

【Appendices】

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Appendix 1. Member List of the Survey Team

(1) Field Survey

| Name | Position | Organization |
|-------------------|---|--|
| Makoto Ashino | Team Leader | JICA Economic Infrastructure Department |
| Daisuke Fukuzawa | Project Management | JICA, Economic Infrastructure Department, Transport and Information Communications Group, Transport and Information Communications Section 2 |
| Keigo Konno | Chief Consultant/Road Planning | Oriental Consultants Co., Ltd. |
| Tomoyuki Konishi | Bridge Design I/Superstructure | Oriental Consultants Co., Ltd. |
| Manori Nakao | Bridge Design II/Substructure | Oriental Consultants Co., Ltd. |
| Teturo Izawa | Road Design.Embankment | Eight-Jpan Engineering Consultants Co., Ltd. |
| Hirokazu Miyamoto | Natural Condition Survey | Eight-Jpan Engineering Consultants Co., Ltd. |
| Kannji Watanabe | Social Emvironmental Consideration/Social Economic Survey | Sowa Consultants Inc. |
| Tsutomu Sawaguchi | Construction/Procurementplanning /CostEstimate | Oriental Consultants Co., Ltd. |
| Yoshiyuki Arita | Traffic Analisys | International Development Center of Japan Inc. |

(2) Progress Survey

| Name | Posision | Affiliation |
|-------------|--------------------------------|--------------------------------|
| Keigo Konno | Chief Consultant/Road Planning | Oriental Consultants Co., Ltd. |

(3) Outline Explanation of the Preparatory Survey

| Name | Position | Affiliation |
|------------------|--------------------------------|--|
| Makoto Ashino | Team Leader | JICA Economic Infrastructure Department |
| Daisuke Fukuzawa | Project Management | JICA, Economic Infrastructure Department, Transport and Information Communications Group, Transport and Information Communications Section 2 |
| Keigo Konno | Chief Consultant/Road Planning | Oriental Consultants Co., Ltd. |

Appendix 2. Survey Schedule

(1) Field Survey

| Order | Date | Leader (JICA) | Management (JICA) | Chief Consultant Road Planning | Bridge Design I / Substructure | Bridge Design/ Substructure | Road Design/ Embankment | Natural Condition Survey | Social Embankment Consideration/Social Economic | Construction/Procurement/Cost Estimate |
|-------|------|-------------------|--|--|--|--|--|--|--|--|
| | | Mr. Makoto ASHINO | Mr. Daisuke FUKUZAWA | Mr. Keigo KONNO | Mr. Tomoyuki KONOSHI | Mr. Masanori NAKAO | Mr. Tetsuro IZAWA | Mr. Hirokazu MIYAMOTO | Mr. Kanji WATANABE | Mr. Tsutomu SAWAGUCHI |
| 1 | 30 | Mon | | | | | | | | |
| 2 | 31 | Tue | | | | | | | | |
| 3 | 1 | Wed | | | | | | | | |
| 4 | 2 | Thu | | | | | | | | |
| 5 | 3 | Fri | | | | | | | | |
| 6 | 4 | Sat | | | | | | | | |
| 7 | 5 | Sun | From Japan | From Japan | To Dar Es Salaam | Site survey | | | | |
| 8 | 6 | Mon | to Dar es Salaam, Courtes call/Meeting with JICA Office | to Dar es Salaam, Courtes call/Meeting with JICA Office | Courtesy call/Meeting with JICA office | Courtesy call/Meeting with JICA office | Data collection/Technical Study | Courtesy call/Meeting with JICA office | Data collection/Technical Study | Data collection/Technical Study |
| 9 | 7 | Tue | Courtesy call/Meeting with TANROADS, MOW, Site survey | Courtesy call/Meeting with TANROADS, MOW, Site survey | Courtesy call/Meeting with TANROADS, MOW, Site survey | Courtesy call/Meeting with TANROADS, MOW, Site survey | Data collection/Technical Study, Site survey | Courtesy call/Meeting with TANROADS, MOW, Site survey | Data collection/Technical Study, Site survey | Data collection/Technical Study, Site survey |
| 10 | 8 | Wed | Courtesy call/Meeting with DART, WB, Minutes of discussion with TANROADS | Courtesy call/Meeting with DART, WB, Minutes of discussion with TANROADS | Courtesy call/Meeting with DART, WB, Minutes of discussion with TANROADS | Courtesy call/Meeting with DART, WB, Minutes of discussion with TANROADS | Courtesy call/Meeting with DART, WB, Minutes of discussion with TANROADS | Courtesy call/Meeting with DART, WB, Minutes of discussion with TANROADS | | |
| 11 | 9 | Thu | Minutes of discussion with TANROADS/Signing | Minutes of discussion with TANROADS/Signing | Minutes of discussion with TANROADS/Signing | Minutes of discussion with TANROADS/Signing | Data collection/Technical Study, Monitoring sub-contractor | Minutes of discussion with TANROADS/Signing | Data collection/Technical Study, Monitoring sub-contractor | Data collection/Technical Study, Monitoring sub-contractor |
| 12 | 10 | Fri | Report to JICA Office/EOJ. Leave from Dar es Salaam | Report to JICA Office/EOJ. Leave from Dar es Salaam | Report to JICA Office/EOJ | Report to JICA Office/EOJ | | Report to JICA Office/EOJ | | |
| 13 | 11 | Sat | to Japan | to Japan | Data collection /Technical Study | Data collection /Technical Study | | Data collection /Technical Study | | |
| 14 | 12 | Sun | | | | | | | | |
| 15 | 13 | Mon | | | | | | | | |
| 16 | 14 | Tue | | | | | | | | |
| 17 | 15 | Wed | | | | | | | | |
| 18 | 16 | Thu | | | | | | | | |
| 19 | 17 | Fri | | | | | | | | |
| 20 | 18 | Sat | | | | | | | | |
| 21 | 19 | Sun | | | | | | | | |
| 22 | 20 | Mon | | | | | | | | |
| 23 | 21 | Tue | | | | | | | | |
| 24 | 22 | Wed | | | | | | | | |
| 25 | 23 | Thu | | | | | | | | |
| 26 | 24 | Fri | | | | | | | | |
| 27 | 25 | Sat | | | | | | | | |
| 28 | 26 | Sun | | | | | | | | |
| 29 | 27 | Mon | | | | | | | | |
| 30 | 28 | Tue | | | | | | | | |
| 31 | 29 | Wed | | | | | | | | |
| 32 | 30 | Thu | | | | | | | | |
| 33 | 1 | Fri | | | | | | | | |
| 34 | 2 | Sat | | | | | | | | |

(2) Progress Survey

| Oder | Date | | Chief Consultemg./Road Planning/Keigo Konno | |
|------|------|----|---|---|
| 1 | 9 | 6 | Sun | Movement |
| 2 | | 7 | Mon | Courtesy Visit to TANROADS/ Explanation |
| 3 | | 8 | Tue | Courtesy Visit to DART, JICA |
| 4 | | 9 | Wed | Meeting with TANTOADS |
| 5 | | 10 | Thu | Meeting with JICA, Meeting with TANROADS |
| 6 | | 11 | Fri | Presentation to Relevant Organization, Movement |
| 7 | | 12 | Sat | Movement |

(3) Outline Explanation of the Preparatory Survey

| Order | Date | | JICA Team Leader Makoto Ashino | JICA Project Management Daisuke Fukuzawa | Chief Consultant Keigo Konno | |
|-------|------|----|-----------------------------------|--|--|--|
| 1 | Dec. | 10 | Sat. | | | Movement |
| 2 | | 11 | Sun | Movement | Movement | Movement |
| 3 | | 12 | Mon | Movement, Courtesy Visit to JICA, Explanation | Movement, Courtesy Visit to JICA, Explanation | Movement, Courtesy Visit to JICA, Explanation |
| 4 | | 13 | Tue | Courtesy Visit to MOW, TANROADS, WB, DART, Explanation | Courtesy Visit to MOW, TANROADS, WB, DART, Explanation | Courtesy Visit to MOW, TANROADS, WB, DART, Explanation |
| 5 | | 14 | Wed | Discussion with TANROADS, Explanation to Relevant Organization | Discussion with TANROADS, Explanation to Relevant Organization | Discussion with TANROADS, Explanation to Relevant Organization |
| 6 | | 15 | Thu | Signing with TANROADS, MOW | Signing with TANROADS, MOW | Signing with TANROADS, MOW |
| 7 | | 16 | Fri | Report to EOJ, JICA Movement | Report to EOJ, JICA Movement | Report to EOJ, JICA Movement |
| 8 | | 17 | Sat | Movement | Movement | Data arrangement |
| 9 | | 18 | Sun | | | Movement |
| 10 | | 19 | Mon | | | Movement |

Appendix 3 List of Parties Concerned in the Recipient Country

| Organization | Name | Position |
|--|--------------------------|--|
| Ministry of Works | Mr. Herbert E. Mrango | Permanent Secretary |
| | Mr. Alois M. Matei | Assistant Director |
| | Mr. Fabian Maseambo | Principal Engineer |
| | Ms. Chobya | Senior Engineer |
| Ministry of Transport | Mr. D. Kassivele | Principal Officer |
| TANROADS | Mr. Patrick A.L. Mfugale | Chief Executive |
| | Mr. Jason Rwiza | Director of Planning |
| | Mr. Ebenezer R Mollel | Head of Design and Standards |
| | Mr. Emanuel Msumba | Structural Engineer |
| | Mr. Kitainda H. | Bridge Engineer |
| | Mr. Snjo M. Mgeta | Senior Environmentalist |
| | Mr. Julius K. Luhuro | Environmentalist |
| DCC | Mr. Nyenye S. M. | City Road Engineer |
| Temeke Municipality | Mr. Ngakuka Uib | Civil Engineer |
| DART | Mr. Cosmas P.M. Takule | Chief Executive |
| | Mr. Enoch Kitandu | Director of System & Operations |
| Tanzania Zambia Railway Authority | Mr. Richard U. Festa | Regional Civil Engineer |
| TRL | Mr. A.H.Hawai | Planning Engineer |
| TANESCO | Mrs. Mercy S. Baregu | Senior Manager Projects |
| | Mr. A. Zafer Ozgur | Resident Site Engineer |
| DAWASA | Mr. G.G. Bhuko | Planner |
| TTCL | Ms. Leticia Wamara | Network Engineer |
| | Mr. Bonaventure Aman | Supervisor Minor Projects |
| | Mr. Castuly Pulia | Assistant Regional Network manager |
| WB | Mr. Yonas Mchomvu | Transport Specialist |
| | Mr. Negede Lewi | Sr. Highway Engineer |
| EU | Mr. B. Kemibaro | Programme Officer |
| AZAM | Mr. Hussein Sufian Ally | Assistant General Manager |
| BRT Phase II (Kyong Dong Engineering) | Mr. Lee, Seung-won | Deputy General Manager |
| Embassy of Japan | Hiroshi Nakagawa | Ambassador extraordinary and plenipotentiary |
| | Yukinori Seki | Second Secretary |
| JICA Tanzania Office | Hideyuki Katsuta | Chief Representative |
| | Tishihisa Hasegawa | Senior Representative |
| | Makoto Maruo | Representative |
| | Eisuke Tachibana | Representative |

MOW: Ministry of Works, MOT: Ministry of Transport, TANROADS: Tanzania National Roads Agency, DCC: Dar es Salaam City Council, DART: Dar es Salaam Rapid Transit, TRL: Tanzania Railway, TANESCO: Tanzania Electric Supply Company Ltd., DAWASA: Dar es Salaam Water & Sewage Company, WB: World Bank, EU: European Union

Appendix 4. Minutes of Discussion (M/D)

(1) Field Survey

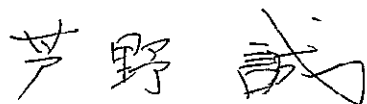
MINUTES OF DISCUSSIONS ON THE PREPARATORY SURVEY (OUTLINE DESIGN) ON THE PROJECT FOR IMPROVEMENT OF TAZARA INTERSECTION IN THE UNITED REPUBLIC OF TANZANIA

In response to a request from the Government of the United Republic of Tanzania (hereinafter referred to as "Tanzania"), the Government of Japan decided to conduct a Preparatory Survey for Outline Design (hereinafter referred to as "the Survey") on the Project for Improvement of TAZARA Intersection (hereinafter referred to as "the Project"), and entrusted the study to Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent the Preparatory Survey Team for Outline Design (hereinafter referred to as "the Team") to Tanzania. The Team is headed by Mr. Makoto ASHINO, Senior Advisor to the Director General, Economic Infrastructure Department, JICA and is scheduled to stay in the country from May 31 to July 1, 2011.

The Team held a series of discussions with the officials of Tanzania and conducted a field survey at the Project area. In the course of the discussions, both sides have confirmed the main items described in the attached sheets. The Team will proceed to further works and prepare the Preparatory Survey Report.

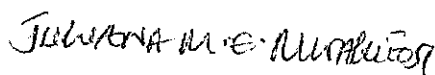
Dar es Salaam, June 9, 2011



Mr. Ashino Makoto
Leader
Preparatory Survey Team
Japan International Cooperation Agency

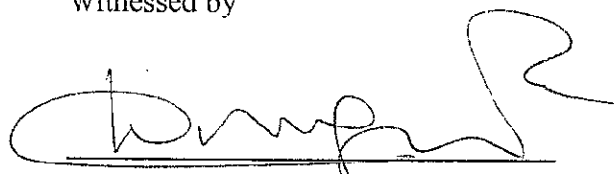


Eng. Patrick A.I. Mfugale
Chief Executive
Tanzania National Roads Agency



Ambassador Herbert E. Mrango
Permanent Secretary
Ministry of Works

Witnessed by



Mr. Ngosha Said Magonya
Commissioner for External Finance
Ministry of Finance

ATTACHMENT

1. Objective of the Project

The objective of the Project is to satisfy the increasing transportation demand and contribute to the reduction of traffic jam, especially in the Central Area of Dar es Salaam City, through the improvement of TAZARA intersection in the Dar es Salaam City in the United Republic of Tanzania.

2. Project Sites

The Project site is located in Dar es Salaam City which is shown in Annex 1.

3. Responsible and Implementing Organizations

The responsible ministry of the Project is the Ministry of Works (hereinafter referred to as "MoW"). The implementing organization of the Project is Tanzania National Roads Agency (hereinafter referred to as "TANROADS"). The organization chart of MoW is under preparation and that of TANROADS is shown in Annex 2.

4. Items requested by the Government of Tanzania

4-1. Components of the Project

The Government of Tanzania requested TAZARA Flyover and the components of the Project are described below.

- Construction of Flyover bridge at the TAZARA intersection along Nyerere Road,
- Construction of approach roads to the Flyover bridge.

4-2. Type of bridge structures

The Tanzanian side expressed that Option 4 would be the best among four options as shown in Annex 3. The Tanzanian side confirmed that any other options would be considered based on the Technical Note in June 2011.

4-3. The Tanzanian side requested that some countermeasures against the traffic jam along Nelson Mandela road near TAZARA Intersection should be taken within the scope of the Project.

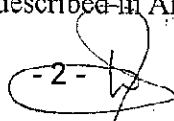
4-4. JICA will assess the appropriateness of the request through the Survey and will report the findings to the Government of Japan. Implementation and components of the Project will be decided by the Government of Japan.

5. Japan's Grant Aid Scheme

5-1. The Tanzanian side has shown a full understanding to the Japan's Grant Aid Scheme explained by the Team, as described in Annex 4 and 5.



- 2 -



5-2. The Tanzanian side will take the necessary measures, as described in Annex 6, for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented.

6. Environmental and Social Considerations

6-1. Both sides confirmed that the Tanzanian side shall conduct the necessary procedure concerning the environmental assessment (including stakeholder meetings, EIA survey etc.) and make EIA report of the Project. The EIA approval shall be received from the responsible authorities and submitted to JICA Tanzania office before March 2012.

