will describe in detail the mitigation measures to be implemented, including the estimated cost, schedule and organization needed to implement it. The monitoring process schedule and any social and environmental management capacity building and institutional strengthening that may be required for responsible institutions involved in the project.

The specific objectives of ESIA study are:-

- ✓ Review and documents the baseline data and information on both the natural environment i.e. physical, biological and man – made environment including social economic conditions of the proposed project areas;
- ✓ To identify, predict and evaluate potential positive and negative impacts of proposed transmission line power project including substations;
- ✓ To develop mitigation measures that aim at eliminating or minimizing the potential negative impact and promote the positive ones and recommended appropriate mitigating measures to be incorporate in the engineering designs;

4.0 Approach

In order to achieve the objectives outlined above and taking the matter as an urgent with NEMC decision, the ESIA study are envisaged to be pursued in the following three main stages:

Stage I: Project registration and submission of project brief to National Environment Management Council. The client in collaboration with consultant shall fill the registration forms; prepare project briefs of the project for carrying out ESIA study to be submitted to NEMC for approval.

Stage II: Carrying out Scoping Study and preparation of ToR: The Consultant shall carry out an environmental scoping exercise and should comply with existing environmental standards in the country i.e. Environmental Management Acts CAP 191 of 2004 and Environmental Assessment and Audit Regulation of 2005.

Stage III: Carrying out full ESIA study after NEMC approve scoping report and ToR for all project components, including infrastructural works, power line and substation.

5.0 Requirements

The ESIA and ESMP must comply with local standards in Tanzania i.e. Environmental Management Act Cap 191 of 2004 and its Environmental Impact Assessment and Audit regulation of 2005 and should meet financier's guideline, current internationally accepted standards of information gathering, reporting and analysis.

Environmental and Social Impact Assessment (ESIA) will be carried out in the proposed project area of probable project influence as already defined and delineated, covering both the construction and operation phases of the project and by using both qualitative and quantitative methods.

6.0. Environmental and Social Impact Assessment

For the Environmental and Social Impact Assessment the consultant(s) will:

- ✓ Describe the proposed project by providing a synthetic description of the project relevant components and presenting plans, maps, figures and tables.
- ✓ Identify and describe the policy, legal and administrative (institutional) framework relevant to the project.
- ✓ Define and justify the project study area for the assessment of environmental and social impacts.
- ✓ Describe and analyse the physical, biological and human (social) environment conditions in the study area before project implementation. This analysis shall include the interrelations between environmental and social components and the importance that the society and local populations attach to these components, in order to identify the environmental and social components of high value or presenting a particular interest.
- ✓ Describe and analyse potential environmental impacts i.e. negative and positive and propose / recommend mitigation measures to minimize or avoid the impacts.
- ✓ Present and analyse alternatives to the proposed project, including the "without project" option, by identifying and comparing the alternatives on the basis of technology, location, design, economic, construction technique, maintainability, environmental and social criteria, capital, and operating cost, institutional and monitoring requirement.
- ✓ Conduct resource evaluation or cost benefit analysis of the project

7.0 Environmental and Social Management Plan (ESMP)

Define appropriate mitigation/enhancement measures to prevent, minimise, mitigate, or compensate for adverse impacts or to enhance the project environmental and social benefits, including responsibilities and associated costs. The ESMP should include (but not limited to) the following:

- ✓ Recommendation of feasible and cost-effective measures to prevent or reduce significant negative impacts to acceptable levels
- ✓ Estimate of the magnitude of impacts and costs of mitigation measures.
- ✓ Consideration for compensation to affected parties for impacts that cannot be mitigated

- ✓ Set of *best practices* measures to be followed in order to avoid some of the impacts during construction and operation phases of the project
- ✓ Identification of institutional needs to implement environmental and social assessment recommendations including a review of the authority and capability of relevant institutions. Recommend steps to strengthen or expand these institutions to ensure that effective environmental management and monitoring will occur.
- ✓ Description of detailed arrangements required for monitoring implementation of mitigating measures and the impacts of the project during construction and operation.
- ✓ Proposed work programs, budget estimates, schedules, responsibilities for implementation, and other necessary support services to implement the ESMP.
- ✓ As appropriate, prepare an environmental hazard plan including an analysis of the risk of accident, the identification of appropriate security measures and the development of a preliminary contingency plan.

8.0 Public Participation

Carry out consultations with primary and secondary stakeholders in order to obtain their views on and preoccupations about the project. These consultations shall occur during the preparation of the ESIA report to identify key environmental and social issues and impacts, and after completion of the draft ESIA Report to obtain comments from stakeholders on the proposed mitigation/enhancement measures.

The consultant will prepare a thorough consultation program and a record (with evidence of picture, adverts and signatures) of meetings, communications and comments to be part of ESIA study and presented to the environmental authority (NEMC).

9.0 Reporting

The ESIA Report shall be presented in a clear and concise manner and focus on relevant and significant environmental and social issues that assist in understanding the project and its impacts. The scope and level of details of the Report shall be proportional to the project's potential impacts.

The ESIA Report shall describe the scientific approach adopted to carry out the studies. In particular, the models, methods and criteria used in the studies shall be presented and explained. The Report shall also include maps and drawings at the appropriate scale and refer to all consulted documents.

ESIA Report shall contain items and arrangement according to the Environmental Impact Assessment and Audit Regulations, 2005. In addition, all relevant consults should have signatures against their names.

I. **Draft final report** 1 soft and 15 hard copies to be submitted to NEMC for review, comments and further actions regarding this draft report. The consultant shall produce Report in English with non technical executive summary in English and Kiswahili languages.

II. **Final report** 1 soft and 5 hard copies amended in response to opinions / comments given by TAC meeting will be submitted to NEMC as final ESIA report. The consultant shall produce report in English with separate bound non technical executive summary in both English and Kiswahili languages.

10.0 ESIA Study Team

The study team will involve consultant and experts with demonstrable practical experience in conducting EIA studies for linear projects.

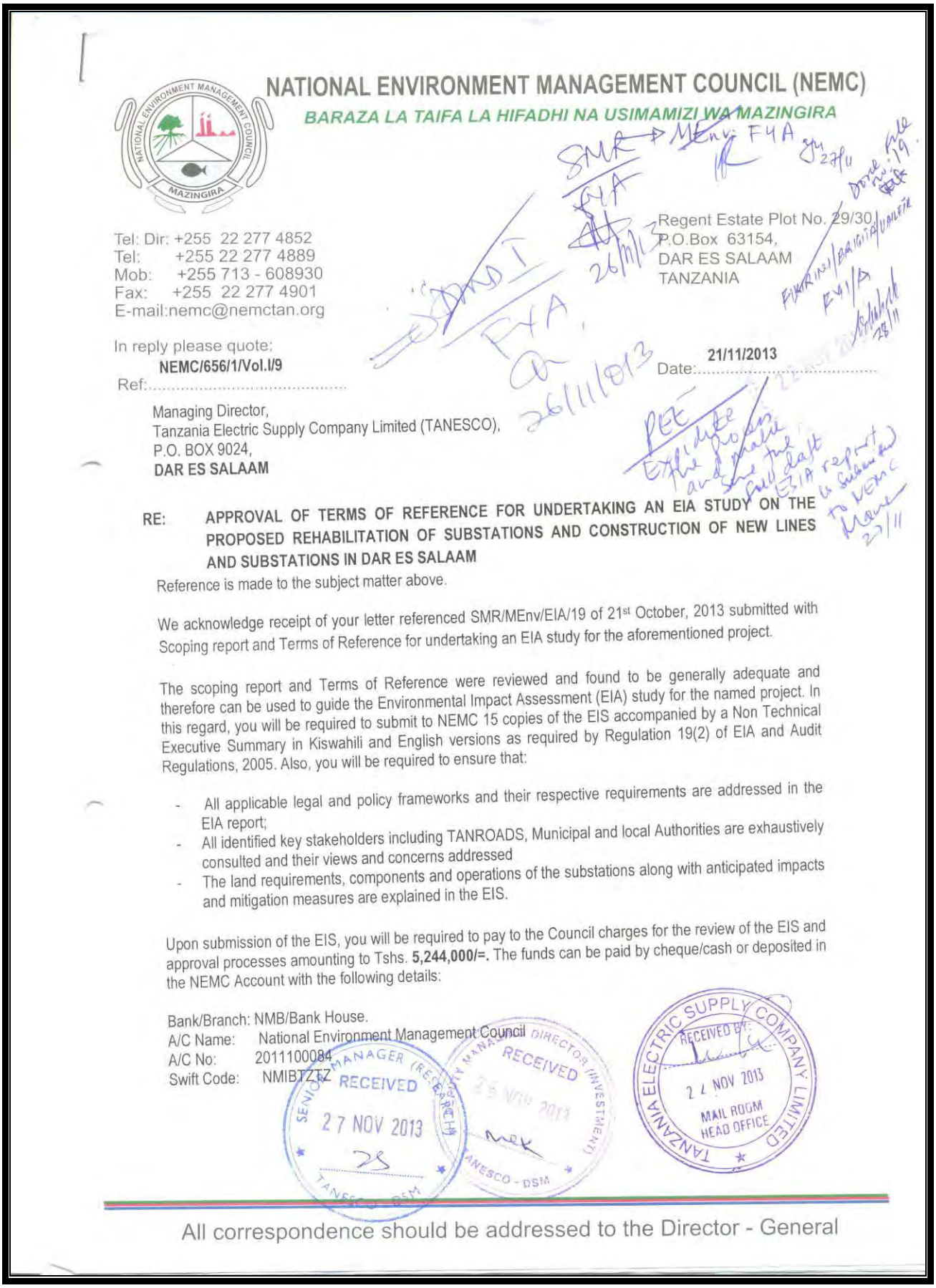
The study team shall in briefly comprise of at least the following key personnel with the specializations listed below:

- ✓ Team Leader – Environmental Expert – Registered with NEMC as EIA expert
- ✓ Sociologist – Economic expert
- ✓ Ecologist
- ✓ Environmental Engineer
- ✓ Mapping / GIS expert
- ✓ Surveyors
- ✓ Other experts including but not limited to: Waste management expert, Transmission and Distribution line expert, RAP expert etc.

11.0 Time Frame

It is anticipated that the duration of the study commencing from the date of approval of these terms of references by NEMC to the date of submission of final ESIA report for the proposed project will be two (2) month calendar

Appendix II: Screening Decision from NEMC for undertaking Scoping Exercise



NATIONAL ENVIRONMENT MANAGEMENT COUNCIL (NEMC)

BARAZA LA TAIFA LA HIFADHI NA USIMAMIZI WA MAZINGIRA

Tel: Dir: +255 22 277 4852
Tel: +255 22 277 4889
Mob: +255 713 - 608930
Fax: +255 22 277 4901
E-mail:nemc@nemctan.org

Regent Estate Plot No. 29/30
P.O.Box 63154,
DAR ES SALAAM
TANZANIA

In reply please quote:
Ref: NEMC/656/1/Vol.I/9

Date: 21/11/2013

Managing Director,
Tanzania Electric Supply Company Limited (TANESCO),
P.O. BOX 9024,
DAR ES SALAAM

RE: APPROVAL OF TERMS OF REFERENCE FOR UNDERTAKING AN EIA STUDY ON THE PROPOSED REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW LINES AND SUBSTATIONS IN DAR ES SALAAM

Reference is made to the subject matter above.

We acknowledge receipt of your letter referenced SMR/MEnv/EIA/19 of 21st October, 2013 submitted with Scoping report and Terms of Reference for undertaking an EIA study for the aforementioned project.

The scoping report and Terms of Reference were reviewed and found to be generally adequate and therefore can be used to guide the Environmental Impact Assessment (EIA) study for the named project. In this regard, you will be required to submit to NEMC 15 copies of the EIS accompanied by a Non Technical Executive Summary in Kiswahili and English versions as required by Regulation 19(2) of EIA and Audit Regulations, 2005. Also, you will be required to ensure that:

- All applicable legal and policy frameworks and their respective requirements are addressed in the EIA report;
- All identified key stakeholders including TANROADS, Municipal and local Authorities are exhaustively consulted and their views and concerns addressed
- The land requirements, components and operations of the substations along with anticipated impacts and mitigation measures are explained in the EIS.

Upon submission of the EIS, you will be required to pay to the Council charges for the review of the EIS and approval processes amounting to Tshs. **5,244,000/=.** The funds can be paid by cheque/cash or deposited in the NEMC Account with the following details:

Bank/Branch: NMB/Bank House.
A/C Name: National Environment Management Council
A/C No: 2011100084
Swift Code: NMIBTZTZ

RECEIVED 27 NOV 2013 — SENIOR MANAGER (RESEARCH) — TANESCO - DSM

RECEIVED 25 NOV 2013 — DIRECTOR (INVESTMENT) — TANESCO - DSM

TANZANIA ELECTRIC SUPPLY COMPANY LIMITED — RECEIVED BY: — 27 NOV 2013 — MAIL ROOM HEAD OFFICE

All correspondence should be addressed to the Director - General

Attached herewith, please find the budget breakdown for your reference.

Should there be any clarification required on this matter, please contact us through mobile numbers 0754611333 or 0784302464.

Yours Sincerely,

Eng. K. P. Luteganya
For: Director General.

Appendix III: Road reserve permits and other permits from responsible authorities

- ✓ **TANROADS PERMIT**

TANZANIA NATIONAL ROADS AGENCY

Good roads for national development

P.O Box 4838
Mabibo External
Mandela Road
Dar es Salaam

Date: 4th July 2013
Our Ref: RM/TNR/DSM/R.80.415/VoL.V/57

Managing Director,
Tanzania Electric Supply Company Limited
P.O. Box 9024,
DAR ES SALAAM - Fax 2452026

RE: REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW DISTRIBUTION LINES AND SUB STATIONS IN DAR ES SALAAM FUNDED BY THE GOVERNMENT OF JAPAN THROUGH JICA

Sub: Request for Construction of 33kV line along New and Old Bagamoyo Road Reserve

PERMIT No. TRD/DSM/2013/2014/T/P/01

Reference is made to your letter dated 1st July 2013 with reference SMD/MPD/JICA regarding the above captioned subject.

After going through your submssion, we have accepted your request to construct 33Kv Power Line along New and Old Bagamoyo road basing on the following conditions:-

1. The work shall be executed in a accordance with submitted DWG No. DL-R-01 showing the Route Map from Tegeta S/S to Jangwani Beach S/S.
2. The 33kV power line shall be constructed within 1.5m from the Road Reserve Marker Posts along New Bagamoyo road and 1.5m from the plot boundaries of Old Bagamoyo road (Africana to TPDF Riffle Range Ground section).
3. Where the power line will cross the road, you are strictly required to maintain the minimum allowable clearance height of 7m from the ground.
4. The Agency reserves the right to carry out any appropriate changes to the part of the developments within the road reserve without any compensation.
5. Carrying the works contrary to this permit shall be considered as an encroachment to the road resrve and the Agency shall take legal actions as per Highway Ordinance Cap. 167.

Tel: + 255 22 2450185/2450046 **Fax**: + 255 22 2450626, **E-Mail**: rmo@dsm.tanroads.org

TANROADS is an Executive Agency of the Ministry of Works, Tanzania, established under the Executive Agencies Act, 1997

6. A normal supervision fee of **Tshs 2,900,000.00** shall be charged and paid before the commencement of the works as detailed in the attached sheet.

7. When you are ready to to start the works, please inform this office so that arrangements can be made for supervision and close monitoring of your work with regard to compliance to the above conditions.

8. Acknowledge recept of this letter.

Ndyamukama J
Regional Manager
DAR ES SALAAM

Tel: + 255 22 2450185/2450046 **Fax**: + 255 22 2450626, **E-Mail**: rmo@dsm.tanroads.org

✓ **ILALA MUNICIPAL PERMIT**

HALMASHAURI YA MANISPAA YA ILALA

BARUA ZOTE ZIPELEKWE KWA MKURUGENZI WA MANISPAA

S.L.P. Na. 20950
Simu Na. 2128800
2128805
Fax Na. 2121486

Kumb. IMC/HT.9/

Ofisi ya Mkurugenzi
Manispaa ya Ilala

Tarehe: 04/07/2013

Mkurugenzi wa TANNESCO,
UBUNGO HEAD OFFICE,
S.L.P. 9024,
DAR ES SALAAM.

YAH: **KIBALI CHA KUPITISHA MIUNDOMBINU YA UMEME BARABARA YA MAGORE HADI HOSPITALI YA MUHIMBILI**

Tafadhali husika na kichwa cha habari hapo juu na pia rejea barua yako ya tarehe 24/04/2013 yenye Kumb. Na.SMD/MPD/983/JICA.

Ofisi ya Mkurugenzi wa Manispaa ya Ilala imepokea barua kutoka ofisi yako ya kuomba kibali cha kupitisha miundombinu ya umeme na kukarabati kituo kidogo cha umeme.

Baada ya kupitia barua yako, napenda kukufahamisha kwamba kibali kimetolewa cha kuwaruhusu kazi hiyo kufanyika, Pamoja na kibali hiki tafadhali zingatia masharti yafuatayvyo:

i. Unatakiwa kuwasiliana na Kitengo cha Maliasili na Idara ya Ujenzi Manispaa ya Ilala kabla ya kuanza utekelezaji.
ii. Kuzingatia sheria za usalama barabarani na kutunza utulivu katika maeneo yatakayotumiwa kwa shughuli hiyo.
iii. Mnatakiwa kulipia gharama za posho ya usimamizi kwa watumishi wa Halmashauri watakaoshiriki katika zoezi hilo.
iv. Unatakiwa kurudishia miundombinu itakayoathirika wakati wa utekelezaji wa kazi hiyo kwenye hali yake ya kawaida mara ukamilishapo kazi zako.

Nakutakia kazi njema.

Archi A.J. Mcha
Kny: **Mkurugenzi wa Manispaa,**
Halmashauri ya Manispaa ya Ilala.

Nakala: Mkurugenzi wa Manispaa ya Ilala – aione kwenye jalada

✓ **KINONDONI MUNICIPAL PERMIT**

KINONDONI MUNICIPAL COUNCIL

ALL CORRESPONDENCES TO BE ADDRESSED TO THE MUNICIPAL DIRECTOR

Tel: 2170173
Fax: 2172951

In reply please quote:

Ref: KMC/MEK/T.20/14/52

MUNICIPAL DIRECTOR
KINONDONI MUNICIPAL COUNCIL
P. O. BOX 31902
DAR ES SALAAM

Date: 13/05/2013

TANZANIA ELECTRIC SUPPLY COMPANY LIMITED ,
BOX 9024,
DAR ES SALAAM.

REF: REHABILITION OF SUBSTATIONS AND CONSTRUCTION OF NEW 33KV DISTRIBUTION LINES AND SUBSTATIONS IN DAR ES SALAAM FUNDED BY THE GOVERNMENT OF JAPAN THROUGH JICA.

Please refer to the heading above.

We have received your request for permit of construction of 33Kv line along the road reserve and tree cutting along the lines corridor.

Following the joint site visit with your surveyor, the following were observed to be addressed:-

- Surveying along the road reserve which will help to mark all structure which are within the road reserve.
- To save of demolition notes to all structures which are within the road reserve.
- To demolish all structures which are within road reserve.

We notify you that in order to succeed all the above activities some cost will be involved of which the council budget is Limited for these activities.

Yours Faithfully.

Engr. I Mafita.
For. **MUNICIPAL DIRECTOR**
KINONDONI

✓ **MUHIMBILI NATIONAL HOSPITAL PERMITS**

MUHIMBILI NATIONAL HOSPITAL

Cables: "MUHIMBILI"
Telephones: 255-22-2151367-9
FAX: 255-22-2150534
Website: www.mnh.or.tz
Email: info@mnh.or.tz
In reply please quote:
Ref: MNH/E2/II/II/69

Postal Address:
P.O. Box 65000
DAR ES SALAAM
Tanzania

1st October 2012

TANZANIA ELECTRIC SUPPLY CO. LTD. REGIONAL OFFICE 09 OCT 2012 ILALA DAR ES SALAAM

Regional Manager,
Tanzania Electrical Supply Company Ltd.,
Ilala,
P.O. Box 9024,
DAR ES SALAAM

Re: REQUEST FOR A SPACE/PLOT TO ESTABLISH A 15MVA, 33/11KV SUB-STATION

Reference is made to your letter No. RM/IL/GEN/38 of 24th September 2012 regarding the above captioned subject matter.

I wish to inform you that we have noted your effort to ensure reliability of the power supply to the Hospital. The Hospital has in principal accepted your request and will provide the space as per your request so that to enable you to establish the above named sub-station and hence to introduce a power line which will be dedicated to Muhimbili National Hospital only.

Thank you for your continued cooperation.

Yours,

Dr. M. A. Njelekela
EXECUTIVE DIRECTOR

/ajh.

All correspondence to be addressed to the Executive Director

MUHIMBILI NATIONAL HOSPITAL

Cables: "MUHIMBILI"
Telephones: +255-22-2151367-9
FAX: +255-22-2150534
Web: www.mnh.or.tz

Postal Address:
P.O. Box 65000
DAR ES SALAAM
Tanzania

Ref: MNH/E2/11/II/85

24th October, 2013

Regional Manager,
TANESCO – Ilala,
P.O. BOX 9024,
DAR ES SALAAM.

REF: REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW 33KV LINE AND SUBSTATIONS IN DAR ES SALAAM CITY FUNDED BY THE GOVERNMENT OF JAPAN THROUGH JICA.

Subject: Request for a temporary stock yard space and access to the proposed 15MVA, 33/11KV Substation at Muhimbili compound (playgroung area)

Reference is made to your letter with reference No. RM/IL/GEN/38 dated on 15th October 2013 regarding the above captioned subject.

I have a pleasure to confirm that the space for a temporary stock yard will be provided to you as per your request. However, the request for access road on the play ground should be channed through Muhimbili Universty for Health and Allied Sciencies who is the owner of the area.

Regards,

Dr. Marina A. Njelekela
EXECUTIVE DIRECTOR

All correspondences to be addressed to the Executive Director

✓ **TPDF PERMIT**

RECEIVED
06 DEC 2011

Katika Kujibu Tafadhali
Nakili:MMJ/2153-1 (CPD)

JESHI LA ULINZI LA WANANCHI WA TANZANIA

Simu ya Upepo: "N G O M E"
Simu ya Mdomo: DSM 2150556/62
Telefax: 2153429

Makao Makuu ya Jeshi,
Sanduku la Posta 9203,
DAR ES SALAAM

02 Desemba, 20

Mkurugenzi Mtendaji,
Shirika la Umeme Tanzania,
Sanduku la Posta 9024,
DAR ES SALAAM, Tanzania.

Kupatiwa Kiwanja Kujenga Kituo cha Kupozea Umeme

Rejea barua DMD (D&CS/SMD/MAJESHI ya tarehe 28 Septemba, 2011.

Makao Makuu ya Jeshi (MMJ) yanakiri kupokea barua iliyorejewa hapo juu. MMJ yanapongeza hatua zinazochukuliwa na shirika katika kutoa huduma kwa jamii.

MMJ yanatoa kibali kutumia kiwanja A2 kama kilivyoainishwa kwenye mchoro mlioambatisha. MMJ yametoa eneo hilo litumike kwa kazi hiyo bila kubadilisha umiliki wa ardhi ambao utaendelea kuwa wa Jeshi. MMJ yanawatakia kazi njema katika kutoa huduma hii muhimu kwa jamii.

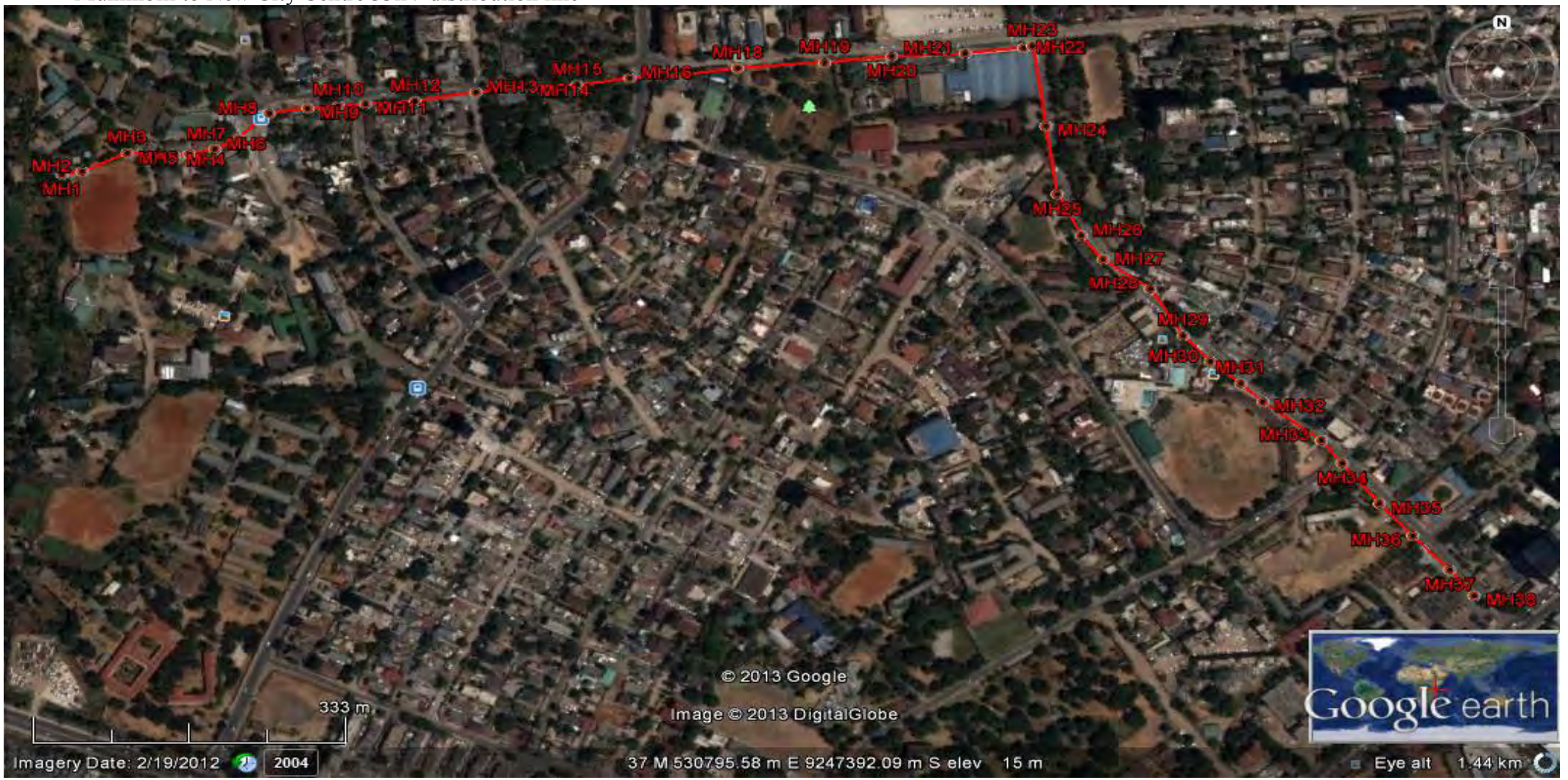
Copy to: PRE
Land Surveyor
DM - Mbezi
Retain original

6/12/11

(L. E. Mndeme, ndc)
Meja Jenerali
Kny:Mkuu wa Majeshi ya Ulinzi

Appendix IV: Google maps show project areas which lines will pass through road reserves

✓ Muhimbili to New City Centre 33kV distribution line



✓ Tegeta to Jangwani Beach S/S 33kV distribution line


TG63
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TG78
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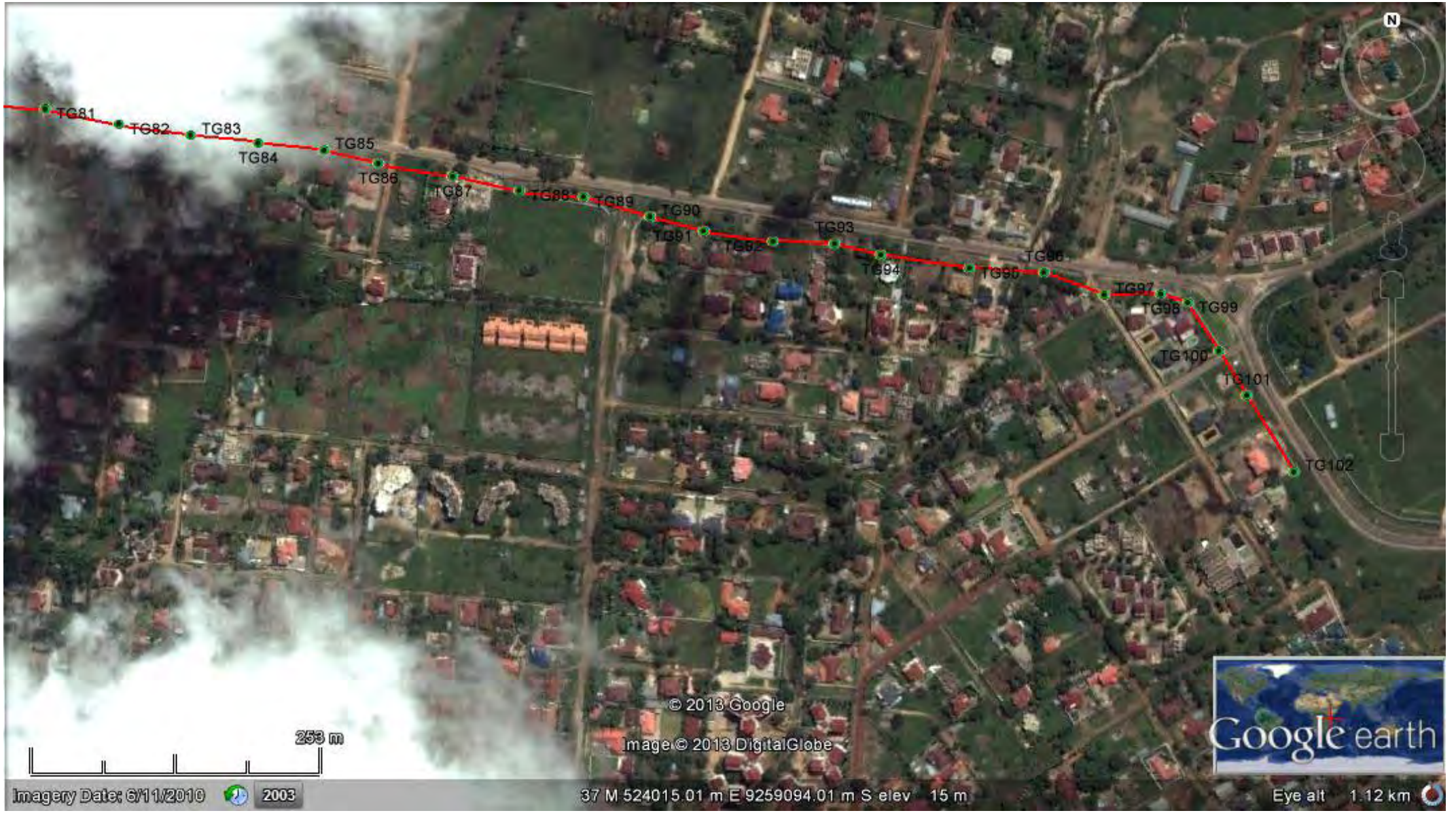
TG80
TG81
TG82
Click to look around
© 2013 Google
Image © 2013 DigitalGlobe
253 m
Google earth
Imagery Date: 6/11/2010
2003
37 M 523109.53 m E 9259590.46 m S elev 25 m
Eye alt 1.15 km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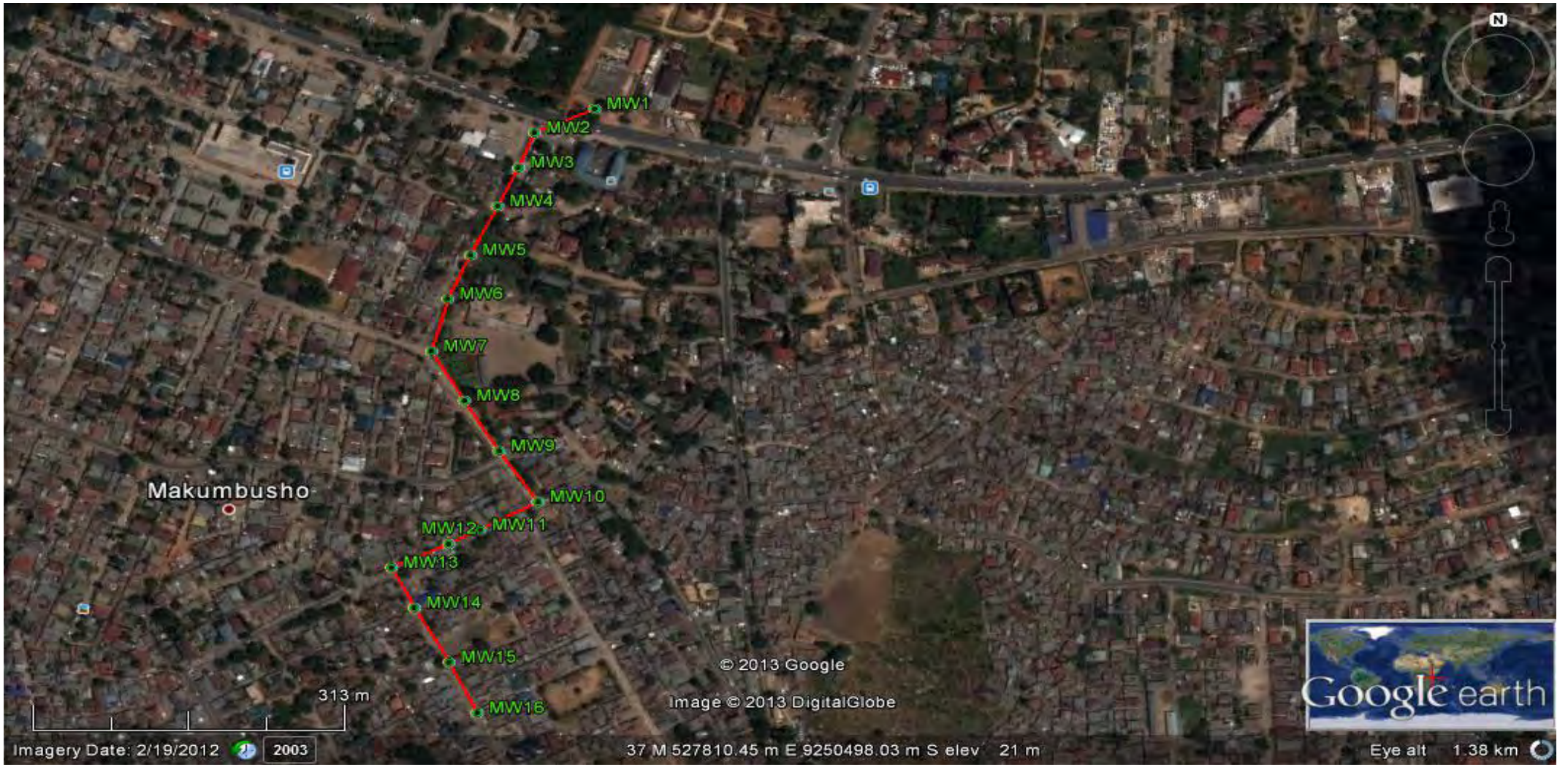
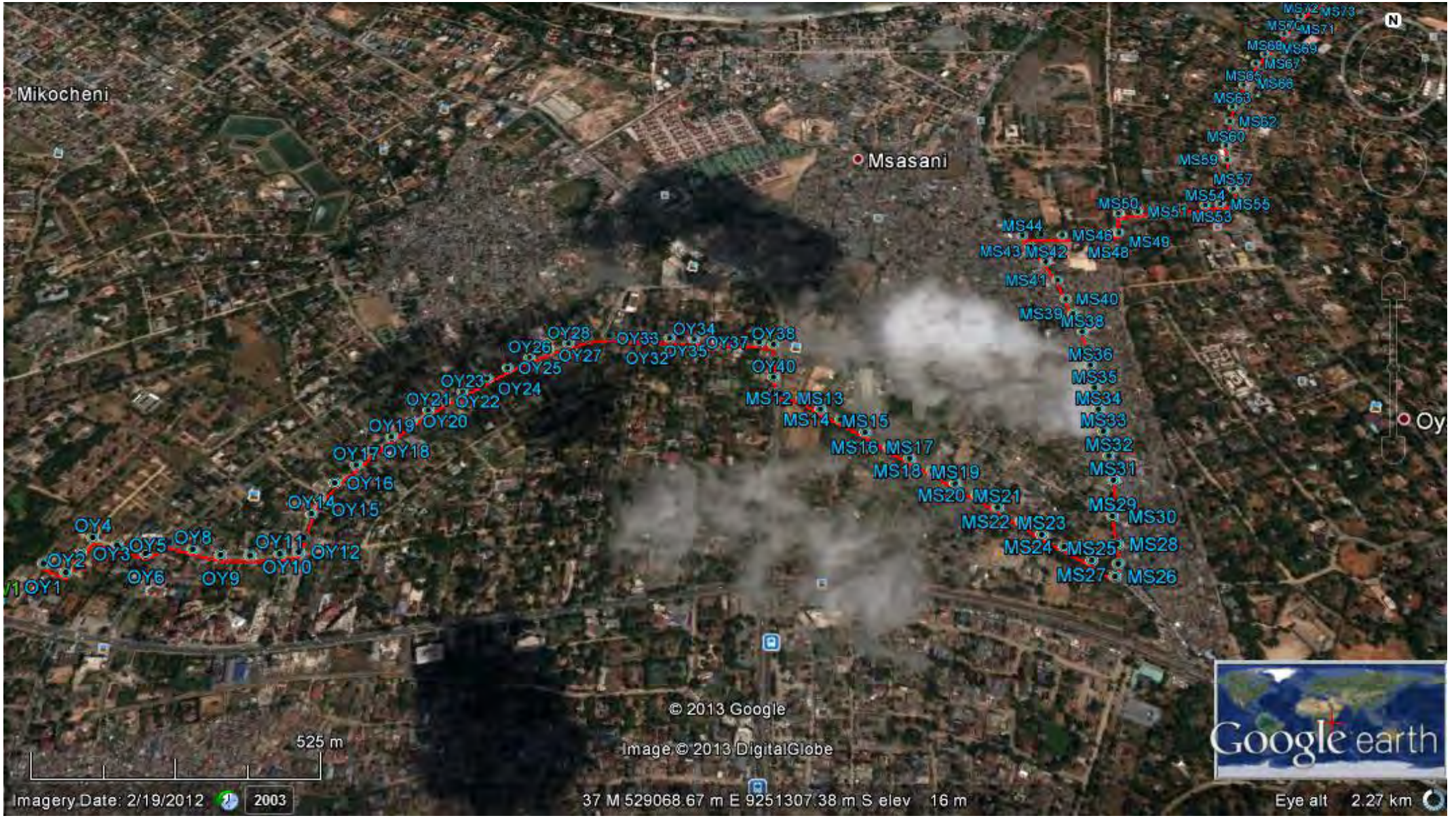
TG102
N
© 2013 Google
Image © 2013 DigitalGlobe
253 m
Google earth
Imagery Date: 6/11/2010
2003
37 M 524015.01 m E 9259094.01 m S elev 15 m
Eye alt 1.12 km

