APPENDIX

Appendix 1: Member List of the Survey Team

Appendix 1. Member List of the Survey Team

1. Field Survey

OKADA Minoru	Leader for the Study / Deputy Director, General Affairs Department, JICA
MATSUSHITA Yuichi	Project Coordinator / Third Project Management Division, Grant Aid Management Department, JICA
MARUOKA Kenji	Chief Consultant / Road Transport Planner / Pacific Consultants International
TAKEUCHI Tomoaki	Highway Engineer / Pacific Consultants International
TAKAI Yoshimi	Bridge Engineer / Pacific Consultants International
FUKUCHI Haruo	Equipment Specialist / Construction Planning Consultant
NAKAMURA Mamoru	Geodetic Engineer / Geologist / Pacific Consultants International
MISONO Isao	River Engineer / Pacific Consultants International
TAKAHASHI Morichika	Construction Planning / Cost Estimator / Pacific Consultants International

2. Explanation of Draft Report

FUJIMOTO Masaya	Leader for the Study / Personnel Division, Personnel Department, JICA
MARUOKA Kenji	Chief Consultant / Road Transport Planner / Pacific Consultants International
TAKEUCHI Tomoaki	Highway Engineer / Pacific Consultants International

TAKAI Yoshimi	Bridge Engineer / Pacific Consultants International
FUKUCHI Haruo	Equipment Specialist / Construction Planning Consultant

Appendix 2: Survey Schedule

Appendix 2. Survey Schedule

a. Itinerary of the Field Survey (May 15, 2000 - July 3, 2000)

No.	Date	Day	Contents of Field Survey
1	May 15	Mon	Team departure (Narita to Beijing)
2	May 16	Tue	Team arrival (Beijing to Ulaanbaatar) Call at JICA Office and Embassy of Japan
3	May 17	Wed	Call at Ministry of Infrastructure (MOI), Finance and Economy (MOFAE) and Foreign Affairs (MOFA)
4	May 18	Thu	Site Survey
5	May 19	Fri	Explanation and Discussion at MOI
6	May 20	Sat	Team Meeting
7	May 21	Sun	Holiday
8	May 22	Mon	Meeting on Minutes of Discussions
9	May 23	Tue	Call at Mayor of Ulaanbaatar City Government (UBCG), Signing of the Minutes of Discussions, Report to JICA Office, Traffic Count Survey
10	May 24	Wed	Leader and Project Coordinator leaves (Ulaanbaatar to Narita) Traffic Count Survey
11	May 25	Thu	Data Collection, Obstacles Survey and Hydrology and Meteorology Survey
12	May 26	Fri	Data Collection, Obstacles Survey and Traffic Count Survey
13	May 27	Sat	Data Examination, Establishment of the Office
14	May 28	Sun	Holiday
15	May 29	Mon	Discussion on the Obstacles with MOI and UBCG
16	May 30	Tue	Data Collection, Obstacles Survey and Hydrology and Meteorology Survey
17	May 31	Wed	Data Collection, Obstacles Survey and Hydrology and Meteorology Survey
18	June 1	Thu	National Holiday, Data Examination
19	June 2	Fri	Discussion on the Flood of Selbe River with UBCG
20	June 3	Sat	Data Examination, Mr. Misono leaves (Ulaanbaatar to Beijing)
21	June 4	Sun	Holiday, Mr. Misono (Beijing to Narita), Mr. Takai arrives in (Narita to Beijing)
22	June 5	Mon	Data Collection, Mr. Takai arrives (Beijing to Ulaanbaatar)
23	June 6	Tue	Data Collection, Obstacles Survey and Road Surface Condition Survey
24	June 7	Wed	Obstacles Survey, Equipment Operation Survey and Road Surface Condition Survey
25	June 8	Thu	Obstacles Survey, Equipment Operation Survey and Road Surface Condition Survey

No.	Date	Day	Contents of Field Survey
26	June 9	Fri	Equipment Operation Survey and Bridge Condition Survey
27	June 10	Sat	Data Examination
28	June 11	Sun	Holiday
29	June 12	Mon	Road Surface Condition Survey, Bridge Condition Survey and Construction Method Survey
30	June 13	Tue	Discussion on the Improvement of Western End of Enkhtaivan Avenue with Mongolian Railway
31	June 14	Wed	Road Surface Condition Survey, Bridge Condition Survey and Construction and Procurement Survey
32	June 15	Thu	Road Surface Condition Survey, Bridge Condition Survey and Construction and Procurement Survey
33	June 16	Fri	Survey regarding Specification for requested Equipment
34	June 17	Sat	Data Examination and Working up of the Survey Result
35	June 18	Sun	Holiday
36	June 19	Mon	Discussion on all Items with UBCG
37	June 20	Tue	Working up of the Survey Result
38	June 21	Wed	Discussion on the Dood Selbe Bridge with UBCG
39	June 22	Thu	Working up of the Survey Result
40	June 23	Fri	Working up of the Survey Result
41	June 24	Sat	Working up of the Survey Result
42	June 25	Sun	Holiday
43	June 26	Mon	Discussion on all Items with UBCG
44	June 27	Tue	Preparing Progress Report
45	June 28	Wed	Discussion on the Obligations of Recipient Country with UBCG
46	June 29	Thu	Preparing Progress Report
47	June 30	Fri	Report to Embassy of Japan, JICA Office and MOI Cleaning the Office
48	July 1	Sat	Preparing Progress Report
49	July 2	Sun	Holiday, Preparing Progress Report
50	July 3	Mon	Team departure (Ulaanbaatar to Narita)