6-2. The Tanzanian side agreed to arrange the budget allocation for EIA study, land acquisition, resettlement and compensation for the Project Affected Persons (PAPs) and secure the land before the implementation of the Project.

7. Schedule of the Study

7-1. The Team will proceed with further studies in Tanzania until July 1, 2011.

7-2. JICA will prepare a draft final report in English and dispatch a mission to Tanzania in order to explain its contents around December 2011.

7-3. If the contents of the report is accepted in principle by the Tanzanian side, JICA will complete the final report in English and send it to Tanzania around March 2012.

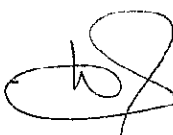
8. Other Relevant Issues

8-1. The Tanzanian side confirmed that the following undertakings should be taken by the Tanzanian side at the Tanzanian expenses under the Project.

- (1) To provide tax exemption for construction materials and equipment for the Project
- (2) To provide land necessary for the Project including camp yard and temporary construction yard
- (3) To assist on implementation of traffic management plans through law enforcements when required
- (4) To assist on securing sites for borrow pit and disposal area after identification
- (5) To arrange for issuance of license, permission and other necessary procedures from the Project commencement
- (6) To relocate existing utilities within the Project site to designated area or out of the Project site

8-2. The Tanzanian side confirmed that the BRT platform is scheduled to be implemented along Nyerere road.



- 3 - 

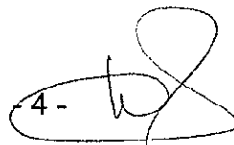
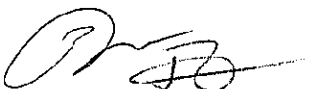


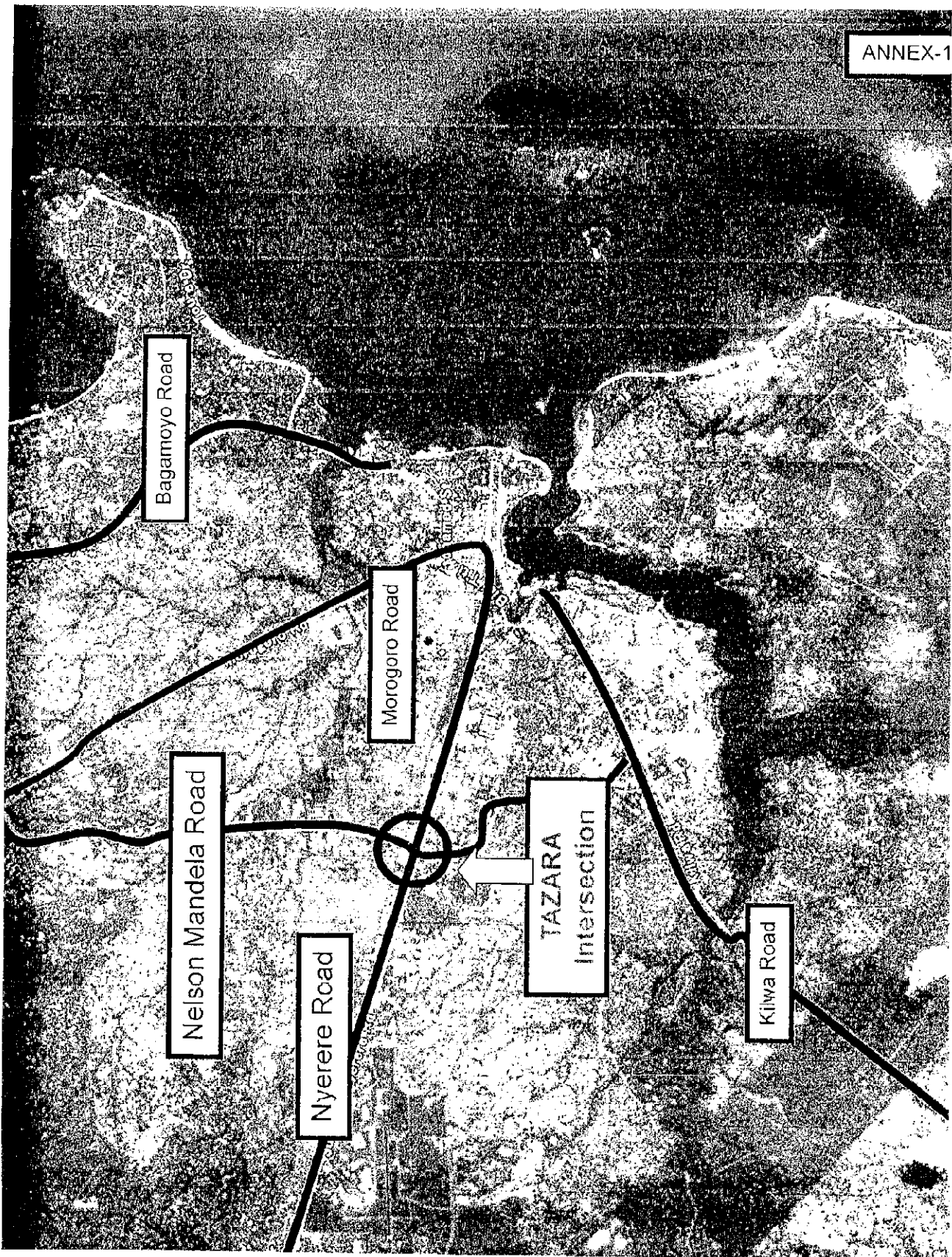
8-3. The Tanzanian side expressed that the BRT truck is expected to be elevated.

8-4. The Tanzanian side expressed their expectation for the early completion of the Project.

8-5. The Tanzanian side shall secure sufficient budget and personnel necessary for the operation and maintenance of the road and bridges constructed by the Project, including the periodical maintenance work after the completion of the Project.

- Annex-1 Project Site
- Annex-2 Organization Chart of TANROADS
- Annex-3 Options for Flyover Bridge type
- Annex-4 Japan's Grant Aid
- Annex-5 Flow Chart of Japan's Grant Aid Procedures
- Annex-6 Major Undertakings to be taken by Each Government

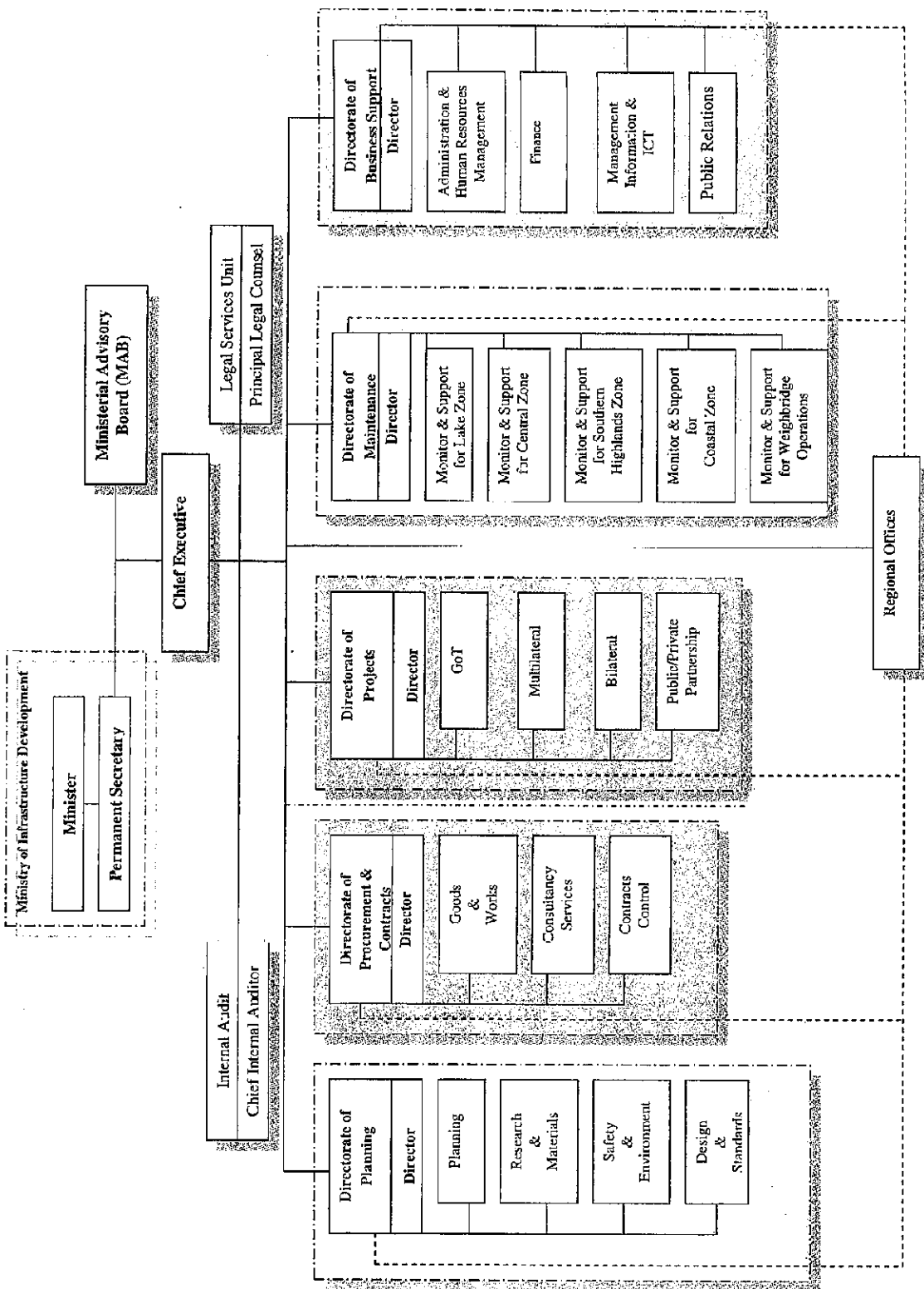




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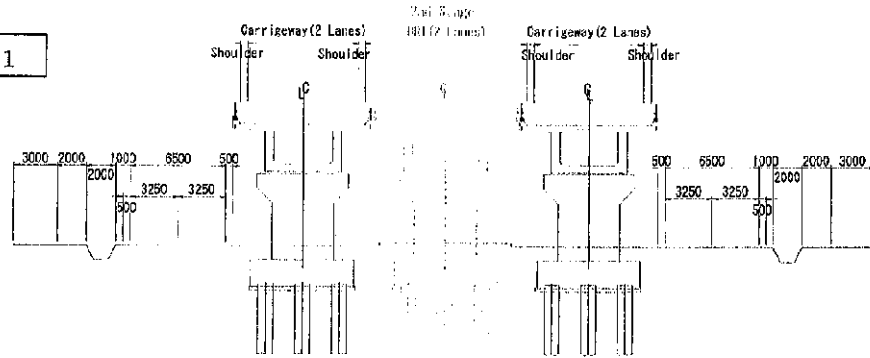
Chart 11

Organization Structure for TANROADS (Headquarters)

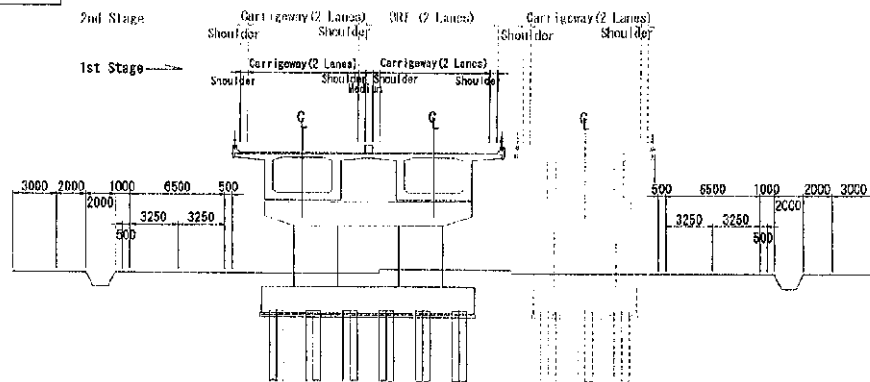


Options for Flyover bridge type

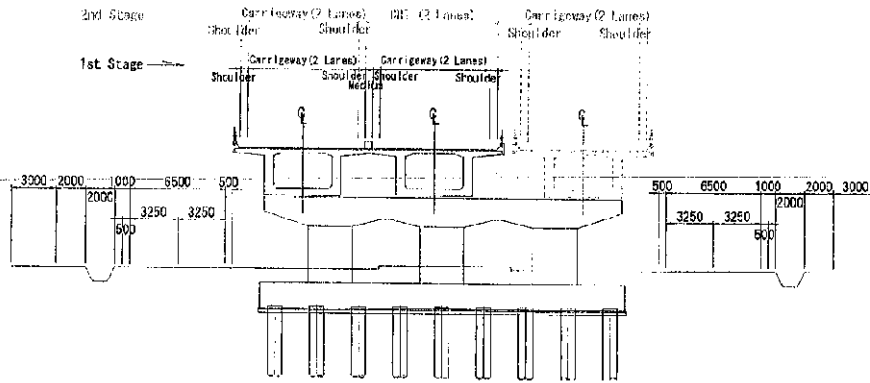
Option 1



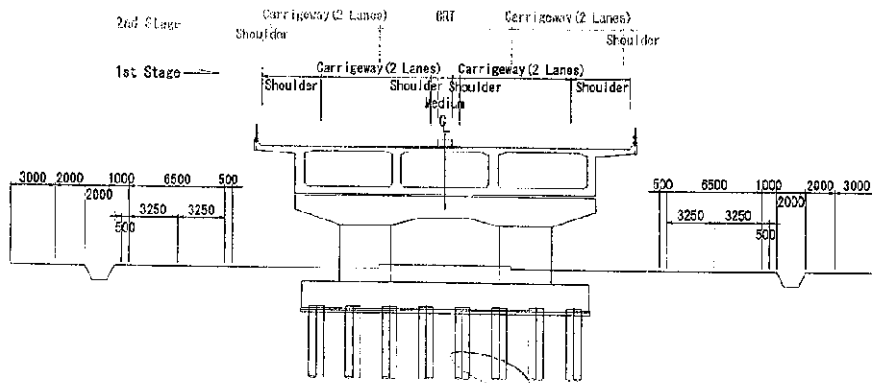
Option 2



Option 3



Option 4



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JAPAN'S GRANT AID

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as a part of this realignment, a new JICA law was entered into effect on October 1, 2008. Based on this law and the decision of the GOJ, JICA has become the executing agency of the Grant Aid for General Projects, for Fisheries and for Cultural Cooperation, etc.

The Grant Aid is non-reimbursable fund provided to a recipient country to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures

The Japanese Grant Aid is supplied through following procedures :


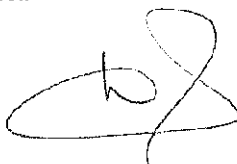
- Preparatory Survey
 - The Survey conducted by JICA
- Appraisal & Approval
 - Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Authority for Determining Implementation
 - The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as "the G/A")
 - Agreement concluded between JICA and a recipient country
- Implementation
 - Implementation of the Project on the basis of the G/A

2. Preparatory Survey

(1) Contents of the Survey

The aim of the preparatory Survey is to provide a basic document necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of a outline design of the Project.


- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid project. The Outline Design of the Project is confirmed based on the guidelines of the Japan's Grant Aid scheme.

JICA requests the Government of the recipient country to take whatever measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization of the recipient country which actually implements the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA employs (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the Report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the appropriateness of the Project.

3. Japan's Grant Aid Scheme

(1) The E/N and the G/A

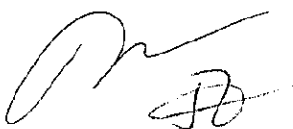
After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be signed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the recipient country to continue to work on the Project's implementation after the E/N and G/A.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals".