✓ Makumbusho to Mwananyamala S/S 33kV distribution line



✓ Makumbusho to Msasani 33kV distribution line


Mikocheni
Msasani
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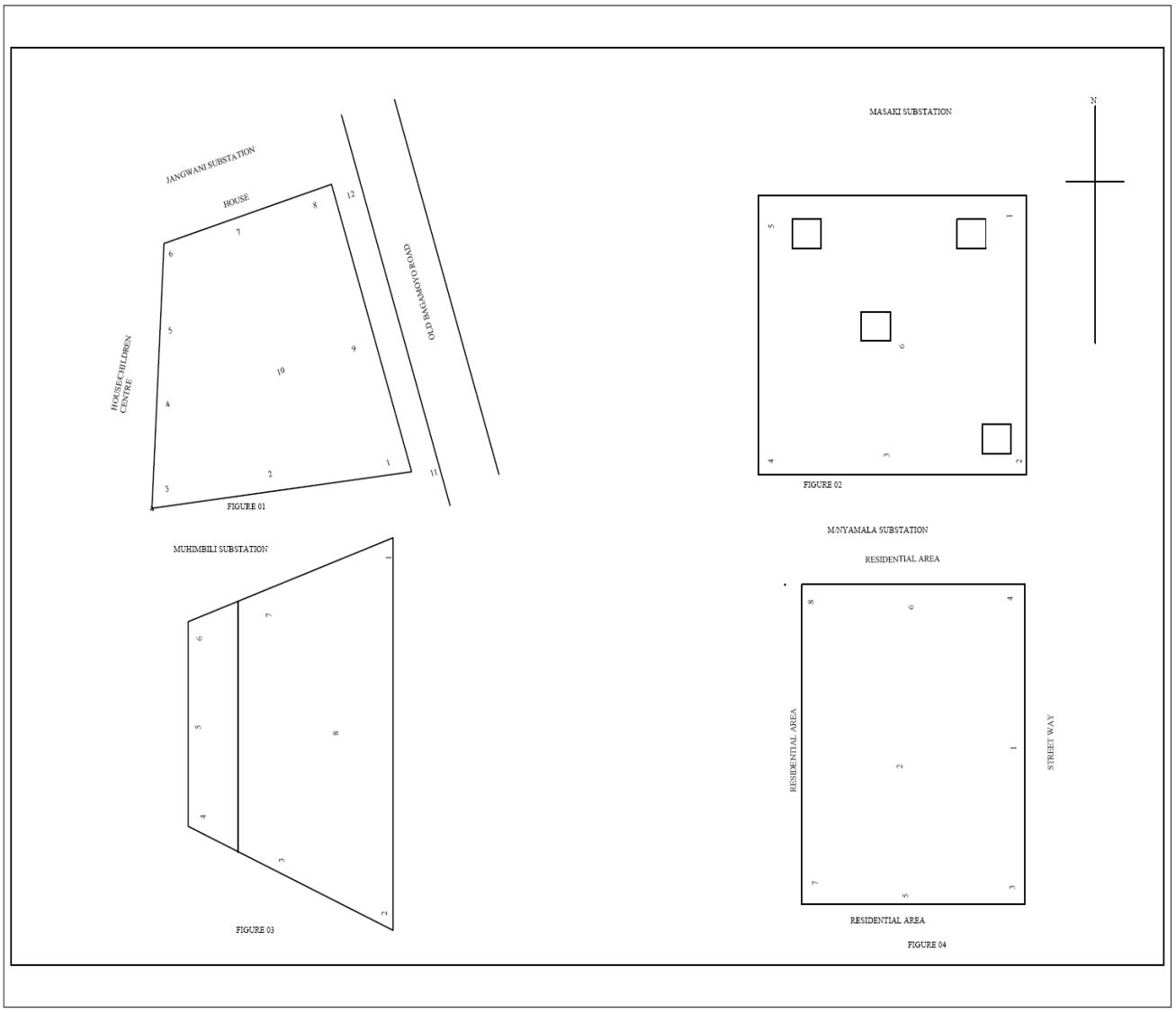
© 2013 Google
Image © 2013 DigitalGlobe
525 m
Imagery Date: 2/19/2012
2003
37 M 529068.67 m E 9251307.38 m S elev 16 m
Eye alt 2.27 km
Google earth

Appendix V: Baseline Environmental Assessment at Four Proposed TANESCO Substations in Dar es Salaam

Appendix Va: Proposed Sites



Appendix Vb: Ambient Air Quality Details

Jangwani Beach S/S Site

	READING NO	O_2 [%]	CO [mg/m^3]	CO_2 [%]	AMBIENT TEMP. [°C]	SO_2 [mg/m^3]	NO [mg/m^3]	NO_x [mg/m^3]
Point 1	1	20.90	-	-	30.30	-	-	-
	2	20.90	-	-	30.30	-	-	-
	3	20.80	-	-	30.40	-	-	-
	AVERAGE	**20.87**	**-**	**-**	**30.33**	**-**	**-**	**-**
Point 2	4	20.70	-	-	30.70	-	-	-
	5	20.80	-	-	30.90	-	-	-
	6	20.80	-	-	31.00	-	-	-
	AVERAGE	**20.77**	**-**	**-**	**30.87**	**-**	**-**	**-**
Point 3	7	20.80	-	-	31.30	-	-	-
	8	20.80	-	-	31.30	-	-	-
	9	20.80	-	-	31.40	-	-	-
	AVERAGE	**20.80**	**-**	**-**	**31.33**	**-**	**-**	**-**
Point 4	10	20.80	-	-	31.80	-	-	-
	11	20.80	-	-	31.90	-	-	-
	12	20.80	-	-	31.90	-	-	-
	AVERAGE	**20.80**	**-**	**-**	**31.87**	**-**	**-**	**-**

Point 5	13	20.70	-	-	32.70	-	-	-
	14	20.80	-	-	33.30	-	-	-
	15	20.80	-	-	33.30	-	-	-
	AVERAGE	**20.77**	-	-	**33.10**	-	-	-
Point 6	16	20.80	-	-	33.60	-	-	-
	17	20.80	-	-	33.80	-	-	-
	18	20.80	-	-	33.80	-	-	-
	AVERAGE	**20.80**	-	-	**33.73**	-	-	-
Point 7	19	20.90	-	-	34.20	-	0.10	0.10
	20	20.90	-	-	34.30	-		
	21	20.90	-	-	34.40	-	-	-
	AVERAGE	**20.90**	-	-	**34.30**	-	**0.05**	**0.05**
Point 8	22	20.80	-	-	34.50	-		
	23	20.80	-	-	34.40	-	-	-
	24	20.90	-	-	34.40	-	-	-
	AVERAGE	**20.83**	-	-	**34.43**	-	-	-
Point 9	25	20.90	-	-	34.80	-	-	-
	26	20.90	-	-	34.60	-	-	-
	27	20.90	-	-	34.70	-	0.10	0.10
	AVERAG	**20.90**	-	-	**34.70**	-	**0.03**	**0.03**

	E							
Point 10	28	20.80	-	-	35.10	-	0.10	0.10
	29	20.90	-	-	35.20	-	-	-
	30	20.90	-	-	35.70	-	-	-
	AVERAGE	**20.87**	**-**	**-**	**35.33**	**-**	**0.03**	**0.03**
Point 11	31	20.90	-	-	35.20	-		
	32	20.90	-	-	34.80	-	-	-
	33	20.90	-	-	34.80	-	-	-
	AVERAGE	**20.90**	**-**	**-**	**34.93**	**-**	**-**	**-**
Point 12	34	20.80	-	-	34.60	-	-	-
	35	20.80	-	-	34.60	-	0.10	0.10
	36	20.90	-	-	34.60	-	-	-
	AVERAGE	**20.83**	**-**	**-**	**34.60**	**-**	**0.03**	**0.03**
MEAN VALUE		**20.84**	**-**	**-**	**33.29**	**-**	**0.01**	**0.01**

Msasani S/S Site

	READING NO	O_2 [%]	CO [mg/m^3]	CO_2 [%]	AMBIENT TEMP. [°C]	SO_2 [mg/m^3]	NO [mg/m^3]	NO_x [mg/m^3]
Point 1	37	20.80	-	-	32.80	-	-	-
	38	20.90	-	-	32.90	-	-	-
	39	20.90	-	-	33.00	-	-	-
	AVERAGE	**20.87**	-	-	**32.90**	-	-	-
Point 2	40	20.80	-	-	33.30	-	-	-
	41	20.90	-	-	33.60	-	-	-
	42	20.90	-	-	33.70	-	-	-
	AVERAGE	**20.87**	-	-	**33.53**	-	-	-
Point 3	43	20.90	-	-	34.40	-	-	-
	44	20.90	-	-	34.40	-	-	-
	45	20.90	-	-	34.40	-	-	-
	AVERAGE	**20.90**	-	-	**34.40**	-	-	-
Point 4	46	20.80	-	-	34.70	-	-	-
	47	20.9	-	-	34.70	-	-	-

		0						
	48	20.90	-	-	34.60	-	-	-
	AVERAGE	**20.87**	**-**	**-**	**34.67**	**-**	**-**	**-**
Point 5	49	20.80	-	-	34.60	-	-	-
	50	20.90	-	-	34.70	-	-	-
	51	20.90	-	-	34.50	-	-	-
	AVERAGE	**20.87**	**-**	**-**	**34.60**	**-**	**-**	**-**
MEAN VALUE		**20.87**	**-**	**-**	**34.02**	**-**	**-**	**-**

Muhimbili S/S Site

	READING NO	O_2 [%]	CO [mg/m^3]	CO_2 [%]	AMBIENT TEMP. [°C]	SO_2 [mg/m^3]	NO [mg/m^3]	NO_x [mg/m^3]
Point 6	52	21.00	-	-	33.00	-	-	-
	53	20.90	-	-	32.90	-	-	-
	54	20.90	-	-	33.00	-	-	-
	AVERAGE	**20.93**	**-**	**-**	**32.97**	**-**	**-**	**-**
Point 7	55	20.90	-	-	34.30	-	-	-
	56	20.90	-	-	34.40	-	-	-
	57	20.90	-	-	34.30	-	-	-

	AVERAGE	**20.90**	**-**	**-**	**34.33**	**-**	**-**	**-**
Point 8	58	20.90	-	-	34.20	-	-	-
	59	20.90	-	-	34.20	-	-	-
	60	20.90	-	-	34.20	-	-	-
	AVERAGE	**20.90**	**-**	**-**	**34.20**	**-**	**-**	**-**
Point 9	61	20.80	-	-	34.30	-	-	-
	62	20.90	-	-	34.40	-	-	-
	63	20.90	-	-	34.40	-	-	-
	AVERAGE	**20.87**	**-**	**-**	**34.37**	**-**	**-**	**-**
Point 10	64	20.90	-	-	34.30	-	-	-
	65	20.90	-	-	34.40	-	-	-
	66	20.90	-	-	34.50	-	-	-
	AVERAGE	**20.90**	**-**	**-**	**34.40**	**-**	**-**	**-**
Point 11	67	20.90	-	-	35.80	-	-	-
	68	20.90	-	-	35.80	-	-	-
	69	20.90	-	-	35.80	-	-	-
	AVERAGE	**20.90**	**-**	**-**	**35.80**	**-**	**-**	**-**

Point 12	70	20.90	-	-	35.90	-	-	-
	71	20.90	-	-	36.00	-	-	-
	72	20.90	-	-	36.10	-	-	-
	AVERAGE	**20.90**	**-**	**-**	**36.00**	**-**	**-**	**-**

MEAN VALUE		**20.90**	**-**	**-**	**34.58**	**-**	**-**	**-**

Mwananyamala S/S Site

	READING NO	O_2 [%]	CO [mg/m^3]	CO_2 [%]	AMBIENT TEMP. [°C]	SO_2 [mg/m^3]	NO [mg/m^3]	NO_x [mg/m^3]
Point 1	73	20.90	-	-	34.70	-	-	-
	74	20.90	-	-	34.70	-	-	-
	75	20.90	-	-	34.70	-	-	-
	AVERAGE	**20.90**	**-**	**-**	**34.70**	**-**	**-**	**-**
Point 2	76	20.90	-	-	35.70	-	-	-
	77	20.90	-	-	35.80	-	-	-
	78	20.90	-	-	35.90	-	-	-
	AVERAGE	**20.90**	**-**	**-**	**35.80**	**-**	**-**	**-**
Point 3	79	20.90	-	-	36.30	-	-	-
	80	20.90	-	-	36.50	-	-	-
	81	20.90	-	-	36.50	-	0.10	0.10
	AVERAGE	**20.90**	**-**	**-**	**36.43**	**-**	**0.03**	**0.03**
Point 4	82	20.80	-	-	37.60	-	-	-
	83	20.90	-	-	38.00	-	-	-

	84	20.90	-	-	38.00	-	0.10	0.10
	AVERAGE	**20.87**	**-**	**-**	**37.87**	**-**	**0.03**	**0.03**
Point 5	85	20.90	-	-	37.30	-	-	-
	86	20.90	-	-	37.20	-	0.10	0.10
	87	20.90	-	-	37.10	-	-	-
	AVERAGE	**20.90**	**-**	**-**	**37.20**	**-**	**0.03**	**0.03**
Point 6	88	20.90	-	-	36.30	-	-	-
	89	20.90	-	-	36.20	-	-	-
	90	20.90	-	-	36.00	-		
	AVERAGE	**20.90**	**-**	**-**	**36.17**	**-**	**-**	**-**
MEAN VALUE		**20.89**	**-**	**-**	**36.36**	**-**	**0.02**	**0.02**
HIGHEST LIMIT (TANZANIA STANDARD)*			**10.00**					**0.12**

* The Environmental Management (Air Quality Standards) Regulations, 2007

Appendix Vc: Noise Level Details

Jangwani Beach S/S

POINT NO.	NOISE LEVEL, dB(A)						
	Reading 1	Reading 2	Reading 3	Reading 4	MEAN	OVER 85 dB(A)?	OVER 90 dB(A)?*
1	60.40	56.40	60.00	63.40	**60.05**	NO	NO
2	62.20	60.00	60.40	61.00	**60.90**	NO	NO
3	57.00	56.60	56.60	56.90	**56.78**	NO	NO
4	63.10	61.90	61.20	62.70	**62.23**	NO	NO
5	63.60	61.90	64.50	62.60	**63.15**	NO	NO
6	63.00	64.40	61.90	64.10	**63.35**	NO	NO
7	63.00	64.40	63.70	63.90	**63.75**	NO	NO
8	63.00	61.50	64.50	62.30	**62.83**	NO	NO
9	60.80	60.10	62.00	60.20	**60.78**	NO	NO
10	62.00	61.40	60.60	60.30	**61.08**	NO	NO
11	67.30	68.00	67.90	69.20	**68.10**	NO	NO
12	69.20	67.10	70.60	66.90	**68.45**	NO	NO
	MEAN NOISE LEVEL				**62.62**	**NO**	**NO**

* Occupational Safety and Health Administration; Occupational Noise Exposure Standard (OSHA – 29 CRF 1910.95)

Msasani S/S

POINT NO.	NOISE LEVEL, dB(A)						
	Reading 1	Reading 2	Reading 3	Reading 4	MEAN	OVER 85 dB(A)?	OVER 90 dB(A)?*
1	54.40	54.10	52.50	52.00	**53.25**	NO	NO

2	56.10	56.30	56.60	55.20	**56.05**	NO	NO
3	56.10	55.80	56.70	56.90	**56.38**	NO	NO
4	55.10	56.20	56.30	54.10	**55.43**	NO	NO
5	56.00	55.30	56.00	56.20	**55.88**	NO	NO
	MEAN NOISE LEVEL				**55.40**	**NO**	**NO**

* Occupational Safety and Health Administration; Occupational Noise Exposure Standard (OSHA – 29 CRF 1910.95)

Muhimbili S/S

POINT NO.	NOISE LEVEL, dB(A)						
	Reading 1	Reading 2	Reading 3	Reading 4	MEAN	OVER 85 dB(A)?	OVER 90 dB(A)?*
1	51.40	50.40	49.50	48.50	**49.95**	NO	NO
2	48.20	50.00	49.80	50.20	**49.55**	NO	NO
3	53.50	52.00	53.60	54.40	**53.38**	NO	NO
4	53.10	53.00	45.00	45.70	**49.20**	NO	NO
5	50.80	51.30	50.10	51.40	**50.90**	NO	NO
6	44.10	44.20	46.00	45.00	**44.83**	NO	NO
7	45.20	45.20	45.20	45.20	**45.20**	NO	NO
	MEAN NOISE LEVEL				**49.00**	**NO**	**NO**

* Occupational Safety and Health Administration; Occupational Noise Exposure Standard (OSHA – 29 CRF 1910.95)

Mwananyamala S/S

POINT NO.	NOISE LEVEL, dB(A)						
	Reading 1	Reading 2	Reading 3	Reading 4	MEAN	OVER 85 dB(A)?	OVER 90 dB(A)?*
1	59.70	58.50	57.10	59.30	**58.65**	NO	NO

2	56.80	56.00	55.20	50.10	**54.53**	NO	NO
3	58.10	59.70	58.00	60.40	**59.05**	NO	NO
4	66.00	65.80	66.50	66.20	**66.13**	NO	NO
7	49.60	47.00	46.60	49.00	**48.05**	NO	NO
8	52.00	48.70	52.10	50.60	**50.85**	NO	NO
	MEAN NOISE LEVEL				**56.21**	**NO**	**NO**

* Occupational Safety and Health Administration; Occupational Noise Exposure Standard (OSHA – 29 CRF 1910.95)

Appendix Vd: Particulate (Dust) Level Details

Jangwani Beach S/S								
NO	VALUE	READING 1	READING 2	READING 3	MEAN	MAXIMUM LIMIT*	TEST AVERAGE	TEST MAX.
1	AVERAGE	-	0.023	-	**0.008**		**NO**	
	MAXIMUM	-	0.207	-	**0.069**			**NO**
2	AVERAGE	-	-	-	-		**NO**	
	MAXIMUM	-	-	-	-			**NO**
4	AVERAGE	-	0.018	0.067	**0.028**	**0.230**	**NO**	
	MAXIMUM	-	0.249	0.473	**0.241**			**YES**
6	AVERAGE	0.160	0.024	0.057	**0.080**		**NO**	
	MAXIMUM	2.225	0.373	0.774	**1.124**			**YES**
9	AVERAGE	0.129	0.385	0.023	**0.179**		**NO**	

	MAXIMUM	0.522	1.681	0.221	**0.808**			**YES**
12	AVERAGE	0.006	0.003	0.010	**0.006**		**NO**	
	MAXIMUM	0.040	0.048	0.082	**0.057**			**NO**

* WHO guidelines

Msasani S/S

NO	VALUE	READING 1	READING 2	READING 3	MEAN	MAXIMUM LIMIT*	TEST AVERAGE	TEST MAX.
1	AVERAGE	0.002	0.008	0.012	**0.007**		**NO**	
	MAXIMUM	0.059	0.159	0.204	**0.141**			**NO**
6	AVERAGE	0.007	0.067	0.042	**0.039**		**NO**	
	MAXIMUM	0.183	0.818	0.754	**0.585**			**YES**

* WHO guidelines

Muhimbili S/S

NO	VALUE	READING 1	READING 2	READING 3	MEAN	MAXIMUM LIMIT*	TEST AVERAGE	TEST MAX.
8	AVERAGE	0.010	0.062	-	**0.024**	**0.230**	**NO**	
	MAXIMUM	0.176	0.446	-	**0.207**			**NO**

* WHO guidelines

Mwananyamala S/S

NO	VALUE	READING 1	READING 2	READING 3	MEAN	MAXIMUM LIMIT*	TEST AVERAGE	TEST MAX.
1	AVERAGE	-	0.306	0.535	**0.280**		**YES**	
	MAXIMUM	-	3.400	2.100	**1.833**			**YES**
2	AVERAGE	0.041	0.068		**0.055**		**NO**	
	MAXIMUM	0.500	5.220		**2.860**			**YES**
8	AVERAGE	0.068	0.063	0.066	**0.066**	**0.230**	**NO**	
	MAXIMUM	5.220	5.220	5.220	**5.220**			**YES**
7	AVERAGE	0.062	0.069	0.064	**0.065**		**NO**	
	MAXIMUM	0.541	0.541	0.541	**0.541**			**YES**
3	AVERAGE	0.028	0.027	0.031	**0.029**		**NO**	
	MAXIMUM	0.990	0.990	0.990	**0.990**			**YES**

* WHO guidelines

Appendix Ve: Ground Vibration Details

Jangwani S/S

POINT NO.	MEASURED VIBRATION LEVEL, m/s^2							
	Reading 1	Reading 2	Reading 3	Reading 4	MEAN	DAILY EXPOSURE*	OVER EAV**	OVER ELV**
9	0.10	0.10	0.10	0.10	**0.10**	**0.05**	NO	NO
11	0.70	0.80	1.10	0.80	**0.85**	**0.43**	NO	NO
12	0.40	0.50	0.70	1.10	**0.68**	**0.34**	NO	NO
	MEANVIBRATIONLEVEL				**0.54**	**0.27**	NO	NO

EAV = Exposure Action Value (0.5 m/s^2)

ELV = Exposure Limit Value (1.15 m/s^2)

* Computed based on 2 hours duration of exposure to vibration per day

** Control of Vibration at Work Regulations 2005, No. 1093 (UK.)

Masaki S/S

POINT NO.	MEASURED VIBRATION LEVEL, m/s^2							
	Reading 1	Reading 2	Reading 3	Reading 4	MEAN	DAILY EXPOSURE*	OVER EAV**	OVER 1.15**
1	0.30	0.40	0.50	0.20	**0.35**	**0.18**	NO	NO
2	0.40	0.20	0.10	0.60	**0.33**	**0.16**	NO	NO
3	0.50	0.60	0.70	0.10	**0.48**	**0.24**	NO	NO
4	-	-	-	0.80	**0.20**	**0.10**	NO	NO
5	0.40	0.30	0.30	0.20	**0.30**	**0.15**	NO	NO
	MEAN VIBRATION LEVEL				**0.33**	**0.17**	NO	NO

EAV = Exposure Action Value (0.5 m/s^2)

ELV = Exposure Limit Value (1.15 m/s^2)

* Computed based on 2 hours duration of exposure to vibration per day

** Control of Vibration at Work Regulations 2005, No. 1093 (UK.)

Muhimbili S/S

POINT NO.	MEASURED VIBRATION LEVEL, m/s^2							
	Reading 1	Reading 2	Reading 3	Reading 4	MEAN	DAILY EXPOSURE*	OVER EAV**	OVER 1.15**
1	0.80	0.90	1.10	0.70	**0.88**	**0.44**	NO	NO
2	-	-	-	-	-	-	NO	NO
3	-	-	-	-	-	-	NO	NO
4	0.70	1.00	0.80	1.30	**0.95**	**0.48**	NO	NO
5	0.20	0.20	0.20	0.20	**0.20**	**0.10**	NO	NO
6	0.60	0.40	0.30	0.20	**0.38**	**0.19**	NO	NO
7	-	-	-	-	-	-	NO	NO
	MEAN VIBRATION LEVEL				**0.34**	**0.17**	NO	NO

EAV = Exposure Action Value (0.5 m/s^2)
ELV = Exposure Limit Value (1.15 m/s^2)
* Computed based on 2 hours duration of exposure to vibration per day
** Control of Vibration at Work Regulations 2005, No. 1093 (UK.)

Mwananyamala S/S

POINT NO.	MEASURED VIBRATION LEVEL, m/s^2							
	Reading 1	Reading 2	Reading 3	Reading 4	MEAN	DAILY EXPOSURE*	OVER EAV**	OVER 1.15**
1	0.70	1.10	0.90	1.00	**0.93**	**0.46**	NO	NO
2	1.10	1.00	0.90	1.20	**1.05**	**0.53**	YES	NO
3	0.90	1.10	0.70	1.20	**0.98**	**0.49**	NO	NO
4	1.40	1.50	1.20	1.20	**1.33**	**0.66**	YES	NO
7	1.00	0.80	1.10	1.00	**0.98**	**0.49**	NO	NO
8	0.60	0.50	0.40	0.40	**0.48**	**0.24**	NO	NO
	MEAN VIBRATION LEVEL				**0.95**	**0.48**	NO	NO

EAV = Exposure Action Value (0.5 m/s^2)

ELV = Exposure Limit Value (1.15 m/s^2)

* Computed based on 2 hours duration of exposure to vibration per day

** Control of Vibration at Work Regulations 2005, No. 1093 (UK.)

Appendix VI: Attachments form Attendance Registers and minutes taken for the Consulted People during ESIA study

資料－１５　**Matrix of Entitlement**

No.	JICA Guidelines	Laws of Tanzania	Gap between JICA Guidelines and Laws of Tanzania	Resettlement Policy for this project
1.	Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives. (JICA GL)	No specific provisions on avoiding involuntary resettlement and loss of means of livelihood although these can come from Environmental and Social Impact Assessment (ESIA)	Avoiding involuntary resettlement is not mentioned in Tanzania land laws	Consider alternative alignment to avoid unnecessary loss of livelihoods
2.	When population displacement is unavoidable, effective measures to minimize impact and to compensate for losses should be taken. (JICA GL)	When displacement is unavoidable, compensation will be given as follows (Land Act, 1999 – Cap 113, Part II Section 3 (1) (g) , Section 34 and 156) Market value of unexhausted improvement [1] , disturbance allowance, transport allowance, accommodation allowance and loss of profits, although depreciated replacement value is given and valuation is often not done properly because some aspects that need to be included are not taken into account – for example, using market values is sometimes ignored and information to affected persons is not sufficiently provided	Full replacement value (market value) plus transaction costsare not mentioned in Tanzania laws Measures to minimize impacts are not explicit in Tanzania laws	Consider full replacement value (market value plus transaction cost into compensation package)
3.	People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels. (JICA GL)	Livelihood restoration is not addressed although, sometimes done through provision of alternative affected social services- for example, providing an alternative health facility or a school are cases in point.	Livelihood restoration is not explicit in Tanzania laws	This ARAP should consider PAPs whose strictures have partially been affected by the project to compensate for the areas/size affected unless the area affected is larger and it impacts on it affect the quality of the livelihood, which will then result to full compensationof the value of the structure.

[1] Land Act, 1999 interprets unexhausted improvement as anything or any quality permanently attached to the land directly resulting from the expenditure of capital or labor by an occupier or any person acting in his behalf and increasing the productive capacity, the utility, the sustainability of its environmental quality and includes trees standing crops and growing produce whether of an agricultural or horticulture nature. This condition has been amended by the Land (Amendment Act), 2004 by replacing Subsection 8 and 9 of the Land Act 1999 to allow for sale land without unexhausted improvements. For development purposes or as joint venture.

No.	JICA Guidelines	Laws of Tanzania	Gap between JICA Guidelines and Laws of Tanzania	Resettlement Policy for this project
				Prepare a livelihood restoration plan, including transitional support(for example putting in place deliberate policies to employ affected persons between the transition period so that they can have some work and earn income as well as providing alternative services points while new social services are being developed for them etc.) to ensure standards of living are restored and improved
4.	Compensation must be based on the full replacement cost as much as possible. (JICA GL)	Market values but usually in practice provide with depreciated replacement values (although the law does not direct the use of depreciated values)	Full replacement cost not paid	Consider adopting full replacement value (market valuesplus transaction costs)
5.	Compensation and other kinds of assistance must be provided prior to displacement. (JICA GL)	Compensation must be provided prior to displacement (Land Acquisition Act, 1967 (15- (1)) and Land Act 1999- Cap 113)	Tanzania laws does not have consideration of other assistance to project affected persons	Consider provision of other assistance (for example affirmative policies to employ affected persons, provision of support on land acquisition, payment of land and related fees, and power or water utilities , provision of temporary social services etc. to ease the burden on affected persons) beside statutory compensation
6.	For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. (JICA GL)	For large scale involuntary resettlement compensation must be provided (Land Acquisition Act 1967 Part II Section 11 and Land Cap 113, Part II Section 3 (1) (g))	Tanzania Law does not consider Resettlement Action Plan as mandatory	Using JICA GL, consider RAP as mandatory tool to manage impacts
7.	In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them	Prior to conducting valuation affected people and local authorities are informed about the project, its effect, valuation and compensation process(Land Act Cap. 113 Section 34 (6), 35 (3))	The level of consultation in Tanzania laws is not as detailed as in others including JICA GL and WB	Consider adopting detailed and sufficient consultations and information sharing with affected persons

No.	JICA Guidelines	Laws of Tanzania	Gap between JICA Guidelines and Laws of Tanzania	Resettlement Policy for this project
	in advance. (JICA GL)			
8.	When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people. (JICA GL)	Prior to conducting valuation affected people and local authorities are informed about the project, its effect, valuation and compensation process(Land Act Cap. 113 Section 34 (6), 35 (3) and Part XIV Section 168 (1) and 169 (1) and (2). And Land Acquisition Act Part II Section 7(1))	The level of consultation in Tanzania laws is not as detailed as in others including JICA GL and WB	Consider adopting detailed and sufficient consultations and information sharing with affected persons
9.	Appropriate participation of affected people must be promoted in planning, implementation, and monitoring of resettlement action plans. (JICA GL)	In Tanzania land laws, Resettlement Action Plan is not mandatory, although compensation is required	There is no sufficient participation of affected persons in planning, implementation and monitoring of Resettlement Action Plan	Consider ensuring effective and appropriate participation of affected persons in planning, implementation and monitoring of RAP
10.	Appropriate and accessible grievance mechanisms must be established for the affected people and their communities. (JICA GL)	Tanzania land laws provides a mechanism for dealing with grievances including lodging complaints to the courts (Land Acquisition Act 1967, Section 13 (1) and (2) and Land Act, Cap 113. Part XIII Section 167 (1))	Tanzania grievance mechanism is not easily accessible to affected persons	Provide an easily accessible grievance mechanism procedures to all affected persons
11.	Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advance of such benefits. (WB OP4.12 Para.6)	Affected People are identified during the valuation exercise and the valuation date is the eligible cut-off date[2]	Socio-Economic baseline survey is not undertaken as part of the valuation exercise	Undertake socio-economic baseline data collection as part of the valuation exercise
12.	Eligibility of benefits includes, the PAPs who have formal legal rights	Eligibility of benefits includes, the PAPs who have formal legal rights to land	Tanzania Law does not recognize encroachers	Informal settlers who havepermanent structures and

[2] This is adopted as best practice but not provided in any land law in Tanzania

No.	JICA Guidelines	Laws of Tanzania	Gap between JICA Guidelines and Laws of Tanzania	Resettlement Policy for this project
	to land (including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying. (WB OP4.12 Para.15)	(including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of valuation but have invested on land will be eligible for compensation of assets but not land (recognized as tenants) Land Act Cap 133		graves in the way leave should be for compensated but not for land. i
13.	Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based. (WB OP4.12 Para.11)	Compensation for land can either be in form of cash or land based)Land Act Cap 113 Section 49 (3) for cash transactions and Land Acquisition Act , 1967 Section 11 (2)	There is no preference to land based resettlement strategies	Where appropriate preference to land based resettlement strategies should be adopted, especially taking into account land scarcity in Dar es Salaam
14.	Provide support for the transition period (between displacement and livelihood restoration). (WB OP4.12 Para.6)	-	The law is silent about provision of support during transition and for livelihood restoration	Consider providing support during transition (for example for acquiring new lands, paying for land registration as well as temporary social services) and for livelihood restoration
15.	Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities etc. (WB OP4.12 Para.8)	-	There is no attention for particular group of project affected persons in Tanzania land laws, all PAPs are treated in equally in the compensation process	Assess existence of such groups during socio-economic survey in the proposed site and pay particular attention to their needs if found to be available, especially, women, children and elderly person.
16.	For projects that entail land acquisition or involuntary resettlement of fewer than 200 people, abbreviated resettlement plan is to be prepared. (WB OP4.12 Para.25)	For projects that affect a large size of people, a Land Use Plan is required to accommodate the project. (Land Use Planning Act, 2007. Section 23, 32 and 35 and Village Land Use Guidelines on 2002)	ARAP is not mandatory in the Tanzania law	Adopt ARAP for this project as part of best practice to manage impacts

資料－１６　変電所用地譲渡に係る
リクエストおよび承認レター

16. 変電所用地譲渡に係るリクエストおよび承認レター

(1) ムワナニャマラ変電所

No.1

TANZANIA ELECTRIC SUPPLY COMPANY LIMITED

FROM: Regional Manager Kinondoni North	**TO: Deputy Managing Director (D & CS)**
Our Ref: KN/RPE/PROJECTS/41	**DATE: 30th August, 2012**

RE: PURCHASE OF TWO DEVELOPED PLOTS FOR CONSTRUCTION OF 33/11KV , 15MVA SUBSTATION AT MWANANYAMALA FUNDED BY THE GOVERNMENT OF JAPAN THROUGH JICA

Please refer to the above topic.