b. Itinerary of the Explanation of DF/R (August 28, 2000 - September 8, 2000)

No.	Date	Day	Contents of Field Survey
1	Aug 28	Mon	Team departure (Narita to Beijing)
2	Aug 29	Tue	Team arrival (Beijing to Ulaanbaatar) Call at JICA Office and Embassy of Japan
3	Aug 30	Wed	Explanation and Discussion on DF/R with MOI, UBCG and Ministry of Nature and the Environment
4	Aug 31	Thu	Explanation and Discussion on DF/R with Traffic Police and Department of Roads Leader (Narita to Beijing)
5	Sep 1	Fri	Explanation and Discussion on DF/R with UBCG and MOFA Leader (Beijing to Ulaanbaatar)
6	Sep 2	Sat	Site Survey
7	Sep 3	Sun	Holiday
8	Sep 4	Mon	Meeting on Minutes of Discussion, Explain and Discuss on DF/R with UBCG
9	Sep 5	Tue	Explanation and Discussion on DF/R with MOFAE and MOI
10	Sep 6	Wed	Signing of Minutes of Discussion, Report to Embassy of Japan and JICA Office
11	Sep 7	Thu	Team departure (Ulaanbaatar to Beijing)
12	Sep 8	Fri	Team arrival (Beijing to Narita)

Appendix 3: List of Party Concerned in the Recipient Country

Appendix 3 List of Party Concerned in the Recipient Country

Japanese Side

Embassy of Japan in Mongolia

FUKASAWA Hiroshi	First Secretary
FUJIMOTO Hiroshi	Third Secretary

Japan International Cooperation Agency, Mongolia Office

MATSUMOTO Kenji	Resident Representative
AMAGAI Tetsuo	Assistant Resident Representative
EGAWA Keizo	Assistant Resident Representative
HASHIMOTO Takumi	JICA Expert for Road Network Improvement

Japan International Cooperation System

SERIZAWA Shinichiro	Head, Non-project Grant Aid Division, Grant Aid Management Department

Mongolia Side

Ministry of Foreign Affairs

Mr. Davaasambuu	Deputy Director, Foreign Trade & Economic Coorperation Department
Mr. D. Munkhat	Director, FTECD
Ms. Nasanbuyan	Assistant Director

Ministry of Infrastructure

Mr. Bud	Director General, Department of Strategic Planning & Integrated Policy
Mr. T. Naranmandakh	Director, Project Implement & Coordination Division
Mr. Munkhat	Officer, PICD
Mr. B. Manduul	Officer, PICD
Mr. D. Munkhat	Staff

Department of Roads

Mr. B. Garangaibaatar	Deputy Director
Ms. E. Oyunchimeg	Director, Planning & Research Division

Ulaanbaatar City Government

Mr. M. Enkhbold	Mayor
Mr. C. Bat	Chief, Strategical Policy & Planning Department
Mr. G. Ulzii	Director, Capital Amenities & Investment Division
Mr. L. Battosooj	Officer, SPPD
Mr. Ariugerel	Officer, Land Relations & Real Estate Registry Department

Ministry of Finance and Economy

Mr. Dashdorj	Head, Fiscal Policy Department
Mr. N. Enkhbayar	Senior Engineer, Budgetary Policy Department
Mr. T. Dorjkhand	Economist

Ministry of Nature and the Environment

Ms. D. Sodnom	Senior Expert

Mongolia Railway

Mr. J. Nyamaa	Chief Engineer

Traffic Police

Mr. O. Batjargal	Director of Division
Mr. T. Ichinnorov	Head of Administrative Management Division of Department
Mr. L. Guntevsuren	Senior Inspector

Appendix 4: Minutes of Discussion

MINUTES OF DISCUSSIONS
ON BASIC DESIGN STUDY
ON THE PROJECT FOR IMPROVEMENT OF ROADS
IN ULAANBAATAR
IN MONGOLIA

In response to a request from the Government of Mongolia, the Government of Japan decided to conduct a Basic Design Study (hereinafter referred to as "the Study") on the Project for Improvement of Roads in Ulaanbaatar (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA dispatched to Mongolia the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Mr. Minoru Okada, Deputy Director, General Affairs Division, General Affairs Department, JICA, and is scheduled to stay in the country from May 16 to July 2, 2000.