(4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to fulfill accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex.

(6) "Proper Use"

The Government of the recipient country is required to maintain and use properly and effectively the facilities constructed and the equipment purchased under the Grant Aid, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant Aid.

(7) "Export and Re-export"

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

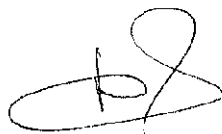
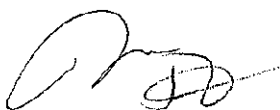
b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

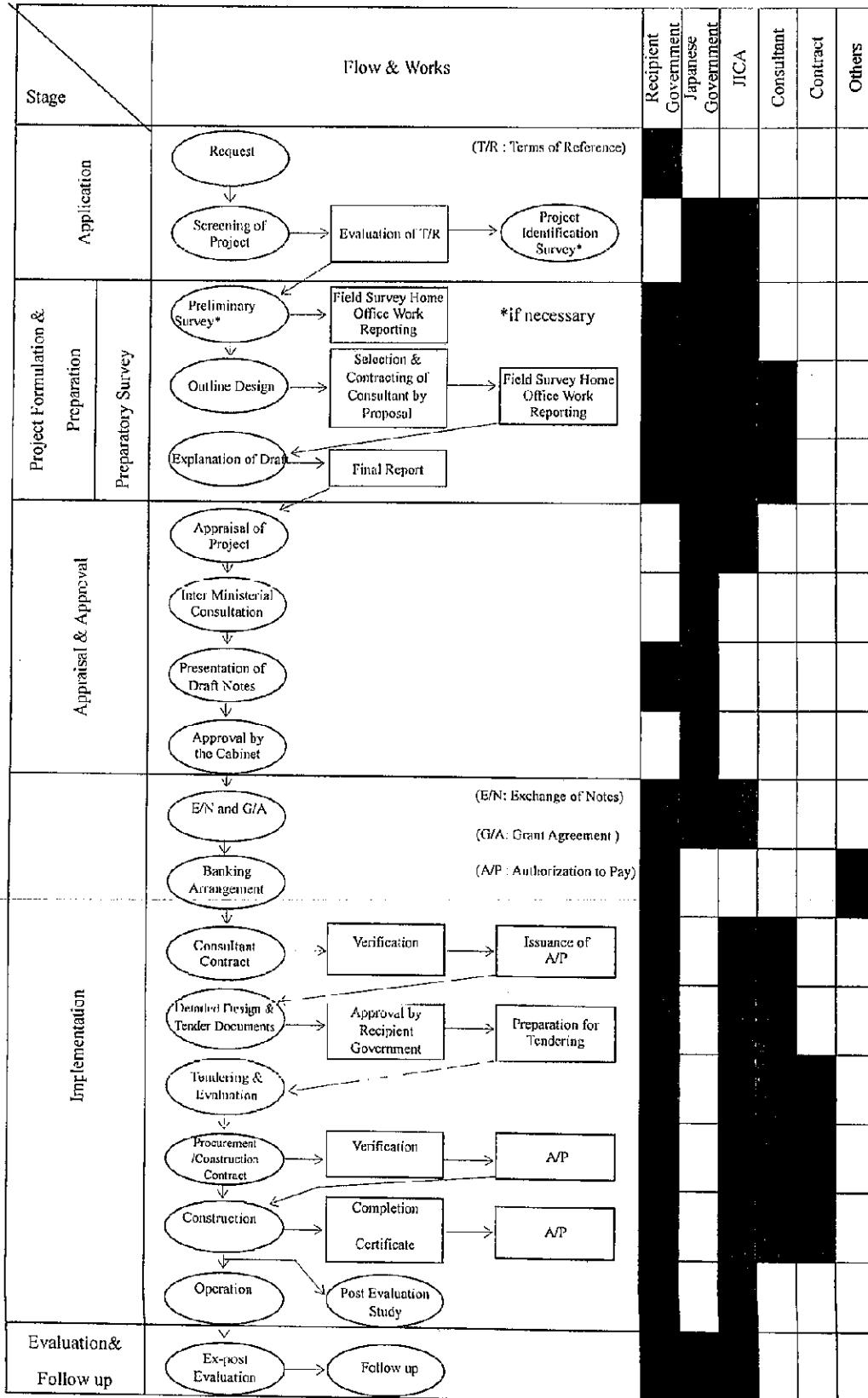
The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions paid to the Bank.

(10) Social and Environmental Considerations

A recipient country must carefully consider social and environmental impacts by the Project and must comply with the environmental regulations of the recipient country and JICA socio-environmental guidelines.



FLOW CHART OF JAPAN'S GRANT AID PROCEDURES



Major Undertakings to be taken by Each Government

| No. | Items | To be covered by Grant Aid | To be covered by Recipient Side |
|-----|--|-------------------------------|---------------------------------------|
| 1 | to secure land necessary for the implementation of the Project and to clear the site; | | ● |
| 2 | To ensure prompt unloading and customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation of the products | | |
| | 1) Marine (Air) transportation of the Products from Japan to the recipient country | ● | |
| | 2) Tax exemption and custom clearance of the Products at the port of disembarkation | | ● |
| | 3) Internal transportation from the port of disembarkation to the project site | ● | |
| 3 | To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the products and the services be exempted | | ● |
| 4 | To accord Japanese nationals whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work | | ● |
| 5 | To ensure that the Facilities are maintained and used properly and effectively for the implementation of the Project | | ● |
| 6 | To bear all the additional expenses, other than those covered by the Grant, necessary for the implementation of the Project | | ● |
| 7 | To bear the following commissions paid to the Japanese bank for banking services based upon the B/A | | |
| | 1) Advising commission of A/P | | ● |
| | 2) Payment commission | | ● |
| 8 | To give due environmental and social consideration in the implementation of the Project. | | ● |

(B/A : Banking Arrangement, A/P : Authorization to pay)

(2) Outline Explanation of the Preparatory Survey

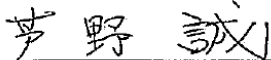
**Minutes of Discussions
on the Preparatory Survey
on the Project for Improvement of TAZARA Intersection
in the United Republic of Tanzania**

In June 2011, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Survey Team on the Project for Improvement of TAZARA Intersection (hereinafter referred to as "the Project") to the United Republic of Tanzania (hereinafter referred to as "Tanzania"), which through discussions, field surveys and technical examination of the results in Japan, prepared a Draft Final Report of the study.

JICA has therefore sent to Tanzania the Preparatory Survey Team (hereinafter referred to as "the Team") to explain and consult the concerned officials of the Government of Tanzania on the contents of the Draft Final Report. The Team is headed by Mr. Makoto Ashino, Senior Advisor to the Director General, Economic Infrastructure Department, JICA and it has been scheduled that the team will carry out their assignment from 11th to 18th December, 2011.

Following the results of the discussions, both sides confirmed the main items described in the attached sheets.

Dar es Salaam, December 15, 2011



Mr. Makoto Ashino
Leader
Preparatory Survey Team
Japan International Cooperation Agency



Eng. Patrick A.L. Mfugale
Chief Executive
Tanzania National Roads Agency



Eng. Dr. John S. Ndunguru
Acting Permanent Secretary
Ministry of Works

Witnessed by



Mr. Ngosha Said Magonya
Commissioner for External Finance
Ministry of Finance



ATTACHMENT

1. Project Component

1-1. During the first Preparatory Survey mission in June 2011, the Tanzanian side preferred option four (4) among four options as presented by the Team and therefore requested that six (6) lanes flyover at the TAZARA Intersection should be designed for the following reasons;

- a) There are ongoing preparations for the construction of BRT trunk route along Nyerere road. If the BRT trunk route will be constructed at grade at the TAZARA intersection, then the merits of the flyover will not be realized to the full expectation.
- b) In case the BRT flyover will be introduced separately at a later stage, there will be delays in the completion of BRT trunk route and the cost of the construction will be higher than if the construction of the same would be done in tandem with current plans of constructing the TAZARA flyover.
- c) Moreover, separate construction of the BRT flyover will cause inconvenience of traffic disruption and complications for construction activities in the median corridor.

1-2. The Team had their opinions that it could be possible to design six (6) lanes flyover, however it is not possible due to the following reasons;

- a) The budget of Japan is constrained due to the force majeure such as the great earthquake in March, 2011.
- b) At the stage of the Preparatory Survey, the fund for the BRT construction along Nyerere road has not been confirmed and the schedule of BRT implementation plan does not clearly indicate the commencement of the construction activities.
- c) According to the analysis made by the Team, the separated flyovers will substantially reduce traffic congestion at the TAZARA intersection at the moment.

1-3. The Team observed that the optimum component under these circumstances would be two (2) separated flyovers of two (2) lanes each making total of four (4) lanes, which have enough space in between for the future construction of BRT flyover (Option No.1 as specified in the draft final report). In view of the budget constraints for the Government of Japan indicated by the Team, the Tanzanian side has no objection of proceeding with the recommended option by the Team although the Tanzanian side preferred a six (6) lanes flyover. It was agreed that the BRT flyover will be constructed separately upon solicitation of funds by the Government of Tanzania.

1-4. After the explanation of the contents of the Draft Final Report by the Team, the Tanzanian side agreed in principle to the project contents.

2. Cost Estimation

Both sides agreed that the Project Cost Estimation as attached in Annex-1 should never be duplicated or disclosed to any third parties before the signing of all the contract(s) with contractor(s) for the Project. The cost to be borne by the Tanzanian side will be updated by the Team upon further review.

3. Japan's Grant Aid Scheme

The Tanzanian side understands the Japan's Grant Aid scheme and the necessary measures to be taken by the recipient country as explained by the Team and described in Annex-4, Annex-5 and Annex-6 of the Minutes of Discussions signed on 9th June 2011. The Tanzanian side also understands that the Preparatory Survey Team is not in the position to guarantee implementation of the Project, this position is the responsibility of the Government of Japan.

4. Schedule of the Study

JICA will complete the final report in accordance with the signed Minutes of Discussions and send it to the Tanzanian side by the middle of April, 2012.

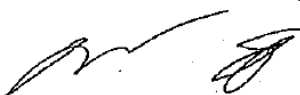
5. Environmental and Social Considerations

- 5-1 The Tanzanian side agreed that they will carryout and complete the EIA (Environmental Impact Assessment) including its certification process.
- 5-2. Both sides agreed to the contents of the Environmental Checklist as shown in Annex-2.
- 5-3. The Tanzanian side agreed that monitoring for Environmental and Social considerations should be conducted by Tanzania National Roads Agency (TANROADS) in accordance with the Monitoring Plan for the Project as described in the Preparatory Survey and EIA reports.
The results of monitoring will be provided to JICA by filling in the Monitoring Form attached as Annex-3, during the pre- construction phase, construction phase, and after completion of the Project.
- 5-4. The Tanzanian side agreed that JICA will disclose monitoring results for Environmental and Social considerations conducted by TANROADS on JICA's website and report them to the Advisory Committee for Environmental and Social Considerations that has been established by JICA.

6. Other Relevant Issues

- 6-1. Both sides confirmed that the following undertakings should be taken by the Tanzanian side at the Tanzanian expenses under the Project.
- (1) To acquire the land for the Project site shown by the Team.
 - (2) Removal/Relocation of existing utilities (power lines and poles/towers, water pipes, telecom lines, etc.) including the underground facilities within the Project site to designated area or out of the Project site.
 - (3) Compensation for the PAPs (Project Affected Persons) which can include landowner of the Project area and long-term street vendors who will be entitled to receive disruption allowance.
 - (4) Securing of the temporary yard for the Project.
 - (5) Securing site for borrowing pit, quarry and disposal area.
 - (6) Necessary assistance on issuance of licenses, permission and other necessary procedures for the commencement of the Project.
 - (7) Necessary assistance for tax exemption and custom clearance for project related equipment, materials and facilities including timely issuance of Government Notice (GN).
- 6-2. The Tanzanian side agreed that the completion of relocation and compensation of all utilities and PAPs is a condition for commencement of the procurement process for the Contractor. The schedule of the commencement of construction and implementation program will be informed by the Government of Japan in case the Project is accepted as a Grant Aid.
- 6-3. The Tanzanian side expressed their expectation for the early commencement and completion of the Project.
- 6-4. The maximum sag level of the expected power line for TANESCO project along Nelson Mandela road which is financed by World Bank should be changed to 15.5m from the ground level instead of 18m as it was indicated in the draft final report.
- 6-5. The costs for utilities to be relocated and project land acquisition from Tazara station and TANESCO areas will be concluded after the necessary consultations with the owners of utilities and land and will be updated in the final report by the Team. In order to update the costs of relocation of utilities and land acquisition, the Team will immediately request such relevant information to the Tanzanian side and the Tanzanian side agreed to provide that information by 15th January 2012.
- 6-6. The Tanzanian side will give additional comments if any about the draft final report to JICA Tanzania office by 15th January 2012. The Team will examine them and may reflect on the final report.

Annex-1 Project Cost Estimation
Annex-2 Environmental Checklist
Annex-3 Monitoring Form



Environmental Checklist: 7. Roads (1)

Annex 2

| Category | Environmental Item | Main Check Items | Yes: Y No: N | Confirmation of Environmental Considerations (Reasons, Mitigation Measures) |
|---------------------------|---|--|----------------------------------|--|
| 1 Permits and Explanation | (1) EIA and Environmental Permits | (a) Have EIA reports been already prepared in official process? (b) Have EIA reports been approved by authorities of the host country's government? (c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government? | (a) N (b) N (c) N (d) N | (a) The EIA report is preparing and will be submitted to National Environment Management Council (environmental management authority). (b)(c) If the amendment of the EIA report is not required, the report will be approved. (d) The other permissions related to environmental management are not required. Existing borrow pit and quarry site will be used. |
| | (2) Explanation to the Local Stakeholders | (a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as local residents) been reflected to the project design? | (a) Y (b) Y | (a) Under the EIA report review, the report will be opened to the public in conformity to the regulation. (b) The interview survey to the local people and stakeholder meeting with the other relevant organizations was conducted at the preparatory study (II) in June 2011. The results were reflected in the design policy and mitigation measures for traffic control, street vendors and so on during |
| | (3) Examination of Alternatives | (a) Have alternative plans of the project been examined with social and environmental considerations? | (a) Y | (a) Several alternative plans compared direction and structure of flyover bridge have been examined with social and environmental considerations at the preparatory study (I) in July 2010 and the preparatory study (II) in June 2011. |
| 2 Pollution Control | (1) Air Quality | (a) Is there a possibility that air pollutants emitted from the project related sources, such as vehicles traffic will affect ambient air quality? Does ambient air quality comply with the country's air quality standards? Are any mitigating measures taken? (b) Where industrial areas already exist near the route, is there a possibility that the project will make air pollution worse? | (a) - (b) - | (a)(b) Because the project site is located in industrial area, considerable air pollution is feared. However, continuous monitoring of the air quality is not conducted. It is unknown whether the air quality exceeds the environmental standards or not. In the future, total amount of air pollutant caused by vehicle exhaust gas will increase. However, because of improved traffic efficiency, the amount may be reduced compared to without project. |
| | (2) Water Quality | (a) Is there a possibility that soil runoff from the bare lands resulting from earthmoving activities, such as cutting and filling will cause water quality degradation in downstream water areas? (b) Is there a possibility that surface runoff from roads will contaminate water sources, such as groundwater? (c) Do effluents from various facilities, such as parking areas/service areas comply with the country's effluent standards and ambient water quality standards? Is there a possibility that the effluents will cause areas not to comply with the country's ambient water quality standards? | (a) N (b) N (c) N | (a) Turbid water will generate in the construction works. The turbid water is dispose into existing drainage ditches along the roadside. There are no intake facilities in and down the site. (b) Because drainage facilities have been constructed along the road, impact on water resources of runoff from road surface will not occur. (c) Development of parking or service areas which generate waste water in operation phase are not included in the project. |
| | (3) Wastes | (a) Are wastes generated from the project facilities, such as parking areas/service areas, properly treated and disposed of in accordance with the country's regulations? | (a) N | (a) Development of parking or service areas are not included in the project. |