We write in reference to our request to you with Reference No. KN/RPE/PROJECTS/41 dated 17th May, 2012 in which we sought for your advice if we can acquire the land parcels at a cost after failure to acquire the same from land Authorities in Kinondoni Municipality.

Having a go ahead from your office, we now send to you correspondences between us and owners of two adjacent plots, Plot No.77 and 76 both in block 2 Mwananyamala area who are ready to let their plots to TANESCO. Owners of Plots Nos. 77 and 76 are Mr. Fikirini Bashiri Shabani Farihallah and the late Safia Thomas respectively. Size of plot 76 is 26.83 x 13.42 m and plot 77 is 26.83 x 13.42 m which when combined become 26.83 x 26.83 m. Both plots owners have declared interest to sell their plots to TANESCO and hence we request for the acquisition process to proceed.

We submit photocopies of certificates and Right of Occupancy, survey plan and form no. IV from Kinondoni Primary Court for plot No. 76 which has approved Mr. Thomas Said Nkwera as the official caretaker for plot 76.

We submit waiting for your further guidance.

Regards,

TANESCO LTD. RECEIVED 31 AUG 2012 Initial A ZONAL MANAGER-DSM & COAST OFFICE

DEPUTY MANAGING DIRECTOR (DISTRIBUTION & CUSTOMER SERVICES) RECEIVED TANESCO - DSM Initials

CHIEF LEGAL COUNSEL & COMPANY SECRETARY TANESCO RECEIVED 31 AUG 2012 Initial

Eng. Christopher J. Masasi
REGIONAL MANAGER
KINONDONI NORTH
CJMmck.

cc: Chief Legal Counsel and Company Secretary
cc: Senior Manager - Distribution
cc: Senior Zonal Manager - DSM & Coast
cc. Mgr - BMD (Investment)

30 AUG 2012

DEPUTY MANAGING DIRECTOR (INVESTMENT) RECEIVED 31 AUG 2012 TANESCO - DSM

16. 変電所用地譲渡に係るリクエストおよび承認レター

(1) ムワナニャマラ変電所

No.2

TANZANIA ELECTRIC SUPPLY COMPANY LTD
RECEIVED
22 AUG 2012
K/NORTH

SHIRIKA LA UMEME TANZANIA
S. L. P. 9024,
DAR ES SLAAM

22/08/2012

FIKIRINI BASHIRI SHABANI FARIHALLAH
C/D FAHAMU PEMBE
S.L.P. 16541
DAR ES SALAAM

Ndugu,

YAH: KUONDOA BARUA YA TAREHE 09/07/2012 KAMA ILIVYOSOMEKA IKUBALIKE BARUA YA 18/06/2012 INAYOHUSU KIWANJA NO.77 KITALU "2" MWANANYAMALA

Somo hapo juu la husika.

Kutokana na maelezo hayo nalijulisha Shirika lako kuwa mazungumzo yetu yaendelee kama tulivyo kubaliana kwenye barua ya tarehe 18/06/2012 na {vyongeza).

Tufanye biashara mapema iwezekanavyo kutokana na mambo yanayonikabili.

Kwa hayo machache nakutakia utendaji mwema.

Wako,

.....

FIKIRINI BASHIRI SHABANI FARIHALLAH

16. 変電所用地譲渡に係るリクエストおよび承認レター

(1) ムワナニャマラ変電所

To Pc Mwakambonja 19/6

No.3

FIKIRINI BASHIRI SHABANI FARIJALLAH,
C/O FAHAMU PEMBE,
P.O. BOX 16541,
DAR ES SALAAM.

18/06/2012

TANZANIA ELECTRIC SUPPLY COMPANY LTD
RECEIVED
19 JUN 2012
K/NORTH

SHIRIKA LA UMEME,
TANZANIA LTD.
DAR ES SALAAM.

YAH: MAJIBU YA OMBI LA KIWANJA No. 77 KITALU No. 2 MWANANYAMALA (KUUZA)

Kichwa cha habari hapo juu cha husika.

Nimepokea barua yako kumbu kumbu No. KN/RPE/PROJECTS/41 ya tarehe 7/6/2012 ikinikumbusha maongezi yetu ya mwezi wa 4. Mimi na shirika lako. Bado maamuzi yangu ni yale yale ya kuliuzia shirika nyumba yangu pamoja na taratibu zote za kisheria zifuatwe.

Asante,
Wako katika ujenzi wa Taifa.

.....
FIKIRINI BASHIRI SHABANI FARIHALLAH

16. 変電所用地譲渡に係るリクエストおよび承認レター

(1) ムワナニャマラ変電所

"Tunayaangaza Maisha Yako" TANESCO "We Light Up Your Life"

No.4

SHIRIKA LA UMEME TANZANIA
TANZANIA ELECTRIC SUPPLY COMPANY LIMITED

Ubungo Head Office, "Umeme Park", P.O. Box 9024 Dar Es Salaam, Tanzánia, Tel: +255 22 2451130/9, Fax: +255 22 2452026

Our Ref:

KN/RPE/PROJECTS/41

Date:

07-06-201

BW. FIKIRINI BASHIRI SHABANI FARIJALA,
C/o FAHAMU PEMBE,
S.L.P. 16541,
DAR ES SALAAM.

YAH: OMBI LA KUUZIWA KIWANJA NA. 77, KITALU NA.2 MWANANYAMALA KWA AJILI YA KUJENGA KITUO CHA KUPOOZEA UMEME WA MSONGO WA 33/11KV.

Somo la hapo juu lahusika.

Tafadhali rejea mazungumzo yetu ya mwezi Aprili 2012 kuhusu TANESCO kuomba kuuziwa kiwanja kwa ajili ya ujenzi wa kituo cha kupoozea umeme (Substation).

Kimsingi ulikubali kuliuzia Shirika letu kiwanja chako kilichoendelezwa kama kinavyoonekana. Kwa barua hii tunakuomba utupe barua ya kuthibitisha kuwa uko tayari kuliuzia Shirika letu eneo hilo na kwamba utakuwa tayari kutumia taratibu za uthamini wa mali yako zilizopo nchini badala ya bei uliyotaja.

Tunategemea ushirikiano wako katika kufanikisha zoezi hili.

Kwa niaba ya Shirika la Umeme Tanzania.

Eng. Christopher J. Masasi
MENEJA WA MKOA – KINONDONI KASKAZINI

Nakala: Meneja Mwandamizi Usambazaji TANESCO Makao Makuu

Nakala: Meneja Mwandamizi wa Kanda Dar es Salaam & Pwani

16. 変電所用地譲渡に係るリクエストおよび承認レター

(1) ムワナニャマラ変電所

UNITED REPUBLIC OF TANZANIA
MINISTRY OF LANDS AND HUMAN SETTLEMENTS DEVELOPMENT
(OFFICIAL SEARCH)

Telegrams: "LANDS"

Telephone: 121241-9
In reply please quote:

LAND REGISTRY
P.O. Box 1191,
DAR ES SALAAM.

Search No.....

TO FIKIRINI BASHIRI SHABANI FARIJALA
P.O. BOX
DAR ES SALAAM

Search fee paid...4000/= Receipt No. 40746217 2. 3. 2010

PLOT NO 77 BLOCK 2 MWANANYAMALA AREA
DSM CITY.

Please refer to your application for an official search over the above mentioned plot. Diligent search has been done and no record revealed in our land Register and you can check further with the Land Officer KINONDONI This letter doesn't guarantee allocation of this plot/land if the same is allocated.

3rd MARCH , 2010

.....
SEN o ASSISTANT REGISTRAR OF TITLES

Copy to: Commissioner for Lands
P.O. Box 9230,
Dar es Salaam.

Authorized Land Officer (KINONDONI Municipality)
P.O. Box,
Dar es Salaam.

16. 変電所用地譲渡に係るリクエストおよび承認レター

(1) ムワナニャマラ変電所

/ TRUE COPY /

THE UNITED REPUBLIC OF TANZANIA

Land Form No. 43

Land Office Nos...41314...

OFFER OF A RIGHT OF OCCUPANCY
The Land Ordinance (Cap. 113 OF THE Laws)
MINISTRY OF LANDS, HOUSING & URBAN DEVELOP,
P.O. Box ..3093.....
DAR ES SALAAM

DISTRICT LAND OFFICER
DAR ES SALAAM
21.10.92

Ref. No...D/KN/A/507..... Date: ..6th April, 1965...

TO: ...Fikirini s/o Machiri Shabani Parijala,

.....

.....

Description of Land...Plot No.771 Block.2 House No -
...Mwanayamala Area, Kinondoni Ward,.....
.....Dar es Salaam.....

You are hereby offered a Right of Occupancy over the Land described above the conditions set out herein.

If you accept this offer please sign all three copies and return them to reach me not later than the...15th April ...1965.....
together with Shs...63.00.....made up as follows:

Premium tendered : : :	Shs:	NIL
Premium for improvements/disturbance :	Shs:	NIL
First payment of rent under condition 2 below: :	Shs:	34.00
Stamp duty on original document of offer : :	Shs:	2.00
Stamp duty on duplicate document of offer : :	Shs:	2.00
Fee for preparation of offer : : :	Shs:	25,00
Total payable on acceptance		63.00

Acceptance out of time of time or unacompanied by payment of this money will not be avalid.

A copy of the accepted offer will be returned to you

You are reminded that under Regulations, 1948, you cannot transfer, mortgage or charge the Right of Occupancy without the President's consent. Such consent must be sought from the Regional Land Officer.

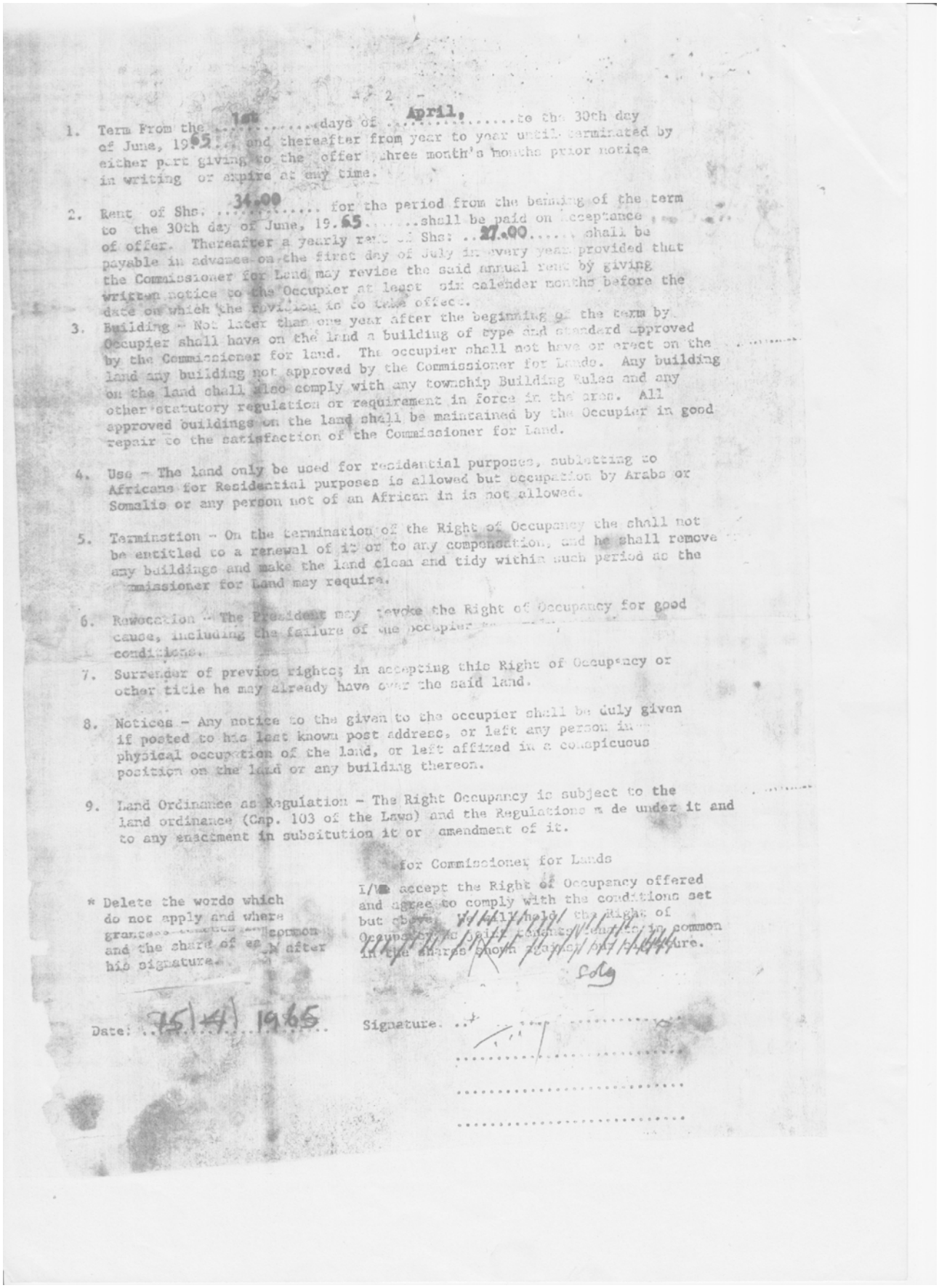
CONDITIONS OF THE RIGHT OF OCCUPANCY

In these condition "Occupier" means the original grantee of the Right of Occupancy and his successors on title and "Commissioner" means the Commissioner for Lands and includes any person authorised by the Commissioner for Lands to act on his behalf; the person so authorised by the Regional Land Officer: Ilala, Dar es Sal.

..../2

16. 変電所用地譲渡に係るリクエストおよび承認レター

(1) ムワナニャマラ変電所



- 2 -

1. Term From the 1st days of April, to the 30th day of June, 1965 and thereafter from year to year until terminated by either part giving to the offer three month's months prior notice in writing or expire at any time.

2. Rent of Shs. 34.00 for the period from the beming of the term to the 30th day of June, 19.65 shall be paid on acceptance of offer. Thereafter a yearly rent of Shs: 27.00 shall be payable in advance on the first day of July in every year provided that the Commissioner for Land may revise the said annual rent by giving written notice to the Occupier at least six calender months before the date on which the revision is to take effect.

3. Building - Not later than one year after the beginning of the term by Occupier shall have on the land a building of type and standard approved by the Commissioner for land. The occupier shall not have or erect on the land any building not approved by the Commissioner for Lands. Any building on the land shall also comply with any townchip Building Rules and any other statutory regulation or requirement in force in the area. All approved buildings on the land shall be maintained by the Occupier in good repair to the satisfaction of the Commissioner for Land.

4. Use - The land only be used for residential purposes, subletting to Africans for Residential purposes is allowed but occupation by Arabs or Somalis or any person not of an African in is not allowed.

5. Termination - On the termination of the Right of Occupancy the shall not be entitled to a renewal of it or to any compensation, and he shall remove any buildings and make the land clean and tidy within such period as the Commissioner for Land may require.

6. Revocation - The President may revoke the Right of Occupancy for good cause, including the failure of the occupier conditions.

7. Surrender of previos rights; in accepting this Right of Occupancy or other title he may already have over the said land.

8. Notices - Any notice to the given to the occupier shall be duly given if posted to his last known post address, or left any person in physical occupation of the land, or left affixed in a conspicuous position on the land or any building thereon.

9. Land Ordinance as Regulation - The Right Occupancy is subject to the land ordinance (Cap. 103 of the Laws) and the Regulations made under it and to any enactment in substitution it or amendment of it.

for Commissioner for Lands

I/We accept the Right of Occupancy offered and agree to comply with the conditions set but obser[illegible] I/We will hold the Right of Occupancy as joint tenants/tenants in common in the shares shown after my/our signature.

* Delete the words which do not apply and where grantees [illegible] common and the share of each after his signature.

Date: 15/4/1965

Signature. ..

.....

.....

.....

16. 変電所用地譲渡に係るリクエストおよび承認レター

(1) ムワナニャマラ変電所

No.9

SHIRIKA LA UMEME TANZANIA
L.T.D P.O.BOX 9024 DSM
22/8/2012.

TANZANIA ELECTRIC SUPPLY COMPANY LTD
RECEIVED
22 AUG 2012
K/NORTH

B11 SAFIA THOMAS
C/D FAHAMU PEMBE
S.L.P 16541
DSM

YAH: KUONDOA BARUA YA TAR 06/7/2012 KAMA INAVYOSOMEKA : IKUBALIKE BARUA YA 15/6/2012 INAYOHUSU KIWANJA NO.76 KITALU "2" MWANANYAMALA.

Ndugu,

Somo hapo juu la husika.

Kutokana na maelezo hayo nalijulisha Shirika lako kuwa mazungumzo yetu yaendelee kama tulivyo kubaliana kwenye barua ya Tarehe 15/6/2012 na { vyongeza }.

Tufanye biashara mapema iwezekanavyo kutokana na mambo yanayotukabili.

Kwa hayo machache tunakutakia utendaji mwema.

Wako,

THOAM
.....
BII SAFIA THOMAS.

16. 変電所用地譲渡に係るリクエストおよび承認レター

(1) ムワナニャマラ変電所

/0

No.10

SAFIA THOMAS,
C/o FAMU PEMBE,
P.O. BOX 16541,
DAR ES SALAAM.
15/06/2012

TANZANIA ELECTRIC SUPPLY CO. LTD
RECEIVED
19 JUN 2012
K/NORTH

SHIRIKA LA UMEME (T)
S.L.P. 9024
DAR ES SALAAM.
TANZANIA

YAH: KIWANJA No. 76 KITALU 2 MWANANYAMALA

Somo la hapo juu lahusika.

Mimi kama mmiliki wa eneo tajwa nimekubali yote yaliyo andikwa kwenye barua yako ya tarehe 7/06/2012 pamoja na maongezi ya awali. Hivyo sina pingamizi endelea na taratibu zako za manunuzi zingatia barua hivyo yenye Kumb- KN/RPE/PROJECT 5/41.

Asante,
Wako katika ujenzi wa Taifa.

Safia Thomas
.....
SAFIA THOMAS

16. 変電所用地譲渡に係るリクエストおよび承認レター

(1) ムワナニャマラ変電所

"Tunayaangaza Maisha Yako" TANESCO "We Light Up Your Life"

No.11

SHIRIKA LA UMEME TANZANIA
TANZANIA ELECTRIC SUPPLY COMPANY LIMITED

Ubungo Head Office, "Umeme Park", P.O. Box 9024 Dar Es Salaam, Tanzania, Tel: +255 22 2451130/9. Fax: +255 22 2452026

Our Ref: KN/RPE/PROJECTS/41

Date: 07.06.2012

BI. SAFIA THOMAS, ✓
C/o FAHAMU PEMBE,
S.L.P. 16541,
DAR ES SALAAM.

YAH: OMBI LA KUUZIWA KIWANJA NA. 76, KITALU NA.2 MWANANYAMALA KWA AJILI YA KUJENGA KITUO CHA KUPOOZEA UMEME WA MSONGO WA 33/1KV.

Somo la hapo juu lahusika.

Tafadhali rejea mazungumzo yetu ya mwezi Aprili 2012 kuhusu TANESCO kuomba kuuziwa kiwanja kwa ajili ya ujenzi wa kituo cha kupoozea umeme (Substation).

Kimsingi ulikubali kuliuzia Shirika letu kiwanja chako kilichoendelezwa kama kinavyoonekana. Kwa barua hii tunakuomba utupe barua ya kuthibitisha kuwa uko tayari kuliuzia Shirika letu eneo hilo na kwamba utakuwa tayari kutumia taratibu za uthamini wa mali yako zilizopo nchini badala ya bei uliyotaja.

Tunategemea ushirikiano wako katika kufanikisha zoezi hili.

Kwa niaba ya Shirika la Umeme Tanzania.

Eng. Christopher J. Masasi
MENEJA WA MKOA – KINONDONI KASKAZINI

Nakala: Meneja Mwandamizi Usambazaji – TANESCO Makao Makuu

Nakala: Meneja Mwandamizi wa Kanda – Dar es Salaam & Pwani

16. 変電所用地譲渡に係るリクエストおよび承認レター

(1) ムワナニャマラ変電所

12. No.12

Form No. IV

JAMHURI YA MUUNGANO WA TANZANIA
USIMAMIZI WA MIRATHI (S. S. M. 1963 NYONGEZA YA 5 FUNGU 2)

Mbele ya Mahakama ya Mwanzo ..... KINONDONI

Usimamizi wa Mirathi Namba 138/2012

Mnamo lea Tarehe 06-07-2012

Bw/bibi/bi ..... THOMAS SAID NKWERA

Amateuliwa kuwa msimamizi wa mirathi ya Marehemu ..... SOPHIA

..... THOMAS PHANTAN

Aliyefariki tarehe 04-05-1999

Ikiwa ameridhidi kusimamia mirathi kwa wema na uaminifu kama alivyoeleza hapa chini.

Mirathi [illegible] kwa kufuatana na nakala ya wosia wa Marehemu ilivyoambatanishwa.

HAKIMU
MAHAKAMA YA MWANZO

HAKIMU MAHAKAMA YA MWANZO WILAYA YA KINONDONI

Mimi ninathibitisha kwa dhati nitasimamia kwa wema na uaminifu mirathi ya marehemu aliyetajwa hapo juu, nikilipa madeni yake na hazina kugawa haki ya mirathi kwa mujibu wa sheria, nami nitaonyesha hesabu kamili na za kweli za mali ya marehemu pamoja na itakavyofanywa, nami nitaonyesha hesabu hizo mbele ya Mahakama hii siku nitakayotakiwa.

IMETIWA SAHIHI LEO TAREHE 06-07-2012

SAHIHI .....
MSIMAMIZI

16. 変電所用地譲渡に係るリクエストおよび承認レター

(1) ムワナニャマラ変電所

13 No.13

TANGANYIKA

D.11660

ORIGINAL

Land Form No. 43

Land Office No. S 41 319

OFFER OF A RIGHT OF OCCUPANCY

The Land Ordinance (Cap. 113 of the Laws)

SETTLEMENT & WATER DEVELOPMENT
MINISTRY OF LANDS, ~~FORESTS AND WILDLIFE,~~
OFFICE OF THE REGIONAL LAND OFFICE AGENT,

P.O. Box 3008

Dar es Salaam.

5th April, 1965

To: Bi. Safia d/o Thomas,

Description of land Plot No. 76, Block 2
Mwananyamara Area, Kinondoni Ward.
Dar es Salaam.

You are hereby offered a Right of Occupancy over the land ... the conditions set out herein.

If you accept this offer sign all three copies and return them to reach me not later than the 15th April, 1965 (or such later date as I may permit) together with Shs. 63.00 made up as follows:—

	Shs.
Premium tendered ...	Nil
Premium for improvements/site clearance ...	Nil
First payment of rent under condition 2 below ...	34.00
Stamp duty on original ...	2.00
Stamp duty on duplicate ...	2.00
Fee, preparation of offer ...	25.00
Total payable on acceptance: Shs.	63.00

G.R.R. No. 51455
DATED 16.4.65
Regional Land Office Coast Region

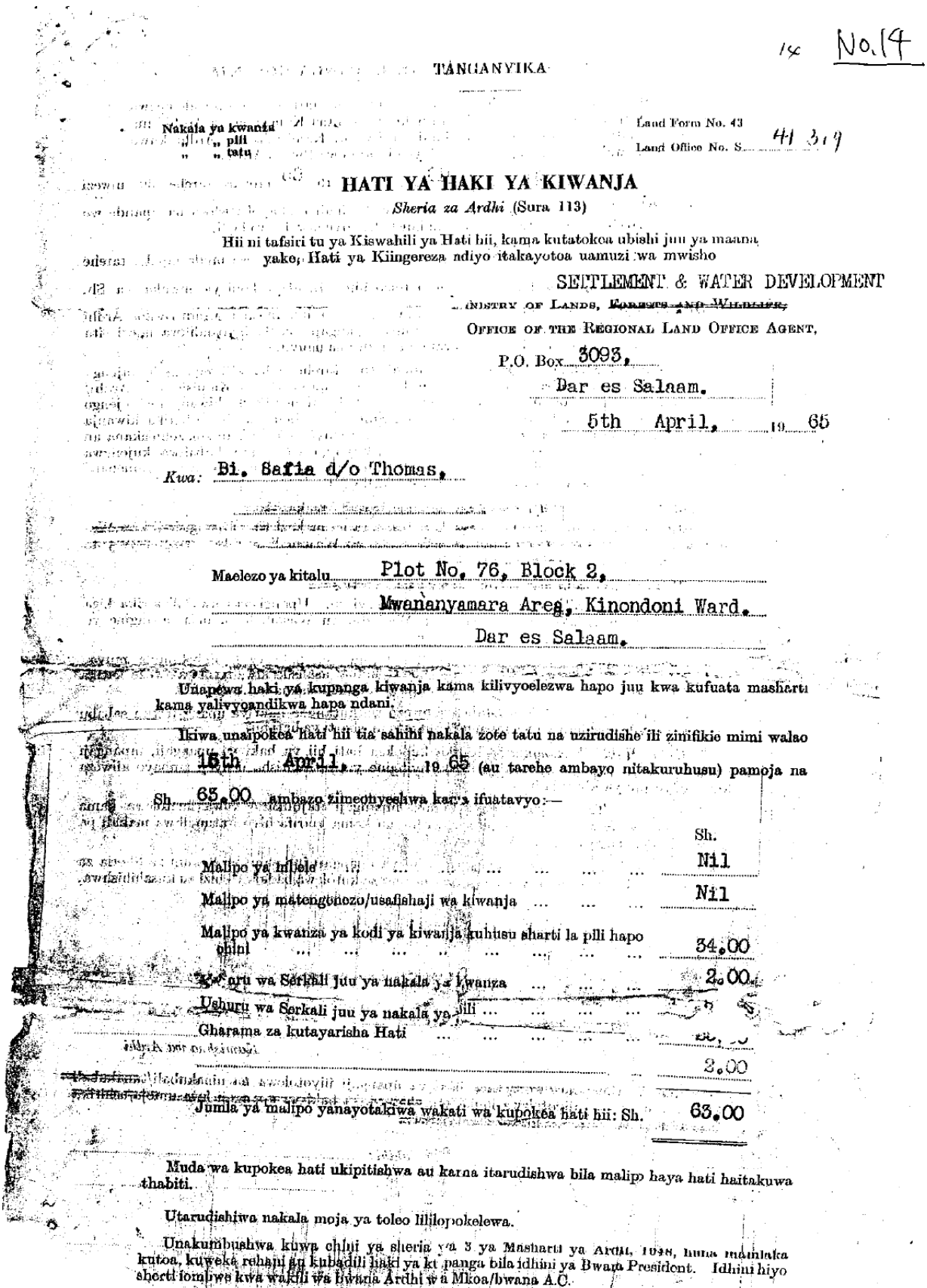
Acceptance out of time or unaccompanied by payment of this amount will not be valid.

A copy of the accepted offer will be returned to you.

You are reminded that under Regulation 3 of the Land Regulations, 1948, you cannot transfer, mortgage or change the Right of Occupancy without the President's consent. Such consent must be sought from the Regional Land Office Agent/~~Area Commissioner.~~

16. 変電所用地譲渡に係るリクエストおよび承認レター

(1) ムワナニャマラ変電所



No.14

TANGANYIKA

Nakala ya kwanza
" pili
" " tatu

Land Form No. 43
Land Office No. S. 41 319

HATI YA HAKI YA KIWANJA

Sheria za Ardhi (Sura 113)

Hii ni tafsiri tu ya Kiswahili ya Hati hii, kama kutatokea ubishi juu ya maana yake, Hati ya Kiingereza ndiyo itakayotoa uamuzi wa mwisho

SETTLEMENT & WATER DEVELOPMENT
MINISTRY OF LANDS, FORESTS AND WILDLIFE,
OFFICE OF THE REGIONAL LAND OFFICE AGENT,
P.O. Box 3093,
Dar es Salaam.

5th April, 19 65

Kwa: Bi. Safia d/o Thomas,

Maelezo ya kitalu Plot No. 76, Block 2,
Mwananyamara Area, Kinondoni Ward.
Dar es Salaam.

Unapewa haki ya kupanga kiwanja kama kilivyoelezwa hapo juu kwa kufuata masharti kama yalivyoandikwa hapa ndani.

Ikiwa unaipokea hati hii tia sahihi nakala zote tatu na uzirudishe ili zimfikie mimi walao 15th April, 19 65 (au tarehe ambayo nitakuruhusu) pamoja na Sh. 65.00 ambazo zimetozwa kama ifuatavyo:—

	Sh.
Malipo ya mjeledi	Nil
Malipo ya matengenezo/usafishaji wa kiwanja	Nil
Malipo ya kwanza ya kodi ya kiwanja kuhusu sharti la pili hapo chini	34.00
Ushuru wa Serikali juu ya nakala ya kwanza	2.00
Ushuru wa Serkali juu ya nakala ya pili	
Gharama za kutayarisha Hati	2.00
Jumla ya malipo yanayotakiwa wakati wa kupokea hati hii: Sh.	63.00

Muda wa kupokea hati ukipitishwa au karna itarudishwa bila malipo haya hati haitakuwa thabiti.

Utarudishiwa nakala moja ya toleo lililopokelewa.

Unakumbushwa kuwa chini ya sheria ya 3 ya Masharti ya Ardhi, 1928, huna mamlaka kutoa, kuweka rehani au kubadili haki ya kupanga bila idhini ya Bwana President. Idhini hiyo shorti iombwe kwa wakili wa Bwana Ardhi wa Mkoa/bwana A.C.

16. 変電所用地譲渡に係るリクエストおよび承認レター

(1) ムワナニャマラ変電所

16.

No.16

MASHARTI YA HAKI YA KUPANGA KIWANJA

Katika masharti haya "mpangaji" maana yake mtu wa kwanza aliyepewa haki ya upangaji na warithi wake wa haki na "Bwana Kamishna wa Ardhi" ina maana mtu ye yote aliyepewa idhini na Bwana Kamishna wa Ardhi kuwa makamu wake: mtu aliyepewa idhini hiyo ni wakili wa Bwana Ardhi.

1. *Muda:*—Toka 1st April 19 65 mpaka tarehe 30 mwezi Juni, 19 66 na baadaye toka mwaka mpaka mwaka hadi utakapokatishwa na upande wo wote ukitoa taarifa ya miezi sita iliyoandikwa kuishi kwenye mwaka wa kodi.

2. *Kodi:*—Kodi ya Sh. 54.00 kwa wakati toka mwanzo wa muda mpaka tarehe 30 Juni, 19 66 italipwa wakati wa kupokea toleo hili. Baadaye kodi ya mwaka ya Sh. 27.00 italipwa mbele kila tarehe ya kwanza ya Julai, kila mwaka, Mradi Bwana Ardhi awezo kubadili kodi hiyo ya mwaka kwa kumpa mpangaji taarifa iliyoandikwa miezi sita mbele ya tarehe ambayo mabadiliko hayo yataanza kuwa na nguvu.

3. *Majengo:*—Kwa muda usiozidi mwaka mmoja toka tarehe ya hati hii, mpangaji atajenga katika kiwanja hiki nyumba ya aina na hali itakayokubaliwa na Bwana Kamishna wa Ardhi/A.C. Kwa wakati wo wote mpangaji hatakuwa na wala hatajenga katika kiwanja hicho jengo lo lote lisilokubaliwa na Bwana Kamishna wa Ardhi/A.C. Ujenzi wo wote katika kiwanja hicho utakubaliana na sheria za kujenga Mjini na sheria nyingine zo zote zinazohusikana au masharti yanayotiliwa mkazo katika eneo hilo. Majengo yote yaliyokubaliwa kujengwa katika kiwanja hiki mpangaji atayaweka katika hali nzuri na atayatengeneza iwapo yameharibika kwa kadiri ya kumridhi Bwana Kamishna wa Ardhi/A.C.