The Team held discussions with the officials concerned of the Government of Mongolia and conducted a field survey at the study area.

In the course of discussions and field survey, both parties confirmed the main items described on the attached sheets. The Team will proceed with further works and prepare the Basic Design Study Report.

Ulaanbaatar, May 23, 2000

Minoru Okada
Leader,
Basic Design Study Team,
JICA

Rentsen Bud
Director General,
Depatrment of Strategic Planning and Integrated Policy,
Ministry of Infrastructure Development

Choimpog Bat
Chief,
Strategical Policy and Planning Department,
Ulaanbaatar City Government

Dalrai Davaasambuu
Deputy Director,
Foreign Trade and Economic Cooperation Department,
Ministry of External Relations

L. Dashdorj
Head,
Fiscal Policy Department,
Ministry of Finance

ATTACHMENT

1. Objective

The objective of the Project is to improve road transportation networks in Ulaanbaatar City in order to contribute to facilitate economic development and enhance social services.

2. Project Site

The project sites are located in Ulaanbaatar City as shown in ANNEX-1. However the final sites of the Project will be described by the Basic Design Study Team after further studies in Japan.

3. Responsible and Implementing Agency

(1) The Responsible Agency of the Project is the Ministry of Infrastructure Development (MOID). MOID shall coordinate agencies concerned in Mongolia.

(2) The Implementing Agency of the Project is the Ulaanbaatar City Government.

4. Items requested by the Government of Mongolia

(1) Following items were finally requested by the Mongolian side. JICA will assess the appropriateness of the request and will recommend to the Government of Japan for approval.

a) Improvement of the Roads

Details are listed in ANNEX-2.

b) Procurement of the Equipment

Details of items are listed in ANNEX-3.

(2) The Team indicated a plan to improve East Cross Intersection by chanellization considering an immediate effect instead of consrtucting flyover at the intersection requested by Mongolian side. The Mongolian side accepted the plan.

(3) The Mongolian side, from viewpoint of technical difficulty crossing six rail lines with securing safety, requested the Team to construct flyover or underpass for railway crossing at Western End of Enkhtaivan Avenue. While the Team will convey the request to Japanese Government and examine the type of railway crossing including of at-grade intersection.

(4) The Mongolian side requested the widening and improvement in the whole stretch of Teeverchid Road. The Team will deliberate priority sections of the stretch after returning in Japan.

(5) Concerning Procurement of Equipment, Mongolian side requested the Equipment not only for road construction but also for road maintenance.

5. Japan's Grant Aid Scheme

The Mongolian side understands the Japan's Grant Aid Scheme explained by the Team, as described in ANNEX-4.

6. Undertaking by Mongolian Side

The Mongolian side shall take necessary measures, as described in ANNEX-5, on condition that the Japan's Grant Aid will be implemented for the Project. Especially important items are described as follows;

(1) The Mongolian side shall take necessary measures to secure land, including relocations of all project affected persons and affected properties and utilities, under the ground, on the ground and above the ground, necessary for the Project before the implementation of the Project.

(2) The Mongolian side shall exempt Japanese juridical and physical nationals engaged in the Project from customs duties, internal taxes including VAT, and other fiscal levies which may be imposed in Mongolia regarding the supply of products and services under the verified contracts.

(3) The Mongolian side shall be responsible for any claims related to the Project which may be raised from third parties during implementation of the Project.

(4) The Mongolian side shall relocate the signals of intersections related to the Project appropriately by own responsibility and at own expense going along with the progress of the Project.

7. Schedule of the Study

(1) The consultants will proceed with further studies in Mongolia until July 2, 2000.

(2) JICA will prepare the draft report in English and dispatch a team in order to explain its contents at the end of August, 2000.

(3) In case that the contents of the report are accepted in principle by the Government of Mongolia, JICA will complete the final report and send it to the Government of Mongolia by September, 2000.