Environmental Checklist: 7. Roads (2)

Annex 2

| Category | Environmental Item | Main Check Items | Yes: Y No: N | Confirmation of Environmental Considerations (Reasons, Mitigation Measures) |
|-----------------------|----------------------------|---|--|---|
| | (4) Noise and Vibration | (a) Do noise and vibrations from the vehicle and train traffic comply with the country's standards? | (a) N | (a) The night noise level on the borderline of the right of way may exceed the environmental standards at present. However, because the project site is located in industrial area, the impact on general population will not be serious. In the future, noise level caused by vehicle driving will increase. However, because F/O bridge will be installed in central part of the right of way, the level on road side may be reduced compared to without project. |
| 3 Natural Environment | (1) Protected Areas | (a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas? (e) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? (c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem? (d) Are adequate protection measures taken to prevent impacts, such as disruption of migration routes, habitat fragmentation, and traffic accident of wildlife and livestock? (e) Is there a possibility that installation of roads will cause impacts, such as destruction of forest, poaching, desertification, reduction in wetland areas, and disturbance of ecosystems due to introduction of exotic (non-native invasive) species and pests? Are adequate measures for preventing such impacts considered? (f) In cases the project site is located at undeveloped areas, is there a possibility that the new development will result in extensive loss of natural environments? | (a) N (b) N (c) N (d) N (e) N (f) N | (a) There are no protected areas in and around the site. (b) There are no ecological valuable habitats in and around the site. (c) Significant ecological impact will not occur. (d) Wild animals migrating through the site have not been identified. (e)(f) The project will not cause destruction of forest and poaching because of bridge construction works along existing road in urban area. |
| | (2) Ecosystem | | | |
| | (3) Hydrology | | (a) Is there a possibility that alteration of topographic features and installation of structures, such as tunnels will adversely affect surface water and groundwater flows? (b) Is there any soft ground on the route that may cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides, where needed? (c) Is there a possibility that soil runoff will result from cut and fill areas, waste soil disposal sites, and borrow sites? Are adequate measures taken to prevent soil runoff? | (a) N (b) N (c) N |
| | (4) Topography and Geology | | | |

Environmental Checklist: 7. Roads (3)

Annex 2

| Category | Environmental Item | Main Check Items | Yes: Y No: N | Confirmation of Environmental Considerations (Reasons, Mitigation Measures) |
|----------------------|---------------------------|---|--|--|
| | (1) Resettlement | <p>(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement?</p> <p>(b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement?</p> <p>(c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement?</p> <p>(d) Are the compensations going to be paid prior to the resettlement?</p> <p>(e) Are the compensation policies prepared in document?</p> <p>(f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples?</p> <p>(g) Are agreements with the affected people obtained prior to resettlement?</p> <p>(h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?</p> <p>(i) Are any plans developed to monitor the impacts of resettlement?</p> <p>(j) Is the grievance redress mechanism established?</p> | <p>(a) N (b) N (c) N (d) N (e) N (f) N (g) N (h) N (i) N (j) N</p> | <p>(a)(b)(c)(d)(e)(f)(g)(h)(i)(j) Land acquisition of small area will be required. However, involuntary resettlement will not be caused by the project.</p> |
| 4 Social Environment | (2) Living and Livelihood | <p>(a) Where roads are newly installed, is there a possibility that the project will affect the existing means of transportation and the associated workers? Is there a possibility that the project will cause significant impacts, such as extensive alteration of existing land uses, changes in sources of livelihood, or unemployment? Are adequate measures considered for preventing these impacts?</p> <p>(b) Is there any possibility that the project will adversely affect the living conditions of the inhabitants other than the target population? Are adequate measures considered to reduce the impacts, if necessary?</p> <p>(c) Is there any possibility that diseases, including infectious diseases, such as HIV will be brought due to immigration of workers associated with the project? Are adequate considerations given to public health, if necessary?</p> <p>(d) Is there any possibility that the project will adversely affect road traffic in the surrounding areas (e.g., increase of traffic congestion and traffic accidents)?</p> <p>(e) Is there any possibility that roads will impede the movement of inhabitants?</p> <p>(f) Is there any possibility that structures associated with roads (such as bridges) will cause a sun shading and radio interference?</p> | <p>(a) N (b) N (c) N (d) N (e) N (f) N</p> | <p>(a)(b)(c)(d)(e) The project will not cause significant changes and impacts on the livelihood of the local people and road traffic in operation phase because of flyover bridge construction along existing arterial road in urban area. However, traffic congestion and control, and relocation of bus stops will be inevitable. Street vendors around junction will be able to continue their business after completion of flyover bridge. (f) Because the distance between F/O bridge 6 m high and road side is 15 m and there are no residents around the project site, impact on sun shading and radio interference will not occur.</p> |

Environmental Checklist: 7. Roads (4)

Annex2

| Category | Environmental Item | Main Check Items | Yes: Y No: N | Confirmation of Environmental Considerations (Reasons, Mitigation Measures) |
|----------------------|--|---|----------------------------------|---|
| | (3) Heritage | (a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws? (a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken? | (a) N | (a) Tazara railway station has historical value. However, impact on the station will not occur. |
| | (4) Landscape | (a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources to be respected? | (a) N (b) N | (a) There are no valuable landscape sites in and around the project sites. (a)(b) The project site is not area where ethnic minorities and indigenous people having unique culture and lifestyle are living. |
| | (5) Ethnic Minorities and Indigenous Peoples | (a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project? (b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials? (c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.? (d) Are appropriate measures being taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents? | (a) Y (b) Y (c) Y (d) Y | (a) Construction works will comply with the laws and ordinances associated with the working conditions. (b) Because construction works on higher ground are included, tangible safety considerations to prevent labor accidents will be involved in the project. (c)(d) Because the construction works are conducted along existing arterial road in urban area, health program and safety training to construction workers, and considerations to local residents will be included in the environmental management plan. |
| 4 Social Environment | (6) Working Conditions | (a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? (b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? (c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts? | (a) Y (b) Y (c) Y | (a) The adequate mitigation measures and monitoring plans to reduce impacts of pollution during the construction will be prepared. (b) The construction activities will not adversely affect the natural environment. (c) Because the construction works are conducted along existing arterial road in urban area, countermeasures against traffic jam will be included in the execution scheme. |
| 5 Others | (1) Impacts during Construction | | | |

Environmental Checklist: 7. Roads (S)

Annex 2

| Category | Environmental Item | Main Check Items | Yes: Y No: N | Confirmation of Environmental Considerations (Reasons, Mitigation Measures) |
|----------|---|---|---|---|
| | (2) Monitoring | <p>(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts?</p> <p>(b) What are the items, methods and frequencies of the monitoring program?</p> <p>(c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)?</p> <p>(d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?</p> | <p>(a) Y</p> <p>(b) Y</p> <p>(c) Y</p> <p>(d) Y</p> | <p>(a) The monitoring plans mentioned in the EIA report will be implemented during the construction and operation phase.</p> <p>(b)(c)(d) Because the EIA report is in progress, the specific monitoring plans have not been prepared yet. JICA study team has submitted the draft monitoring plan to TANROADS.</p> |
| 6 Note | Reference to Checklist of Other Sectors | <p>(a) Where necessary, pertinent items described in the Forestry Projects checklist should also be checked (e.g., projects including large areas of deforestation).</p> <p>(b) Where necessary, pertinent items described in the Power Transmission and Distribution Lines checklist should also be checked (e.g., projects including installation of power transmission lines and/or electric distribution facilities).</p> | <p>(a) N</p> <p>(b) N</p> | <p>(a) Deforestation is not included in the project.</p> <p>(b) Relocation of existing power transmission lines will be limited in the right of way and has no serious environmental impacts.</p> |
| | Note on Using Environmental Checklist | <p>(a) If necessary, the impacts to transboundary or global issues should be confirmed, if necessary (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).</p> | <p>(a) N</p> | <p>(a) Impacts to transboundary or global environmental issues will not occur.</p> |

1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made.

In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).

2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which it is located.

MONITORING FORM (Draft)

| Environmental Item | Responsible Person and Organization | Item | Location | Method | Frequency | Monitoring Results |
|-----------------------------------|--|--|---|--|---|--------------------|
| Construction phase | | | | | | |
| Air quality | - Supervision consultant - Construction contractor | Dust | Around construction site | Visual observation and interview to pedestrians | Visual observation : Daily Interview: Monthly or as needed | |
| Noise and vibration | - Supervision consultant - Construction contractor | Noise and vibration caused by construction works | Around construction site, especially Dar Group Hospital | Interview to persons concerned hospital and pedestrians | Weekly or as needed | |
| Ground water quality and quantity | - Supervision consultant - Construction contractor | Oil, quantity etc. | Wells in Azam factory | Interview to persons concerned factory | Weekly or as needed | |
| Waste | - Supervision consultant - Construction contractor | Disposal methods of construction waste | Construction site and disposal site | Visual observation and meeting with contractor | Visual observation : Daily Meeting: Monthly or as needed | |
| Road side tree felling | - Supervision consultant - Construction contractor | Status of needless tree felling | Construction site | Visual observation and meeting with contractor | Visual observation : Daily Meeting: Monthly or as needed | |
| Accident | - Supervision consultant - Construction contractor | Effect of accident prevention measures | Construction site | Visual observation, and interview to pedestrians and construction workers | Visual observation : Daily Interview: Monthly or as needed | |
| Commercial activity near junction | - Supervision consultant - Construction contractor - Ward office - TANROADS | Status of street vendors | Construction site | Visual observation and interview to street vendors | Visual observation : Daily Interview: Monthly or as needed | |
| Operation phase | | | | | | |
| Noise and vibration | - TANROADS | Noise and vibration caused by vehicular traffic | Dar Group Hospital | Measurement by noise level meter and interview to persons concerned hospital | Yearly | |
| Traffic management | - TANROADS | Status of vehicular traffic | Around Tazara junction | Interview to road users and record of traffic accident | 2~6 times during the first year after completion | |
| Commercial activity near junction | - Ward office - TANROADS | Status of street vendors | Around Tazara junction | Interview to street vendors | 2~6 times during the first year after completion | |

Appendix 5 Other Relevant Data
(Technical Notes signed with the Government of Tanzania)

TECHNICAL NOTES

JICA Survey Team for the Preparatory Survey for TAZARA Intersection Improvement Project (the Survey Team) and the representative of the TANZANIA NATIONAL ROADS AGENCY (TANROADS) which is the responsible and implementing organization for aforesaid project have agreed upon the items described in the attached Technical Notes. Based on these Technical Notes, the Survey Team will carry out the outline design for the Project including the project cost estimate through analysis of the field survey findings and discussions with concerned authorities in Japan.

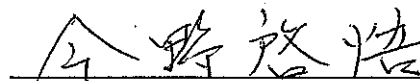
The results of the analysis and the outline design will be presented and explained in December, 2011.

June 28, 2011
Dar es Salaam



Eng. Patrick A.L. Mfugale

Chief Executive,
Tanzania National Roads Agency
(TANROADS)



Mr. Keigo KONNO

Chief Consultant,
JICA Survey Team

1. Flyover Direction

Tanzania and Japan sides confirm and agree that a flyover shall be planned and designed along the Nyerere Road at TAZARA intersection.

2. Application of Design Guideline

Reference shall be made to following manuals and specification for the outline design requirements of bridge and road:

2.1 Bridge Design

- Draft Code of Practice for the Design of Road Bridges and Culverts Reprinted July 2001, SATCC
- Specifications for Highway Bridges (Part I – V), Japan Road Association

2.2 Highway Design

(1) Geometrical Design

- Draft Road Manual 1989 Edition with its Revisions, Ministry of Communications and Works, the United Republic of Tanzania
- Draft Code of Practice for the Geometric Design of Trunk Road, Reprinted July 2001, SATCC
- A Policy on Geometric Design of Highway and Streets 2001, AASHTO
- Road Structure Ordinance, Japan Road Association

(2) Pavement Design

- Pavement and Material Design Manual 1999, Ministry of Works, the United Republic of Tanzania
- Draft Code of Practice for Design of Road Pavements, Reprinted July 2001, SATCC
- AASHTO Guide for Design Pavement Structures 1993

(3) Intersection Design

- At Grade Intersection Plan and Design Manual, Japan Society Traffic Engineers

(4) Traffic Safety

- A Guide to Traffic Signing 2009, Ministry of Infrastructure Development, the United Republic of Tanzania

2.3 Construction Method/Material Specification

- Standard Specification for Road Works 2000, Ministry of Works, the United Republic of Tanzania

3. Improvement Options

Four (4) improvement options are proposed by the Survey Team and these options are evaluated from engineering view points by the team as well. The result of the evaluations is shown in the Annex-1.

Tanzania side strongly recommends the Option 4 while the Survey Team recommends the Option 1 as optimum.



4. Bridge Structure Material

Followed to analysis in JICA's Master Plan and a consideration of easy maintenance, Tanzania side prefers concrete as the bridge material.

5. Pavement Design Life

Pavement design life shall be recommended as 20 years.

6. Design Parameters

The design parameters to be applied are shown in Table 1.

Table 1 Design Parameters

| Parameters | Unit | Design | Remarks |
|--|-------|---|---|
| 1. Bridge Design | | | |
| Live Load | | NA and NB (45 units) | STACC |
| Horizontal Seismic Coefficient | | 0.05 | LOADS FOR STRUCTURAL DESIGN, Building Research Unit (BRU) |
| Vertical Clearance under F/O | M | 5.5 | New Draft Road Manual |
| Temporary Vertical Clearance during Erection | M | 5.0 | New Draft Road Manual |
| Maximum Grade | % | 4.0 | |
| Min. Reserve for BRT | M | 7.0 | |
| Width of Median (Min.) | M | 2.0 | |
| Width of Shoulder (Min.) | M | 0.5 | |
| Additional Lane Width | M | Not Applied*1 | Draft Road Manual |
| Public Utility Duct | | Four(4) ducts to be considered | Add on the Bridge |
| 2. Road Design | | | |
| Design Speed | km/hr | 60 | Draft Road Manual |
| Design Vehicle | | Semi Trailer combination large W=2.6, L=16.7 H=4.1 | |
| Lane Width | M | 3.25 | Draft Road Manual |
| Shoulder Width | M | 1.5 | Draft Road Manual |
| Reserve for BRT | M | 9.0-12.0 | |
| Min. Stopping Sight Distance | M | 75 | Draft Road Manual |
| Min. Horizontal Curve Radius | M | 135 | Draft Road Manual |
| Min. R of Curve omitting Transition | M | 500 | Draft Road Manual |
| Max. Gradient (Fat) | % | 5 | Draft Road Manual |
| Max. Super-elevation | % | 8 | Draft Road Manual |
| Crest Vertical Curve Stopping | Kmin | 16 | Draft Road Manual |
| Sag Vertical Curve Stopping | Kmin | 16 | Draft Road Manual |
| Normal Cross-fall | % | 2.5 | Draft Road Manual |
| Shoulder Cross-fall | % | 2.5 | Draft Road Manual |
| Walkway Width | M | 2.0 | For Pedestrian |
| Service Road Width | M | 3.0 | Followed to the Mandela Rd. Case |

*1 Draft Design Manual suggested that 1.0m additional width for 6.5m (Normal Truck Road Lane Width) shall be provided. However, this provision results in creation of bottle neck at its approach. It is, thus, not recommended for the bridges which aim to bring smooth traffic flow.

7. Accessories

7.1 Signal

New Signal system at TAZARA intersection shall be introduced and installed under the Japan's Grant Aid and synchronization with signal at Buguruni Intersection shall also be considered in the outline design.