*Kata isiyotakiwa

*~~4. *Matumizi:*—Ardhi hiyo itatumika kwa biashara na makazi tu.~~

*~~4. *Matumizi:*—Ardhi hiyo itatumika kwa biashara na makazi tu. Upangishaji kwa Waafrika unakubaliwa lakini upangishaji kwa Waarabu au Wasomali au mtu mwingine ye yote ambaye asili yake si Mwafrika haukubaliwi.~~

*~~4. *Matumizi:*—Ardhi hiyo itatumika kwa makazi tu.~~

*4. *Matumizi:*—Ardhi hiyo itatumika kwa makazi tu. Upangishaji kwa Waafrika kwa makazi unakubaliwa lakini upangishaji kwa Waarabu au Wasomali au mtu mwingine ye yote ambaye asili yake si Mwafrika haukubaliwi.

5. *Kikomo:*—Haki hiyo ikiisha, mpangaji hatakuwa na haki ya kuomba muda mpya au kupewa [illegible] yo yote na atatakiwa kubomoa nyumba, asafishe kiwanja na akiweke katika hali safi na ya taratibu kwa muda atakaopewa na Bwana Kamishna wa Ardhi/A.C.

6. *Utanguo:*—Bwana Rais wa Jamhuri uwezo wa kutangua haki ya upangaji kwa sababu nzuri, kama vile kushindwa kwa mpangaji kufuata masharti ya hati hii.

7. *Kutoa Haki zilizotangulia:*—Katika kupokea hati hii ya haki ya upangaji, mpangaji anatoa haki yo yote ya upangaji au haki nyingine ya kuthibitisha uenyeji ambayo aliweza kuwa nayo juu ya kiwanja hiki.

8. *Tangazo:*—Taarifa yo yote ya kumpa mpangaji itajulikana kuwa imetolewa kama itapelekwa kwa anwani yake aliyoitoa mwisho, au kama taarifa hiyo itatundikwa mahali pa wazi au juu ya jongo lo lote katika kiwanja hicho.

9. *Sheria na Masharti ya Ardhi:*—Haki hii ya upangaji ipo chini ya kanuni za Sheria za Ardhi (Sura 113) na masharti yake na amri zinazoweza kutolewa badala ya hizi au kusahihishwa.

....

Kamishna wa Ardhi

*Kata maneno yasiyotakiwa, iwapo wapangaji wanashika haki kwa ushirika onyesha hisa ya kila mmoja mbele ya sahihi yake.

Mimi/~~Sisi~~ ninapokea/~~tunapokea~~ haki ya upangaji iliyotolewa na ninakubali/~~tunakubali~~ kutimiza masharti yaliyotolewa hapo juu. ~~*Tutashika haki ya upangaji kwa umoja/ushirika katika hisa zilizoonyeshwa kuelekea sahihi zetu.~~

Sahihi: ....

....

....

....

Tarehe ....

G P Dsm 4046/12-6/40m

16. 変電所用地譲渡に係るリクエストおよび承認レター

(1) ムワナニャマラ変電所

17

No.17

CONDITIONS OF THE RIGHT OF OCCUPANCY

In these conditions "Occupier" means the original grantee of the Right of Occupancy and his successors in title and "Commissioner for Lands" includes any person authorized by the Commissioner for Lands to act on his behalf: the person so authorized is the Regional Land Office Agent Ilala, Dar es Salaam.

1. *Term:*—From the 1st day of April, 1965 to the 30th day of June, 1966 and thereafter from year to year until terminated at the end of a rental year by either party giving to the other six months' prior notice in writing.

2. *Rent:*—Rent of Shs. 54.00 for the period from the commencement of the term to the 30th day of June, 1966 shall be paid on acceptance of the offer. Thereafter an annual rent of Shs. 27.00 shall be payable in advance on the first day of July in every year provided that the Commissioner for Lands may revise the said annual rent by giving written notice to the Occupier at least six calendar months before the date on which the revision is to take effect.

3. *Buildings:*—Not later than one year after the commencement of the term the Occupier shall have on the land a building of a type and standard approved by the Commissioner for Lands/~~Area Commissioner~~. The Occupier shall at no time have or erect on the land any building not approved by the Commissioner for Lands/~~Area Commissioner~~. Any building on the land shall also comply with any Township Building Rules and any other statutory regulations or requirements in force in the area. All approved buildings on the land shall be maintained by the Occupier in good repair to the satisfaction of the Commissioner for Lands/~~Area Commissioner~~.

~~*4. *User:*—The land shall be used for trading and residential purposes only.~~

*Delete whichever are inapplicable.

~~*4. *User:*—The land shall be used for trading and residential purposes only. Sub-letting to Africans is allowed but occupation by Arabs or Somalis or any person not of an African race is not allowed.~~

~~*4. *User:*—The land shall only be used for residential purposes.~~

*4. *User:*—The land shall only be used for residential purposes. Sub-letting to Africans for residential purposes is allowed but occupation by Arabs or Somalis or any person not of an African race is not allowed.

5. *Termination:*—On the termination of the Right of Occupancy the Occupier shall not be entitled to a renewal thereof or to any compensation, and he shall remove any buildings and make the land clean and tidy within such period as the Commissioner for Lands/Area Commissioner may require.

6. *Revocation:*—The President may revoke the Right of Occupancy for good cause, including the failure of the Occupier to comply with these conditions.

7. *Surrender of previous rights:*—In accepting this Right of Occupancy the Occupier surrenders any Right of Occupancy or other title he may already have over the said land.

8. *Notices:*—Any notice to be given to the Occupier shall be duly given if posted to his last known postal address, or left with any person in physical occupation of the land, or left affixed in a conspicuous position on the land or on any building thereon.

9. *Land Ordinance and Regulations:*—The Right of Occupancy is subject to the provisions of the Land Ordinance (Cap. 113 of the Laws) and the regulations thereunder and to any enactment in substitution therefor or amendment thereof.

B. Swette,
for Commissioner for Lands

Delete the words which do not apply, and where grantees take as tenants in common add the share of each after his signature.

I/~~We~~ accept the Right of Occupancy offered and agree to comply with the conditions set out above. ~~We will hold the Right of Occupancy as joint tenants/tenants in common in the shares shown against our signatures.~~

Signatures: Sofia Thomas

Date 15/4/65

16. 変電所用地譲渡に係るリクエストおよび承認レター

(1) ムワナニャマラ変電所

No.18

Valuation Report 18.

HATI YA FIDIA:
MLIPAJI FIDIA: SHIRIKA LA UMEME TANZANIA- TANESCO
MAHALI: MWANANYAMALA B
MRADI: UJENZI WA KITUO KIODOGO CHA KUSAMBAZA UMEME (33/11kV, MWANANYAMALA SUBSTATION)
JUMLA KUU TSHS. 417,890,494.90

SINA	KUMB:NA KND/VAL	JINA LA MWENYE MALI	MAHALI	THAMANI YA JENGO	THAMANI YA ARDHI	POSHO YA MAKAZI	POSHO YA USUMBUFU	POSHO YA USAFIRI	JUMLA TSHS	SAHIHI/DOLE GUMBA
1	MWNB/001	THOMAS SAIDI MKWELA	MWANANYAMALA B	94,538,317.50	71,208,000.00	25,920,000.00	13,259,705.40	500,000.00	205,426,022.90	
2	MWNB/002	FIKIRINI BASHIRI SHABANI FARUALA	MWANANYAMALA B	99,498,600.00	74,764,800.00	23,760,000.00	13,941,072.00	500,000.00	212,464,472.00	
		JUMLA KUU		194,036,917.50	145,972,800.00	49,680,000.00	27,200,777.40	1,000,000.00	417,890,494.90	

Valuer
Sahihi ya Mthamini aliyefanya Uthamini

Municipal Valuer
Sahihi ya Mthamini wa Manispaa

Chief Government Valuer
Sahihi ya Mthamini Mkuu wa Serikali

UNITED REPUBLIC OF TANZANIA
FROM THE DESK
GOVT. CHIEF VALUER
VALUATION APPROVED

17/01/2013
OFFICER INCHARGE / CHIEF VALUER

Ward executive officer
Sahihi ya Afisa Mtendaji Kata

Land officer
Sahihi ya Afisa Ardhi 21/8/13

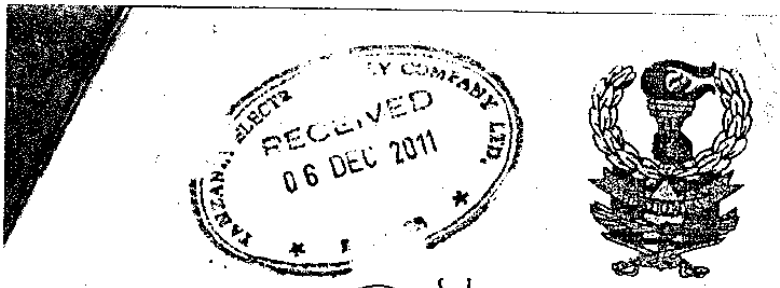
District Commissioner
Sahihi ya Mkuu wa Wilaya

Sahihi ya Mkuu wa Mkoa
Regional Commissioner of Dar es Salaam

24/1/2013
MKUU WA WILAYA
KINONDONI

16. 変電所用地譲渡に係るリクエストおよび承認レター

(2) ジャングワニビーチ変電所



Katika Kujibu Tafadhali
Nakili:MMJ/2153-1 (CPD)

JESHI LA ULINZI LA WANANCHI WA TANZANIA

Simu ya Upepo: "N G O M E"
Simu ya Mdomo: DSM 2150556/62
Telefax: 2153429

Makao Makuu ya Jeshi,
Sanduku la Posta 9203,
DAR ES SALAAM 02 Desemba, 20:

Mkurugenzi Mtendaji,
Shirika la Umeme Tanzania,
Sanduku la Posta 9024,
DAR ES SALAAM, Tanzania.

Kupatiwa Kiwanja Kujenga Kituo cha Kupozea Umeme

Rejea barua DMD (D&CS/SMD/MAJESHI ya tarehe 28 Septemba, 2011.

Makao Makuu ya Jeshi (MMJ) yanakiri kupokea barua iliyorejewa hapo juu. MMJ yanapongeza hatua zinazochukuliwa na shirika katika kutoa huduma kwa jamii.

MMJ yanatoa kibali kutumia kiwanja A2 kama kilivyoainishwa kwenye mchoro mlioambatisha. MMJ yametoa eneo hilo litumike kwa kazi hiyo bila kubadilisha umiliki wa ardhi ambao utaendelea kuwa wa Jeshi. MMJ yanawatakia kazi njema katika kutoa huduma hii muhimu kwa jamii.

Copy to: PRE
Land Surveyor
DM - Mbezi
Retain original

6/12/11

(L. E. Mndeme, ndc)
Meja Jenerali
Kny:Mkuu wa Majeshi ya Ulinzi

16. 変電所用地譲渡に係るリクエストおよび承認レター
(2) ジャングワニビーチ変電所

Jangwani Beach SS 用地取得.

TANZANIA PEOPLE'S DEFENCE FORCE

REF: MMJ/2153-1(CPD)

Telex: "NGOME"

Telephone:DSM 2150556/62

Telefax 2153429.

TPDF HEAD QUARTER

P.O.Box 9203,

DAR ES SALAAM.

02.December,2011.

Managing Director,

Tanzania Electric Supply Company Limited,

P.O.Box 9024.

DAR ES SALAAM, Tanzania.

Re: RELEASE OF PLOT TO BUILD A SUBSTATION.

Refer your later ref: DMD (D&CS/SMD/MAJESHI dated 28th September,2011.

Tanzania People's Defence Force head quarters acknowledge to receive the letter with the above heading. Tanzania People's Defence Force head quarters has been encouraged by TANESCO on the measure taken to provide good service to Community.

Tanzania People's Defence Force head quarters here by authorize to use land parcel No A2 as shown in the attached sketch with an area of 1,325 m^2. Tanzania People's Defence Force head quarters had authorized to use that area without changing the title deed. The plot will remain to be the property of Tanzania People's Defence Force head quarters.

Tanzania People's Defence Force wishes you all the best in providing service good to Community

Yours Faithfully

Signed by

(L. E.Mndeme,ndc)

Major General

For: **CHIEF DEFENCE OFFICER.**

16. 変電所用地譲渡に係るリクエストおよび承認レター
(2) ジャングワニビーチ変電所

"Tunayaangaza Maisha Yako" TANESCO "We Light Up Your Life"

SHIRIKA LA UMEME TANZANIA
TANZANIA ELECTRIC SUPPLY COMPANY LIMITED

Ubungo Head Office, "Umeme Park", P.O.Box 9024 Dar Es Salaam, Tanzania. Tel: +255 22 2451130/9. Fax: +255 22 2452026

Our Ref: DMD(D&CS/SMD/MAJESHI

Date: 28 Septemba, 2011

Mkuu wa Majeshi,
Makao Makuu ya Jeshi la Wananchi (JWTZ),
S. L. P. 9203,
DAR ES SALAAM.

Ndugu,

YAH: OMBI LA KUPATIWA SEHEMU YA KIWANJA CHA JESHI KILICHOPO ENEO LA JANGWANI BEACH ILI KUJENGA KITUO CHA KUPOOZEA UMEME; 33/11KV KWA MSAADA WA SERIKALI YA JAPAN KUPITIA JICA.

Tafadhali rejea somo la hapo juu.

Tumepata msaada kutoka serikali ya Japan kwa ajili ya kujenga vituo vinne vya kupoozea umeme wa msongo wa 33/11kV katika manispaa ya Kinondoni. Maeneo yaliyopendekezwa kwa ajili ya vituo hivyo ni Kawe, Jangwani Beach, Msasani/Masaki na Mwananyamala.

Lengo la kujenga kituo cha kupoozea umeme (substation) eneo la Jangwani Beach ni kuvipunguzia mzigo vituo vya jirani ambavyo tayari vimeshazidiwa. Pia ili kupunguza mzigo mkubwa uliopo kwenye njia ndefu za mifumo ya umeme maeneo ya Mbezi Beach, Mbezi Kilongawima, Jangwani Beach na sehemu ya Salasala tunahitaji kuwa na kituo hicho ili kuboresha mifumo yetu na kupata umeme mzuri ulio katika kiwango bora katika maeneo hayo.

Hivyo basi, tunaomba kipande cha ardhi chenye eneo la karibu mita za mraba 1,325 (1325m²) kama tulivyoonyesha kwenye mchoro (sketch) ulioambatanishwa kikiwa ni asilimia 16.5 ya eneo lote lililowekwa wigo wa waya (chain link fence).

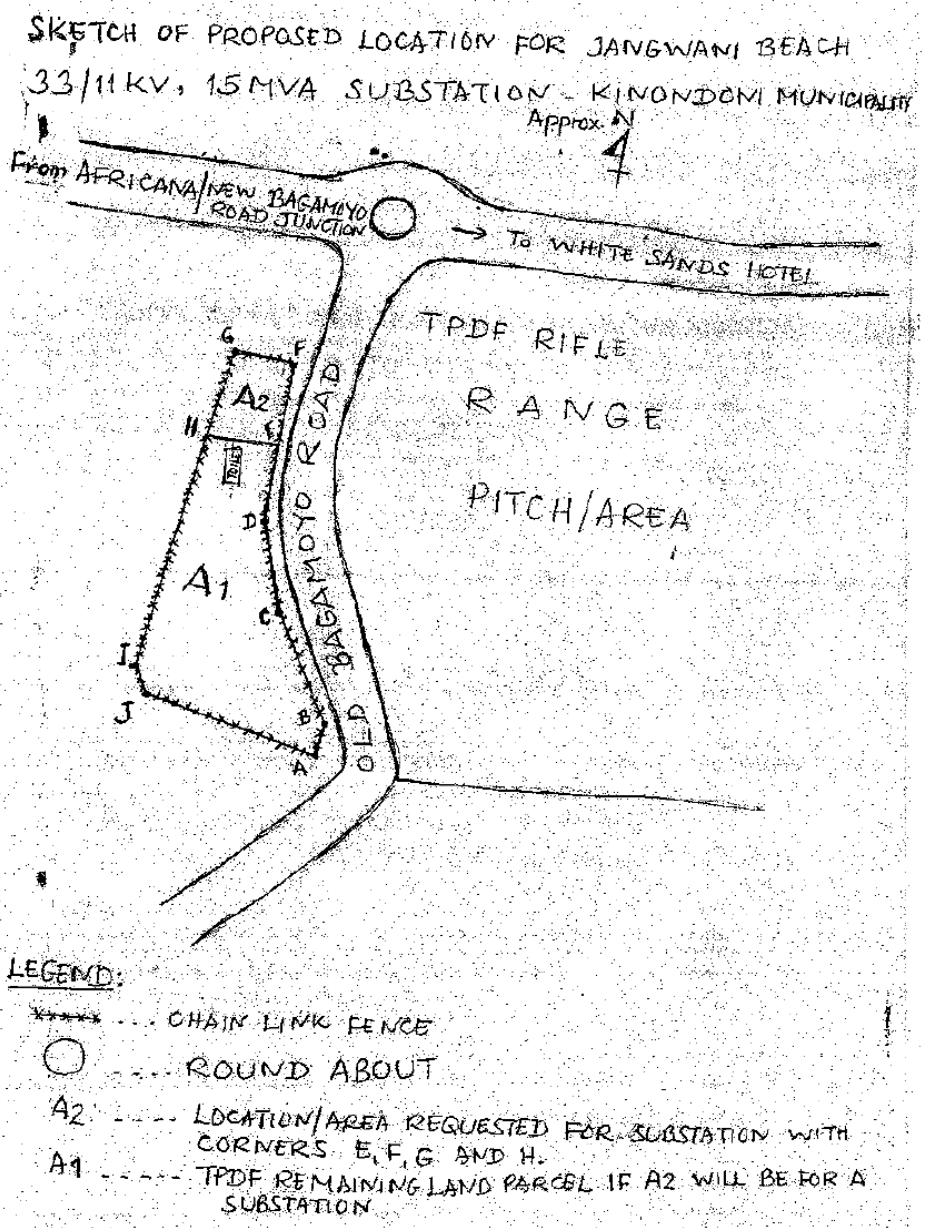
Msaada wa ofisi yako unahitajika sana ili kufanikisha mradi huu.

Wako Amini,
KNY: SHIRIKA LA UMEME TANZANIA,

WILLIAM G. MHANDO
MKURUGENZI MTENDAJI
WGM/FJM/ssm

16. 変電所用地譲渡に係るリクエストおよび承認レター

(2) ジャングワニビーチ変電所



16. 変電所用地譲渡に係るリクエストおよび承認レター

(2) ジャングワニビーチ変電所

PROPOSED 33/11KV, 15MVA SUBSTATION AT JANGWANI BEACH NEAR RIFLE RANGE AREA

COORDINATE LIST EXTRACTED BY HAND HELD GPS-Garmin Map 60Cx TO ALL CORNER POINTS AS INDICATED IN THE SKETCH

	N	E
A	9258951	524686
B	9258955	524683
C	9258956	524629
D	9258962	524688
E	9258988	524553
F	9259036	524518
G	9259027	524503
H	9258976	524527
I	9258891	524571
J	9258893	524584

NOTE: 1. COORDINATES ARE IN METRES (m)
2. COORDINATES WERE OBSERVED ON ACCURACY OF ±3M.

AREA COMPUTED FROM COORDINATES:

- TOTAL AREA (A1 + A2) = 8043 m^2
- AREA FOR PROPOSED SUBSTATION = 1325 m^2 (A2)
- REMAINING PORTION (A1) = 6718 m^2
- A2 IS ABOUT 16.5 % OF THE TOTAL AREA.

16. 変電所用地譲渡に係るリクエストおよび承認レター

(3) ムヒンビリ変電所

RM/IL/GEN/38

24th September, 2012

Managing Director
Muhimbili National Hospital
P.O. Box
Dar essalaam

Dear Sir/Madam,

RE: REQUEST FOR A SPACE/PLOT AT YOUR COMPOUND TO ESTABLISH A 15MVA, 33/11KV SUBSTATION

The above heading refers.

In one of our effort to improve power reliability, TANESCO has a plan to establish a 33/11kV substation at Muhimbili compound. This substation is very important for reliable power supply to the hospital and the nearby residents.

Currently we have been experiencing a lot of power breakdowns at Muhimbili hospital due to the fact that, the current power is coming far away from the hospital and hence facing a lot of challenges and obstacles along the way. These challenges include cable theft, vandalism, line overload and other the like. To overcome these challenges/problems we are looking for a space where we can establish a substation which will be close to our hospital.

Please avail us with a space of about 182M² as per attached map plan to enable us to establish the above named substation and hence be able to introduce a power line, which shall be dedicated to Muhimbili Hospital only.

Yours faithfully,
For: TANZANIA ELECTRIC SUPPLY COMPANY LIMITED

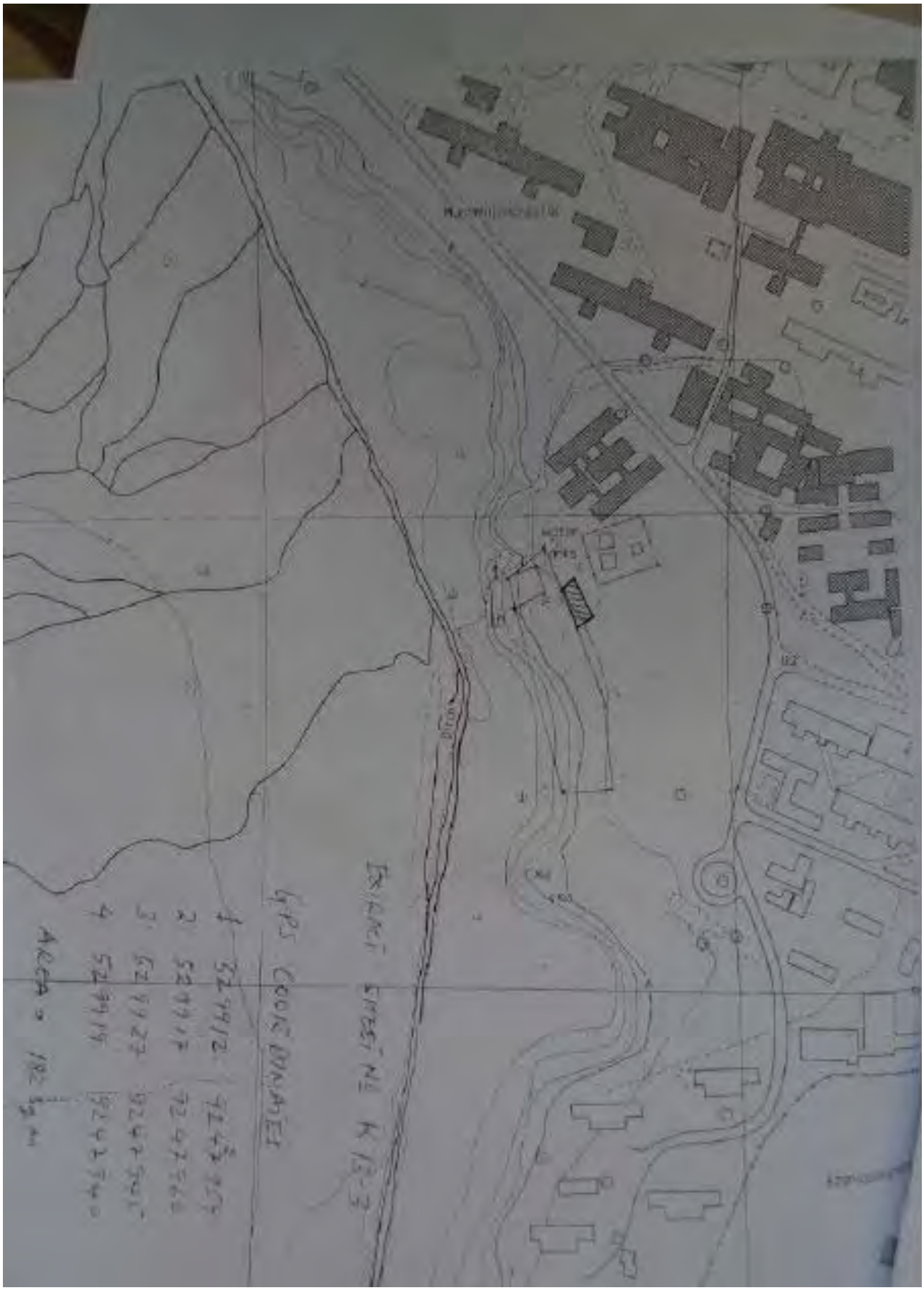
Original Signed By
AMOS W. MAGANGA

ENG. AMOS W. MAGANGA
AG.REGIONAL MANAGER – ILALA
AWM/gn

cc: Senior Zonal Manager – (DSM & Coast)
cc: Manager Design and Planning

16. 変電所用地譲渡に係るリクエストおよび承認レター

(3) ムヒンビリ変電所



16. 変電所用地譲渡に係るリクエストおよび承認レター

(3) ムヒンビリ変電所

RM/IL/GEN/38

24th September, 2012

Managing Director
Ilala Municipal Council
P.O. Box
Dar essalaam

Dear Sir/Madam,

RE: REQUEST FOR A SPACE/PLOT AT JANGWANI NEAR MUHIMBILI COMPOUND TO ESTABLISH A 15MVA, 33/11KV SUBSTATION

The above heading refers.

In one of our effort to improve power reliability, TANESCO has a plan to establish a 33/11kV substation near to Muhimbili National Hospital. This substation is very important for reliable power supply to the hospital and the nearby residents.

Currently we have been experiencing a lot of power breakdowns at Muhimbili hospital due to the fact that, the current power is coming far away from the hospital and hence facing a lot of challenges and obstacles along the way. These challenges include cable theft, vandalism, line overload and other the like. To overcome these challenges/problems we are looking for a space where we can establish a substation which will be close to our hospital.

Please avail us with a space of about 3735M² as per attached map plan to enable us to establish the above named substation and hence be able to introduce a power line, which shall be dedicated to Muhimbili Hospital only.

We hope our request will be considered in a positive way.

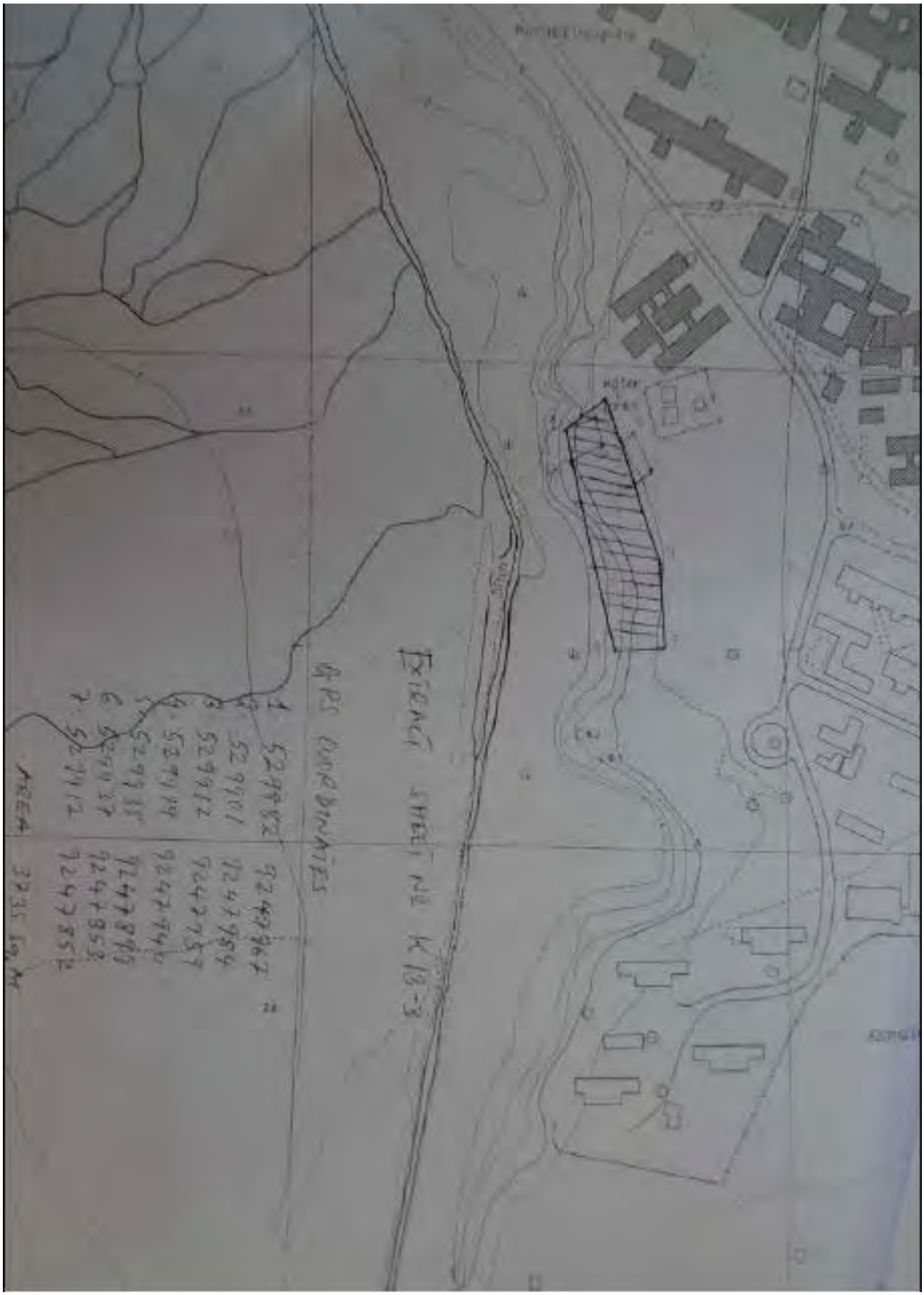
Yours faithfully,
For: TANZANIA ELECTRIC SUPPLY COMPANY LIMITED

ENG. AMOS W. MAGANGA
AG:REGIONAL MANAGER – ILALA
AWM/gn

cc Senior Zonal Manager - (DSM & Coast)
cc Manager Design and Planning

16. 変電所用地譲渡に係るリクエストおよび承認レター

(3) ムヒンビリ変電所



16. 変電所用地譲渡に係るリクエストおよび承認レター

(3) ムヒンビリ変電所

MUHIMBILI NATIONAL HOSPITAL

Cables: "MUHIMBILI"
Telephones: 255-22-2151367-9
FAX: 255-22-2150534
Website: www.mnh.or.tz
Email: info@mnh.or.tz
In reply please quote:
Ref: MNH/E2/II/II/69

Postal Address:
P.O. Box 65000
DAR ES SALAAM
Tanzania

TANZANIA ELECTRIC SUPPLY CO LTD
REGIONAL OFFICE
07 OCT 2012
ILALA
DAR ES SALAAM

1st October 2012

Regional Manager,
Tanzania Electrical Supply Company Ltd.,
Ilala,
P.O. Box 9024,
DAR ES SALAAM

Re: REQUEST FOR A SPACE/PLOT TO ESTABLISH A 15MVA, 33/11KV SUB-STATION

Reference is made to your letter No. RM/IL/GEN/38 of 24th September 2012 regarding the above captioned subject matter.

I wish to inform you that we have noted your effort to ensure reliability of the power supply to the Hospital. The Hospital has in principal accepted your request and will provide the space as per your request so that to enable you to establish the above named sub-station and hence to introduce a power line which will be dedicated to Muhimbili National Hospital only.

Thank you for your continued cooperation.

Yours,

Dr. M. A. Njelekela
EXECUTIVE DIRECTOR

/ajh.

All correspondence to be addressed to the Executive Director

16. 変電所用地譲渡に係るリクエストおよび承認レター

(3) ムヒンビリ変電所

"Tunayaangaza Maisha Yako" TANESCO "We Light Up Your Life"

SHIRIKA LA UMEME TANZANIA
TANZANIA ELECTRIC SUPPLY COMPANY LIMITED

Ubungo Head Office, "Umeme Park", P.O. Box 9024 Dar Es Salaam, Tanzania, Tel: +255 22 2451130/9. Fax: +255 22 2451035

Our Ref: Date:

Our ref: RM/IL/GEN/38 15th October, 2013

Executive Director,
Muhimbili National Hospital,
DAR ES SALAAM

RE: REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW 33KV LINES AND SUBSTATIONS IN DAR ES SALAAM CITY FUNDED BY THE GOVERNMENT OF JAPAN THROUGH JICA.

Subject: Request for a temporary stock yard space and an access to the proposed 15MVA, 33/11kV Substation at Muhimbili compound (playground area)

Please refer to the captioned subject.

In order to improve power reliability at Muhimbili Hospital and its neighborhood, TANESCO, is intending to establish a 33/11kV substation at your compound next year. By so doing we are going to improve our services to customers including Muhimbili National Hospital.

We once again thank you for accepting our request for a space to construct the above mentioned substation. However we still need a space of land for storage of construction materials and an access road to the substation plot.

The Google map is attached herewith for your easy reference.

Please kindly avail us with the requested space to cater the purpose.

Yours faithfully,
For: TANZANIA ELECTRIC SUPPLY COMPANY LIMITED

Eng. Athanasius H.J. Nangali
REGIONAL MANAGER ILALA
AHJN/dem

16. 変電所用地譲渡に係るリクエストおよび承認レター

(3) ムヒンビリ変電所

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

OFFICE OF THE VICE CHANCELLOR

P.O. BOX 65001 • DAR ES SALAAM • TANZANIA
Telephone:+255 022 2150302-6 Ext. 209 * Direct Line: +255 022 2151596 * Telefax: +255 022 2150465
E-mail: vc@muhas.ac.tz
E-mail: vc@muhas.ac.tz
E-mail: vc@muhas.ac.tz

MU/01/0007/017/100

24th December, 2013

Managing Director,
Tanzania Electric Supply Company Limited,
P.O.Box 9024,
DAR ES SALAAM

RE: REHABILITATION OF SUBSTATION AND CONSTRUCTION OF NEW 33KV DISTRIBUTION LINES IN DSM CITY FUNDED BY THE GOVERNMENT OF JAPAN THROUGH JICA

SUB: Request for an access road to the proposed 15MVA, 3311kV substation at Muhimbili Campus (on the edge of playground area)

Reference is made to your letter SMD/MPD/JICA dated 19th December, 2013 regarding the above subject.

This is to acknowledge that the office of Vice Chancellor received your letter mentioned above on 23rd December, 2013 worked on it.

Please be informed that your request for an access road to the proposed 15MVA, 33/11kV substation at Muhimbili campus (on the edge of MUHAS playground) has been approved as requested.