8. Other Miscellaneous Matters

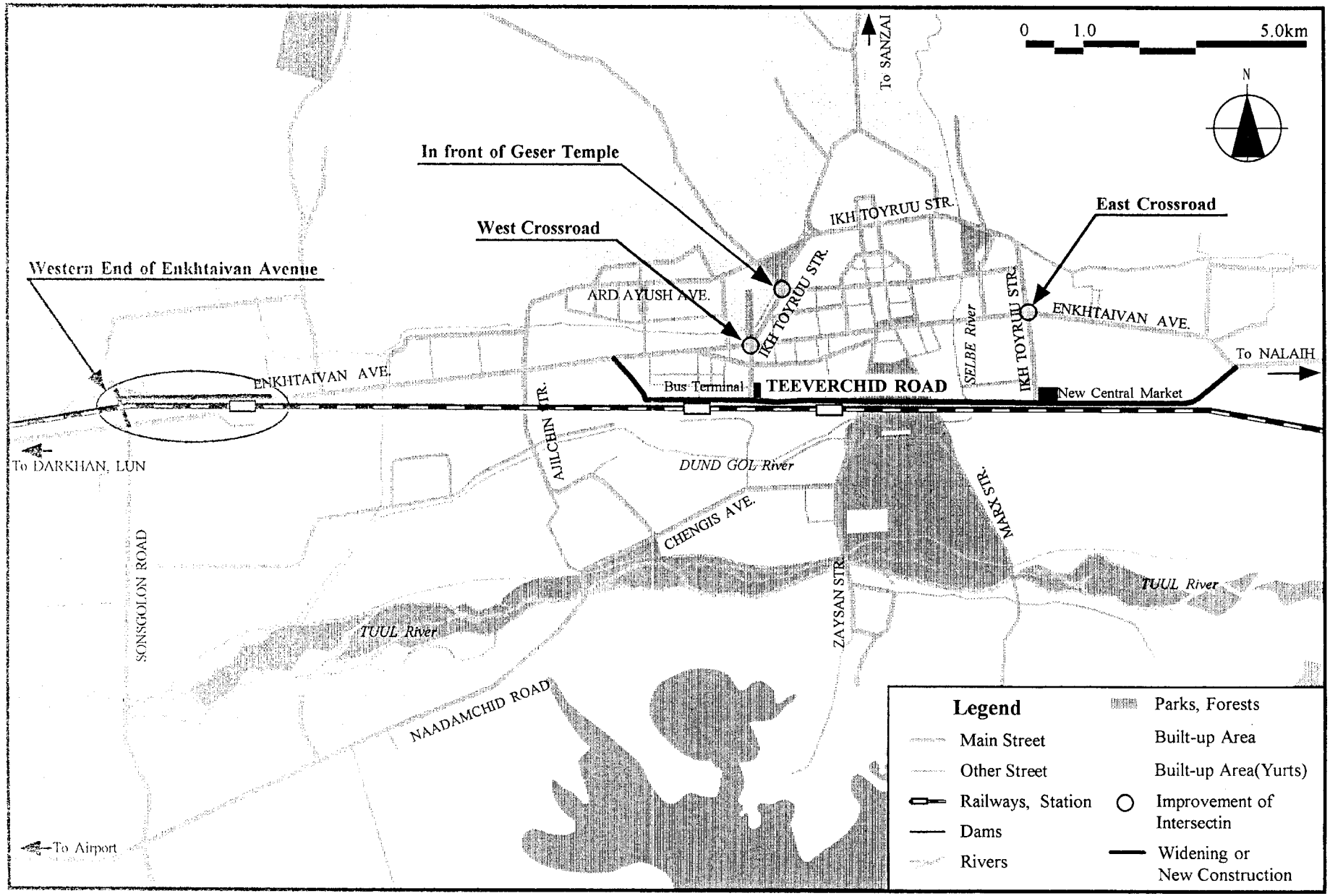
(1) The Mongolian side shall ensure enough budget and personnel to operate and maintain the facilities and equipment after completion of the Project.

(2) For the sake of the technology transfer on sustainable operation and maintenance, the Mongolian side pointed out the need for dispatch of Japanese experts as well as technical training of counterpart personnel in Japan. They also understood that another official request on technical cooperation should be submitted through diplomatic channel.

(3) The Mongolian side shall assign necessary number of counterpart personnel to the Team during

the period of the Study.

(4) The Mongolian side shall submit answers to the questionnaire which the Team handed to Mongolian side by June 30, 2000.



Project Location Map

ANNEX - I

A - 13

ANNEX-2

Outline of Requested Road Improvement

1. Road Improvement

1.1 Teeverchid Road Widening (8.4 km)

1.2 Western end of Enkhtaivan Avenue Widening (1.7 km)

1.3 Tolgoit – Sonsgolon cross New Road Construction (Approx. 0.45 km)

1.4 South Tolgoit Road New Construction (Approx. 0.35 km)

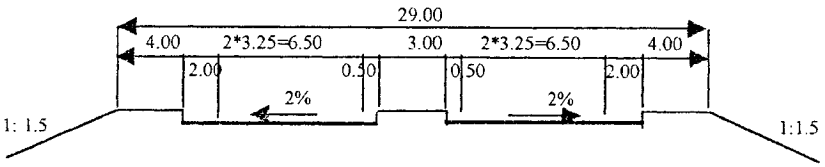
1.5 Three (3) Intersections Improvement (In front of Geser Temple, West Crossroad and East Crossroad)