7.2 Street Light

Tanzanian side strongly requests the provisions of street lights on Flyover Bridge as well as its approach section under the Japan's Grant Aid since there are existing street lights along the Nyerere Road.

8. Environmental Considerations

8.1 EIA Study Schedule

The Tanzania side confirms the EIA Study Schedule as follows,

Table 2 Tentative Schedule of EIA

| Year | 2011 | | | | | | | | 2012 | | | | |
|--|-------|------|------|---|------|------|-----------------|-----------------------------------|------|----------------------|------|------|-----|
| | Month | Jun. | Jul. | Aug. | Sep. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May |
| JICA Preparatory Survey | | ■ | | ▲ Selecti on of F/O Options | | | | ▲ Draft Final Repor t | | ▲ Final Report | | | |
| EIA Procedure | | | | | | | | | | | | | |
| Preparation & submission of project brief, Selection of EIA consultant and Screening | | | | ■ | ■ | ■ | | | | | | | |
| Preparation & submission of scoping and TOR, and Approval by NEMC | | | | | | ■ | ■ | | | | | | |
| EIA study and Holding of public meetings | | | | | | | ■ | ▲ | | | | | |
| Submission to NEMC & review of EIS | | | | | | | ▲ Submission | | ■ | ■ | ■ | | |
| Issue of environmental certificate | | | | | | | | | | | ▲ | | |

8.2 Policy Framework for Property Affected People (PAP) and Entitlements

Table 3 Table of Entitlements per Category of PAP

| PAP Category | Entitlements through Valuers | Entitlements through Complementary Compensation |
|--|------------------------------|---|
| Authorized non-transient street vendors | Disturbance allowance | Relocation assistance Moving assistance |
| Other street vendors (daily transient vendors) | - | Relocation assistance |

Relocation assistance for informal users of the right of way

There are several types of informal users of the right of way. This includes taxi spots, daladala parking areas, construction truck waiting areas, as well as non-transient street vendors. Relocation assistance will be provided for PAP that are not eligible for disturbance allowance. All these types of PAPs will be assisted through indication of alternative locations where they can continue to develop their current activity, as well as with necessary permitting in order to ensure that activities at new locations are conducted in a legally regular manner.

Basic Source: "CONSULTANCY SERVICES FOR THE CONCEPTUAL DESIGN OF A LONG TERM INTEGRATED DAR ES SALAAM BRT SYSTEM AND DETAILED DESIGN FOR THE INITIAL CORRIDOR, RESETTLEMENT POLICY FRAMEWORK"

9. Traffic Survey Results and Analysis

9.1 TAZARA Intersection

As the results of traffic count survey at TAZARA intersection,

- Inflow traffic volume in morning peak has decreased from the last survey by JICA in 2010.
- The share of motorcycle or Bhajaj has increased. On the other hand, buses including Dala dala have decreased.
- Saturation degree (an index of traffic congestion) at TAZARA intersection has improved in a.m. peak because of decrease of inflow traffic volume during survey period, however, more congested in p.m. peak because of increase of right turn heavy traffic namely, daladala and trucks from north of Nelson Mandela road to airport.

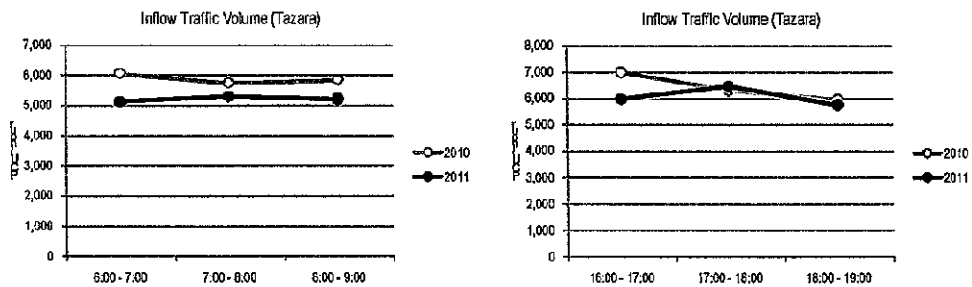


Figure 1 Inflow Traffic Volume at TAZARA Intersection

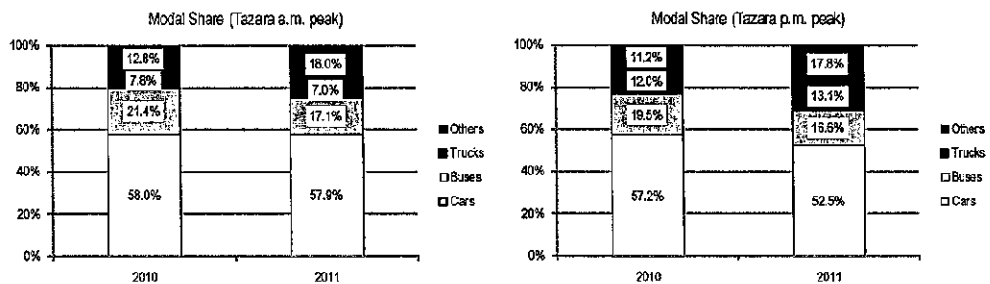


Figure 2 Modal Share of Inflow Traffic Volume at TAZARA Intersection

TECHNICAL NOTES FOR TAZARA INTERSECTION IMPROVEMENT PROJECT, JICA

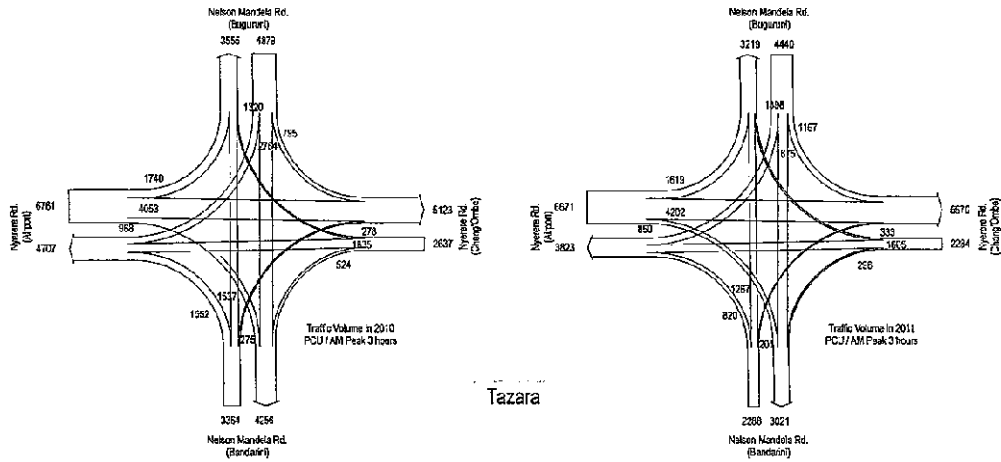


Figure 3 Traffic Volume by Turn Movement at TAZARA intersection (a.m. peak 3 hours)

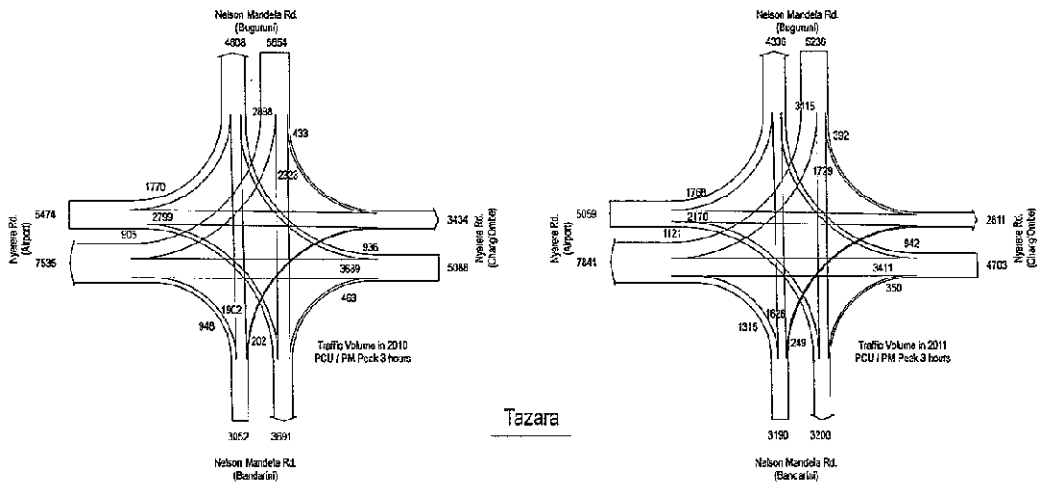


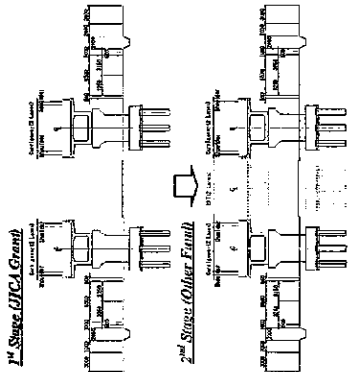
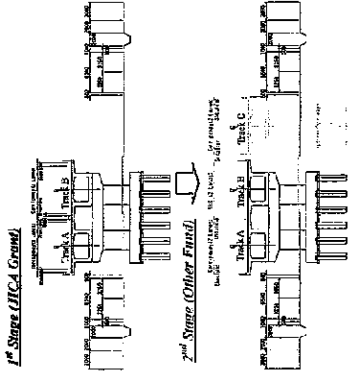
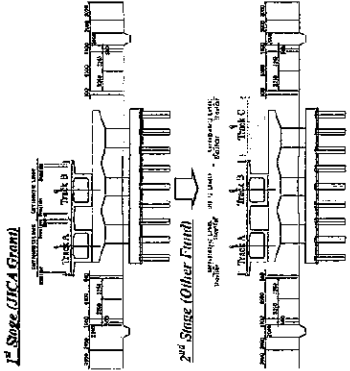
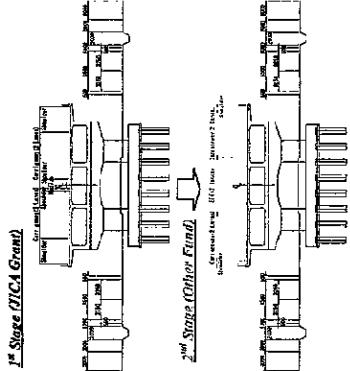
Figure 4 Traffic Volume by Turn Movement at TAZARA intersection (p.m. peak 3 hours)

Table 4 Saturation Degree at TAZARA intersection

| | | 2010 | 2011 |
|---------|---------------|-------|-------|
| AM Peak | 6:00 - 7:00 | 1.101 | 0.996 |
| | 7:00 - 8:00 | 1.028 | 1.040 |
| | 8:00 - 9:00 | 1.066 | 0.988 |
| PM Peak | 16:00 - 17:00 | 1.749 | 1.066 |
| | 17:00 - 18:00 | 1.165 | 1.452 |
| | 18:00 - 19:00 | 1.220 | 1.414 |

Handwritten mark

Handwritten signature

| B Bridge Type | Option 1 | Option 2 | Option 3 | Option 4 |
|-----------------------------|---|--|---|---|
| Description of Alternatives | <p>1st Stage: Separated Two (2) bridges (total 4 lanes) shall be constructed for normal through traffics by Japan's Grant Aid.</p> <p>2nd Stage: A bridge is expected to be constructed for BRT (2 lanes) by other donor or Tanzania.</p> | <p>1st Stage: 4 lanes bridge shall be constructed by Japan's Grant Aid and the bridge will be opened for normal through traffic until BRT starts to operate.</p> <p>2nd Stage: A bridge (Track C) is expected to be constructed by other donor or Tanzania, and Track B on the 1st bridge will be converted as BRT track and Track C will be used for normal through traffics after 2nd Bridge opened.</p> | <p>1st Stage: 4 lanes bridge and whole substructure shall be constructed by Japan's Grant Aid and the bridge will be opened for normal through traffic until BRT starts to operate.</p> <p>2nd Stage: Only superstructure (Track C) is expected to be constructed by other donor or Tanzania, and Track B will be converted as BRT track and Track C will be used for normal through traffics after completion of whole bridge.</p> | <p>1st Stage: Whole bridge with enough width shall be constructed by Japan's Grant Aid. It covers normal through traffics and future BRT.</p> <p>2nd Stage: Providing centre 2 lanes for BRT.</p> |
| Cross Section |  |  |  |  |
| 1 Construction Cost Ratio | <p>1.00</p> <p>0.50*</p> | <p>0.95</p> <p>0.55*</p> | <p>1.10</p> <p>0.35</p> | <p>1.25</p> <p>0.00</p> |
| 2 Flexibility to BRT Plan | <p>There is the flexibility to BRT plan (elevated or at grade).</p> <p>A</p> | <p>Although BRT can be constructed at grade, BRT and normal traffic will be interaced.</p> <p>B</p> | <p>BRT tracks must be elevated (not at grade) since there are piers in centre medium.</p> <p>There is no flexibility to BRT Plan.</p> <p>C</p> | <p>BRT tracks must be elevated (not at grade) since there are piers in centre medium.</p> <p>There is no flexibility to BRT Plan.</p> <p>C</p> |
| 3 Constructability | <p>For 1st Stage There is enough space and no difficulty for bridge construction since diversions of current traffic will be provided at out-sides before bridge construction.</p> <p>For 2nd Stage It will be possible to construct BRT bridge (9m width) with no difficulty since the distance between separated bridges on 1st stage was kept 12m width.</p> <p>A</p> | <p>For 1st Stage Same as Option 1.</p> <p>For 2nd Stage There is no difficulty for construction.</p> <p>A</p> | <p>For 1st Stage Same as Option 1.</p> <p>For 2nd Stage Difficult arrangement will be required at the time of superstructure erection.</p> <p>C</p> | <p>For 1st Stage Same as Option 1.</p> <p>For 2nd Stage No construction work without lane conversion.</p> <p>A</p> |
| 4 Road Alignment | <p>A straight alignment can be designed for entire section.</p> <p>A</p> | <p>S (two) curves need to be inserted in approach section for a direction during tentative open to traffic (before BRT comes).</p> <p>C</p> | <p>S (two) curves need to be inserted in approach section for a direction during tentative open to traffic (before BRT comes).</p> <p>C</p> | <p>A straight alignment can be designed for entire section.</p> <p>A</p> |
| 5 Traffic Management | <p>No difficulty for traffic management.</p> <p>A</p> | <p>No difficulty for traffic management.</p> <p>A</p> | <p>Diversion of existing traffic will be required to keep temporary construction road.</p> <p>C</p> | <p>Diversion of existing traffic will be required to keep temporary construction road.</p> <p>C</p> |
| 6 Environmental Aspect | <p>Land acquisition in TAZARA station side may be required.</p> <p>B</p> | <p>Same as Option 1.</p> <p>B</p> | <p>Same as Option 1.</p> <p>B</p> | <p>Land acquisition will not be required.</p> <p>A</p> |
| Evaluation | <p>Any BRT design can be accommodated with this alternative.</p> <p>Recommendable</p> | <p>Although any BRT design can be accommodated with this alternative, Road alignment is inferior to Option 1.</p> <p>Not recommendable</p> | <p>There is no flexibility for future BRT Construction. Some items are inferior to other alternatives.</p> <p>Not recommendable</p> | <p>Although there is no flexibility for future BRT Construction, the cost of 2nd stage will be very small.</p> <p>Recommendable</p> |

*: When BRT is constructed at grade, this ratio will be 0.00.



Appendix 6 Reference (Outline Design Drawings)



MINISTRY OF WORKS
TANZANIA NATIONAL ROADS AGENCY (TANROADS)

**THE PREPARATORY SURVEY ON
THE PROJECT FOR IMPROVEMENT OF TAZARA INTERSECTION
IN THE UNITED REPUBLIC OF TANZANIA**

DRAWINGS

DECEMBER 2011



JAPAN INTERNATIONAL COOPERATION AGENCY



ORIENTAL CONSULTANTS CO.,LTD.