Take note that the vehicles should not pass within the play ground. Also in order to avoid unnecessary delays at the gate on security issues, you should introduce your staff who will be involved in the activity to MUHAS security Department and will be given ID for the whole period of implementation.

Hamis Kamandwa
For: VICE CHANCELLOR

cc: Deputy Vice Chancellor- **ARC, MUHAS**
cc: Deputy Vice Chancellor – **PFA, MUHAS**
cc: Director of Planning and Development- **Muhimbili Campus**
cc:: Head, Security Department ,**MUHAS** – prepare the ID for them
cc: Manager, SSB, **MUHAS**
cc: Estates Manager, **MUHAS**

MANAGING DIRECTOR'S OFFICE RECEIVED 27 DEC 2013 TANESCO-DSM

TANZANIA ELECTRIC SUPPLY COMPANY LIMITED RECEIVED BY: 27 DEC 2013 MAIL ROOM HEAD OFFICE

30 DEC 2013

資料－１７　配電線建設に係る
リクエストおよび承認レター

17. 配電線建設に係るリクエストおよび承認レター

TANZANIA NATIONAL ROADS AGENCY

Tanzania National Roads Agency
TANROADS
Good roads for national development

Date: 4th July 2013
Our Ref: RM/TNR/DSM/R.80.415/VoL.V/57

P.O Box 4833
Mobile Exchange
Mandela Road
Dar es Salaam

Managing Director,
Tanzania Electric Supply Company Limited
P.O. Box 9024,
DAR ES SALAAM - Fax 2452026

RE: **REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW DISTRIBUTION LINES AND SUB STATIONS IN DAR ES SALAAM FUNDED BY THE GOVERNMENT OF JAPAN THROUGH JICA**

Sub: **Request for Construction of 33kV line along New and Old Bagamoyo Road Reserve**

PERMIT No. TRD/DSM/2013/2014/T/P/01

Reference is made to your letter dated 1st July 2013 with reference SMD/MPD/JICA regarding the above captioned subject.

After going through your submssion, we have accepted your request to construct 33Kv Power Line along New and Old Bagamoyo road basing on the following conditions:-

1. The work shall be executed in a accordance with submitted DWG No DL-R-01 showing the Route Map from Tegeta S/S to Jangwani Beach S/S.
2. The 33kV power line shall be constructed within 1.5m from the Road Reserve Marker Posts along New Bagamoyo road and 1.5m from the plot boundaries of Old Bagamoyo road (Africana to TPDF Riffle Range Ground section).
3. Where the power line will cross the road, you are strictly required to maintain the minimum allowable clearance height of 7m from the ground.
4. The Agency reserves the right to carry out any appropriate changes to the part of the developments within the road reserve without any compensation.
5. Carrying the works contrary to this permit shall be considered as an encroachment to the road resrve and the Agency shall take legal actions as per Highway Ordinance Cap. 167.

Tel. + 255 22 2450185/2450046 Fax. + 255 22 2450626, E-Mail: rmo@dsm.tanroads.org

6. A normal supervision fee of **Tshs 2,900,000.00** shall be charged and paid before the commencement of the works as detailed in the attached sheet.

7. When you are ready to to start the works, please inform this office so that arrangements can be made for supervision and close monitoring of your work with regard to compliance to the above conditions.

8. Acknowledge recept of this letter.

Ndyamukama J
Regional Manager
DAR ES SALAAM

Tel: + 255 22 2450185/2450046 **Fax:** + 255 22 2450626, **E-Mail:** rmo@dsm.tanroads.org

17. 配電線建設に係るリクエストおよび承認レター

TANZANIA NATIONAL ROADS AGENCY

Good roads for national development

P.O Box 4838
Mabibo External
Mandela Road
Dar es Salaam

Date: 5th July 2013
Our Ref: RM/TNR/DSM/R.80.415/VoL.V/58

Managing Director,
Tanzania Electric Supply Company Limited
P.O. Box 9024,
DAR ES SALAAM - Fax 2452026

RE: REHABILITATION OF SUBSTATIONS AND CONSTRUCTION OF NEW DISTRIBUTION LINES AND SUB STATIONS IN DAR ES SALAAM FUNDED BY THE GOVERNMENT OF JAPAN THROUGH JICA

Sub: Request for Construction of 33kV line along New and Old Bagamoyo Road Reserve

Reference is made to your letter dated 1st July 2013 with reference SMD/MPD/JICA regarding the above captioned subject.

After going through your submssion, we have accepted your request to construct 33Kv Power Line along New and Old Bagamoyo road.

The permit will be issued after payment of **Tshs 2,900,000.00** exclusive of VAT being the estimated supervision cost during implementation of your project.

The breakdown of estimated supervision cost is attached to this letter.

Ndyamukama, J.
Regional Manager
DAR ES SALAAM

Tel: + 255 22 2450185/2450046 Fax: + 255 22 2450626, E-Mail: rmo@dsm.tanroads.org

CONSTRUCTION OF 33kV POWER LINE ALONG NEW & OLD BAGAMOYO RD

ESTIMATION OF SUPERVISION COST

Item	Description	Unit	Qty	Rate (Tshs)	Amount (Tshs)
1	Supervision Vehicle per day including fuel	Days	20	80,000.00	1,600,000.00
2	Allowance of the Supervisor, TANROADS Engineer	Days	20	40,000.00	800,000.00
3	Allowance of driver	Days	20	25,000.00	500,000.00
	Total estimated supervision Costs				**2,900,000.00**

17．配電線建設に係るリクエストおよび承認レター

HALMASHAURI YA MANISPAA YA ILALA

BARUA ZOTE ZIPELEKWE KWA MKURUGENZI WA MANISPAA

S.L.P. Na. 20950
Simu Na. 2128800
2128805
Fax Na. 2121486

Ofisi ya Mkurugenzi
Manispaa ya Ilala

Kumb. IMC/HT.9/

Tarehe: 04/07/2013

Mkurugenzi wa TANNESCO,
UBUNGO HEAD OFFICE,
S.L.P. 9024,
DAR ES SALAAM.

YAH: **KIBALI CHA KUPITISHA MIUNDOMBINU YA UMEME BARABARA YA MAGORE HADI HOSPITALI YA MUHIMBILI**

Tafadhali husika na kichwa cha habari hapo juu na pia rejea barua yako ya tarehe 24/04/2013 yenye Kumb. Na.SMD/MPD/983/JICA.

Ofisi ya Mkurugenzi wa Manispaa ya Ilala imepokea barua kutoka ofisi yako ya kuomba kibali cha kupitisha miundombinu ya umeme na kukarabati kituo kidogo cha umeme.

Baada ya kupitia barua yako, napenda kukufahamisha kwamba kibali kimetolewa cha kuwaruhusu kazi hiyo kufanyika, Pamoja na kibali hiki tafadhali zingatia masharti yafuatayo:

i. Unatakiwa kuwasiliana na Kitengo cha Maliasili na Idara ya Ujenzi Manispaa ya Ilala kabla ya kuanza utekelezaji.
ii. Kuzingatia sheria za usalama barabarani na kutunza utulivu katika maeneo yatakayotumiwa kwa shughuli hiyo.
iii. Mnatakiwa kulipia gharama za posho ya usimamizi kwa watumishi wa Halmashauri watakaoshiriki katika zoezi hilo.
iv. Unatakiwa kurudishia miundombinu itakayoathirika wakati wa utekelezaji wa kazi hiyo kwenye hali yake ya kawaida mara ukamilishapo kazi zako.

Nakutakia kazi njema.

Arch. A.J. Mcha
Kny: **Mkurugenzi wa Manispaa,**
Halmashauri ya Manispaa ya Ilala.

Nakala: Mkurugenzi wa Manispaa ya Ilala – aione kwenye jalada

17．配電線建設に係るリクエストおよび承認レター

KINONDONI MUNICIPAL COUNCIL

ALL CORRESPONDENCES TO BE ADDRESSED TO THE MUNICIPAL DIRECTOR

Tel: 2170173
Fax: 2172951

In reply please quote:

Ref: KMC/MEK /T20/26

MUNICIPAL DIRECTOR
KINONDONI MUNICIPAL COUNCIL
P. O. BOX 31902
DAR ES SALAAM

Date: 03/07/2013

MANAGING DIRECTOR,
TANZANIA ELECTRIC SUPPLY CO. LTD,
P.O. BOX 9024,
DAR ES SALAAM

RE: PERMIT FOR CONSTRUCTION OF 33 KV LINES FROM MAKUMBUSHO SUB STATION TO MASAKI, MAKUMBUSHO SUB STATION TO MWANANYAMALA AND TEGETA SUB STATION TO JANGWANI BEACH ALONG THE ROAD RESERVE AND TREE CUTTING ALONG THE LINES CORRIDOR.

Kindly refer to your letter with reference number SMD/PMD/JICA dated 24th April, 2013 on the above subject matter.

I would like to thank you for upgrading the electric power supply in the Kinondoni Municipaiity and that this project will enhance the development of our people.

The permit is hereby granted with the following conditions;-

1. You must contact the Municipal surveyor at your own cost for the roads demarcation.

2. TANROADS must be involved for the power transmission in the trunk roads such as Bagamoyo road and Old Bagamoyo road etc.

3. The removal of the road reserve encroachers will be financed by your firm through our assistance. Tree cutting is inevitable in the transmission corridor so as to avoid electric accidents/shocks.

Thank you for your good co-operation with our Municipality.

Eng. Uriyo G. A
For: **MUNICIPAL DIRECTOR**
KINONDONI MUNICIPAL COUNCIL

CC.

- **Municipal Surveyor** – assist them according to the By Laws.

17．配電線建設に係るリクエストおよび承認レター

KINONDONI MUNICIPAL COUNCIL

ALL CORRESPONDENCES TO BE ADDRESSED TO THE MUNICIPAL DIRECTOR

Tel: 2170173
Fax: 2172951

In reply please quote:

Ref: KMC/MEK /T20/26

MUNICIPAL DIRECTOR
KINONDONI MUNICIPAL COUNCIL
P. O. BOX 31902
DAR ES SALAAM

Date: 03/07/2013

MANAGING DIRECTOR,
TANZANIA ELECTRIC SUPPLY CO. LTD,
P.O. BOX 9024,
DAR ES SALAAM

RE: PERMIT FOR CONSTRUCTION OF 33 KV LINES FROM MAKUMBUSHO SUB STATION TO MASAKI, MAKUMBUSHO SUB STATION TO MWANANYAMALA AND TEGETA SUB STATION TO JANGWANI BEACH ALONG THE ROAD RESERVE AND TREE CUTTING ALONG THE LINES CORRIDOR.

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Thank you for your good co-operation with our Municipality.

Eng. Uriyo G. A
For: **MUNICIPAL DIRECTOR**
KINONDONI MUNICIPAL COUNCIL

CC.

- **Municipal Surveyor** – assist them according to the By Laws.

資料－１８　環境社会配慮モニタリングフォーム

18. 環境社会配慮モニタリングフォーム

モニタリング計画に基づき、本プロジェクトのモニタリングフォーム案を以下に示す。

＜建設時のモニタリング＞

１．許認可

項目	モニタリング結果
環境許認可の取得状況	
環境許認可の付帯条件の遵守状況	

２．ステークホルダー協議

No.	ステークホルダー協議実施日	参加者（所属、参加者数）	議題・参加者からのコメント	対処事項
1				
2				
3				

３．廃棄物

No.	発生サイト（変電所サイト名）	廃棄物の種類	有害廃棄物・一般廃棄物の区別	発生量（月間）	処理方法	請負業者
1						
2						
3						

４．住民移転

補償の支払い

Lot	計画総数（世帯数 HHs）（A）	補償受領済世帯数（HHs）（B）	進捗率%（B/A x 100）
Lot1			
Lot2			
Lot3			

移転の実施

Lot	計画移転総数（世帯数 HHs）（A）	移転済世帯数（HHs）（B）	進捗率%（B/A x 100）
Lot1			
Lot2			
Lot3			

Ubungo-Ilala 間 132kV 送電線用地内墓地移転

移転対象墓地数（A）	補償支払い済の墓地数	移転済墓地数（B）	進捗率%（B/A x 100）
250			

５．既存インフラ

項目	モニタリング結果
工事実施時のムヒンビリ病院の半地下受水槽への影響の有無	

６．事故

項目	モニタリング期間	モニタリング結果
労働安全管理計画の実施状況		
事故発生状況（件数、発生場所、事故内容、対処状況）		

＜供用時のモニタリング＞

１．廃棄物

No.	発生サイト（変電所サイト名）	廃棄物の種類	有害廃棄物・一般廃棄物の区別	発生量（月間）	処理方法	請負業者
1						
2						
3						

２．土壌・地下水汚染

変電所サイト	モニタリング日	各変圧器の漏油状況（点検結果）	対処状況
イララ変電所			
ムササニ変電所			
ムヒンビリ変電所			
ジャングワニビーチ変電所			
ムワナニャマラ変電所			

３．騒音（等価騒音レベル）

変電所名	時間帯	単位	測定場所	測定値	基準値	
					タンザニア	IFC
ムワナニャマラ変電所	6:00-22:00	dBA（L_{Aeq}）			50	55
	22:00-6:00	dBA（L_{Aeq}）			35	45
ムヒンビリ変電所	6:00-22:00	dBA（L_{Aeq}）			55	55
	22:00-6:00	dBA（L_{Aeq}）			45	45
ジャングワニビーチ変電所	6:00-22:00	dBA（L_{Aeq}）			55	55
	22:00-6:00	dBA（L_{Aeq}）			45	45

モニタリング計画に基づき、本プロジェクトのモニタリングフォーム案（英文）を以下に示す。

Draft Monitoring Form

<Construction Phase>

1. Permission

Item	Result of monitoring
Status of obtaining environmental permits (date / name of permit / status)	
Status of compliance with covenants of environmental permits	

2. Stakeholder consultation

No.	Date	Participants (number of participants, organization)	Agenda / Comments from participants	Measures taken against the comments
1				
2				
3				

3. Waste

No.	Substation name	Type of waste	Hazardous / Non-hazardous	Amount per month	Disposal method	Contractor
1						
2						
3						

4. Resettlement

Payment of compensation

Lot	Number of total affected household (HHs) (A)	Number of household received compensation (B)	Completion rate% （B/A x 100）
Lot1			
Lot2			
Lot3			

Implementation of relocation

Lot	Number of total affected household (HHs) (A)	Number of household relocated (B)	Completion rate% （B/A x 100）
Lot1			
Lot2			
Lot3			

Grave removal for Ubungo-Ilala 132kV Transmission line

Number of total affected graves(A)	Number of graves compensated	Number of graves relocated (B)	Completion rate % （B/A x 100）
250			

5. Existing Social Infrastructure and Institution

Item	Result of monitoring
Damage on the existing water tank adjacent to Muhimbili substation site during construction	

6. Accident

Item	Monitoring period	Result of monitoring
Implementation status of Occupational health and safety management plan		
Accidents occurred (number of accident / place / type of accident / measures taken)		

<Operation Phase>

1. Waste

No.	Substation name	Type of waste	Hazardous / Non-hazardous	Amount per month	Disposal method	Contractor
1						
2						
3						

2. Groundwater and Soil contamination

Substation name	Date	Observation on oil leakage from transformers (result of inspection)	Measures taken
Ilala			
Msasani			
Muhimbili			
Jangwani Beach			
Mwananyamala			

3. Noise level (Equivalent continuous A-weighted sound pressure Level)

Substation name	Time	Unit	Location	Noise level	Standard	
					Tanzania	IFC
Mwananyamala	6:00-22:00	dBA (L_{Aeq})			50 dBA	55 dBA
	22:00-6:00	dBA (L_{Aeq})			35 dBA	45 dBA
Muhimbili	6:00-22:00	dBA (L_{Aeq})			55 dBA	55 dBA
	22:00-6:00	dBA (L_{Aeq})			45 dBA	45 dBA
Jangwani Beach	6:00-22:00	dBA (L_{Aeq})			55 dBA	55 dBA
	22:00-6:00	dBA (L_{Aeq})			45 dBA	45 dBA

資料－１９　土質調査報告書

FACTUAL GEOTECHNICAL REPORT FOR THE FIVE ELECTRIC POWER SUBSTATIONS LOCATED IN DAR ES SALAAM, TANZANIA

Factual Geotechnical Report

YACHIYO ENGINEERING CO., LTD.
LOMO Consult LTD

May 2013

7. ESTIMATION OF BEARING CAPACITY OF THE SOILS

7.1 General

Relatively fair homogeneity properties for each site was demonstrated by the apparently cohesion-less (silt SANDS, SM), moderately plastic (clayey SANDS, SC) and clayey calcareous GRAVEL (GC) soils up to a depth of 10m at different site. It is therefore logical to conclude based on observations made for distinct site, for design purposes, to enable a conservative estimate of bearing capacity values for each site.

7.2 Selection and evaluation of soil parameters

The soil test results, which shall be obtained from the laboratory investigation will be analyzed and interpreted in order to derive satisfactory design parameters. Initially, values for the representative soil parameters will be conservatively chosen from the measured laboratory results. Care will be taken to ensure that the representative values for each of the 5 sites are properly applicable to the part of the design for which it is intended.

Consistency indices, derived from moisture content and liquid and plastic limit tests, shall provide a useful correlation with soil strength and stiffness indices. Isolated low or high values will be scrutinized to determine, or at least predict, their reliability and application for design purposes.

For soil parameters, such as density, for which field values can be determined with confidence from test results; the representative value was taken as 1500 kg/m^3 assuming loose SAND state of compaction.

7.3 Estimation of Bearing Capacity by Analytical Method

Use of shear strength parameters obtained from the shear box test (for cohesion-less soils) or triaxial tests (cohesive soils) are traditionally used to estimate bearing capacity of the soils by analytical approach. In addition, assumption is made on using equation for the design of vertical bearing capacity derived from plasticity theory and experimental (empirical) results under drained condition by taking into account:

- The strength of the ground, generally represented by design values (internal angle of friction and apparent cohesion).
- Load eccentricity, shape, ground inclination, groundwater pressures, hydraulic gradients and ground variability.

The equation used for bearing capacity is thus:

$$Q_{ult(net)} = CN_c + 0{,}5\gamma BN_\gamma + p_o (N_q - 1)$$

Where: $Q_{ult(net)}$ = net ultimate bearing capacity
C = cohesion
γ = bulk unit weigh (kN/m^3)
B = Width of foundation (m)
p_o = effective overburden stress to foundation level
N_c, N_y, N_q = bearing capacity factors according to AASHTO, 2004

ϕ	N_c	N_q	N_γ	ϕ	N_c	N_q	N_γ
0	5.14	1.0	0.0	23	18.1	8.7	8.2
1	5.4	1.1	0.1	24	19.3	9.6	9.4
2	5.6	1.2	0.2	25	20.7	10.7	10.9
3	5.9	1.3	0.2	26	22.3	11.9	12.5
4	6.2	1.4	0.3	27	23.9	13.2	14.5
5	6.5	1.6	0.5	28	25.8	14.7	16.7
6	6.8	1.7	0.6	29	27.9	16.4	19.3
7	7.2	1.9	0.7	30	30.1	18.4	22.4
8	7.5	2.1	0.9	31	32.7	20.6	26.0
9	7.9	2.3	1.0	32	35.5	23.2	30.2
10	8.4	2.5	1.2	33	38.6	26.1	35.2
11	8.8	2.7	1.4	34	42.2	29.4	41.1
12	9.3	3.0	1.7	35	46.1	33.3	48.0
13	9.8	3.3	2.0	36	50.6	37.8	56.3
14	10.4	3.6	2.3	37	55.6	42.9	66.2
15	11.0	3.9	2.7	38	61.4	48.9	78.0
16	11.6	4.3	3.1	39	67.9	56.0	92.3
17	12.3	4.8	3.5	40	75.3	64.2	109.4
18	13.1	5.3	4.1	41	83.9	73.9	130.2
19	13.9	5.8	4.7	42	93.7	85.4	155.6
20	14.8	6.4	5.4	43	105.1	99.0	186.5
21	15.8	7.1	6.2	44	118.4	115.3	224.6
22	16.9	7.8	7.1	45	133.9	134.9	271.8

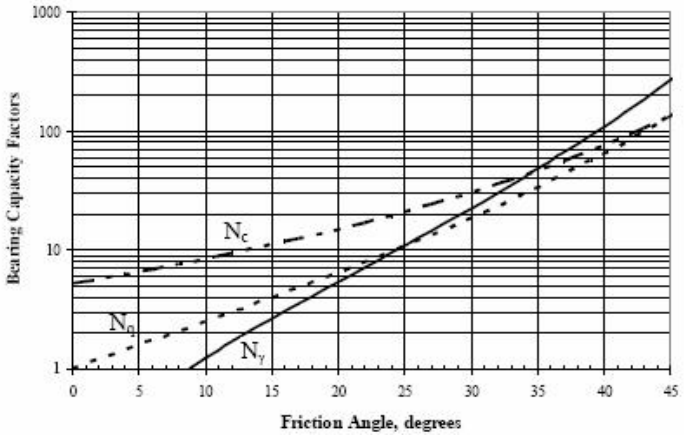

Figure 7.1: Bearing capacity factors (AASHTO 2004, with 2006 interims)

The Table 7.1 below shows the assumed cohesion, internal angle of friction, bearing capacity factors and estimated bearing capacity for each site and strata.

Site Name	Depth (m)	Apparent Cohesion (kN/m^2)	Friction angle (degrees)	Bearing Capacity Factors (N_c, N_q, $N\mu$)	Net Bearing value (kN/m^2) *FOS =2
Ilala	1.5	6.7	18	13.1, 5.3, 4.1	130
	2.5	6.5	18	13.1, 5.3, 4.1	147
	3.5	2.7	20	14.8, 6.4, 5.4	251
Muhimbili	1.5	3.7	19	13.9, 5.8, 4.7	143
	3.5	2.3	20	14.8, 6.4, 5.4	236
	5.5	30.4	25	20.7, 10.7, 10.9	580
Mwananyamala	1.5	2.1	20	14.8, 6.4, 5.4	137
	2.5	3.1	19	13.9, 5.8, 4.7	172
Jangwani Beach	1.5	36.9	21	15.8, 7.1, 6.2	287
	2.5	12.4	20	14.8, 6.4, 5.4	224
	3.5	34.3	21	15.8, 7.1, 6.2	334

Table 7.1: Estimated bearing capacity by Analytical Method

Calculations of bearing capacity using analytical have provided comparatively higher values than using empirical (SPT) method. In geotechnical analyses, conservative selection is made by taking into consideration of all other physical, mechanical properties and field observations of underlying soils.

7.4 Estimation of Bearing Capacity by Empirical Method

In this case attempt has been made to evaluate bearing capacity by using lowest SPT values at a depth of 1, 2, 3 m below ground level for each of the 5 sites. Use of SPT modelling results is considered appropriate taking cognizance of dominant underlying SAND buffs or gravelly soils at the sites. A conservative corrected SPT N value selected for design is selected as the lowest between corresponding N_{60} values as shown in Table 7.3 below.

APPENDIX 1 – BOREHOLE LOGS

19．土質調査報告書

BOREHOLE RECORD

PROJECT: GEOTECHNICAL INVESTIGATIONS FOR THE 5 PROPOSED POWER STATIONS IN DAR ES SALAAM

SITE	ILALA
Drill Hole ID	BH 1
Drilling method	Rotary
Core dia. (mm)	None

Borehole Elevation (m) AMSL	14.428
Casings dia (mm)	150
Ground Water Table (m)	
Logged by	Besta

Latitude	S 06^0 49.281’
Longitude	E 039^0 16.072’

Date	Mar-13

Stratum Elevation (m) AMSL	Depth (m)	Thickness (m)	Description of strata	Sample type	SPT N Value 1	2	3		$(N_1)_{60}$	Relative Density
14.078			*Imported compacted clayey GRAVEL FILL*							
13.478	1.00		*Brownish silty SAND*		2	2	3	6	10	LOOSE
13.228			*Light greyish silty SAND collapsible*							
	2.00		*Pale yellow silty SAND collapsible*		2	4	6	10	14	MEDIUM DENSE
	3.00				4	5	7	12	15	MEDIUM DENSE
	4.00				5	8	8	16	19	MEDIUM DENSE
	5.00				6	8	10	18	20	MEDIUM DENSE
8.428	6.00				5	6	9	15	15	MEDIUM DENSE
	7.00		*Light greyish silty SAND collapsible*		5	7	8	15	15	MEDIUM DENSE
	8.00				5	5	6	11	10	MEDIUM DENSE
	9.00				2	4	7	11	10	MEDIUM DENSE
4.428	10.00		*END OF BORING*							

LEGEND

- ■ U4 SAMPLE
- ▲ BULK SAMPLE
- ◊ SPT SAMPLE
- ● DISTURBED SAMPLE
- GWT

Note

Stable ground water level at 9m below GL
The drilling was conducted during heavy rain season
Collapsibility emerged at a depth of 1.5 metres

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BOREHOLE RECORD

PROJECT: GEOTECHNICAL INVESTIGATIONS FOR THE 5 PROPOSED POWER STATIONS IN DAR ES SALAAM

SITE	ILALA
Drill Hole ID	BH 2
Drilling method	Rotary
Core dia. (mm)	None

Borehole Elevation (m) AMSL	15.065
Casings dia (mm)	150
Ground Water Table (m)	
Logged by	Besta

Latitude	S 06^0 49.281’
Longitude	E 039^0 16.072’

Date	Mar-13

Stratum Elevation (m) AMSL	Depth (m)	Thickness (m)	Description of strata	Sample type	SPT N Value 1	2	3		$(N_1)_{60}$	Relative Density
14.815			*Imported compacted clayey GRAVEL FILL*							
			Light to darkish grey silty SAND							
14.065	1.00			● ◊	2	3	2	6	10	LOOSE
			Mottled silty SAND partilaly collapsible							
	2.00			● ◊	6	6	6	12	17	MEDIUM DENSE
	3.00			● ◊	3	5	6	11	14	MEDIUM DENSE
	4.00				3	5	6	11	13	MEDIUM DENSE
	5.00				4	4	5	9	10	MEDIUM DENSE
9.065	6.00			● ◊	5	6	7	13	13	MEDIUM DENSE
			Light greyish coarse silty SAND							
8.365	7.00			● ◊						
			Homogeneous lightish grey silty clayey SAND							
	8.00			◊	4	8	6	14	10	MEDIUM DENSE
	9.00			◊	9	17	17	34	30	DENSE
5.065	10.00		*END OF BORING*							

LEGEND

- ■ U4 SAMPLE
- ▲ BULK SAMPLE
- ◊ SPT SAMPLE
- ● DISTURBED SAMPLE
- GWT

Note

Stable ground water level at 9m below GL
The drilling was conducted during heavy rain season
Collapsibility emerged at a depth of 1.5 metres

19．土質調査報告書

BOREHOLE RECORD

PROJECT: GEOTECHNICAL INVESTIGATIONS FOR THE 5 PROPOSED POWER STATIONS IN DAR ES SALAAM

SITE	ILALA
Drill Hole ID	BH 3
Drilling method	Rotary
Core dia. (mm)	None

Borehole Elevation (m) AMSL	15.706
Casings dia (mm)	150
Ground Water Table (m)	
Logged by	Besta

Latitude	S 06^0 49.281’
Longitude	E 039^0 16.072’

Date	Mar-13

Stratum Elevation (m) AMSL	Legend	Depth (m)	Thickness (m)	Description of strata	Sample type	SPT N Value 1	2	3		$(N_1)_{60}$	Relative Density
15.356				***Imported compacted clayey GRAVEL FILL***							
14.506		1.00		***Darkish grey silty SAND***	■	5	6	5	11	18	MEDIUM DENSE
		2.00		***Mottled silty SAND***	■ ● ◊	6	7	7	14	19	MEDIUM DENSE
		3.00			● ◊	5	8	7	15	19	MEDIUM DENSE
		4.00				6	8	9	17	20	MEDIUM DENSE
		5.00			● ◊	6	8	9	17	18	MEDIUM DENSE
9.506		6.00			◊	10	11	13	24	25	MEDIUM DENSE
		7.00		***Yellowish grey silty SAND collapsible***	● ◊	9	10	12	22	21	MEDIUM DENSE
		8.00		***Homogeneous lightish grey silty clayey SAND***		4	9	7	16	15	
		9.00			◊	2	6	12	18	16	MEDIUM DENSE
5.706		10.00		*END OF BORING*							

LEGEND

■ U4 SAMPLE
▲ BULK SAMPLE
◊ SPT SAMPLE
● DISTURBED SAMPLE

GWT

Note

Stable ground water level at 9m below GL
The drilling was conducted during heavy rain season
Collapsibility emerged at a depth of 1.5 andmetres

BOREHOLE RECORD

PROJECT: GEOTECHNICAL INVESTIGATIONS FOR THE 5 PROPOSED POWER STATIONS IN DAR ES SALAAM

SITE	MUHIMBILI
Drill Hole ID	BH 1
Drilling method	Rotary
Core dia. (mm)	None

Borehole Elevation (m) AMSL	11.579
Casings dia (mm)	150
Ground Water Table (m)	
Logged by	Besta

Latitude	S 06^0 48.224'
Longitude	E 039^0 16.183'
Date	Mar-13

Stratum Elevation (m) AMSL	Depth (m)	Thickness (m)	Description of strata	Sample type	SPT N Value 1	2	3		$(N_1)_{60}$	Relative Density
11.379			*Top vegetable topsoils with roots and debris*							
			Dull brown silty SAND							
	1.00			■ ◊	6	9	10	19	31	MEDIUM DENSE
	2.00			■ ◊	7	7	8	15	21	MEDIUM DENSE
	3.00			● ◊	6	8	10	18	23	MEDIUM DENSE
	4.00				7	11	13	24	28	MEDIUM DENSE
7.129										
	5.00		*Brownish grey silty SAND*	● ◊	17	15	14	29	31	MEDIUM DENSE
6.179										
5.879			*Light greyish silty clayey gravelly SAND*							
	6.00			◊	16	18	19	37	38	DENSE
			Pale yellow silty clayey SAND mixed with gravels							
4.679										
	7.00		*Mottled silty SAND mixed with whitish calacreous SAND*	● ◊	6	10	11	22	21	MEDIUM DENSE
3.979										
	8.00		*Whitish coral gravels damp*		7	10	11	22	20	MEDIUM DENSE
	9.00			◊	8	10	9	19	17	MEDIUM DENSE
1.579	10.00		*END OF BORING*							

LEGEND

■ U4 SAMPLE
▲ BULK SAMPLE
◊ SPT SAMPLE
● DISTURBED SAMPLE

GWT

Note
Stable GWT at 7.0 metres below GL
Whitish calcareous silts and gravels underlie

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BOREHOLE RECORD

PROJECT: GEOTECHNICAL INVESTIGATIONS FOR THE 5 PROPOSED POWER STATIONS IN DAR ES SALAAM

SITE	MUHIMBILI
Drill Hole ID	BH 2
Drilling method	Rotary
Core dia. (mm)	None

Borehole Elevation (m) AMSL	11.148
Casings dia (mm)	150
Ground Water Table (m)	
Logged by	Besta

Latitude	S 06^0 48.224'
Longitude	E 039^0 16.183'

Date	Mar-13

Stratum Elevation (m) AMSL	Depth (m)	Thickness (m)	Description of strata	Sample type	SPT N Value 1	2	3		$(N_1)_{60}$	Relative Density
	1.00		*Brownrey grey silty SAND*	■ ◊	3	4	4	8	13	MEDIUM DENSE
	2.00			■ ◊	3	4	5	9	13	MEDIUM DENSE
	3.00			● ◊	3	4	5	9	11	MEDIUM DENSE
7.848										
	4.00		*Greyish silty clayey coarse SAND mixed with GRAVELS*		2	4	6	10	12	MEDIUM DENSE
7.148										
	5.00		*Greyish silty clayey coarse SAND*	● ◊	5	4	5	9	10	MEDIUM DENSE
6.148										
	6.00		*Whitish calcareous decomposed gravels, slighly plastic*	◊	5	5	4	9	9	MEDIUM DENSE
	7.00			● ◊	7	5	6	11	11	MEDIUM DENSE
	8.00				6	4	7	11	10	MEDIUM DENSE
	9.00			◊	8	12	13	25	22	MEDIUM DENSE
1.148	10.00		*END OF BORING*							

LEGEND

■ U4 SAMPLE
▲ BULK SAMPLE
◊ SPT SAMPLE
● DISTURBED SAMPLE

GWT

Note
The overbudden damp SAND up to 3m depth
Stable GWT at 7.0 metres below GL

BOREHOLE RECORD

PROJECT: GEOTECHNICAL INVESTIGATIONS FOR THE 5 PROPOSED POWER STATIONS IN DAR ES SALAAM

SITE	MUHIMBILI
Drill Hole ID	BH 3
Drilling method	Rotary
Core dia. (mm)	None

Borehole Elevation (m) AMSL	6.319
Casings dia (mm)	150
Ground Water Table (m)	
Logged by	Besta

Latitude	S 06^0 48.224'
Longitude	E 039^0 16.183'

Date	Mar-13

Stratum Elevation (m) AMSL	Depth (m)	Thickness (m)	Description of strata	Sample type	SPT N Value 1	2	3		$(N_1)_{60}$	Relative Density
			Whitish coral fragmentary gravels							
	1.00			■ ● ◊	4	12	10	22	36	MEDIUM DENSE
4.219	2.00			■ ● ◊	5	7	10	17	24	MEDIUM DENSE
			Light greyish silty clayey coarse SAND mixed with soft calcareous gravels							
3.319	3.00			● ◊	5	6	9	11	14	MEDIUM DENSE
			Whitish calcareous silts and gravels of marine origin damp to fully saturated							
	4.00				6	8	10	18	21	MEDIUM DENSE
	5.00			● ◊	35	>50		>50	>50	VERY DENSE
	6.00			◊				>50	>50	VERY DENSE
	7.00		***Whitish calcareous silts and gravels of marine origin damp to fully saturated***	● ◊				>50	>50	VERY DENSE
	8.00							>50	>50	VERY DENSE
	9.00			◊	5	7	9	16		MEDIUM DENSE
-3.681	10.00		*END OF BORING*							

LEGEND

■ U4 SAMPLE
▲ BULK SAMPLE
◊ SPT SAMPLE
● DISTURBED SAMPLE

GWT

Note
Stable GWT at 8.5 metres below GL
Whitish calcareous silts and gravels underlie