2. Road Classification and Typical Cross Sections

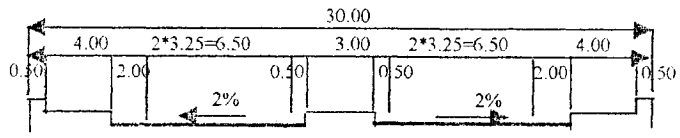
2.1 Road Classification

1) Teeverchid Road Widening	Class B (Primary Road)
2) Western end of Enkhtaivan Avenue Widening	Class B (Primary Road)
3) Tolgoit – Sonsgolon cross New Road Construction	Class B (Primary Road)
4) South Tolgoit Road New Construction	Class B (Primary Road)

2.2 Typical Cross Sections



Road Section (Total Width)



Bridge Section (Total width)

ANNEX-3

Outline of Requested Road Construction/Maintenace Equipment

	Equipment	Specification	Quantity
1.	Road Maintenance Truck	6.5 ton	6
2.	Universal Truck	2 ton	6
3.	Backhoe Loader	100 HP	9
4.	Medium Size Combi Rollers w/ One Vibratory Drum in front and Four smooth tyres at rear/Asphalt Compactor	7 ton	3
5.	Asphalt Pavers	6.5 m	1
6.	Asphalt Pavers	2 - 4 m	2
7.	4-wheel Drive Forward Tipping	2 ton	4
8.	Semi-trailer	35 ton	1
9.	Asphalt Plant	60 ton/hr	1
10.	Double Cab Pick Up	2000 cc	2
11.	Concrete and Asphalt Cutter	30 cm & Floor Saws	8
12.	Plate Compactors (Hand)	80 – 100 kg	8
13.	Vibratory Rammaers	70 kg	8
14.	Core Drilling Machine	15 cm dia.	2
15.	Marker	Hot type	2
16.	Spare Parts		lump sum

Japan's Grant Aid Program

1. Japan's Grant Aid Procedures

(1) The Japan's Grant Aid is executed by the following procedures.

- **Application** (request made by a recipient country)
- **Study** (Preparatory Study / Basic Design Study conducted by JICA)
- **Appraisal & Approval** (Appraisal by the Government of Japan and Approval by the Cabinet of Japan)
- **Determination of Implementation** (Exchange of Notes between the Governments of Japan and the recipient country)
- **Implementation** (Implementation of the Project)

(2) Firstly, an application or a request for a Project submitted by the recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is suitable for Japan's Grant Aid. If the request is deemed appropriate, the Government of Japan entrusts a study on the request to JICA (Japan International Cooperation Agency).

Secondly, JICA conducts the study (Basic Design Study), using a Japanese consulting firm(s). If the background and objective of the requested project are not clear, a Preparatory Study is conducted prior to a Basic Design Study.

Thirdly, the Government of Japan appraises the project to see whether or not the Project is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA and the results are then submitted for approval by the Cabinet.

Fourthly, the Project approved by the Cabinet becomes official when pledges by the Exchange of Notes (E/N) signed by the both Governments.

Finally, for the implementation of the Project, JICA assists the recipient country in preparing contracts and so on.

2. Basic Design Study

(1) Contents of the Study

The purpose of the Study (Preparatory Study/Basic Design Study) conducted on a project requested by JICA is to provide a basic document necessary for appraisal of the project by the Japanese Government. The contents of the Study are as follows:

(a) to confirm background, objectives, benefits of the project and also institutional capacity of agencies concerned of the recipient country necessary for project implementation;

(b) to evaluate appropriateness of the Project for the Grant Aid Scheme from a technical, social and economical point of view;

(c) to confirm items agreed on by both parties concerning the basic concept of the Project;

(d) to prepare a basic design of the project,

(e) to estimate cost involved in the project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure 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 in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

(2) Selecting (a) Consulting Firm(s)

For smooth implementation of the study, JICA uses (a) consulting firm(s) registered. JICA selects (a) firm(s) through proposals submitted by firms which are interested. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference made by JICA.

The consulting firm(s) used for the study is(are) recommended by JICA to a recipient country after Exchange of Notes, in order to maintain technical consistency .

3. Japan's Grant Aid Scheme

(1) What is Grant Aid?

The Grant Aid provides a recipient country with non-reimbursable funds needed to procure facilities, equipment and services for economic and social development of the country under the following principles in accordance with relevant laws and regulations of Japan. The Grant Aid is not in a form of donation as such.

(2) Exchange of Notes (E/N)

The Japan's Grant Aid is extended in accordance with the Exchange of Notes by both Governments, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid,etc., are confirmed.

(3) "The period of the Grant Aid" means Japanese single fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedure such as Exchange of Notes, concluding contracts with (a) consulting firm(s) and (a) contractor(s) and a final payment to them must be completed. However in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of single fiscal year at most by mutual agreement between the two Governments.