EIGHT-JAPAN ENGINEERING CONSULTANTS INC.

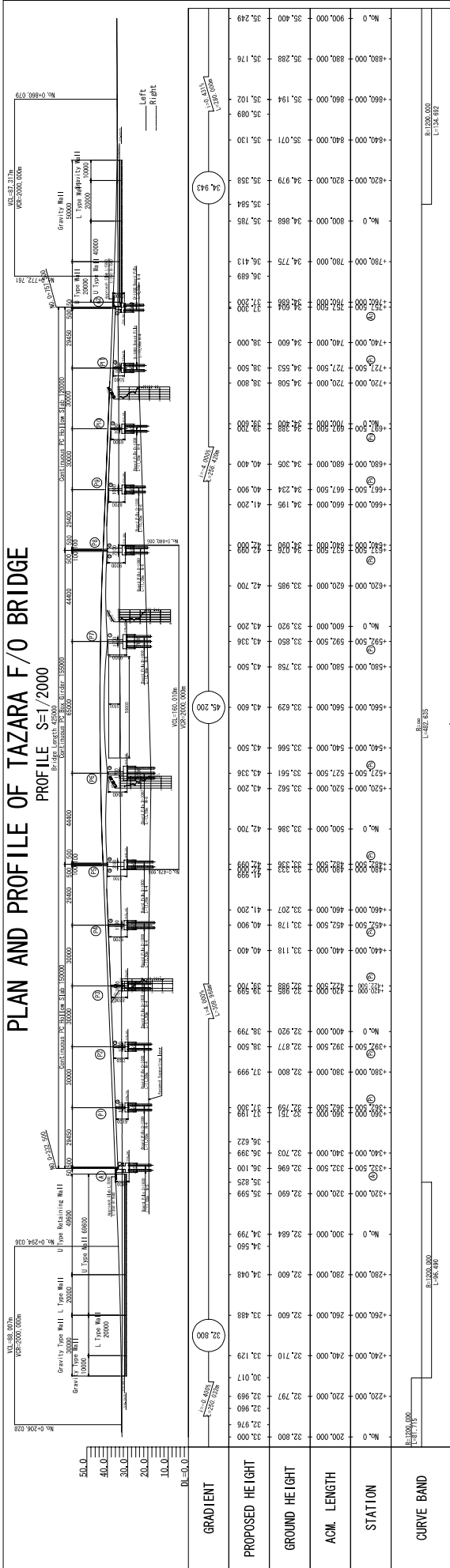


INTERNATIONAL DEVELOPMENT CENTER OF JAPAN INC.

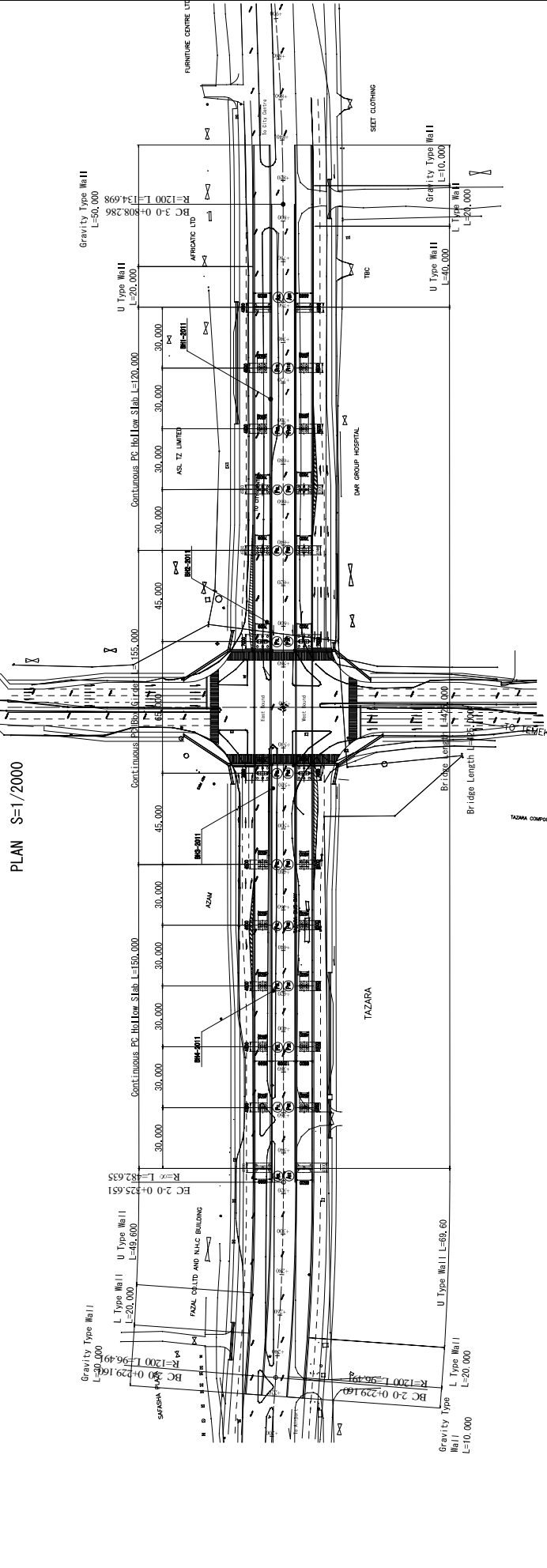


PLAN AND PROFILE OF TAZARA F/O BRIDGE

PROFILE S=1/2000



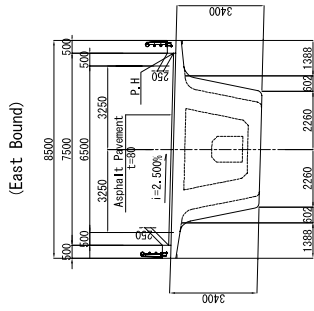
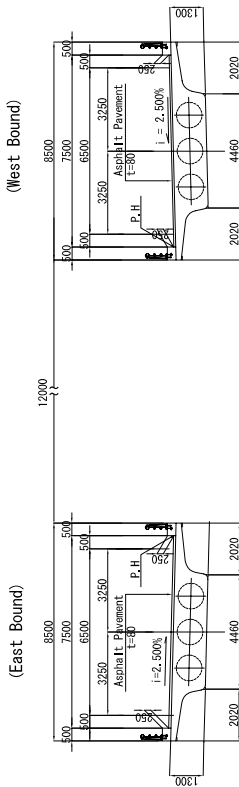
PLAN S=1/2000



| APPROVED: | PROJECT ENGINEER | CHIEF EXECUTIVE |
|---|------------------|-----------------|
| <p>TANROADS TANZANIA NATIONAL ROADS AGENCY P.O. Box 11364 DAR ES SALAAM</p> | | |
| <p>JAPAN INTERNATIONAL COOPERATION AGENCY CONSULTANT Oriental Consultants Co., LTD. Eight-Japan Engineering Consultants Inc., International Development Center of Japan Inc.</p> | | |
| DESIGNED | DRAWN | CHECKED |
| | | |
| DATE | DESCRIPTION | REVISIONS |
| | | |
| <p>PROJECT: Preparatory Survey on the Project for Improvement of TAZARA Intersection</p> | | |
| <p>DWG TITLE: PLAN AND PROFILE OF TAZARA F/O BRIDGE</p> | | |
| <p>SCALE: As shown</p> | | |
| <p>DATE: _____</p> | | |
| <p>Dwg No. 1/14</p> | | |
| <p>Rev</p> | | |

CROSS-SECTION OF TAZARA F/O BRIDGE

SECTION S=1/200
(PC HOLLOW SLAB BRIDGE)



SECTION S=1/200
(PC BOX GIRDER BRIDGE)

DESIGN CRITERIA

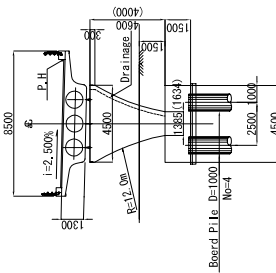
| | |
|---------------------|--|
| CATEGORY | PRESTRESSED CONCRETE ROAD BRIDGE |
| TYPE | 5 SPAN PC HOLLOW SLAB BRIDGE 3 SPAN PC BOX GIRDER BRIDGE 4 SPAN PC HOLLOW SLAB BRIDGE |
| TOTAL BRIDGE LENGTH | L=425.000m |
| BRIDGE LENGTH | 5 SPAN PC HOLLOW SLAB L=150.0m (5/30.0, 0) 3 SPAN PC BOX GIRDER L=155.0m (45.0+65.0+45.0, 0-45, 0) 4 SPAN PC HOLLOW SLAB L=120.0m (45.0+0.0) |
| WIDTH | TOTAL 8.500(m) (0.500+0.500+6.500+0.500+0.500) |
| LIVE-LOAD | HA and HB (45 UNITS) |
| SEISMI COEFFICIENT | Kt=0.05 |
| ANGLE OF SKEW | 90° 00' 00" |
| RADIUS OF CURVATURE | R=∞ |
| SECTION SLOPE | i=2.500% |
| LONGITUDINAL SLOPE | i=4.000% |

MATERIALS

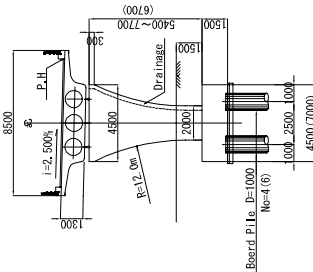
| | |
|----------------|---|
| PC HOLLOW SLAB | $\sigma_{ck}=36.0N/mm^2$ |
| PC BOX GIRDER | $\sigma_{ck}=36.0N/mm^2$ |
| SUBSTRUCTURE | $\sigma_{ck}=24N/mm^2$ $\sigma_{ck}=30N/mm^2$ |
| PC HOLLOW SLAB | 12S15.2 (SMPR1BL) |
| PC BOX GIRDER | 1S21.8 (SMPR1L) |
| DEFORMED BAR | ϕ 32 (SPPK 930/1080) |
| SUBSTRUCTURE | S0845 |
| SUBSTRUCTURE | S0846 |

CROSS SECTION S=1/300

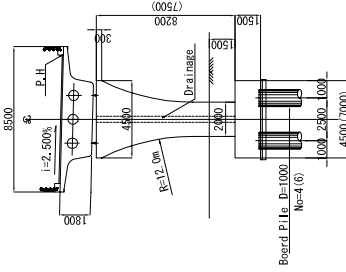
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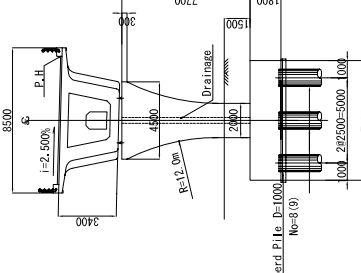
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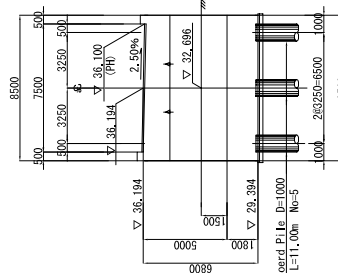
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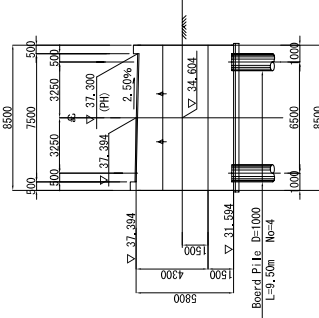
(F9) (F7)



(A1)



(A2)



TANROADS
TANZANIA NATIONAL ROADS AGENCY
P.O. Box 11184
DAR ES SALAM

APPROVED:
PROJECT ENGINEER
CHIEF EXECUTIVE

JAPAN INTERNATIONAL COOPERATION AGENCY
CONSULTANT
Oriental Consultants Co., LTD.
Eight-Japan Engineering Consultants Inc.,
International Development Center of Japan Inc.

Designed
Drawn
Checked
Rev:SMRD

DATE

REVISIONS
DESCRIPTION

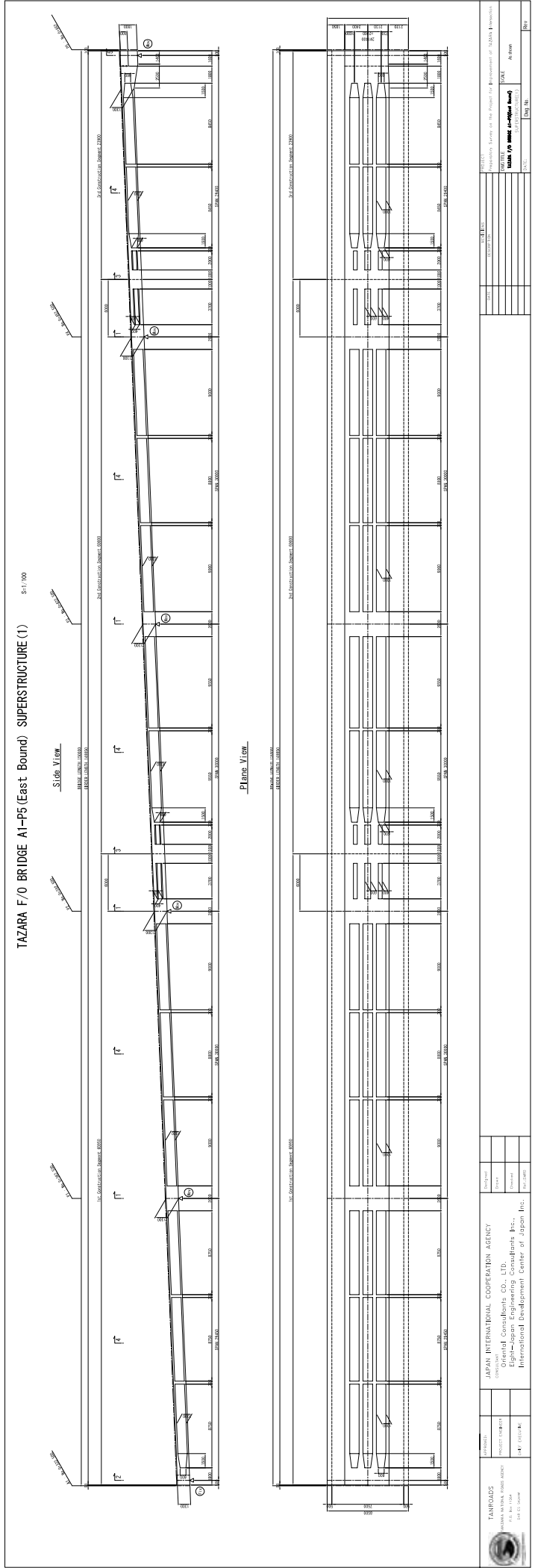
PROJECT
Preparatory Survey on the Project for Improvement of TAZARA Intersection