BOREHOLE RECORD

PROJECT: GEOTECHNICAL INVESTIGATIONS FOR THE 5 PROPOSED POWER STATIONS IN DAR ES SALAAM

SITE	MUHIMBILI
Drill Hole ID	BH 4
Drilling method	Rotary
Core dia. (mm)	None

Borehole Elevation (m) AMSL	11.892
Casings dia (mm)	150
Ground Water Table (m)	
Logged by	Besta

Latitude	S 06^0 48.224’
Longitude	E 039^0 16.183’

Date	Mar-13

Stratum Elevation (m) AMSL	Depth (m)	Thickness (m)	Description of strata	Sample type	SPT N Value 1	2	3		$(N_1)_{60}$	Relative Density
11.392			*Vegetable top soil*							
	1.00		*Brownish grey silty SAND*	■ ● ◊	2	8	15	23	37	MEDIUM DENSE
	2.00			■ ● ◊	6	8	10	18	25	MEDIUM DENSE
	3.00			● ◊	4	5	7	12	15	MEDIUM DENSE
7.892	4.00				10	8	9	17	20	MEDIUM DENSE
7.392			*Brownish grey silty coarse SAND*							
6.892	5.00		*Brownish silty clayey coarse SAND*	● ◊	11	17	15	32	35	MEDIUM DENSE
6.592			*Yellowish silty gravelly SAND*							
5.992	6.00		*Mottled silty coarse SAND*	◊	5	6	7	13	13	MEDIUM DENSE
5.092	7.00		*Light greyish silty coarse SAND*	● ◊	7	9	14	23	22	MEDIUM DENSE
4.592										
	8.00		*Whitish sometimes reddish calcareous silts and gravel*		8	9	10	19	18	MEDIUM DENSE
	9.00			◊	7	10	12	22	20	MEDIUM DENSE
1.892	10.00		*END OF BORING*							

LEGEND

■ U4 SAMPLE
▲ BULK SAMPLE
◊ SPT SAMPLE
● DISTURBED SAMPLE

GWT

Note
Stable GWT at 8.5 metres below GL
Whitish calcareous silts and gravels underlie

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BOREHOLE RECORD

PROJECT: GEOTECHNICAL INVESTIGATIONS FOR THE 5 PROPOSED POWER STATIONS IN DAR ES SALAAM

SITE	MWANANYAMALA
Drill Hole ID	BH 1
Drilling method	Rotary
Core dia. (mm)	None

Borehole Elevation (m) AMSL	20.027
Casings dia (mm)	150
Ground Water Table (m)	
Logged by	Besta

Latitude	S 06^0 47.724'
Longitude	E 039^0 15.639'

Date	Mar-13

Stratum Elevation (m) AMSL	Legend	Depth (m)	Thickness (m)	Description of strata	Sample type	SPT N Value 1	2	3		$(N_1)_{60}$	Relative Density
				Vegetable top soil							
19.527											
		1.00		*Brownish grey silty SAND*	■ ● ◊	2	3	3	6	10	LOOSE
		2.00			■ ● ◊	1	2	3	5	7	LOOSE
		3.00			● ◊	4	4	5	9	11	MEDIUM DENSE
16.527											
		4.00		*Pale grey to yellowish silty SAND (mottled SAND)* ⇩		3	3	4	7	8	LOOSE
		5.00			● ◊	3	6	6	12	13	MEDIUM DENSE
		6.00			◊	3	4	5	9	9	MEDIUM DENSE
		7.00			● ◊	3	5	6	11	11	MEDIUM DENSE
12.527											
		8.00		*Greyish silty SAND*		4	5	6	11	10	MEDIUM DENSE
		9.00			◊	3	4	5	9	8	MEDIUM DENSE
10.027		10.00		*END OF BORING*							

LEGEND

■ U4 SAMPLE
▲ BULK SAMPLE
◊ SPT SAMPLE
● DISTURBED SAMPLE

⇩ GWT

Note
GWTin this BH encountered at a depth of 4.5 metres
Apparently cohesionless SAND dominates

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BOREHOLE RECORD

PROJECT: GEOTECHNICAL INVESTIGATIONS FOR THE 5 PROPOSED POWER STATIONS IN DAR ES SALAAM

SITE	MWANANYAMALA
Drill Hole ID	BH 2
Drilling method	Rotary
Core dia. (mm)	None

Borehole Elevation (m) AMSL	20.521
Casings dia (mm)	150
Ground Water Table (m)	
Logged by	Besta

Latitude	S 06^0 47.724'
Longitude	E 039^0 15.639'

Date	Mar-13

Stratum Elevation (m) AMSL	Legend	Depth (m)	Thickness (m)	Description of strata	Sample type	SPT N Value 1	2	3		$(N_1)_{60}$	Relative Density
20.221				*Loose vegetable top soil*							
		1.00		*Dark greyish silty SAND homogeneous*	■ ● ◊	2	5	4	9	15	MEDIUM DENSE
		2.00			■ ● ◊	2	5	4	9	13	MEDIUM DENSE
17.321		3.00			● ◊	4	7	7	14	18	MEDIUM DENSE
		4.00		*Light greyish silty SAND homogeneous*		6	7	7	14	16	MEDIUM DENSE
		5.00			● ◊	5	5	7	12	13	MEDIUM DENSE
13.771		6.00			◊	4	6	7	13	13	MEDIUM DENSE
		7.00		*Brownish greyish silty SAND*	● ◊	5	5	7	12	12	MEDIUM DENSE
		8.00				5	7	7	14	13	MEDIUM DENSE
		9.00			◊	4	6	7	13	12	MEDIUM DENSE
10.521		10.00		*END OF BORING*							

LEGEND

■ U4 SAMPLE
▲ BULK SAMPLE
◊ SPT SAMPLE
● DISTURBED SAMPLE

GWT

Note
GWTin this BH encountered at a depth of 4.5 metres
Apparently cohesionless SAND dominates

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BOREHOLE RECORD

PROJECT: GEOTECHNICAL INVESTIGATIONS FOR THE 5 PROPOSED POWER STATIONS IN DAR ES SALAAM

SITE	MWANANYAMALA
Drill Hole ID	BH 3
Drilling method	Rotary
Core dia. (mm)	None

Borehole Elevation (m) AMSL	20.472
Casings dia (mm)	150
Ground Water Table (m)	
Logged by	Besta

Latitude	S 06^0 47.724'
Longitude	E 039^0 15.639'

Date	Mar-13

Stratum Elevation (m) AMSL	Depth (m)	Thickness (m)	Description of strata	Sample type	SPT N Value 1	2	3		$(N_1)_{60}$	Relative Density
20.172			*imported reddish gravelly fill*							
19.722			*Darkish grey silty SAND*							
	1.00		*Dull brown silty SAND*	● ◊	2	3	3	6	10	LOOSE
	2.00			● ◊	3	5	6	11	15	MEDIUM DENSE
	3.00			● ◊	4	6	6	12	15	MEDIUM DENSE
	4.00				5	5	4	9	10	MEDIUM DENSE
15.672										
	5.00			● ◊	2	2	2	4	4	VERY LOOSE
	6.00		*Light grey silty SAND*	◊	2	2	3	5	5	VERY LOOSE
	7.00			● ◊	2	2	4	6	6	LOOSE
	8.00				2	3	4	7	6	LOOSE
	9.00			◊	2	3	3	6	5	LOOSE
10.472	10.00		*END OF BORING*							

LEGEND

- ■ U4 SAMPLE
- ▲ BULK SAMPLE
- ◊ SPT SAMPLE
- ● DISTURBED SAMPLE
- GWT

Note

GWTin this BH encountered at a depth of 4.5 metres
Apparently cohesionless SAND dominates

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BOREHOLE RECORD

PROJECT: GEOTECHNICAL INVESTIGATIONS FOR THE 5 PROPOSED POWER STATIONS IN DAR ES SALAAM

SITE	JANGWANI
Drill Hole ID	BH 1
Drilling method	Rotary
Core dia. (mm)	None

Borehole Elevation (m) AMSL	9.66
Casings dia (mm)	150
Ground Water Table (m)	
Logged by	Besta

Latitude	S 06^0 42.226'
Longitude	E 039^0 13.326'

Date	Mar-13

Stratum Elevation (m) AMSL	Depth (m)	Thickness (m)	Description of strata	Sample type	SPT N Value 1	2	3		$(N_1)_{60}$	Relative Density
	1.00		*Darkish silty SAND with vegetable soil*	■ ◊	2	4	4	8	13	MEDIUM DENSE
7.360	2.00			■ ◊	3	5	7	12	17	MEDIUM DENSE
	3.00		*Light greyish silty clayey SAND very wet*	● ◊	3	5	6	11	14	MEDIUM DENSE
	4.00		GWT		5	7	9	16	19	MEDIUM DENSE
	5.00			● ◊	5	7	9	16	17	MEDIUM DENSE
	6.00			◊	4	4	5	9	9	MEDIUM DENSE
-7.200	7.00			● ◊	4	5	6	11	11	MEDIUM DENSE
-7.900	8.00		*Blackish silty CLAY very wet*		5	5	6	11	10	MEDIUM STIFF
	9.00		*Light greyish silty SAND very wet*	◊	5	6	7	13	12	MEDIUM STIFF
-10.000	10.00		*END OF BORING*							

LEGEND

■ U4 SAMPLE
▲ BULK SAMPLE
◊ SPT SAMPLE
● DISTURBED SAMPLE

GWT

Note
Depth of GWT measured at 4.5 metres
Site located on marshy area

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BOREHOLE RECORD

PROJECT: GEOTECHNICAL INVESTIGATIONS FOR THE 5 PROPOSED POWER STATIONS IN DAR ES SALAAM

SITE	JANGWANI
Drill Hole ID	BH 2
Drilling method	Rotary
Core dia. (mm)	None

Borehole Elevation (m) AMSL	9.657
Casings dia (mm)	150
Ground Water Table (m)	
Logged by	Besta

Latitude	S 06^0 42.226'
Longitude	E 039^0 13.326'

Date	Mar-13

Stratum Elevation (m) AMSL	Legend	Depth (m)	Thickness (m)	Description of strata	Sample type	SPT N Value 1	2	3		$(N_1)_{60}$	Relative Density
				Brownish grey silty SAND							
		1.00			■ ● ◊	5	9	11	20	32	MEDIUM DENSE
7.937											
		2.00			■ ● ◊	2	8	12	20	28	MEDIUM DENSE
				Greyish silty clayey SAND							
		3.00			● ◊	4	8	12	20	25	MEDIUM DENSE
		4.00				6	8	9	17	20	MEDIUM DENSE
				GWT							
		5.00			● ◊	7	8	10	18	20	MEDIUM DENSE
		6.00			◊	4	8	10	18	18	MEDIUM DENSE
		7.00			● ◊	5	7	10	17	17	MEDIUM DENSE
2.557											
		8.00		***Blackish silty CLAY very wet***		4	9	10	19	18	MEDIUM STIFF
0.857											
		9.00		***Mottled silty clayey SAND***	◊	5	10	12	22	20	MEDIUM STIFF
-0.343		10.00		*END OF BORING*							

LEGEND

■ U4 SAMPLE
▲ BULK SAMPLE
◊ SPT SAMPLE
● DISTURBED SAMPLE

GWT

Note
Depth of GWT measured at 4.5 metres
Site located on marshy area

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BOREHOLE RECORD

PROJECT: GEOTECHNICAL INVESTIGATIONS FOR THE 5 PROPOSED POWER STATIONS IN DAR ES SALAAM

SITE	JANGWANI
Drill Hole ID	BH 3
Drilling method	Rotary
Core dia. (mm)	None

Borehole Elevation (m) AMSL	9.76
Casings dia (mm)	150
Ground Water Table (m)	
Logged by	Besta

Latitude	S 06^0 42.226'
Longitude	E 039^0 13.326'

Date	Mar-13

Stratum Elevation (m) AMSL	Legend	Depth (m)	Thickness (m)	Description of strata	Sample type	SPT N Value 1	2	3		$(N_1)_{60}$	Relative Density
				Dark grey silty SAND							
		1.00			♦	2	3	3	6	10	MEDIUM DENSE
7.560		2.00			♦	3	4	5	9	13	MEDIUM DENSE
				Greyish silty clayey SAND							
		3.00			♦	3	5	5	10	13	MEDIUM DENSE
		4.00									MEDIUM DENSE
				GWT							
		5.00			♦	3	6	7	13	14	MEDIUM DENSE
		6.00			♦	3	5	7	12	12	MEDIUM DENSE
2.760		7.00			♦	4	5	7	12	12	MEDIUM DENSE
				Blackish sandy silty CLAY very wet							
		8.00				4	6	7	13	12	MEDIUM DENSE
				END OF BORING							
		9.00			♦						MEDIUM DENSE
		10.00									

LEGEND

- ■ U4 SAMPLE
- ▲ BULK SAMPLE
- ♦ SPT SAMPLE
- ● DISTURBED SAMPLE
- GWT

Note

Depth of GWT measured at 4.5 metres
Site located on marshy area
SPT not conducted at 4.5 due to softness

BOREHOLE RECORD

PROJECT: GEOTECHNICAL INVESTIGATIONS FOR THE 5 PROPOSED POWER STATIONS IN DAR ES SALAAM

SITE	MSASANI
Drill Hole ID	BH 1
Drilling method	Rotary
Core dia. (mm)	None

Borehole Elevation (m) AMSL	
Casings dia (mm)	150
Ground Water Table (m)	
Logged by	Besta

Latitude	S 06^0 45.544'
Longitude	E 039^0 16.810'

Date	Mar-13

Stratum Elevation (m) AMSL	Legend	Depth (m)	Thickness (m)	Description of strata	Sample type	SPT N Value 1	2	3		$(N_1)_{60}$	Relative Density
-0.400				*Imported gravel fill and loose gneiss aggregate bedding*							
		1.00		*Fragmented carbonatite or calcareous gravels/rock*		7	13	15	28	43	DENSE TO VERY DENSE
-1.500				*END OF DRILLING*							
		2.00									
		3.00									
		4.00									
		5.00									
		6.00									
		7.00									
		8.00									
		9.00									
		10.00									

LEGEND

- ■ U4 SAMPLE
- ▲ BULK SAMPLE
- ◊ SPT SAMPLE
- ● DISTURBED SAMPLE
- GWT

Note

Very dense calcareous rock/gravels underlies
Drilling halted at 1.5m depth due to impenetrability
No ground water encountered

APPENDIX 2 – LABORATORY TEST RESULTS

MINISTRY OF WATER
DRILLING AND DAM CONSTRUCTION AGENCY
SOIL MECHANICS LABORATORY UBUNGO-MAJI
SOIL TEST RESULTS SUMMARY
PROJECT: GEOTECHNICAL INVESTIGATION FOR FIVE PROPOSED ELECTRIC POWER SUBSTATION AT DAR ES SALAAM

							SIEVE ANALYSIS			ATTERBERG LIMIT			LINEAR	SHEAR		SG	CONSOLIDATION	
LAB. NO	BH NO	S No	DEPTH (m)	SOIL DESCRIPTION	NMC %	BULK DENSITY	FINES %	SAND %	GRAVEL %	L.L %	P.L %	P.I %	SHRINKAGE %	C Kg/cm^2	ø O^0		MV cm^2/kg	CC
				ILALA														
7871	1	1	1.50- 2.00		5.25	1.947	11.00	89.00	0.00	NP	NP	NP		0.067	18	2.594		
7872	1	2	2.50 -3.00		2.55	1.944	10.60	89.35	0.05	NP	NP	NP		0.065	18	2.656		
7873	2	1	2.50-3.00		7.07	2.170	11.450	88.550	0.000	NP	NP	NP		0.028	20	2.638		
	2	2	5.50-6.00		6.41													
	3	1	3.50 -4.00		1.75		24.70	75.30	0.00	NP	NP	NP		0.027	20			
	3	2	7.50-8.00		4.64													
				JANGWANI														
7874	1	1	3.50 -4.00		15.50	1.926	43.80	56.2	0.00	55.56	12.66	42.9	4.25	0.343	21	2.514	0.0220	0.1513
7875	2	1	2.50 -3.00		14.70	1.998	26.60	72.50	0.90	34.35	10.26	24.09	0.71	0.124	20	2.587	0.0217	0.1162
7876	3	1	1.50 -2.00		18.38	1.999	40.05	59.9	0.05	45.83	12.5	33.33	3.54	0.369	21	2.628	0.0153	0.0837
				MUHIMBILI														
7877	1	1	1.50-2.0		3.03	1.977	14.05	85.95	0.00					0.037	19	2.626	0.0159	0.1178
	1	2	5.50 - 6.00		8.35													
7878	2	1	3.50 - 4.00		11.43	2.110	18.80	81.20	0.00	25.73	12.35	13.38	5.680	0.0227	20	2.619	0.0076	0.0526
	3	1	5.50 -6.00		13.08	2.135	60.70	20.00	19.60					0.304	25			
7879	4	1	3.50- 4.00		3.83	2.117	15.20	84.80	0.00					0.064	18	2.627	0.0300	0.1551
	4	2	7.50 -8.00		5.46	2.023	16.50	81.40	2.10					0.179	20			
				MSASANI														
7880	1		1.00 -1.45		8.21		56.60	21.50	21.90	34.40	10.00	24.40	5.00					
				MWANANYAMALA		g/cm3												
7881	1		1.50- 2.00		7.530	1.998	10.20	89.80	0.00	NP	NP	NP		0.021	20	2.568		
7882	2		2.50 -3.01		3.980	1.999	7.20	92.80	0.00	NP	NP	NP		0.031	19	2.645		
	3		6.50 -7.00		17.48													

KEY

LAB-laboratory, BH-borehole, S/No-sample number, NMC- natural moisture content, L.L- liquid limit, P.L - plastic limit,
SG = Specific gravity
C - cohesion, Θ - angle of internal friction,
NOTE THAT KG/CM2 x 100 EQUAL TO KN/M2

資料－２０　潮流結果概要表

2025年（負荷力率0.86イララ
11kV調相設備無し）

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS(R)E SUN, SEP 15 2013 11:46

DAR
DAR-1

%MVA FOR TRANSFORMERS
% I FOR NON-TRANSFORMER BRANCHES

FROM BUS			AREA	VOLT		GEN	LOAD	SHUNT	TO BUS					TRANSFORMER				RATING		
BUS#	X-- NAME	--X BASKV	ZONE	PU/KV	ANGLE	MW/MVAR	MW/MVAR	MW/MVAR	BUS#	X-- NAME	--X BASKV	AREA	CKT	MW	MVAR	RATIO	ANGLE	AMPS	%	SET A
1105	ILALA	11.000	1	0.9531	-11.4	0.0	39.1	0.0												
			1	10.484		0.0	23.2	0.0	3305	ILALA	33.000	1	1	-13.0	-7.7	1.000	LK	836	101	15M
									3305	ILALA	33.000	1	2	-13.0	-7.7	1.000	LK	836	101	15M
									3305	ILALA	33.000	1	3	-13.0	-7.7	1.000	LK	836	101	15M
1121	MUHIBILI11	11.000	1	1.0024	-10.7	0.0	13.0	0.0												
			1	11.026		0.0	7.7	0.0	3321	MUHIBILI33	33.000	1	1	-13.0	-7.7	1.000	LK	794	101	15M
1122	MWANANYA11	11.000	1	1.0048	-14.2	0.0	13.0	0.0												
			1	11.052		0.0	7.7	0.0	3322	MWANANYA33	33.000	1	1	-13.0	-7.7	1.000	LK	793	101	15M
1123	JAGWANI11	11.000	1	0.9698	-13.2	0.0	13.0	0.0												
			1	10.667		0.0	7.7	0.0	3323	JAGWANI33	33.000	1	1	-13.0	-7.7	1.000	LK	821	101	15M
1124	MSASANI11	11.000	1	1.0010	-14.4	0.0	26.1	0.0												
			1	11.011		0.0	15.5	0.0	3324	MSASANI33	33.000	1	1	-13.0	-7.7	1.000	LK	796	101	15M
									3324	MSASANI33	33.000	1	2	-13.0	-7.7	1.000	LK	796	101	15M
3301	UBUNGO	33.000	1	1.0030	-6.4	0.0	256.0	0.0												
			1	33.100		0.0	151.9	0.0	13201	UBUNGO	132.00	1	1	-256.0	-151.9	1.000	LK	5192	99	300M
3303	F-ZONE3	33.000	1	0.9839	-8.0	0.0	77.2	0.0												
			1	32.470		0.0	45.8	0.0	13203	F-ZONE3	132.00	1	1	-38.6	-22.9	1.000	LK	799	100	45M
									13203	F-ZONE3	132.00	1	2	-38.6	-22.9	1.000	LK	799	100	45M
3304	KURASHINI	33.000	1	0.9503	-10.6	0.0	78.3	0.0												
			1	31.358		0.0	46.5	0.0	13204	KURASINI	132.00	1	1	-78.3	-46.5	1.000	LK	1676	182	50M
3305	ILALA	33.000	1	0.9898	-8.3	0.0	182.7	0.0												
			1	32.663		0.0	108.4	-36.2	1105	ILALA	11.000	1	1	13.1	8.8	1.000	UN	279	105	15M
									1105	ILALA	11.000	1	2	13.1	8.8	1.000	UN	279	105	15M
									1105	ILALA	11.000	1	3	13.1	8.8	1.000	UN	279	105	15M
									13205	ILALA	132.00	1	1	-55.5	-24.6	1.000	LK	1073	101	60M
									13205	ILALA	132.00	1	2	-55.5	-24.6	1.000	LK	1073	101	60M
									13205	ILALA	132.00	1	3	-55.5	-24.6	1.000	LK	1073	101	60M
									13205	ILALA	132.00	1	4	-55.5	-24.6	1.000	LK	1073	101	60M
3306	MAKUMBUSHO3333	33.000	1	0.9880	-11.4	0.0	134.4	0.0												
			1	32.604		0.0	79.7	0.0	3322	MWANANYA33	33.000	1	1	13.1	8.7			278	69	405A
									3324	MSASANI33	33.000	1	1	14.1	8.8			294	73	405A
									3324	MSASANI33	33.000	1	2	12.1	8.7			264	65	404A
									13206	MAKUMBUSHO	132.00	1	1	-86.9	-53.0	1.000	LK	1801	226	45M
									13206	MAKUMBUSHO	132.00	1	2	-86.9	-53.0	1.000	LK	1801	226	45M
3307	MILINDIZE	33.000	1	0.9672	-9.2	0.0	22.8	0.0												
			1	31.918		0.0	13.5	0.0	13207	MILINDIZI	132.00	1	1	-11.4	-6.8	1.000	LK	240	133	10M
									13207	MILINDIZI	132.00	1	2	-11.4	-6.8	1.000	LK	240	133	10M
3308	TEGETA33	33.000	1	0.9592	-10.0	0.0	127.2	0.0												
			1	31.653		0.0	75.5	0.0	3323	JAGWANI33	33.000	1	1	13.1	8.8			288	71	405A
									13208	TEGETA	132.00	1	1	-70.2	-42.1	1.000	LK	1493	164	50M
									13208	TEGETA	132.00	1	2	-70.2	-42.1	1.000	LK	1493	164	50M
3309	F-ZONE2	33.000	1	1.0144	-4.1	0.0	39.1	0.0												
			1	33.475		0.0	23.2	0.0	13209	F-ZONE2	132.00	1	1	-39.1	-23.2	1.000	LK	785	91	50M
3310	MBAGALA	33.000	1	0.9644	-7.8	0.0	90.7	0.0												
			1	31.825		0.0	53.8	0.0	13210	MBAGALA	132.00	1	1	-90.7	-53.8	1.000	LK	1913	211	50M
3311	N-C-CENTER3333	33.000	1	0.9862	-7.8	0.0	65.2	0.0												
			1	32.546		0.0	38.7	0.0	3321	MUHIBILI33	33.000	1	1	13.1	8.7			279	69	405A

								13211	N-C-CENTER	132.00	1	1	-39.2	-23.7	1.000	LK	812	92	50M
								13211	N-C-CENTER	132.00	1	2	-39.2	-23.7	1.000	LK	812	92	50M
3313	MTONI	33.000	1 0.9722	-8.8	0.0	87.4	0.0												
			1 32.081		0.0	51.9	0.0	13213	MTONI	132.00	1	1	-30.9	-18.3	1.000	LK	646	120	30M
								13213	MTONI	132.00	1	2	-30.9	-18.3	1.000	LK	646	120	30M
								13213	MTONI	132.00	1	3	-25.7	-15.3	1.000	LK	538	120	25M
3314	CHALINZE	33.000	1 0.9782	-8.2	0.0	13.0	0.0												
			1 32.281		0.0	7.7	0.0	13214	CHALINZE	132.00	1	1	-13.0	-7.7	1.000	LK	271	101	15M
3320	F-ZONE1	33.000	1 1.0167	-5.3	0.0	26.1	0.0												
			1 33.551		0.0	15.5	0.0	13203	F-ZONE3	132.00	1	1	-8.7	-5.2	1.000	LK	174	67	15M
								13203	F-ZONE3	132.00	1	2	-8.7	-5.2	1.000	LK	174	67	15M
								13203	F-ZONE3	132.00	1	3	-8.7	-5.2	1.000	LK	174	67	15M
3321	MUHIBILI33	33.000	1 0.9853	-7.8	0.0	0.0	0.0												
			1 32.515		0.0	0.0	0.0	1121	MUHIBILI11	11.000	1	1	13.1	8.7	0.950	UN	279	105	15M
								3311	N-C-CENTER3	33.000	1	1	-13.1	-8.7			279	69	405A
3322	MWANANYA33	33.000	1 0.9875	-11.4	0.0	0.0	0.0												
			1 32.586		0.0	0.0	0.0	1122	MWANANYA11	11.000	1	1	13.1	8.7	0.950	UN	278	105	15M
								3306	MAKUMBUSHO3	33.000	1	1	-13.1	-8.7			278	69	405A
3323	JAGWANI33	33.000	1 0.9555	-10.2	0.0	0.0	0.0												
			1 31.531		0.0	0.0	0.0	1123	JAGWANI11	11.000	1	1	13.1	8.7	0.950	UN	288	105	15M
								3308	TEGETA33	33.000	1	1	-13.1	-8.7			288	71	405A
3324	MSASANI33	33.000	1 0.9840	-11.5	0.0	0.0	0.0												
			1 32.472		0.0	0.0	0.0	1124	MSASANI11	11.000	1	1	13.1	8.7	0.950	UN	279	105	15M
								1124	MSASANI11	11.000	1	2	13.1	8.7	0.950	UN	279	105	15M
								3306	MAKUMBUSHO3	33.000	1	1	-14.0	-8.8			294	73	405A
								3306	MAKUMBUSHO3	33.000	1	2	-12.1	-8.6			264	65	404A
13201	UBUNGO	132.00	1 1.0210	-5.0	312.5	0.0	0.0												
			1 134.77		544.7R	0.0	0.0	3301	UBUNGO	33.000	1	1	256.6	161.1	1.000	UN	1298	101	300M
								13203	F-ZONE3	132.00	1	1	103.6	67.4			530	90	589A
								13204	KURASINI	132.00	1	1	78.8	58.0			419	71	589A
								13205	ILALA	132.00	1	1	150.6	83.8			738	77	960A
								13205	ILALA	132.00	1	2	150.6	83.8			738	77	960A
								13206	MAKUMBUSHO	132.00	1	1	174.9	135.6			948	161	589A
								13207	MILINDIZI	132.00	1	1	36.1	24.9			188	46	405A
								13208	TEGETA	132.00	1	1	49.8	1.5			213	53	405A
								13208	TEGETA	132.00	1	2	64.9	2.0			278		
								22001	UBUNGO220	220.00	1	1	-376.8	-36.6	1.000	LK	1622	252	150M
								22001	UBUNGO220	220.00	1	2	-376.8	-36.6	1.000	LK	1622	252	150M
13202	KINYEREZI	132.00	1 1.0460	-1.5	312.0	0.0	0.0												
			1 138.07		267.1R	0.0	0.0	13209	F-ZONE2	132.00	1	1	130.6	94.6			674	114	589A
								22002	KINYEREZI220	220.00	1	1	90.7	86.3	1.000	LK	523	83	150M
								22002	KINYEREZI220	220.00	1	2	90.7	86.3	1.000	LK	523	83	150M
13203	F-ZONE3	132.00	1 1.0189	-5.1	0.0	0.0	0.0												
			1 134.50		0.0	0.0	0.0	3303	F-ZONE3	33.000	1	1	38.7	25.8	1.000	UN	200	103	45M
								3303	F-ZONE3	33.000	1	2	38.7	25.8	1.000	UN	200	103	45M
								3320	F-ZONE1	33.000	1	1	8.7	5.2	1.000	UN	44	68	15M
								3320	F-ZONE1	33.000	1	2	8.7	5.2	1.000	UN	44	68	15M
								3320	F-ZONE1	33.000	1	3	8.7	5.2	1.000	UN	44	68	15M
								13201	UBUNGO	132.00	1	1	-103.5	-67.1			530	90	589A
13204	KURASINI	132.00	1 1.0186	-5.1	0.0	0.0	0.0												
			1 134.45		0.0	0.0	0.0	3304	KURASHINI	33.000	1	1	78.7	57.7	1.000	UN	419	195	50M
								13201	UBUNGO	132.00	1	1	-78.7	-57.7			419	71	589A
13205	ILALA	132.00	1 1.0188	-5.1	0.0	0.0	0.0												
			1 134.48		0.0	0.0	0.0	3305	ILALA	33.000	1	1	55.6	28.5	1.000	UN	268	104	60M
								3305	ILALA	33.000	1	2	55.6	28.5	1.000	UN	268	104	60M
								3305	ILALA	33.000	1	3	55.6	28.5	1.000	UN	268	104	60M
								3305	ILALA	33.000	1	4	55.6	28.5	1.000	UN	268	104	60M
								13201	UBUNGO	132.00	1	1	-150.5	-83.3			738	77	960A
								13201	UBUNGO	132.00	1	2	-150.5	-83.3			738	77	960A
								13211	N-C-CENTER	132.00	1	1	78.5	52.7			406	100	405A
13206	MAKUMBUSHO	132.00	1 1.0181	-5.1	0.0	0.0	0.0												

		1	134.39		0.0	0.0	0.0	3306	MAKUMBUSHO3333.000	1	1	87.4	67.4	0.950	UN	474	245	45	M
								3306	MAKUMBUSHO3333.000	1	2	87.4	67.4	0.950	UN	474	245	45	M
								13201	UBUNGO 132.00	1	1	-174.7	-134.8			948	161	589	A
13207	MILINDIZI	132.00	1	1.0152	-5.2	0.0	0.0	0.0												
		1	134.00		0.0	0.0	0.0	3307	MILINDIZE 33.000	1	1	11.5	7.9	1.000	UN	60	139	10	M
								3307	MILINDIZE 33.000	1	2	11.5	7.9	1.000	UN	60	139	10	M
								13201	UBUNGO 132.00	1	1	-36.0	-24.6			188	46	405	A
								13214	CHALINZE 132.00	1	1	13.1	8.7			68	17	405	A
13208	TEGETA	132.00	1	1.0200	-5.1	114.4	0.0	0.0												
		1	134.64		159.2R	0.0	0.0	3308	TEGETA33 33.000	1	1	70.5	51.1	1.000	UN	373	174	50	M
								3308	TEGETA33 33.000	1	2	70.5	51.1	1.000	UN	373	174	50	M
								13201	UBUNGO 132.00	1	1	-49.7	-1.4			213	53	405	A
								13201	UBUNGO 132.00	1	2	-64.8	-1.8			278			
								13213	MTONI 132.00	1	1	55.5	25.5			262	65	405	A
								13213	MTONI 132.00	1	2	32.5	34.8			204	50	405	A
13209	F-ZONE2	132.00	1	1.0452	-1.5	0.0	0.0	0.0												
		1	137.96		0.0	0.0	0.0	3309	F-ZONE2 33.000	1	1	39.2	25.7	1.000	UN	196	94	50	M
								13202	KINYEREZI 132.00	1	1	-130.5	-94.4			674	114	589	A
								13210	MBAGALA 132.00	1	1	91.3	68.8			478	118	405	A
13210	MBAGALA	132.00	1	1.0430	-1.6	0.0	0.0	0.0												
		1	137.68		0.0	0.0	0.0	3310	MBAGALA 33.000	1	1	91.2	68.5	1.000	UN	478	228	50	M
								13209	F-ZONE2 132.00	1	1	-91.2	-68.5			478	118	405	A
13211	N-C-CENTER	132.00	1	1.0185	-5.1	0.0	0.0	0.0												
		1	134.45		0.0	0.0	0.0	3311	N-C-CENTER3333.000	1	1	39.3	26.3	1.000	UN	203	95	50	M
								3311	N-C-CENTER3333.000	1	2	39.3	26.3	1.000	UN	203	95	50	M
								13205	ILALA 132.00	1	1	-78.5	-52.7			406	100	405	A
13213	MTONI	132.00	1	1.0149	-5.2	0.0	0.0	0.0												
		1	133.97		0.0	0.0	0.0	3313	MTONI 33.000	1	1	31.0	21.1	1.000	UN	161	125	30	M
								3313	MTONI 33.000	1	2	31.0	21.1	1.000	UN	161	125	30	M
								3313	MTONI 33.000	1	3	25.8	17.6	1.000	UN	135	125	25	M
								13208	TEGETA 132.00	1	1	-55.3	-25.2			262	65	405	A
								13208	TEGETA 132.00	1	2	-32.4	-34.5			204	50	405	A
13214	CHALINZE	132.00	1	1.0139	-5.2	0.0	0.0	0.0												
		1	133.84		0.0	0.0	0.0	3314	CHALINZE 33.000	1	1	13.1	8.7	1.000	UN	68	105	15	M
								13207	MILINDIZI 132.00	1	1	-13.1	-8.7			68	17	405	A
22001	UBUNGO220	220.00	1	1.0323	-2.3	0.0	0.0	0.0												
		1	227.10		0.0	0.0	0.0	13201	UBUNGO 132.00	1	1	378.8	55.0	1.000	UN	973	255	150	M
								13201	UBUNGO 132.00	1	2	378.8	55.0	1.000	UN	973	255	150	M
								22002	KINYEREZI220220.00	1	1	-468.9	-133.7			1240	106	1165	A
								22099	MOROGORO 220.00	1	1	-288.7	23.7			736	63	1165	A
22002	KINYEREZI220	220.00	1	1.0338	-2.1	0.0	0.0	0.0												
		1	227.44		0.0	0.0	0.0	13202	KINYEREZI 132.00	1	1	-90.5	-84.4	1.000	UN	314	82	150	M
								13202	KINYEREZI 132.00	1	2	-90.5	-84.4	1.000	UN	314	82	150	M
								22001	UBUNGO220 220.00	1	1	469.1	135.5			1240	106	1165	A
								22099	MOROGORO 220.00	1	1	-288.1	33.2			736	63	1165	A
22099	MOROGORO	220.00	1	1.0350	0.0	579.6	0.0	0.0												
		1	227.70		-35.2R	0.0	0.0	22001	UBUNGO220 220.00	1	1	290.2	-12.3			736	63	1165	A
								22002	KINYEREZI220220.00	1	1	289.4	-22.8			736	63	1165	A