(4) Under the Grant, in principle, products and services of origins of Japan or the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant may be used for the purchase of products or services of a third country origin.

However, the prime contractors, namely, consulting, construction and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means Japanese physical persons or Japanese juridical persons controlled by Japanese physical persons.)

(5) Necessity of the "Verification"

The Government of the recipient country or its designated authority will conclude into contracts in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. The "Verification" is deemed necessary to secure accountability to Japanese tax payers.

(6) Undertakings required to the Government of the recipient country

In the implementation of the Grant Aid, the recipient country is required to undertake necessary measures such as the following:

(a) to secure land necessary for the sites of the project and to clear and level the land prior to commencement of the construction work,

(b) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,

(c) to secure buildings prior to the installation work in case the Project is providing equipment,

(d) to ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid,

(e) to exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts,

(f) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

(7) Proper Use

The recipient country is required to maintain and use facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for their operation and maintenance as well as to bear all expenses other than those to be borne by the Grant Aid.

(8) Re-export

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

(9) Banking Arrangement (B/A)

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

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

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, including relocations of all project affected persons and affected properties and utirities, under the ground, on the ground and above the ground		●
2	To clear the site when needed		●
3	To relocate the signals of intersections related to the Project appropriately		●
4	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
5	To ensure prompt unloading and customs clearance at the port of disembarkation		
	1) Transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and customs clearance of the products		●
	3) Internal transportation to the project site	●	
6	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
7	To exempt Japanese juridical and physical nationals engaged in the Project from customs duties, internal taxes including VAT, and other fiscal levies which may be imposed in the recipient country regarding the supply of products and services under the verified contract		●
8	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		●
9	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for the Project		●
10	To be responsible for any claims related to the Project which may be raised from third parties in the Project area during implementation of the Project.		●

MINUTES OF DISCUSSIONS
ON BASIC DESIGN STUDY
ON THE PROJECT FOR IMPROVEMENT OF ROADS
IN ULAANBAATAR
IN MONGOLIA
(EXPLANATION ON DRAFT REPORT)

In May 2000, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Basic Design Study Team on the Project for Improvement of Roads in Ulaanbaatar (hereinafter referred to as "the Project") to Mongolia, and through discussion, field survey, and technical examination of the results in Japan, JICA prepared a draft report of the study.

In order to explain and to consult Mongolia on the components of the draft report, JICA sent to Mongolia the Draft Report Explanation Team (hereinafter referred to as "the Team"), which is headed by Mr. Masaya Fujimoto, Personnel Division, Personnel Department, JICA, from August 29 to September 7, 2000.

As a result of discussions, both parties confirmed the main items described on the attached sheets.

Ulaanbaatar, September 6, 2000

Masaya Fujimoto
Leader,
Draft Report Explanation Team,
JICA

Rentsen Bud
Director General,
Roads,Transportation,Information,Communications and Tourism Policy and Coordination Department,
Ministry of Infrastructure

Choimpog Bat
Chief,
Strategical Policy and Planning Department,
Ulaanbaatar City Government

Damdin Tsogtbaatar
Deputy Director,
Multilateral Cooperation Department,
Ministry of Foreign Affairs

Tserenpil Davaasuren
Deputy Director,
State Treasury Department,
Ministry of Finance and Economy

ATTACHMENT

1. Components of the Draft Report

The Government of Mongolia agreed and accepted in principle the components of the draft report explained by the Team.

2. Japan's Grant Aid Scheme

The Mongolian side understands the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Mongolia as explained by the Team and described in ANNEX-4 and ANNEX-5 of the Minutes of Discussions signed by both parties on May 23, 2000.

3. Schedule of the Study

JICA will complete the final report in accordance with the confirmed item and send it to the Government of Mongolia by October, 2000.

4. Other Relevant Issues

(1) The Mongolian side shall ensure enough budget and personnel to operate and maintain the facilities and equipment after the completion of the Project.

(2) The Mongolian side shall take necessary measures to secure land, including relocations of all project affected persons and affected properties and utilities, under the ground, on the ground and above the ground, necessary for the Project before the implementation of the Project.

(3) The Mongolian side shall be responsible for any claims related to the Project which may be raised from third parties during implementation of the Project.

(4) The Mongolian side shall relocate the signals on intersections related to the Project appropriately by own responsibility and expense going along with the progress of the Project.

(5) The Mongolian side promised to exempt Japanese juridical and physical nationals engaged in the Project from customs duties, internal taxes including VAT, and other fiscal levies which may be imposed in Mongolia regarding the supply of products and services under the verified contracts.

(6) The Team handed one copy of the draft detailed specification of the equipment and drawings to Mr. Guntev Ulzii, Chief, Construction and Investment Department, Ulaanbaatar City Government. Both sides agreed that this draft specification is confidential and should not be duplicated or released to any outside parties.