DWG TITLE
CROSS-SECTION OF TAZARA F/O BRIDGE

SCALE
As shown

Dwg. No. 2 / 14

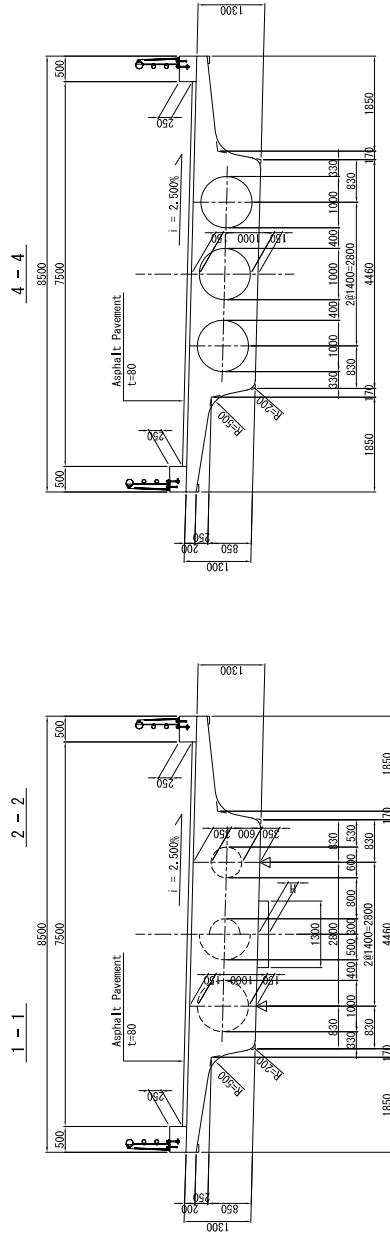
Rev



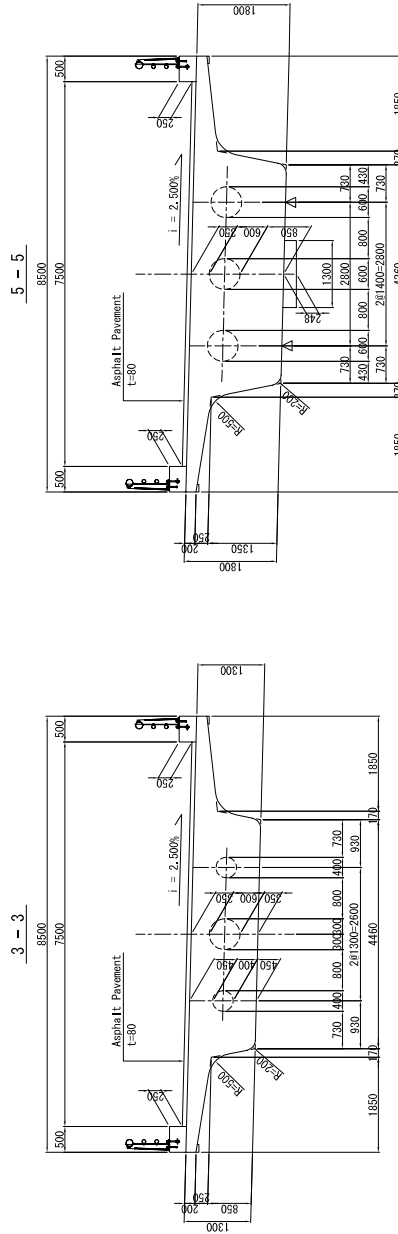
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| JICA JAPAN INTERNATIONAL COOPERATION AGENCY 1-1-1 Kojimachi, Chiyoda-ku, Tokyo 100-8305, Japan | PROJECT TITLE TAZARA F/O BRIDGE A1-P5 (East Bound) SUPERSTRUCTURE (1) | PROJECT NO. A1-P5-100 | DRAWING NO. S-1/100 |
| | PROJECT OWNER TANROADS TANZANIA NATIONAL ROAD AGENCY P.O. Box 10344 Dar es Salaam | | SCALE AS SHOWN |
| | PROJECT CONSULTANT JAPAN INTERNATIONAL COOPERATION AGENCY CONSULTANT ENGINEERING CONSULTANTS CO., LTD. Eight-Japan Engineering Consultants Inc., International Development Center of Japan Inc. | | DATE 2011.08.18 |
| | PROJECT LOCATION TANZANIA TAZARA F/O BRIDGE A1-P5 (East Bound) SUPERSTRUCTURE (1) | | DRAWN BY H.Y. CHEN |

TAZARA F/O BRIDGE A1-P5 (East Bound) SUPERSTRUCTURE (2)

Cross Section S-1/50



| | | | | | |
|---|-----|-----|-----|-----|-----|
| H | A1 | P1 | P2 | P3 | P4 |
| | 157 | 175 | 193 | 193 | 248 |



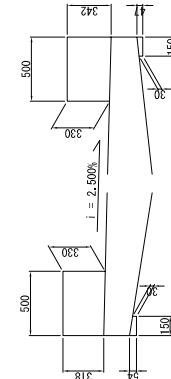
Design Condition

| | |
|----------------|---|
| CATEGORY | PRESTRESSED CONCRETE ROAD BRIDGE |
| TYPE | 5 SPAN PC CONTINUOUS HOLLOW SLAB BRIDGE (CAST-IN-PLACE) |
| BRIDGE LENGTH | 156,000 (m) |
| GIRDER LENGTH | 149,850 (m) |
| EFFECTIVE SPAN | 29,450 + 3630,000 + 29,400 (m) |
| TOTAL | 8,500 (m) (0,500+7,500+0,500) |
| WIDTH | 90' |
| DESIGN LOAD | B LIVE-LOAD (TYPE L) |

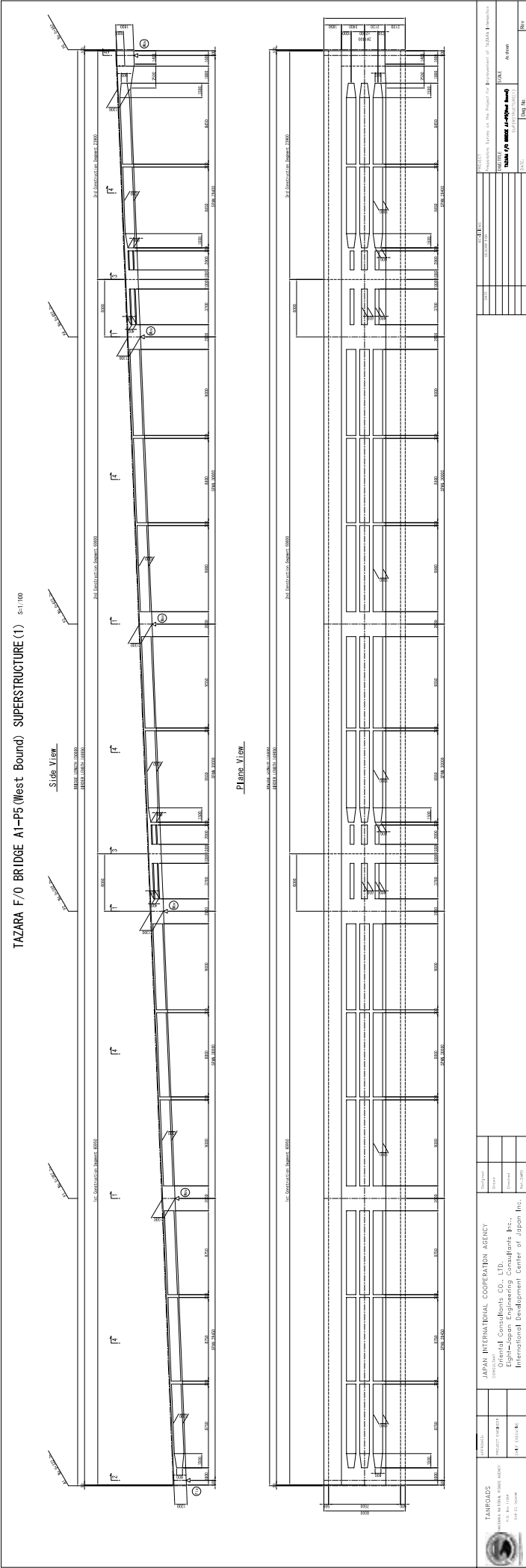
Material List

| | (N/mm ²) |
|-----------------------------------|-----------------------|
| CONCRETE | |
| DESIGN STRENGTH | 36.0 |
| ALLOWABLE COMPRESSIVE STRESS | 26.0 |
| TO BENDING MOMENT | 16.40 |
| ALLOWABLE TENSILE STRESS | 12.80 |
| TO BENDING MOMENT | -1.38 |
| AVERAGE SHEARING STRESS | -1.38 |
| MAXIMUM SHEARING STRESS | 0.51 |
| ALLOWABLE DIAGONAL TENSILE STRESS | 4.78 |
| AT THE DEAD LOAD | 0.92 |
| AT THE DESIGN LOAD | 1.88 |
| TENDON UNIT | |
| TENSILE STRENGTH | 1870 |
| YIELD POINT STRENGTH | 1600 |
| ALLOWABLE TENSILE STRESS | 1440 |
| AT PRESTRESSING | 1295 |
| AT THE DESIGN LOAD | 1110 |
| DEFORMED BAR | |
| STRENGTH SEGMENT | SR345 |
| YIELD POINT STRENGTH | 345 |
| ALLOWABLE TENSILE STRESS | 100 |
| AT THE DEAD LOAD | 180 |
| AT THE DESIGN LOAD | 140 |

Detail of Fellow Guard and Flashing S-1/20

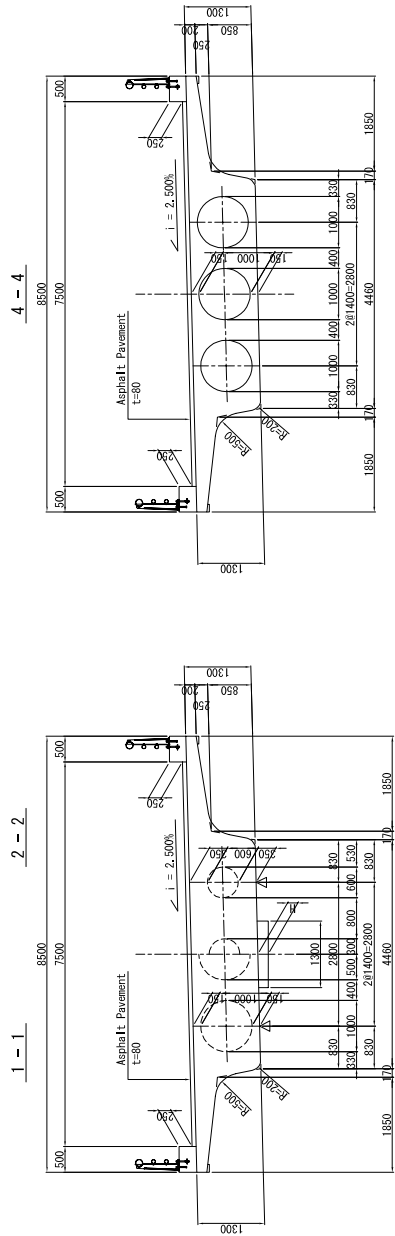


| | | | |
|---|---|---|----------------------------------|
| | APPROVED: _____ PROJECT ENGINEER CHIEF EXECUTIVE | JAPAN INTERNATIONAL COOPERATION AGENCY CONSULTANT Oriental Consultants Co., LTD. Eight-Japan Engineering Consultants Inc., International Development Center of Japan Inc. | REVISIONS DESCRIPTION DATE |
| TANZANIA NATIONAL ROADS AGENCY P.O. Box 11364 DAR ES SALAAM | PROJECT Preparatory Survey on the Project for Improvement of TAZARA Intersection | DWG TITLE TAZARA F/O BRIDGE A1-P5(East Bound) | SCALE As shown |
| DATE: _____ Dwg. No. _____ | PROJECT Preparatory Survey on the Project for Improvement of TAZARA Intersection | SUPERSTRUCTURE(2) | Rev _____ |

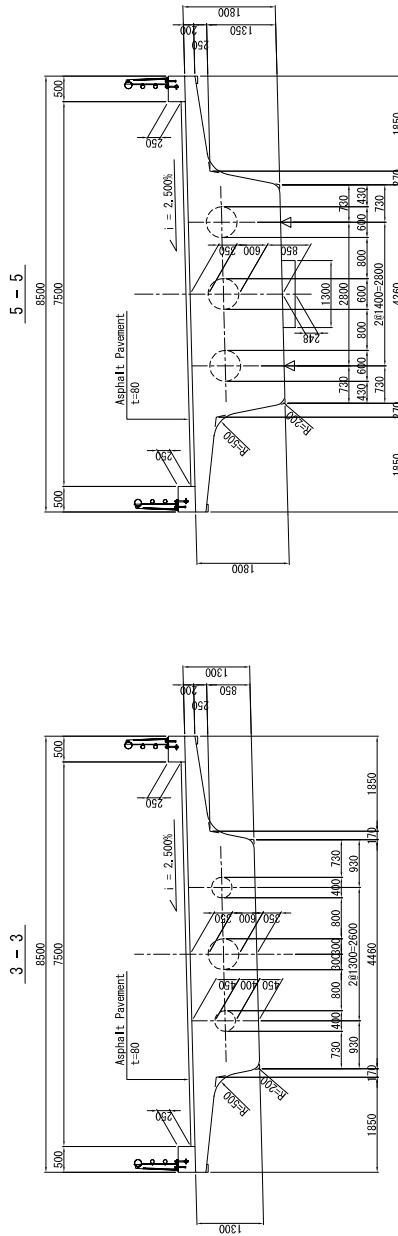


TAZARA F/O BRIDGE A1-P5 (West Bound) SUPERSTRUCTURE (2)

Cross Section s=1/50



| | | | | | |
|---|-----|-----|-----|-----|-----|
| | A1 | P1 | P2 | P3 | P4 |
| H | 157 | 175 | 183 | 193 | 248 |



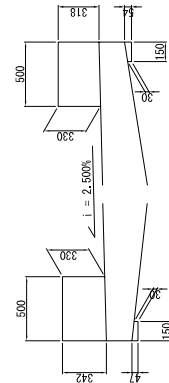
Design Condition

| | |
|----------------|---|
| CATEGORY | PRESTRESSED CONCRETE ROAD BRIDGE |
| TYPE | 5 SPAN PC CONTINUOUS HOLLOW SLAB BRIDGE (CAST-IN-PLACE) |
| BRIDGE LENGTH | 150,000 (m) |
| GIRDER LENGTH | 149,850 (m) |
| EFFECTIVE SPAN | 29,450 = 3630,000 ÷ 123.400 (m) |
| TOTAL | 8,500 (m) (0,500×7,500+0,500) |
| ANGLE | 30° |
| DESIGN LOAD | B LIVE-LOAD (TYPE L) |

Material List

| | (N/mm ²) | | |
|----------|--|---------------------------|--------------------|
| CONCRETE | DESIGN STRENGTH | AT THE DESIGN LOAD | |
| | | AT PRESTRESSING | |
| | ALLOWABLE COMPRESSIVE STRESS TO BEGINNING MOMENT | IMMEDIATELY AFTER TENSION | |
| | | AT THE DESIGN LOAD | |
| | ALLOWABLE TENSILE STRESS TO BEGINNING MOMENT | IMMEDIATELY AFTER TENSION | |
| | | AT THE DESIGN LOAD | |
| | AVERAGE SHEARING STRESS | 0.51 | |
| | MAXIMUM SHEARING STRESS | 4.78 | |
| | ALLOWABLE DIAGONAL TENSILE STRESS | AT THE DEAD LOAD | |
| | | AT THE DESIGN LOAD | |
| PC-CABLE | TENDON UNIT | | |
| | TENSILE STRENGTH | 1,850 | |
| | YIELD POINT STRENGTH | 1,850 | |
| | ALLOWABLE TENSILE STRESS | AT PRESTRESSING | |
| | | IMMEDIATELY AFTER TENSION | |
| | | AT THE DESIGN LOAD | |
| | DEFORMED BAR | STRENGTH SEGMENT | 1,110 |
| | | YIELD POINT STRENGTH | 345 |
| | | ALLOWABLE TENSILE STRESS | AT THE DESIGN LOAD |
| | | | AT SLAB |