2025年（負荷力率0.86イララ
11kV調相設備有り）

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS(R)E SUN, SEP 15 2013 11:59

DAR
DAR-1

%MVA FOR TRANSFORMERS
% I FOR NON-TRANSFORMER BRANCHES

FROM BUS			AREA	VOLT		GEN	LOAD	SHUNT	TO BUS					TRANSFORMER				RATING		
BUS#	X-- NAME	X BASKV	ZONE	PU/KV	ANGLE	MW/MVAR	MW/MVAR	MW/MVAR	BUS#	X-- NAME	X BASKV	AREA	CKT	MW	MVAR	RATIO	ANGLE	AMPS	%	SET A
1105	ILALA	11.000	1	0.9783	-11.4	0.0	39.1	0.0												
			1	10.761		0.0	23.2	-14.4	3305	ILALA	33.000	1	1	-13.0	-3.0	1.000LK		718	89	15M
									3305	ILALA	33.000	1	2	-13.0	-3.0	1.000LK		718	89	15M
									3305	ILALA	33.000	1	3	-13.0	-3.0	1.000LK		718	89	15M
1121	MUHIBILI11	11.000	1	1.0026	-10.7	0.0	13.0	0.0												
			1	11.028		0.0	7.7	0.0	3321	MUHIBILI33	33.000	1	1	-13.0	-7.7	1.000LK		794	101	15M
1122	MWANANYA11	11.000	1	1.0048	-14.2	0.0	13.0	0.0												
			1	11.052		0.0	7.7	0.0	3322	MWANANYA33	33.000	1	1	-13.0	-7.7	1.000LK		793	101	15M
1123	JAGWANI11	11.000	1	0.9698	-13.2	0.0	13.0	0.0												
			1	10.667		0.0	7.7	0.0	3323	JAGWANI33	33.000	1	1	-13.0	-7.7	1.000LK		821	101	15M
1124	MSASANI11	11.000	1	1.0010	-14.4	0.0	26.1	0.0												
			1	11.011		0.0	15.5	0.0	3324	MSASANI33	33.000	1	1	-13.0	-7.7	1.000LK		796	101	15M
									3324	MSASANI33	33.000	1	2	-13.0	-7.7	1.000LK		796	101	15M
3301	UBUNGO	33.000	1	1.0030	-6.4	0.0	256.0	0.0												
			1	33.100		0.0	151.9	0.0	13201	UBUNGO	132.00	1	1	-256.0	-151.9	1.000LK		5192	99	300M
3303	F-ZONE3	33.000	1	0.9839	-8.0	0.0	77.2	0.0												
			1	32.470		0.0	45.8	0.0	13203	F-ZONE3	132.00	1	1	-38.6	-22.9	1.000LK		799	100	45M
									13203	F-ZONE3	132.00	1	2	-38.6	-22.9	1.000LK		799	100	45M
3304	KURASHINI	33.000	1	0.9503	-10.6	0.0	78.3	0.0												
			1	31.358		0.0	46.5	0.0	13204	KURASINI	132.00	1	1	-78.3	-46.5	1.000LK		1676	182	50M
3305	ILALA	33.000	1	0.9940	-8.3	0.0	182.7	0.0												
			1	32.803		0.0	108.4	-36.6	1105	ILALA	11.000	1	1	13.1	3.7	1.000UN		239	91	15M
									1105	ILALA	11.000	1	2	13.1	3.7	1.000UN		239	91	15M
									1105	ILALA	11.000	1	3	13.1	3.7	1.000UN		239	91	15M
									13205	ILALA	132.00	1	1	-55.5	-20.7	1.000LK		1042	99	60M
									13205	ILALA	132.00	1	2	-55.5	-20.7	1.000LK		1042	99	60M
									13205	ILALA	132.00	1	3	-55.5	-20.7	1.000LK		1042	99	60M
									13205	ILALA	132.00	1	4	-55.5	-20.7	1.000LK		1042	99	60M
3306	MAKUMBUSHO3	33.000	1	0.9880	-11.4	0.0	134.4	0.0												
			1	32.604		0.0	79.7	0.0	3322	MWANANYA33	33.000	1	1	13.1	8.7			278	69	405A
									3324	MSASANI33	33.000	1	1	14.1	8.8			294	73	405A
									3324	MSASANI33	33.000	1	2	12.1	8.7			264	65	404A
									13206	MAKUMBUSHO	132.00	1	1	-86.9	-53.0	1.000LK		1801	226	45M
									13206	MAKUMBUSHO	132.00	1	2	-86.9	-53.0	1.000LK		1801	226	45M
3307	MILINDIZE	33.000	1	0.9672	-9.2	0.0	22.8	0.0												
			1	31.918		0.0	13.5	0.0	13207	MILINDIZI	132.00	1	1	-11.4	-6.8	1.000LK		240	133	10M
									13207	MILINDIZI	132.00	1	2	-11.4	-6.8	1.000LK		240	133	10M
3308	TEGETA33	33.000	1	0.9592	-10.0	0.0	127.2	0.0												
			1	31.653		0.0	75.5	0.0	3323	JAGWANI33	33.000	1	1	13.1	8.8			288	71	405A
									13208	TEGETA	132.00	1	1	-70.2	-42.1	1.000LK		1493	164	50M
									13208	TEGETA	132.00	1	2	-70.2	-42.1	1.000LK		1493	164	50M
3309	F-ZONE2	33.000	1	1.0144	-4.1	0.0	39.1	0.0												
			1	33.475		0.0	23.2	0.0	13209	F-ZONE2	132.00	1	1	-39.1	-23.2	1.000LK		785	91	50M
3310	MBAGALA	33.000	1	0.9644	-7.8	0.0	90.7	0.0												
			1	31.825		0.0	53.8	0.0	13210	MBAGALA	132.00	1	1	-90.7	-53.8	1.000LK		1913	211	50M
3311	N-C-CENTER3	33.000	1	0.9864	-7.8	0.0	65.2	0.0												
			1	32.551		0.0	38.7	0.0	3321	MUHIBILI33	33.000	1	1	13.1	8.7			279	69	405A

								13211	N-C-CENTER	132.00	1	1	-39.2	-23.7	1.000	LK	812	92	50M
								13211	N-C-CENTER	132.00	1	2	-39.2	-23.7	1.000	LK	812	92	50M
3313	MTONI	33.000	1 0.9722	-8.8	0.0	87.4	0.0												
			1 32.081		0.0	51.9	0.0	13213	MTONI	132.00	1	1	-30.9	-18.3	1.000	LK	646	120	30M
								13213	MTONI	132.00	1	2	-30.9	-18.3	1.000	LK	646	120	30M
								13213	MTONI	132.00	1	3	-25.7	-15.3	1.000	LK	538	120	25M
3314	CHALINZE	33.000	1 0.9782	-8.2	0.0	13.0	0.0												
			1 32.281		0.0	7.7	0.0	13214	CHALINZE	132.00	1	1	-13.0	-7.7	1.000	LK	271	101	15M
3320	F-ZONE1	33.000	1 1.0167	-5.3	0.0	26.1	0.0												
			1 33.551		0.0	15.5	0.0	13203	F-ZONE3	132.00	1	1	-8.7	-5.2	1.000	LK	174	67	15M
								13203	F-ZONE3	132.00	1	2	-8.7	-5.2	1.000	LK	174	67	15M
								13203	F-ZONE3	132.00	1	3	-8.7	-5.2	1.000	LK	174	67	15M
3321	MUHIBILI33	33.000	1 0.9854	-7.8	0.0	0.0	0.0												
			1 32.520		0.0	0.0	0.0	1121	MUHIBILI11	11.000	1	1	13.1	8.7	0.950	UN	279	105	15M
								3311	N-C-CENTER3	33.000	1	1	-13.1	-8.7			279	69	405A
3322	MWANANYA33	33.000	1 0.9875	-11.4	0.0	0.0	0.0												
			1 32.586		0.0	0.0	0.0	1122	MWANANYA11	11.000	1	1	13.1	8.7	0.950	UN	278	105	15M
								3306	MAKUMBUSHO3	33.000	1	1	-13.1	-8.7			278	69	405A
3323	JAGWANI33	33.000	1 0.9555	-10.2	0.0	0.0	0.0												
			1 31.531		0.0	0.0	0.0	1123	JAGWANI11	11.000	1	1	13.1	8.7	0.950	UN	288	105	15M
								3308	TEGETA33	33.000	1	1	-13.1	-8.7			288	71	405A
3324	MSASANI33	33.000	1 0.9840	-11.5	0.0	0.0	0.0												
			1 32.472		0.0	0.0	0.0	1124	MSASANI11	11.000	1	1	13.1	8.7	0.950	UN	279	105	15M
								1124	MSASANI11	11.000	1	2	13.1	8.7	0.950	UN	279	105	15M
								3306	MAKUMBUSHO3	33.000	1	1	-14.0	-8.8			294	73	405A
								3306	MAKUMBUSHO3	33.000	1	2	-12.1	-8.6			264	65	404A
13201	UBUNGO	132.00	1 1.0210	-5.0	312.5	0.0	0.0												
			1 134.77		528.3R	0.0	0.0	3301	UBUNGO	33.000	1	1	256.6	161.1	1.000	UN	1298	101	300M
								13203	F-ZONE3	132.00	1	1	103.6	67.4			530	90	589A
								13204	KURASINI	132.00	1	1	78.8	58.0			419	71	589A
								13205	ILALA	132.00	1	1	150.6	75.6			722	75	960A
								13205	ILALA	132.00	1	2	150.6	75.6			722	75	960A
								13206	MAKUMBUSHO	132.00	1	1	174.9	135.6			948	161	589A
								13207	MILINDIZI	132.00	1	1	36.1	24.9			188	46	405A
								13208	TEGETA	132.00	1	1	49.8	1.5			213	53	405A
								13208	TEGETA	132.00	1	2	64.9	2.0			278		
								22001	UBUNGO220	220.00	1	1	-376.8	-36.7	1.000	LK	1622	252	150M
								22001	UBUNGO220	220.00	1	2	-376.8	-36.7	1.000	LK	1622	252	150M
13202	KINYEREZI	132.00	1 1.0460	-1.5	312.0	0.0	0.0												
			1 138.07		267.1R	0.0	0.0	13209	F-ZONE2	132.00	1	1	130.6	94.6			674	114	589A
								22002	KINYEREZI220	220.00	1	1	90.7	86.3	1.000	LK	523	83	150M
								22002	KINYEREZI220	220.00	1	2	90.7	86.3	1.000	LK	523	83	150M
13203	F-ZONE3	132.00	1 1.0189	-5.1	0.0	0.0	0.0												
			1 134.50		0.0	0.0	0.0	3303	F-ZONE3	33.000	1	1	38.7	25.8	1.000	UN	200	103	45M
								3303	F-ZONE3	33.000	1	2	38.7	25.8	1.000	UN	200	103	45M
								3320	F-ZONE1	33.000	1	1	8.7	5.2	1.000	UN	44	68	15M
								3320	F-ZONE1	33.000	1	2	8.7	5.2	1.000	UN	44	68	15M
								3320	F-ZONE1	33.000	1	3	8.7	5.2	1.000	UN	44	68	15M
								13201	UBUNGO	132.00	1	1	-103.5	-67.1			530	90	589A
13204	KURASINI	132.00	1 1.0186	-5.1	0.0	0.0	0.0												
			1 134.45		0.0	0.0	0.0	3304	KURASHINI	33.000	1	1	78.7	57.7	1.000	UN	419	195	50M
								13201	UBUNGO	132.00	1	1	-78.7	-57.7			419	71	589A
13205	ILALA	132.00	1 1.0189	-5.1	0.0	0.0	0.0												
			1 134.50		0.0	0.0	0.0	3305	ILALA	33.000	1	1	55.6	24.4	1.000	UN	261	101	60M
								3305	ILALA	33.000	1	2	55.6	24.4	1.000	UN	261	101	60M
								3305	ILALA	33.000	1	3	55.6	24.4	1.000	UN	261	101	60M
								3305	ILALA	33.000	1	4	55.6	24.4	1.000	UN	261	101	60M
								13201	UBUNGO	132.00	1	1	-150.5	-75.1			722	75	960A
								13201	UBUNGO	132.00	1	2	-150.5	-75.1			722	75	960A
								13211	N-C-CENTER	132.00	1	1	78.5	52.7			406	100	405A
13206	MAKUMBUSHO	132.00	1 1.0181	-5.1	0.0	0.0	0.0												

		1	134.39		0.0	0.0	0.0	3306	MAKUMBUSHO3333.000	1	1	87.4	67.4	0.950UN		474	245	45M
								3306	MAKUMBUSHO3333.000	1	2	87.4	67.4	0.950UN		474	245	45M
								13201	UBUNGO 132.00	1	1	-174.7	-134.8			948	161	589A
13207	MILINDIZI	132.00	1	1.0152	-5.2	0.0	0.0	0.0												
		1	134.00		0.0	0.0	0.0	3307	MILINDIZE 33.000	1	1	11.5	7.9	1.000UN		60	139	10M
								3307	MILINDIZE 33.000	1	2	11.5	7.9	1.000UN		60	139	10M
								13201	UBUNGO 132.00	1	1	-36.0	-24.6			188	46	405A
								13214	CHALINZE 132.00	1	1	13.1	8.7			68	17	405A
13208	TEGETA	132.00	1	1.0200	-5.1	114.4	0.0	0.0												
		1	134.64		159.2R	0.0	0.0	3308	TEGETA33 33.000	1	1	70.5	51.1	1.000UN		373	174	50M
								3308	TEGETA33 33.000	1	2	70.5	51.1	1.000UN		373	174	50M
								13201	UBUNGO 132.00	1	1	-49.7	-1.4			213	53	405A
								13201	UBUNGO 132.00	1	2	-64.8	-1.8			278		
								13213	MTONI 132.00	1	1	55.5	25.5			262	65	405A
								13213	MTONI 132.00	1	2	32.5	34.8			204	50	405A
13209	F-ZONE2	132.00	1	1.0452	-1.5	0.0	0.0	0.0												
		1	137.96		0.0	0.0	0.0	3309	F-ZONE2 33.000	1	1	39.2	25.7	1.000UN		196	94	50M
								13202	KINYEREZI 132.00	1	1	-130.5	-94.4			674	114	589A
								13210	MBAGALA 132.00	1	1	91.3	68.8			478	118	405A
13210	MBAGALA	132.00	1	1.0430	-1.6	0.0	0.0	0.0												
		1	137.68		0.0	0.0	0.0	3310	MBAGALA 33.000	1	1	91.2	68.5	1.000UN		478	228	50M
								13209	F-ZONE2 132.00	1	1	-91.2	-68.5			478	118	405A
13211	N-C-CENTER	132.00	1	1.0187	-5.1	0.0	0.0	0.0												
		1	134.47		0.0	0.0	0.0	3311	N-C-CENTER3333.000	1	1	39.3	26.3	1.000UN		203	95	50M
								3311	N-C-CENTER3333.000	1	2	39.3	26.3	1.000UN		203	95	50M
								13205	ILALA 132.00	1	1	-78.5	-52.7			406	100	405A
13213	MTONI	132.00	1	1.0149	-5.2	0.0	0.0	0.0												
		1	133.97		0.0	0.0	0.0	3313	MTONI 33.000	1	1	31.0	21.1	1.000UN		161	125	30M
								3313	MTONI 33.000	1	2	31.0	21.1	1.000UN		161	125	30M
								3313	MTONI 33.000	1	3	25.8	17.6	1.000UN		135	125	25M
								13208	TEGETA 132.00	1	1	-55.3	-25.2			262	65	405A
								13208	TEGETA 132.00	1	2	-32.4	-34.5			204	50	405A
13214	CHALINZE	132.00	1	1.0139	-5.2	0.0	0.0	0.0												
		1	133.84		0.0	0.0	0.0	3314	CHALINZE 33.000	1	1	13.1	8.7	1.000UN		68	105	15M
								13207	MILINDIZI 132.00	1	1	-13.1	-8.7			68	17	405A
22001	UBUNGO220	220.00	1	1.0323	-2.3	0.0	0.0	0.0												
		1	227.10		0.0	0.0	0.0	13201	UBUNGO 132.00	1	1	378.7	55.0	1.000UN		973	255	150M
								13201	UBUNGO 132.00	1	2	378.7	55.0	1.000UN		973	255	150M
								22002	KINYEREZI220220.00	1	1	-468.8	-133.7			1239	106	1165A
								22099	MOROGORO 220.00	1	1	-288.6	23.7			736	63	1165A
22002	KINYEREZI220	220.00	1	1.0338	-2.1	0.0	0.0	0.0												
		1	227.44		0.0	0.0	0.0	13202	KINYEREZI 132.00	1	1	-90.5	-84.4	1.000UN		314	82	150M
								13202	KINYEREZI 132.00	1	2	-90.5	-84.4	1.000UN		314	82	150M
								22001	UBUNGO220 220.00	1	1	469.1	135.5			1239	106	1165A
								22099	MOROGORO 220.00	1	1	-288.0	33.2			736	63	1165A
22099	MOROGORO	220.00	1	1.0350	0.0	579.5	0.0	0.0												
		1	227.70		-35.2R	0.0	0.0	22001	UBUNGO220 220.00	1	1	290.1	-12.3			736	63	1165A
								22002	KINYEREZI220220.00	1	1	289.4	-22.8			736	63	1165A

2015年（負荷力率0.90イララ
11kV調相設備有り）

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS(R)E SUN, SEP 15 2013 12:28

DAR
DAR-1

%MVA FOR TRANSFORMERS
% I FOR NON-TRANSFORMER BRANCHES

FROM BUS			AREA	VOLT		GEN	LOAD	SHUNT	TO BUS					TRANSFORMER				RATING		
BUS#	X-- NAME	--X BASKV	ZONE	PU/KV	ANGLE	MW/MVAR	MW/MVAR	MW/MVAR	BUS#	X-- NAME	--X BASKV	AREA	CKT	MW	MVAR	RATIO	ANGLE	AMPS	%	SET A
1105	ILALA	11.000	1	1.0196	-4.9	0.0	23.5	0.0												
			1	11.215		0.0	11.4	-15.6	3305	ILALA	33.000	1	1	-7.8	1.4	1.000LK		410	53	15M
									3305	ILALA	33.000	1	2	-7.8	1.4	1.000LK		410	53	15M
									3305	ILALA	33.000	1	3	-7.8	1.4	1.000LK		410	53	15M
1121	MUHIBILI11	11.000	1	0.9867	-4.7	0.0	7.8	0.0												
			1	10.854		0.0	3.8	0.0	3321	MUHIBILI33	33.000	1	1	-7.8	-3.8	1.000LK		463	58	15M
1122	MWANANYA11	11.000	1	0.9605	-7.2	0.0	7.8	0.0												
			1	10.565		0.0	3.8	0.0	3322	MWANANYA33	33.000	1	1	-7.8	-3.8	1.000LK		476	58	15M
1123	JAGWANI11	11.000	1	0.9719	-6.0	0.0	7.8	0.0												
			1	10.691		0.0	3.8	0.0	3323	JAGWANI33	33.000	1	1	-7.8	-3.8	1.000LK		470	58	15M
1124	MSASANI11	11.000	1	0.9586	-7.3	0.0	15.7	0.0												
			1	10.545		0.0	7.6	0.0	3324	MSASANI33	33.000	1	1	-7.8	-3.8	1.000LK		477	58	15M
									3324	MSASANI33	33.000	1	2	-7.8	-3.8	1.000LK		477	58	15M
3301	UBUNGO	33.000	1	1.0121	-2.0	0.0	153.8	0.0												
			1	33.400		0.0	74.5	0.0	13201	UBUNGO	132.00	1	1	-153.8	-74.5	1.000LK		2953	57	300M
3303	F-ZONE3	33.000	1	1.0031	-3.0	0.0	46.4	0.0												
			1	33.102		0.0	22.5	0.0	13203	F-ZONE3	132.00	1	1	-23.2	-11.2	1.000LK		450	57	45M
									13203	F-ZONE3	132.00	1	2	-23.2	-11.2	1.000LK		450	57	45M
3304	KURASHINI	33.000	1	0.9879	-4.5	0.0	47.0	0.0												
			1	32.599		0.0	22.8	0.0	13204	KURASINI	132.00	1	1	-47.0	-22.8	1.000LK		925	104	50M
3305	ILALA	33.000	1	1.0156	-3.1	0.0	109.7	0.0												
			1	33.513		0.0	53.1	-38.2	1105	ILALA	11.000	1	1	7.8	-1.2	1.000UN		137	53	15M
									1105	ILALA	11.000	1	2	7.8	-1.2	1.000UN		137	53	15M
									1105	ILALA	11.000	1	3	7.8	-1.2	1.000UN		137	53	15M
									13205	ILALA	132.00	1	1	-33.3	-2.9	1.000LK		576	56	60M
									13205	ILALA	132.00	1	2	-33.3	-2.9	1.000LK		576	56	60M
									13205	ILALA	132.00	1	3	-33.3	-2.9	1.000LK		576	56	60M
									13205	ILALA	132.00	1	4	-33.3	-2.9	1.000LK		576	56	60M
3306	MAKUMBUSHO33	33.000	1	0.9786	-5.3	0.0	80.7	0.0												
			1	32.295		0.0	39.1	0.0	3322	MWANANYA33	33.000	1	1	7.9	4.1			159	39	405A
									3324	MSASANI33	33.000	1	1	8.4	4.1			168	41	405A
									3324	MSASANI33	33.000	1	2	7.3	4.2			150	37	404A
									13206	MAKUMBUSHO	132.00	1	1	-52.1	-25.8	1.000LK		1040	129	45M
									13206	MAKUMBUSHO	132.00	1	2	-52.1	-25.8	1.000LK		1040	129	45M
3307	MILINDIZE	33.000	1	0.9952	-3.7	0.0	13.7	0.0												
			1	32.842		0.0	6.6	0.0	13207	MILINDIZI	132.00	1	1	-6.9	-3.3	1.000LK		134	76	10M
									13207	MILINDIZI	132.00	1	2	-6.9	-3.3	1.000LK		134	76	10M
3308	TEGETA33	33.000	1	0.9914	-4.1	0.0	76.4	0.0												
			1	32.717		0.0	37.0	0.0	3323	JAGWANI33	33.000	1	1	7.9	4.1			157	39	405A
									13208	TEGETA	132.00	1	1	-42.1	-20.6	1.000LK		827	94	50M
									13208	TEGETA	132.00	1	2	-42.1	-20.6	1.000LK		827	94	50M
3309	F-ZONE2	33.000	1	1.0297	-0.9	0.0	23.5	0.0												
			1	33.979		0.0	11.4	0.0	13209	F-ZONE2	132.00	1	1	-23.5	-11.4	1.000LK		444	52	50M
3310	MBAGALA	33.000	1	1.0070	-3.0	0.0	54.5	0.0												
			1	33.232		0.0	26.4	0.0	13210	MBAGALA	132.00	1	1	-54.5	-26.4	1.000LK		1051	121	50M
3311	N-C-CENTER33	33.000	1	1.0046	-2.9	0.0	39.2	0.0												
			1	33.151		0.0	19.0	0.0	3321	MUHIBILI33	33.000	1	1	7.9	4.1			154	38	405A

								13211	N-C-CENTER	132.00	1	1	-23.5	-11.5	1.000	LK	456	52	50M
								13211	N-C-CENTER	132.00	1	2	-23.5	-11.5	1.000	LK	456	52	50M
3313	MTONI	33.000	1 0.9969	-3.4	0.0	52.5	0.0												
			1 32.897		0.0	25.4	0.0	13213	MTONI	132.00	1	1	-18.5	-9.0	1.000	LK	361	69	30M
								13213	MTONI	132.00	1	2	-18.5	-9.0	1.000	LK	361	69	30M
								13213	MTONI	132.00	1	3	-15.4	-7.5	1.000	LK	301	69	25M
3314	CHALINZE	33.000	1 1.0002	-3.1	0.0	7.8	0.0												
			1 33.007		0.0	3.8	0.0	13214	CHALINZE	132.00	1	1	-7.8	-3.8	1.000	LK	152	58	15M
3320	F-ZONE1	33.000	1 1.0188	-1.4	0.0	15.7	0.0												
			1 33.622		0.0	7.6	0.0	13203	F-ZONE3	132.00	1	1	-5.2	-2.5	1.000	LK	100	39	15M
								13203	F-ZONE3	132.00	1	2	-5.2	-2.5	1.000	LK	100	39	15M
								13203	F-ZONE3	132.00	1	3	-5.2	-2.5	1.000	LK	100	39	15M
3321	MUHIBILI33	33.000	1 1.0041	-2.9	0.0	0.0	0.0												
			1 33.135		0.0	0.0	0.0	1121	MUHIBILI11	11.000	1	1	7.8	4.1	1.000	UN	154	59	15M
								3311	N-C-CENTER3333	.000	1	1	-7.8	-4.1			154	38	405A
3322	MWANANYA33	33.000	1 0.9784	-5.3	0.0	0.0	0.0												
			1 32.286		0.0	0.0	0.0	1122	MWANANYA11	11.000	1	1	7.8	4.1	1.000	UN	159	59	15M
								3306	MAKUMBUSHO3333	.000	1	1	-7.8	-4.1			159	39	405A
3323	JAGWANI33	33.000	1 0.9896	-4.1	0.0	0.0	0.0												
			1 32.656		0.0	0.0	0.0	1123	JAGWANI11	11.000	1	1	7.8	4.1	1.000	UN	157	59	15M
								3308	TEGETA33	33.000	1	1	-7.8	-4.1			157	39	405A
3324	MSASANI33	33.000	1 0.9765	-5.4	0.0	0.0	0.0												
			1 32.225		0.0	0.0	0.0	1124	MSASANI11	11.000	1	1	7.8	4.1	1.000	UN	159	59	15M
								1124	MSASANI11	11.000	1	2	7.8	4.1	1.000	UN	159	59	15M
								3306	MAKUMBUSHO3333	.000	1	1	-8.4	-4.1			168	41	405A
								3306	MAKUMBUSHO3333	.000	1	2	-7.3	-4.1			150	37	404A
13201	UBUNGO	132.00	1 1.0210	-1.2	312.5	0.0	0.0												
			1 134.77		142.5R	0.0	0.0	3301	UBUNGO	33.000	1	1	154.0	77.4	1.000	UN	738	57	300M
								13203	F-ZONE3	132.00	1	1	62.2	32.0			300	51	589A
								13204	KURASINI	132.00	1	1	47.2	26.3			231	39	589A
								13205	ILALA	132.00	1	1	90.3	20.5			397	41	960A
								13205	ILALA	132.00	1	2	90.3	20.5			397	41	960A
								13206	MAKUMBUSHO	132.00	1	1	104.7	61.4			520	88	589A
								13207	MILINDIZI	132.00	1	1	21.6	11.6			105	26	405A
								13208	TEGETA	132.00	1	1	9.9	18.0			88	22	405A
								13208	TEGETA	132.00	1	2	12.9	23.5			115		
								22001	UBUNGO220	220.00	1	1	-140.2	-74.3	1.000	LK	680	106	150M
								22001	UBUNGO220	220.00	1	2	-140.2	-74.3	1.000	LK	680	106	150M
13202	KINYEREZI	132.00	1 1.0450	0.6	312.0	0.0	0.0												
			1 137.94		188.2R	0.0	0.0	13209	F-ZONE2	132.00	1	1	78.2	43.1			374	63	589A
								22002	KINYEREZI220	220.00	1	1	116.9	72.5	1.000	LK	576	92	150M
								22002	KINYEREZI220	220.00	1	2	116.9	72.5	1.000	LK	576	92	150M
13203	F-ZONE3	132.00	1 1.0199	-1.2	0.0	0.0	0.0												
			1 134.63		0.0	0.0	0.0	3303	F-ZONE3	33.000	1	1	23.2	12.1	1.000	UN	112	58	45M
								3303	F-ZONE3	33.000	1	2	23.2	12.1	1.000	UN	112	58	45M
								3320	F-ZONE1	33.000	1	1	5.2	2.5	1.000	UN	25	39	15M
								3320	F-ZONE1	33.000	1	2	5.2	2.5	1.000	UN	25	39	15M
								3320	F-ZONE1	33.000	1	3	5.2	2.5	1.000	UN	25	39	15M
								13201	UBUNGO	132.00	1	1	-62.1	-31.9			300	51	589A
13204	KURASINI	132.00	1 1.0198	-1.2	0.0	0.0	0.0												
			1 134.61		0.0	0.0	0.0	3304	KURASHINI	33.000	1	1	47.1	26.2	1.000	UN	231	108	50M
								13201	UBUNGO	132.00	1	1	-47.1	-26.2			231	39	589A
13205	ILALA	132.00	1 1.0202	-1.3	0.0	0.0	0.0												
			1 134.66		0.0	0.0	0.0	3305	ILALA	33.000	1	1	33.4	4.0	1.000	UN	144	56	60M
								3305	ILALA	33.000	1	2	33.4	4.0	1.000	UN	144	56	60M
								3305	ILALA	33.000	1	3	33.4	4.0	1.000	UN	144	56	60M
								3305	ILALA	33.000	1	4	33.4	4.0	1.000	UN	144	56	60M
								13201	UBUNGO	132.00	1	1	-90.2	-20.4			397	41	960A
								13201	UBUNGO	132.00	1	2	-90.2	-20.4			397	41	960A
								13211	N-C-CENTER	132.00	1	1	47.1	24.8			228	56	405A
13206	MAKUMBUSHO	132.00	1 1.0196	-1.3	0.0	0.0	0.0												

		1	134.58		0.0	0.0	0.0	3306	MAKUMBUSHO3333.000	1	1	52.3	30.6	1.000UN		260	135	45M
								3306	MAKUMBUSHO3333.000	1	2	52.3	30.6	1.000UN		260	135	45M
								13201	UBUNGO 132.00	1	1	-104.6	-61.2			520	88	589A
13207	MILINDIZI	132.00	1	1.0180	-1.3	0.0	0.0	0.0												
		1	134.38		0.0	0.0	0.0	3307	MILINDIZE 33.000	1	1	6.9	3.7	1.000UN		33	78	10M
								3307	MILINDIZE 33.000	1	2	6.9	3.7	1.000UN		33	78	10M
								13201	UBUNGO 132.00	1	1	-21.6	-11.5			105	26	405A
								13214	CHALINZE 132.00	1	1	7.9	4.1			38	9	405A
13208	TEGETA	132.00	1	1.0200	-1.2	114.4	0.0	0.0												
		1	134.64		33.3R	0.0	0.0	3308	TEGETA33 33.000	1	1	42.2	23.3	1.000UN		207	96	50M
								3308	TEGETA33 33.000	1	2	42.2	23.3	1.000UN		207	96	50M
								13201	UBUNGO 132.00	1	1	-9.9	-18.0			88	22	405A
								13201	UBUNGO 132.00	1	2	-12.9	-23.4			115		
								13213	MTONI 132.00	1	1	32.5	10.7			147	36	405A
								13213	MTONI 132.00	1	2	20.2	17.3			114	28	405A
13209	F-ZONE2	132.00	1	1.0446	0.6	0.0	0.0	0.0												
		1	137.89		0.0	0.0	0.0	3309	F-ZONE2 33.000	1	1	23.5	12.2	1.000UN		111	53	50M
								13202	KINYEREZI 132.00	1	1	-78.2	-43.1			374	63	589A
								13210	MBAGALA 132.00	1	1	54.6	30.9			263	65	405A
13210	MBAGALA	132.00	1	1.0435	0.6	0.0	0.0	0.0												
		1	137.75		0.0	0.0	0.0	3310	MBAGALA 33.000	1	1	54.6	30.8	1.000UN		263	125	50M
								13209	F-ZONE2 132.00	1	1	-54.6	-30.8			263	65	405A
13211	N-C-CENTER	132.00	1	1.0201	-1.3	0.0	0.0	0.0												
		1	134.65		0.0	0.0	0.0	3311	N-C-CENTER3333.000	1	1	23.5	12.4	1.000UN		114	53	50M
								3311	N-C-CENTER3333.000	1	2	23.5	12.4	1.000UN		114	53	50M
								13205	ILALA 132.00	1	1	-47.1	-24.8			228	56	405A
13213	MTONI	132.00	1	1.0173	-1.3	0.0	0.0	0.0												
		1	134.29		0.0	0.0	0.0	3313	MTONI 33.000	1	1	18.6	9.8	1.000UN		90	70	30M
								3313	MTONI 33.000	1	2	18.6	9.8	1.000UN		90	70	30M
								3313	MTONI 33.000	1	3	15.5	8.2	1.000UN		75	70	25M
								13208	TEGETA 132.00	1	1	-32.4	-10.6			147	36	405A
								13208	TEGETA 132.00	1	2	-20.2	-17.2			114	28	405A
13214	CHALINZE	132.00	1	1.0173	-1.3	0.0	0.0	0.0												
		1	134.29		0.0	0.0	0.0	3314	CHALINZE 33.000	1	1	7.8	4.1	1.000UN		38	59	15M
								13207	MILINDIZI 132.00	1	1	-7.8	-4.1			38	9	405A
22001	UBUNGO220	220.00	1	1.0328	-0.2	0.0	0.0	0.0												
		1	227.22		0.0	0.0	0.0	13201	UBUNGO 132.00	1	1	140.6	77.6	1.000UN		408	107	150M
								13201	UBUNGO 132.00	1	2	140.6	77.6	1.000UN		408	107	150M
								22002	KINYEREZI220220.00	1	1	-251.0	-143.6			735	63	1165A
								22099	MOROGORO 220.00	1	1	-30.2	-11.5			82	7	1165A
22002	KINYEREZI220	220.00	1	1.0342	-0.1	0.0	0.0	0.0												
		1	227.53		0.0	0.0	0.0	13202	KINYEREZI 132.00	1	1	-116.7	-70.2	1.000UN		346	91	150M
								13202	KINYEREZI 132.00	1	2	-116.7	-70.2	1.000UN		346	91	150M
								22001	UBUNGO220 220.00	1	1	251.0	144.3			735	63	1165A
								22099	MOROGORO 220.00	1	1	-17.7	-3.8			46	4	1165A
22099	MOROGORO	220.00	1	1.0350	0.0	48.0	0.0	0.0												
		1	227.70		15.4R	0.0	0.0	22001	UBUNGO220 220.00	1	1	30.2	11.6			82	7	1165A
								22002	KINYEREZI220220.00	1	1	17.7	3.8			46	4	1165A