Appendix 5: Cost Estimation borne by the Recipient Country

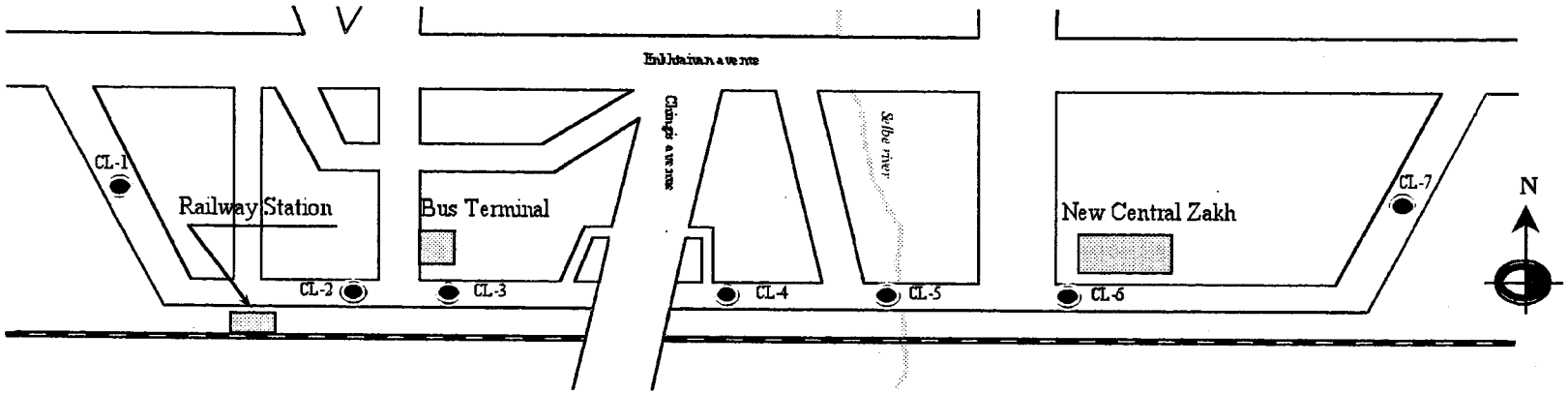
COST BREAKDOWN

(Tg)

No.	Item	Teeverchid road	Intersection		
			West Crossroads	East Crossroads	Geser Temple
1	Electric cable	119,676,885	850,340	9,353,740	11,309,522
2	Communication cable	270,938,192	1,212,121	13,333,331	
3	Heating supply line	313,575,000			
4	Sewerage line	700,000,000			
5	Drinking water supply line	143,000,000			
6	Flood water disposal channel	225,000,000			
7	Fence	57,000,000			
8	Plantation	55,380,500			
9	Street lighting	32,567,000	34,202,000	32,102,000	21,643,000
10	Traffic signal	1,015,101	388,636	388,636	419,009
11	2 apartment houses for 8 households	29,400,000			
	Sub Total	**1,947,552,678**	**36,653,097**	**55,177,707**	**33,371,531**
	Total	**2,072,755,013**			
12	Trolley contact wire net and poles	56,400,000			
	GRAND TOTAL	**2,129,155,013**			

Appendix 6: References

6-1 Traffic Volume Data



Summary of Traffic Volume on Teeverchid Road in May 2000

veh./day

	Car	Bus	Trucks	M-cycle	Total	Heavy Vehicles
	①	②	③	④		②+③
CL-1	7,989	70	1,639	19	9,718	1,709
CL-2	14,657	613	1,456	32	16,757	2,069
CL-3	18,245	404	1,385	33	20,067	1,789
CL-4	17,382	359	1,286	33	19,061	1,645
CL-5	17,700	472	1,292	47	19,512	1,765
CL-6	17,043	108	1,143	49	18,343	1,251
CL-7	5,199	78	811	10	6,097	888