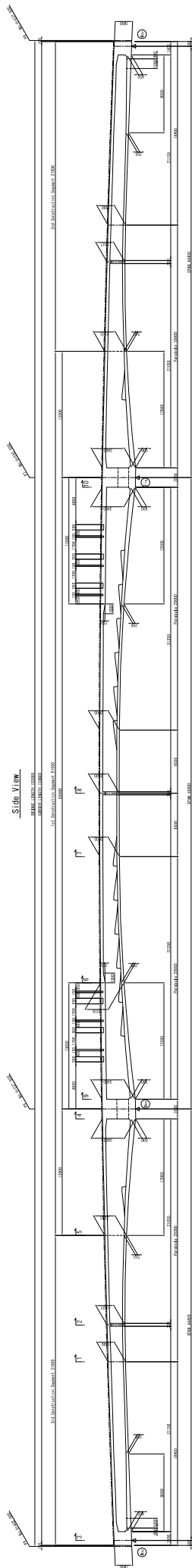
Detail of Felloe Guard and Flashing s=1/20



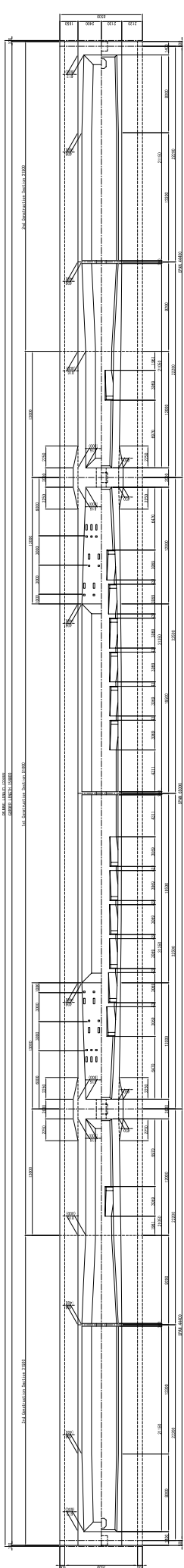
| | | | | |
|---|---|--|--|--------------------------------|
| <p>TANROADS TANZANIA NATIONAL ROADS AGENCY P.O. Box 11364 DAR ES SALAM</p> | <p>APPROVED:</p> <p>PROJECT ENGINEER</p> <p>CHIEF EXECUTIVE</p> | <p>JAPAN INTERNATIONAL COOPERATION AGENCY CONSULTANT Oriental Consultants Co., LTD. Eight-Japan Engineering Consultants Inc., International Development Center of Japan Inc.</p> | <p>DESIGNED</p> <p>DRAWN</p> <p>CHECKED</p> <p>REVISIONS</p> | <p>DATE</p> <p>DESCRIPTION</p> |
| <p>PROJECT: Preparatory Survey on the Project for Improvement of TAZARA Intersection</p> | | <p>DWG TITLE: TAZARA F/O BRIDGE A1-P5 (West Bound)</p> | | <p>SCALE: As shown</p> |
| <p>DATE: _____</p> | | <p>DWG NO: _____</p> | | <p>Rev</p> |

TAZARA F/O BRIDGE P5-P8 (East Bound) SUPERSTRUCTURE (1) S=1:100

Side View



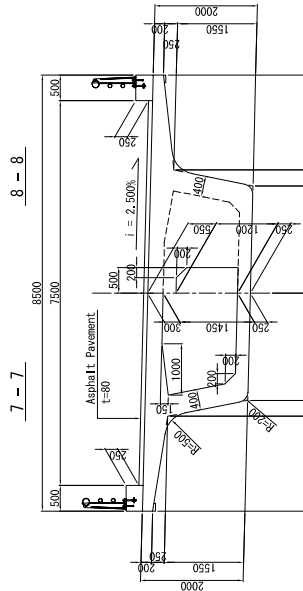
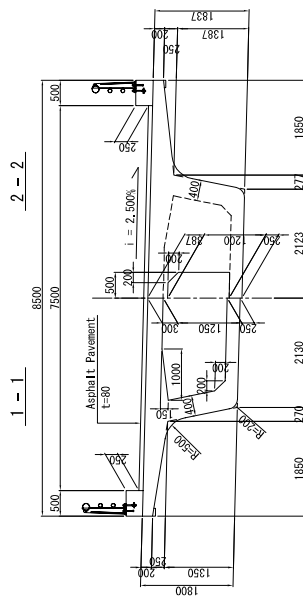
Plans View



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|--|--|--|--|
| | JAPAN INTERNATIONAL COOPERATION AGENCY 1-1-1, Kasumigaoka 2-chome, Chiyoda-ku, Tokyo 100-8501, Japan TEL: 03-3581-3111 FAX: 03-3581-3114 | PROJECT TITLE TAZARA F/O BRIDGE P5-P8 (East Bound) SUPERSTRUCTURE (1) | SHEET NO. 01 |
| | PROJECT CLIENT JICA (Japan International Cooperation Agency) | PROJECT DESIGNER JICA (Japan International Cooperation Agency) | DRAWING NO. 01 |
| PROJECT NAME TAZARA RAILWAY PROJECT | PROJECT LOCATION KENYA, UGANDA | PROJECT NO. TAZARA F/O BRIDGE P5-P8 (East Bound) SUPERSTRUCTURE (1) | SCALE 1:100 |
| PROJECT OWNER JICA (Japan International Cooperation Agency) | PROJECT MANAGER JICA (Japan International Cooperation Agency) | PROJECT ENGINEER JICA (Japan International Cooperation Agency) | PROJECT CHECKER JICA (Japan International Cooperation Agency) |

TAZARA F/O BRIDGE P5-P8 (East Bound) SUPERSTRUCTURE (2)

Cross Section S=1/50



Design Condition

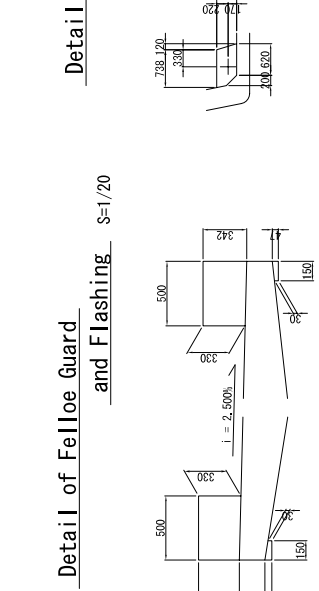
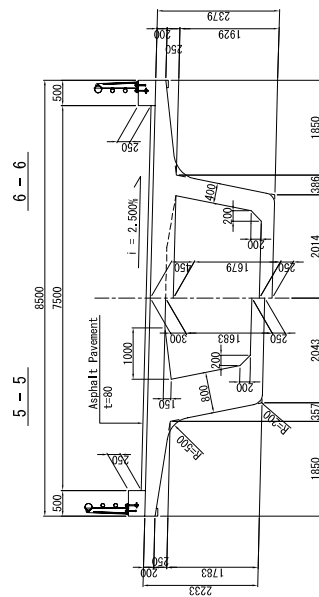
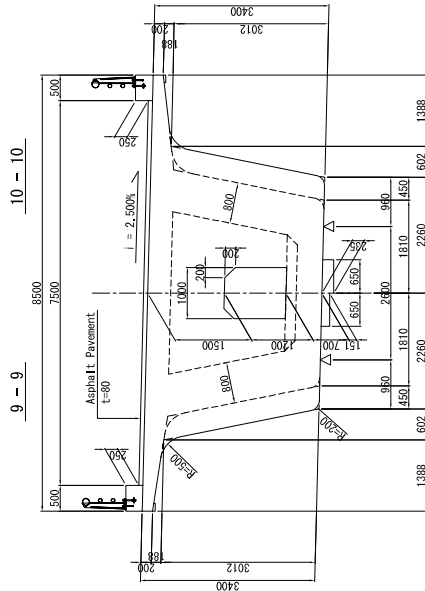
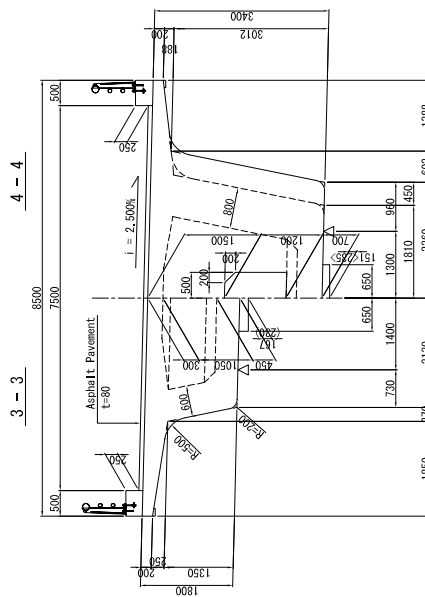
| | |
|----------------|--|
| CATEGORY | PRESTRESSED CONCRETE ROAD BRIDGE |
| TYPE | 3 SPAN PC CONTINUOUS BOX GIRDER BRIDGE (CAST-IN-PLACE) |
| BRIDGE LENGTH | 155,000 (m) |
| GIRDER LENGTH | 154,800 (m) |
| EFFECTIVE SPAN | 44,400 + 65,000 + 44,400 (m) |
| WIDTH | TOTAL 8,500 (m) (0.500x7,500+0.500) |
| ANGLE | 90° |
| DESIGN LOAD | B LIVE-LOAD (TYPE L) |

Material List

| CONCRETE | DESIGN STRENGTH | GIRDER (N/mm ²) | |
|--|---------------------------|-----------------------------|---------------|
| | | AT THE DESIGN LOAD | AT PRESSURING |
| ALLOWABLE COMPRESSIVE STRESS TO BENDING MOMENT | IMMEDIATELY AFTER TENSION | 36.0 | 36.0 |
| ALLOWABLE TENSILE STRESS TO BENDING MOMENT | AT THE DESIGN LOAD | 16.40 | 16.40 |
| AVERAGE SHEARING STRESS | IMMEDIATELY AFTER TENSION | 12.80 | 12.80 |
| ALLOWABLE DIAGONAL TENSILE STRESS | AT THE DESIGN LOAD | -1.38 | -1.38 |
| | AT THE DESIGN LOAD | 0.51 | 0.51 |
| | AT THE DEAD LOAD | 4.78 | 4.78 |
| | AT THE DESIGN LOAD | 0.92 | 0.92 |
| | AT THE DESIGN LOAD | 1.88 | 1.88 |

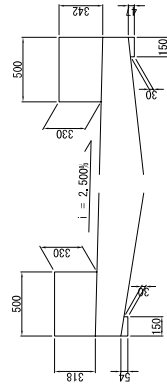
| PC-CABLE | TENSION UNIT | GIRDER (N/mm ²) | |
|--|--------------|-----------------------------|---------|
| | | SMR/FBL | SMR/TL |
| TENSILE COMPRESSIVE STRENGTH | SMR/FBL | 12515.2 | 9307080 |
| YIELD POINT STRENGTH | SMR/FBL | 1321.8 | 932 |
| ALLOWABLE TENSILE (COMPRESSION) STRESS | SMR/TL | 1850 | 1800 |
| | SMR/TL | 1600 | 1080 |
| | SMR/TL | 1440 | 930 |
| | SMR/TL | 1295 | 1260 |
| | SMR/TL | 1110 | 1080 |
| | SMR/TL | 680 | 687 |
| | SMR/TL | 5045 | 5045 |

| DEFORMED BAR | YIELD POINT STRENGTH | GIRDER (N/mm ²) | |
|--------------------------|----------------------|-----------------------------|--------------------|
| | | AT THE DEAD LOAD | AT THE DESIGN LOAD |
| ALLOWABLE TENSILE STRESS | AT THE DEAD LOAD | 345 | 345 |
| | AT THE DESIGN LOAD | 180 | 180 |
| | AT SLAB | 140 | 140 |



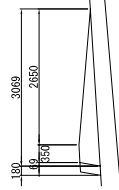
Detail of Felloe Guard and Flashing

S=1/20



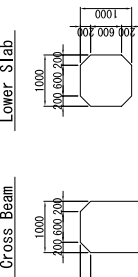
Detail of Anchor Block


S=1/50



Detail of Man Hole

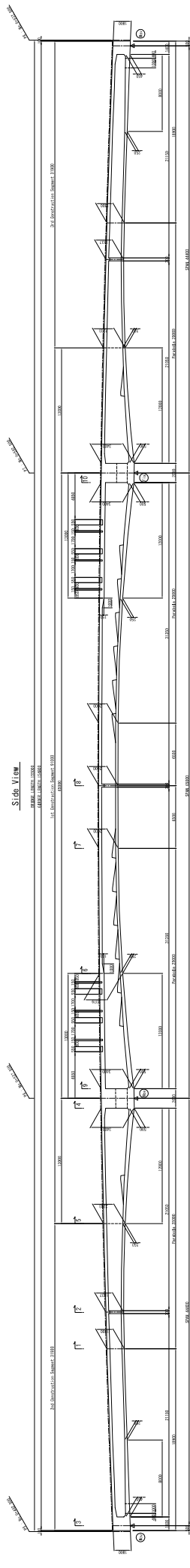
S=1/50



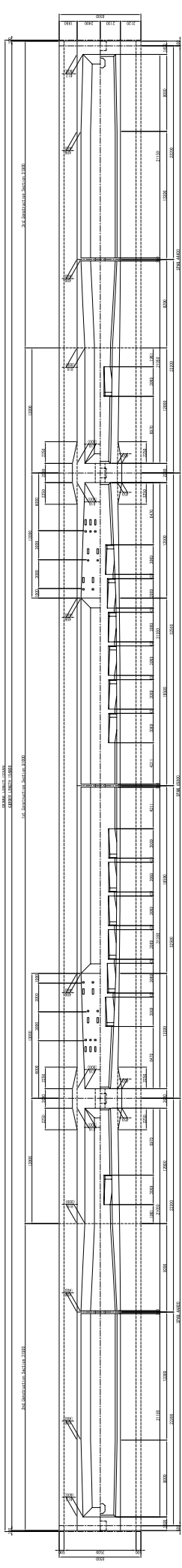
| | | | | |
|--|---|---|--|--------------------------------|
|  <p>TANROADS TANZANIA NATIONAL ROADS AGENCY P.O. Box 11364 DAR ES SALAAM</p> | <p>APPROVED:</p> <p>PROJECT ENGINEER</p> <p>CHIEF EXECUTIVE</p> | <p>JAPAN INTERNATIONAL COOPERATION AGENCY CONSULTANT</p> <p>Oriental Consultants Co., LTD. Eight-Japan Engineering Consultants Inc., International Development Center of Japan Inc.</p> | <p>DESIGNED</p> <p>DRAWN</p> <p>CHECKED</p> <p>REVISIONS</p> | <p>DATE</p> <p>DESCRIPTION</p> |
| <p>PROJECT: Preparatory Survey on the Project for Improvement of TAZARA Intersection</p> | | <p>DWG TITLE: TAZARA F/O BRIDGE P5-P8(East Bound)</p> | | <p>SCALE: As shown</p> |
| <p>DATE: _____</p> | | <p>DATE: _____</p> | | <p>DWG No. _____</p> |
| <p>Rev</p> | | <p>Rev</p> | | <p>Rev</p> |

TAZARA F/O BRIDGE P5-P8 (West Bound) SUPERSTRUCTURE (1) S=1:100

Side View



Plans View



| | | | |
|--------------------------------|---|--|----------------------|
| | JAPAN INTERNATIONAL COOPERATION AGENCY 1-1-1, Kasumigaoka 2-chome, Chiyoda-ku, Tokyo 100-8305, Japan TEL: +81-3-3502-1211 FAX: +81-3-3502-1215 E-MAIL: jica@jica.go.jp | PROJECT TITLE TAZARA F/O BRIDGE P5-P8 (West Bound) SUPERSTRUCTURE (1) | DRAWING NO. A6-10 |
| | PROJECT OWNER JICA | PROJECT CONSULTANT JICA | DESIGNER JICA |
| PROJECT NAME TAZARA RAILWAY | PROJECT NO. TAZARA | DRAWING TITLE TAZARA F/O BRIDGE P5-P8 (West Bound) SUPERSTRUCTURE (1) | DATE 2011.10.27 |