2020年（負荷力率0.90イララ
11kV調相設備有り）

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS(R)E SUN, SEP 15 2013 12:36

DAR
DAR-1

%MVA FOR TRANSFORMERS
% I FOR NON-TRANSFORMER BRANCHES

FROM BUS			AREA	VOLT		GEN	LOAD	SHUNT	TO BUS					TRANSFORMER				RATING		
BUS#	X-- NAME	--X BASKV	ZONE	PU/KV	ANGLE	MW/MVAR	MW/MVAR	MW/MVAR	BUS#	X-- NAME	--X BASKV	AREA	CKT	MW	MVAR	RATIO	ANGLE	AMPS	%	SET A
1105	ILALA	11.000	1	0.9904	-8.2	0.0	33.6	0.0												
			1	10.895		0.0	16.3	-14.7	3305	ILALA	33.000	1	1	-11.2	-0.5	1.000LK		594	75	15M
									3305	ILALA	33.000	1	2	-11.2	-0.5	1.000LK		594	75	15M
									3305	ILALA	33.000	1	3	-11.2	-0.5	1.000LK		594	75	15M
1121	MUHIBILI11	11.000	1	0.9593	-7.9	0.0	11.2	0.0												
			1	10.552		0.0	5.4	0.0	3321	MUHIBILI33	33.000	1	1	-11.2	-5.4	1.000LK		681	83	15M
1122	MWANANYA11	11.000	1	1.0313	-10.5	0.0	11.2	0.0												
			1	11.345		0.0	5.4	0.0	3322	MWANANYA33	33.000	1	1	-11.2	-5.4	1.000LK		633	83	15M
1123	JAGWANI11	11.000	1	0.9889	-9.7	0.0	11.2	0.0												
			1	10.878		0.0	5.4	0.0	3323	JAGWANI33	33.000	1	1	-11.2	-5.4	1.000LK		660	83	15M
1124	MSASANI11	11.000	1	1.0285	-10.7	0.0	22.4	0.0												
			1	11.314		0.0	10.8	0.0	3324	MSASANI33	33.000	1	1	-11.2	-5.4	1.000LK		635	83	15M
									3324	MSASANI33	33.000	1	2	-11.2	-5.4	1.000LK		635	83	15M
3301	UBUNGO	33.000	1	0.9975	-3.9	0.0	219.7	0.0												
			1	32.919		0.0	106.4	0.0	13201	UBUNGO	132.00	1	1	-219.7	-106.4	1.000LK		4280	81	300M
3303	F-ZONE3	33.000	1	0.9841	-5.3	0.0	66.3	0.0												
			1	32.474		0.0	32.1	0.0	13203	F-ZONE3	132.00	1	1	-33.1	-16.0	1.000LK		655	82	45M
									13203	F-ZONE3	132.00	1	2	-33.1	-16.0	1.000LK		655	82	45M
3304	KURASHINI	33.000	1	0.9606	-7.6	0.0	67.2	0.0												
			1	31.700		0.0	32.5	0.0	13204	KURASINI	132.00	1	1	-67.2	-32.5	1.000LK		1359	149	50M
3305	ILALA	33.000	1	0.9953	-5.5	0.0	156.7	0.0												
			1	32.844		0.0	75.9	-36.7	1105	ILALA	11.000	1	1	11.2	1.0	1.000UN		198	75	15M
									1105	ILALA	11.000	1	2	11.2	1.0	1.000UN		198	75	15M
									1105	ILALA	11.000	1	3	11.2	1.0	1.000UN		198	75	15M
									13205	ILALA	132.00	1	1	-47.6	-10.6	1.000LK		857	81	60M
									13205	ILALA	132.00	1	2	-47.6	-10.6	1.000LK		857	81	60M
									13205	ILALA	132.00	1	3	-47.6	-10.6	1.000LK		857	81	60M
									13205	ILALA	132.00	1	4	-47.6	-10.6	1.000LK		857	81	60M
3306	MAKUMBUSHO3	33.000	1	1.0029	-8.1	0.0	115.3	0.0												
			1	33.096		0.0	55.8	0.0	3322	MWANANYA33	33.000	1	1	11.2	6.0			222	55	405A
									3324	MSASANI33	33.000	1	1	12.0	6.1			235	58	405A
									3324	MSASANI33	33.000	1	2	10.4	6.1			211	52	404A
									13206	MAKUMBUSHO	132.00	1	1	-74.5	-37.0	1.000LK		1451	185	45M
									13206	MAKUMBUSHO	132.00	1	2	-74.5	-37.0	1.000LK		1451	185	45M
3307	MILINDIZE	33.000	1	0.9721	-6.3	0.0	19.6	0.0												
			1	32.080		0.0	9.5	0.0	13207	MILINDIZI	132.00	1	1	-9.8	-4.7	1.000LK		196	109	10M
									13207	MILINDIZI	132.00	1	2	-9.8	-4.7	1.000LK		196	109	10M
3308	TEGETA33	33.000	1	0.9661	-7.0	0.0	109.2	0.0												
			1	31.881		0.0	52.9	0.0	3323	JAGWANI33	33.000	1	1	11.2	6.1			232	57	405A
									13208	TEGETA	132.00	1	1	-60.2	-29.5	1.000LK		1214	134	50M
									13208	TEGETA	132.00	1	2	-60.2	-29.5	1.000LK		1214	134	50M
3309	F-ZONE2	33.000	1	1.0227	-1.1	0.0	33.6	0.0												
			1	33.749		0.0	16.3	0.0	13209	F-ZONE2	132.00	1	1	-33.6	-16.3	1.000LK		638	75	50M
3310	MBAGALA	33.000	1	0.9883	-4.2	0.0	77.8	0.0												
			1	32.615		0.0	37.7	0.0	13210	MBAGALA	132.00	1	1	-77.8	-37.7	1.000LK		1530	173	50M
3311	N-C-CENTER3	33.000	1	0.9859	-5.1	0.0	56.0	0.0												
			1	32.535		0.0	27.1	0.0	3321	MUHIBILI33	33.000	1	1	11.2	6.1			227	56	405A

								13211	N-C-CENTER	132.00	1	1	-33.6	-16.6	1.000	LK	665	75	50M
								13211	N-C-CENTER	132.00	1	2	-33.6	-16.6	1.000	LK	665	75	50M
3313	MTONI	33.000	1 0.9747	-6.0	0.0	75.0	0.0												
			1 32.165		0.0	36.3	0.0	13213	MTONI	132.00	1	1	-26.5	-12.8	1.000	LK	528	98	30M
								13213	MTONI	132.00	1	2	-26.5	-12.8	1.000	LK	528	98	30M
								13213	MTONI	132.00	1	3	-22.1	-10.7	1.000	LK	440	98	25M
3314	CHALINZE	33.000	1 0.9798	-5.5	0.0	11.2	0.0												
			1 32.332		0.0	5.4	0.0	13214	CHALINZE	132.00	1	1	-11.2	-5.4	1.000	LK	222	83	15M
3320	F-ZONE1	33.000	1 1.0073	-2.9	0.0	22.4	0.0												
			1 33.242		0.0	10.8	0.0	13203	F-ZONE3	132.00	1	1	-7.5	-3.6	1.000	LK	144	55	15M
								13203	F-ZONE3	132.00	1	2	-7.5	-3.6	1.000	LK	144	55	15M
								13203	F-ZONE3	132.00	1	3	-7.5	-3.6	1.000	LK	144	55	15M
3321	MUHIBILI33	33.000	1 0.9852	-5.2	0.0	0.0	0.0												
			1 32.511		0.0	0.0	0.0	1121	MUHIBILI11	11.000	1	1	11.2	6.1	1.000	UN	227	85	15M
								3311	N-C-CENTER33	33.000	1	1	-11.2	-6.1			227	56	405A
3322	MWANANYA33	33.000	1 1.0025	-8.2	0.0	0.0	0.0												
			1 33.083		0.0	0.0	0.0	1122	MWANANYA11	11.000	1	1	11.2	6.0	0.950	UN	222	85	15M
								3306	MAKUMBUSHO33	33.000	1	1	-11.2	-6.0			222	55	405A
3323	JAGWANI33	33.000	1 0.9633	-7.1	0.0	0.0	0.0												
			1 31.789		0.0	0.0	0.0	1123	JAGWANI11	11.000	1	1	11.2	6.1	0.950	UN	232	85	15M
								3308	TEGETA33	33.000	1	1	-11.2	-6.1			232	57	405A
3324	MSASANI33	33.000	1 0.9999	-8.3	0.0	0.0	0.0												
			1 32.998		0.0	0.0	0.0	1124	MSASANI11	11.000	1	1	11.2	6.0	0.950	UN	223	85	15M
								1124	MSASANI11	11.000	1	2	11.2	6.0	0.950	UN	223	85	15M
								3306	MAKUMBUSHO33	33.000	1	1	-12.0	-6.0			235	58	405A
								3306	MAKUMBUSHO33	33.000	1	2	-10.4	-6.0			211	52	404A
13201	UBUNGO	132.00	1 1.0105	-2.7	312.5	0.0	0.0												
			1 133.39		215.8R	0.0	0.0	3301	UBUNGO	33.000	1	1	220.1	112.6	1.000	UN	1070	82	300M
								13203	F-ZONE3	132.00	1	1	88.9	47.1			435	74	589A
								13204	KURASINI	132.00	1	1	67.5	40.1			340	58	589A
								13205	ILALA	132.00	1	1	129.1	44.8			592	62	960A
								13205	ILALA	132.00	1	2	129.1	44.8			592	62	960A
								13206	MAKUMBUSHO	132.00	1	1	149.8	93.2			764	130	589A
								13207	MILINDIZI	132.00	1	1	30.9	17.3			153	38	405A
								13208	TEGETA	132.00	1	1	35.5	18.1			173	43	405A
								13208	TEGETA	132.00	1	2	46.3	23.6			225		
								22001	UBUNGO220	220.00	1	1	-292.4	-112.9	1.000	LK	1357	209	150M
								22001	UBUNGO220	220.00	1	2	-292.4	-112.9	1.000	LK	1357	209	150M
13202	KINYEREZI	132.00	1 1.0450	1.1	552.1	0.0	0.0												
			1 137.94		222.4R	0.0	0.0	13209	F-ZONE2	132.00	1	1	111.9	65.2			542	92	589A
								22002	KINYEREZI220	220.00	1	1	220.1	78.6	1.000	LK	978	156	150M
								22002	KINYEREZI220	220.00	1	2	220.1	78.6	1.000	LK	978	156	150M
13203	F-ZONE3	132.00	1 1.0089	-2.8	0.0	0.0	0.0												
			1 133.18		0.0	0.0	0.0	3303	F-ZONE3	33.000	1	1	33.2	18.0	1.000	UN	164	84	45M
								3303	F-ZONE3	33.000	1	2	33.2	18.0	1.000	UN	164	84	45M
								3320	F-ZONE1	33.000	1	1	7.5	3.6	1.000	UN	36	55	15M
								3320	F-ZONE1	33.000	1	2	7.5	3.6	1.000	UN	36	55	15M
								3320	F-ZONE1	33.000	1	3	7.5	3.6	1.000	UN	36	55	15M
								13201	UBUNGO	132.00	1	1	-88.8	-46.8			435	74	589A
13204	KURASINI	132.00	1 1.0087	-2.8	0.0	0.0	0.0												
			1 133.15		0.0	0.0	0.0	3304	KURASHINI	33.000	1	1	67.4	39.9	1.000	UN	340	157	50M
								13201	UBUNGO	132.00	1	1	-67.4	-39.9			340	58	589A
13205	ILALA	132.00	1 1.0091	-2.8	0.0	0.0	0.0												
			1 133.20		0.0	0.0	0.0	3305	ILALA	33.000	1	1	47.7	13.0	1.000	UN	214	82	60M
								3305	ILALA	33.000	1	2	47.7	13.0	1.000	UN	214	82	60M
								3305	ILALA	33.000	1	3	47.7	13.0	1.000	UN	214	82	60M
								3305	ILALA	33.000	1	4	47.7	13.0	1.000	UN	214	82	60M
								13201	UBUNGO	132.00	1	1	-129.0	-44.5			592	62	960A
								13201	UBUNGO	132.00	1	2	-129.0	-44.5			592	62	960A
								13211	N-C-CENTER	132.00	1	1	67.3	36.8			333	82	405A
13206	MAKUMBUSHO	132.00	1 1.0083	-2.8	0.0	0.0	0.0												

		1	133.10		0.0	0.0	0.0	3306	MAKUMBUSHO3333.000	1	1	74.8	46.4	0.950UN		382	196	45M
								3306	MAKUMBUSHO3333.000	1	2	74.8	46.4	0.950UN		382	196	45M
								13201	UBUNGO 132.00	1	1	-149.7	-92.7			764	130	589A
13207	MILINDIZI	132.00	1	1.0061	-2.9	0.0	0.0	0.0												
		1	132.80		0.0	0.0	0.0	3307	MILINDIZE 33.000	1	1	9.8	5.5	1.000UN		49	113	10M
								3307	MILINDIZE 33.000	1	2	9.8	5.5	1.000UN		49	113	10M
								13201	UBUNGO 132.00	1	1	-30.9	-17.1			153	38	405A
								13214	CHALINZE 132.00	1	1	11.2	6.1			56	14	405A
13208	TEGETA	132.00	1	1.0090	-2.7	114.4	0.0	0.0												
		1	133.19		71.3R	0.0	0.0	3308	TEGETA33 33.000	1	1	60.4	35.4	1.000UN		303	140	50M
								3308	TEGETA33 33.000	1	2	60.4	35.4	1.000UN		303	140	50M
								13201	UBUNGO 132.00	1	1	-35.5	-18.0			173	43	405A
								13201	UBUNGO 132.00	1	2	-46.3	-23.5			225		
								13213	MTONI 132.00	1	1	46.6	16.4			214	53	405A
								13213	MTONI 132.00	1	2	28.8	25.6			167	41	405A
13209	F-ZONE2	132.00	1	1.0444	1.1	0.0	0.0	0.0												
		1	137.86		0.0	0.0	0.0	3309	F-ZONE2 33.000	1	1	33.6	17.9	1.000UN		160	76	50M
								13202	KINYEREZI 132.00	1	1	-111.8	-65.1			542	92	589A
								13210	MBAGALA 132.00	1	1	78.2	47.2			383	94	405A
13210	MBAGALA	132.00	1	1.0428	1.0	0.0	0.0	0.0												
		1	137.65		0.0	0.0	0.0	3310	MBAGALA 33.000	1	1	78.1	47.1	1.000UN		383	182	50M
								13209	F-ZONE2 132.00	1	1	-78.1	-47.1			383	94	405A
13211	N-C-CENTER	132.00	1	1.0089	-2.8	0.0	0.0	0.0												
		1	133.17		0.0	0.0	0.0	3311	N-C-CENTER3333.000	1	1	33.7	18.4	1.000UN		166	77	50M
								3311	N-C-CENTER3333.000	1	2	33.7	18.4	1.000UN		166	77	50M
								13205	ILALA 132.00	1	1	-67.3	-36.8			333	82	405A
13213	MTONI	132.00	1	1.0050	-2.9	0.0	0.0	0.0												
		1	132.66		0.0	0.0	0.0	3313	MTONI 33.000	1	1	26.5	14.7	1.000UN		132	101	30M
								3313	MTONI 33.000	1	2	26.5	14.7	1.000UN		132	101	30M
								3313	MTONI 33.000	1	3	22.1	12.2	1.000UN		110	101	25M
								13208	TEGETA 132.00	1	1	-46.5	-16.2			214	53	405A
								13208	TEGETA 132.00	1	2	-28.7	-25.4			167	41	405A
13214	CHALINZE	132.00	1	1.0051	-2.9	0.0	0.0	0.0												
		1	132.67		0.0	0.0	0.0	3314	CHALINZE 33.000	1	1	11.2	6.1	1.000UN		56	85	15M
								13207	MILINDIZI 132.00	1	1	-11.2	-6.1			56	14	405A
22001	UBUNGO220	220.00	1	1.0302	-0.6	0.0	0.0	0.0												
		1	226.65		0.0	0.0	0.0	13201	UBUNGO 132.00	1	1	293.8	125.7	1.000UN		814	213	150M
								13201	UBUNGO 132.00	1	2	293.8	125.7	1.000UN		814	213	150M
								22002	KINYEREZI220220.00	1	1	-501.8	-193.5			1370	118	1165A
								22099	MOROGORO 220.00	1	1	-85.8	-57.9			264	23	1165A
22002	KINYEREZI220	220.00	1	1.0323	-0.4	0.0	0.0	0.0												
		1	227.10		0.0	0.0	0.0	13202	KINYEREZI 132.00	1	1	-219.4	-71.9	1.000UN		587	154	150M
								13202	KINYEREZI 132.00	1	2	-219.4	-71.9	1.000UN		587	154	150M
								22001	UBUNGO220 220.00	1	1	502.1	195.7			1370	118	1165A
								22099	MOROGORO 220.00	1	1	-63.3	-51.9			208	18	1165A
22099	MOROGORO	220.00	1	1.0400	0.0	149.4	0.0	0.0												
		1	228.80		112.2R	0.0	0.0	22001	UBUNGO220 220.00	1	1	86.0	59.4			264	23	1165A
								22002	KINYEREZI220220.00	1	1	63.4	52.8			208	18	1165A

2025年（負荷力率0.90イララ
11kV調相設備有り）

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS(R)E SUN, SEP 15 2013 12:45
DAR %MVA FOR TRANSFORMERS
DAR-1 % I FOR NON-TRANSFORMER BRANCHES

X------- FROM BUS ------X		AREA	VOLT		GEN	LOAD	SHUNT	X---------- TO BUS ----------X				TRANSFORMER			RATING	
BUS#	X-- NAME --X	BASKV	ZONE	PU/KV	ANGLE	MW/MVAR	MW/MVAR	MW/MVAR	BUS#	X-- NAME --X	BASKV	AREA	CKT	MW	MVAR	RATIO	ANGLE	AMPS	%	SET A
1105	ILALA	11.000	1	0.9706	-10.5	0.0	39.1	0.0												
			1	10.677		0.0	19.0	-14.1	3305	ILALA	33.000	1	1	-13.0	-1.6	1.000LK		711	88	15M
									3305	ILALA	33.000	1	2	-13.0	-1.6	1.000LK		711	88	15M
									3305	ILALA	33.000	1	3	-13.0	-1.6	1.000LK		711	88	15M
1121	MUHIBILI11	11.000	1	0.9936	-9.8	0.0	13.0	0.0												
			1	10.930		0.0	6.3	0.0	3321	MUHIBILI33	33.000	1	1	-13.0	-6.3	1.000LK		766	97	15M
1122	MWANANYA11	11.000	1	1.0029	-13.4	0.0	13.0	0.0												
			1	11.032		0.0	6.3	0.0	3322	MWANANYA33	33.000	1	1	-13.0	-6.3	1.000LK		759	97	15M
1123	JAGWANI11	11.000	1	1.0859	-11.2	0.0	13.0	0.0												
			1	11.944		0.0	6.3	0.0	3323	JAGWANI33	33.000	1	1	-13.0	-6.3	1.000LK		701	97	15M
1124	MSASANI11	11.000	1	0.9995	-13.6	0.0	26.1	0.0												
			1	10.995		0.0	12.6	0.0	3324	MSASANI33	33.000	1	1	-13.0	-6.3	1.000LK		761	97	15M
									3324	MSASANI33	33.000	1	2	-13.0	-6.3	1.000LK		761	97	15M
3301	UBUNGO	33.000	1	0.9867	-5.4	0.0	256.0	0.0												
			1	32.560		0.0	124.0	0.0	13201	UBUNGO	132.00	1	1	-256.0	-124.0	1.000LK		5044	95	300M
3303	F-ZONE3	33.000	1	0.9705	-7.1	0.0	77.2	0.0												
			1	32.028		0.0	37.4	0.0	13203	F-ZONE3	132.00	1	1	-38.6	-18.7	1.000LK		774	95	45M
									13203	F-ZONE3	132.00	1	2	-38.6	-18.7	1.000LK		774	95	45M
3304	KURASHINI	33.000	1	0.9983	-9.2	0.0	78.3	0.0												
			1	32.942		0.0	37.9	0.0	13204	KURASINI	132.00	1	1	-78.3	-37.9	1.000LK		1525	174	50M
3305	ILALA	33.000	1	0.9809	-7.3	0.0	182.7	0.0												
			1	32.369		0.0	88.5	-35.6	1105	ILALA	11.000	1	1	13.1	2.4	1.000UN		237	89	15M
									1105	ILALA	11.000	1	2	13.1	2.4	1.000UN		237	89	15M
									1105	ILALA	11.000	1	3	13.1	2.4	1.000UN		237	89	15M
									13205	ILALA	132.00	1	1	-55.5	-15.0	1.000LK		1025	96	60M
									13205	ILALA	132.00	1	2	-55.5	-15.0	1.000LK		1025	96	60M
									13205	ILALA	132.00	1	3	-55.5	-15.0	1.000LK		1025	96	60M
									13205	ILALA	132.00	1	4	-55.5	-15.0	1.000LK		1025	96	60M
3306	MAKUMBUSHO3333	333.000	1	0.9808	-10.5	0.0	134.4	0.0												
			1	32.365		0.0	65.1	0.0	3322	MWANANYA33	33.000	1	1	13.1	7.2			266	66	405A
									3324	MSASANI33	33.000	1	1	14.0	7.2			282	70	405A
									3324	MSASANI33	33.000	1	2	12.2	7.2			253	63	404A
									13206	MAKUMBUSHO	132.00	1	1	-86.8	-43.4	1.000LK		1732	216	45M
									13206	MAKUMBUSHO	132.00	1	2	-86.8	-43.4	1.000LK		1732	216	45M
3307	MILINDIZE	33.000	1	0.9560	-8.3	0.0	22.8	0.0												
			1	31.550		0.0	11.1	0.0	13207	MILINDIZI	132.00	1	1	-11.4	-5.5	1.000LK		232	127	10M
									13207	MILINDIZI	132.00	1	2	-11.4	-5.5	1.000LK		232	127	10M
3308	TEGETA33	33.000	1	1.0043	-8.6	0.0	127.2	0.0												
			1	33.141		0.0	61.6	0.0	3323	JAGWANI33	33.000	1	1	13.1	7.1			260	64	405A
									13208	TEGETA	132.00	1	1	-70.2	-34.4	1.000LK		1361	156	50M
									13208	TEGETA	132.00	1	2	-70.2	-34.4	1.000LK		1361	156	50M
3309	F-ZONE2	33.000	1	1.0239	-2.2	0.0	39.1	0.0												
			1	33.789		0.0	19.0	0.0	13209	F-ZONE2	132.00	1	1	-39.1	-19.0	1.000LK		743	87	50M
3310	MBAGALA	33.000	1	0.9827	-5.8	0.0	90.7	0.0												
			1	32.428		0.0	43.9	0.0	13210	MBAGALA	132.00	1	1	-90.7	-43.9	1.000LK		1794	202	50M
3311	N-C-CENTER3333	333.000	1	0.9726	-6.8	0.0	65.2	0.0												
			1	32.096		0.0	31.6	0.0	3321	MUHIBILI33	33.000	1	1	13.1	7.2			269	66	405A

								13211	N-C-CENTER	132.00	1	1	-39.2	-19.4	1.000	LK	786	87	50M
								13211	N-C-CENTER	132.00	1	2	-39.2	-19.4	1.000	LK	786	87	50M
3313	MTONI	33.000	1 0.9590	-7.9	0.0	87.4	0.0												
			1 31.647		0.0	42.3	0.0	13213	MTONI	132.00	1	1	-30.9	-14.9	1.000	LK	625	114	30M
								13213	MTONI	132.00	1	2	-30.9	-14.9	1.000	LK	625	114	30M
								13213	MTONI	132.00	1	3	-25.7	-12.5	1.000	LK	521	114	25M
3314	CHALINZE	33.000	1 0.9653	-7.3	0.0	13.0	0.0												
			1 31.856		0.0	6.3	0.0	13214	CHALINZE	132.00	1	1	-13.0	-6.3	1.000	LK	263	97	15M
3320	F-ZONE1	33.000	1 0.9983	-4.2	0.0	26.1	0.0												
			1 32.943		0.0	12.6	0.0	13203	F-ZONE3	132.00	1	1	-8.7	-4.2	1.000	LK	169	64	15M
								13203	F-ZONE3	132.00	1	2	-8.7	-4.2	1.000	LK	169	64	15M
								13203	F-ZONE3	132.00	1	3	-8.7	-4.2	1.000	LK	169	64	15M
3321	MUHIBILI33	33.000	1 0.9717	-6.9	0.0	0.0	0.0												
			1 32.067		0.0	0.0	0.0	1121	MUHIBILI11	11.000	1	1	13.1	7.2	0.950	UN	269	99	15M
								3311	N-C-CENTER33	33.000	1	1	-13.1	-7.2			269	66	405A
3322	MWANANYA33	33.000	1 0.9803	-10.5	0.0	0.0	0.0												
			1 32.350		0.0	0.0	0.0	1122	MWANANYA11	11.000	1	1	13.1	7.2	0.950	UN	266	99	15M
								3306	MAKUMBUSHO33	33.000	1	1	-13.1	-7.2			266	66	405A
3323	JAGWANI33	33.000	1 1.0012	-8.7	0.0	0.0	0.0												
			1 33.039		0.0	0.0	0.0	1123	JAGWANI11	11.000	1	1	13.1	7.0	0.900	UN	260	99	15M
								3308	TEGETA33	33.000	1	1	-13.1	-7.0			260	64	405A
3324	MSASANI33	33.000	1 0.9772	-10.7	0.0	0.0	0.0												
			1 32.246		0.0	0.0	0.0	1124	MSASANI11	11.000	1	1	13.1	7.2	0.950	UN	267	99	15M
								1124	MSASANI11	11.000	1	2	13.1	7.2	0.950	UN	267	99	15M
								3306	MAKUMBUSHO33	33.000	1	1	-14.0	-7.2			282	70	405A
								3306	MAKUMBUSHO33	33.000	1	2	-12.2	-7.2			253	63	404A
13201	UBUNGO	132.00	1 1.0020	-3.9	312.5	0.0	0.0												
			1 132.26		194.8R	0.0	0.0	3301	UBUNGO	33.000	1	1	256.6	132.7	1.000	UN	1261	96	300M
								13203	F-ZONE3	132.00	1	1	103.6	55.8			514	87	589A
								13204	KURASINI	132.00	1	1	78.7	47.5			401	68	589A
								13205	ILALA	132.00	1	1	150.6	59.3			707	74	960A
								13205	ILALA	132.00	1	2	150.6	59.3			707	74	960A
								13206	MAKUMBUSHO	132.00	1	1	174.8	114.1			911	155	589A
								13207	MILINDIZI	132.00	1	1	36.1	20.7			182	45	405A
								13208	TEGETA	132.00	1	1	49.7	22.7			239	59	405A
								13208	TEGETA	132.00	1	2	64.8	29.7			311		
								22001	UBUNGO220	220.00	1	1	-376.5	-173.6	1.000	LK	1810	276	150M
								22001	UBUNGO220	220.00	1	2	-376.5	-173.6	1.000	LK	1810	276	150M
13202	KINYEREZI	132.00	1 1.0500	0.4	552.1	0.0	0.0												
			1 138.60		282.0R	0.0	0.0	13209	F-ZONE2	132.00	1	1	130.5	78.4			634	108	589A
								22002	KINYEREZI220	220.00	1	1	210.8	101.8	1.000	LK	975	156	150M
								22002	KINYEREZI220	220.00	1	2	210.8	101.8	1.000	LK	975	156	150M
13203	F-ZONE3	132.00	1 1.0001	-4.0	0.0	0.0	0.0												
			1 132.02		0.0	0.0	0.0	3303	F-ZONE3	33.000	1	1	38.7	21.4	1.000	UN	193	98	45M
								3303	F-ZONE3	33.000	1	2	38.7	21.4	1.000	UN	193	98	45M
								3320	F-ZONE1	33.000	1	1	8.7	4.3	1.000	UN	42	65	15M
								3320	F-ZONE1	33.000	1	2	8.7	4.3	1.000	UN	42	65	15M
								3320	F-ZONE1	33.000	1	3	8.7	4.3	1.000	UN	42	65	15M
								13201	UBUNGO	132.00	1	1	-103.5	-55.5			514	87	589A
13204	KURASINI	132.00	1 0.9999	-4.0	0.0	0.0	0.0												
			1 131.98		0.0	0.0	0.0	3304	KURASHINI	33.000	1	1	78.6	47.2	0.950	UN	401	183	50M
								13201	UBUNGO	132.00	1	1	-78.6	-47.2			401	68	589A
13205	ILALA	132.00	1 1.0002	-4.0	0.0	0.0	0.0												
			1 132.02		0.0	0.0	0.0	3305	ILALA	33.000	1	1	55.6	18.5	1.000	UN	256	98	60M
								3305	ILALA	33.000	1	2	55.6	18.5	1.000	UN	256	98	60M
								3305	ILALA	33.000	1	3	55.6	18.5	1.000	UN	256	98	60M
								3305	ILALA	33.000	1	4	55.6	18.5	1.000	UN	256	98	60M
								13201	UBUNGO	132.00	1	1	-150.4	-58.9			707	74	960A
								13201	UBUNGO	132.00	1	2	-150.4	-58.9			707	74	960A
								13211	N-C-CENTER	132.00	1	1	78.5	43.8			393	97	405A
13206	MAKUMBUSHO	132.00	1 0.9994	-4.0	0.0	0.0	0.0												

		1	131.92		0.0	0.0	0.0	3306	MAKUMBUSHO3333	33.000	1	1	87.3	56.7	0.950	UN	456	231	45M
								3306	MAKUMBUSHO3333	33.000	1	2	87.3	56.7	0.950	UN	456	231	45M
								13201	UBUNGO	132.00	1	1	-174.6	-113.4			911	155	589A
13207	MILINDIZI	132.00	1	0.9967	-4.1	0.0	0.0	0.0												
		1	131.56		0.0	0.0	0.0	3307	MILINDIZE	33.000	1	1	11.5	6.6	1.000	UN	58	132	10M
								3307	MILINDIZE	33.000	1	2	11.5	6.6	1.000	UN	58	132	10M
								13201	UBUNGO	132.00	1	1	-36.0	-20.5			182	45	405A
								13214	CHALINZE	132.00	1	1	13.1	7.3			66	16	405A
13208	TEGETA	132.00	1	1.0000	-4.0	114.4	0.0	0.0												
		1	132.00		81.6R	0.0	0.0	3308	TEGETA33	33.000	1	1	70.4	41.8	0.950	UN	358	164	50M
								3308	TEGETA33	33.000	1	2	70.4	41.8	0.950	UN	358	164	50M
								13201	UBUNGO	132.00	1	1	-49.7	-22.6			239	59	405A
								13201	UBUNGO	132.00	1	2	-64.7	-29.5			311		
								13213	MTONI	132.00	1	1	54.5	19.8			254	63	405A
								13213	MTONI	132.00	1	2	33.5	30.4			198	49	405A
13209	F-ZONE2	132.00	1	1.0493	0.3	0.0	0.0	0.0												
		1	138.50		0.0	0.0	0.0	3309	F-ZONE2	33.000	1	1	39.2	21.2	1.000	UN	186	89	50M
								13202	KINYEREZI	132.00	1	1	-130.4	-78.2			634	108	589A
								13210	MBAGALA	132.00	1	1	91.2	57.1			448	111	405A
13210	MBAGALA	132.00	1	1.0474	0.2	0.0	0.0	0.0												
		1	138.26		0.0	0.0	0.0	3310	MBAGALA	33.000	1	1	91.1	56.8	1.000	UN	448	215	50M
								13209	F-ZONE2	132.00	1	1	-91.1	-56.8			448	111	405A
13211	N-C-CENTER	132.00	1	1.0000	-4.1	0.0	0.0	0.0												
		1	132.00		0.0	0.0	0.0	3311	N-C-CENTER3333	33.000	1	1	39.3	21.9	1.000	UN	197	90	50M
								3311	N-C-CENTER3333	33.000	1	2	39.3	21.9	1.000	UN	197	90	50M
								13205	ILALA	132.00	1	1	-78.5	-43.8			393	97	405A
13213	MTONI	132.00	1	0.9953	-4.2	0.0	0.0	0.0												
		1	131.38		0.0	0.0	0.0	3313	MTONI	33.000	1	1	30.9	17.6	1.000	UN	156	119	30M
								3313	MTONI	33.000	1	2	30.9	17.6	1.000	UN	156	119	30M
								3313	MTONI	33.000	1	3	25.8	14.6	1.000	UN	130	119	25M
								13208	TEGETA	132.00	1	1	-54.3	-19.6			254	63	405A
								13208	TEGETA	132.00	1	2	-33.4	-30.2			198	49	405A
13214	CHALINZE	132.00	1	0.9955	-4.2	0.0	0.0	0.0												
		1	131.41		0.0	0.0	0.0	3314	CHALINZE	33.000	1	1	13.1	7.2	1.000	UN	66	100	15M
								13207	MILINDIZI	132.00	1	1	-13.1	-7.2			66	16	405A
22001	UBUNGO220	220.00	1	1.0316	-1.3	0.0	0.0	0.0												
		1	226.96		0.0	0.0	0.0	13201	UBUNGO	132.00	1	1	379.0	196.4	1.000	UN	1086	285	150M
								13201	UBUNGO	132.00	1	2	379.0	196.4	1.000	UN	1086	285	150M
								22002	KINYEREZI220	220.00	1	1	-579.7	-286.8			1645	141	1165A
								22099	MOROGORO	220.00	1	1	-178.3	-106.1			528	45	1165A
22002	KINYEREZI220	220.00	1	1.0345	-1.0	0.0	0.0	0.0												
		1	227.58		0.0	0.0	0.0	13202	KINYEREZI	132.00	1	1	-210.1	-95.2	1.000	UN	585	154	150M
								13202	KINYEREZI	132.00	1	2	-210.1	-95.2	1.000	UN	585	154	150M
								22001	UBUNGO220	220.00	1	1	580.1	289.9			1645	141	1165A
								22099	MOROGORO	220.00	1	1	-159.9	-99.6			478	41	1165A
22099	MOROGORO	220.00	1	1.0500	0.0	339.6	0.0	0.0												
		1	231.00		215.9R	0.0	0.0	22001	UBUNGO220	220.00	1	1	179.1	111.9			528	45	1165A
								22002	KINYEREZI220	220.00	1	1	160.5	103.9			478	41	1165A