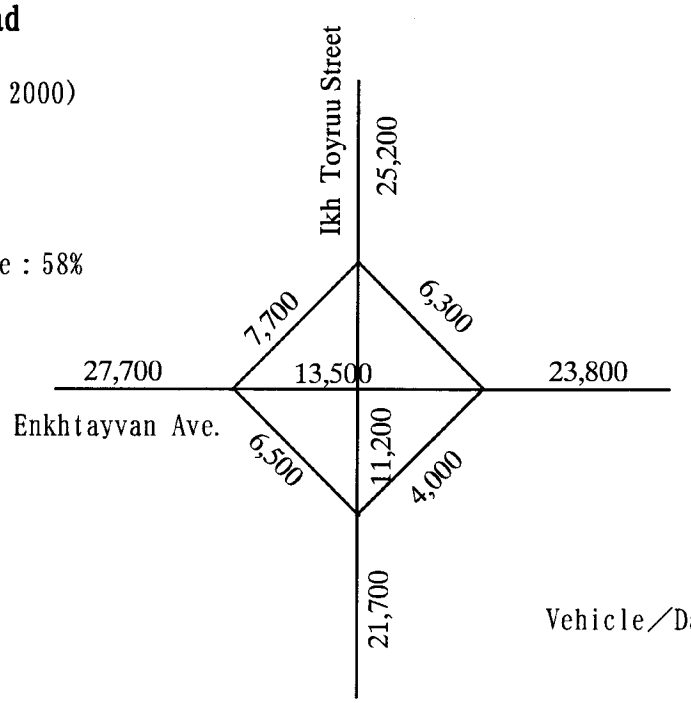
Analysis of East Crossroad

1. Existing Traffic Volume (May 2000)

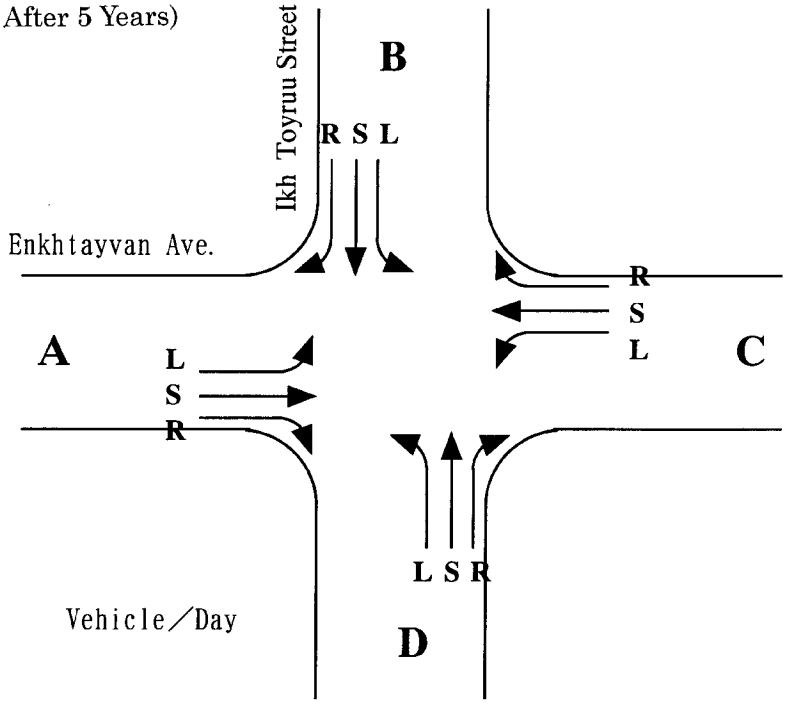
Peak Rate : 7%

Directional Distribution Rate : 58%

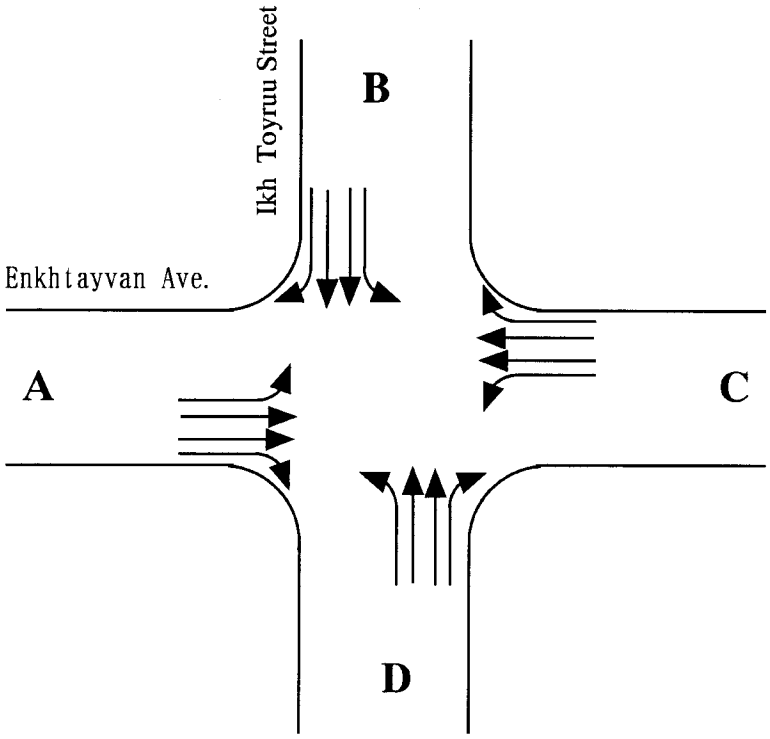
Heavy Vehicle Rate : 5%



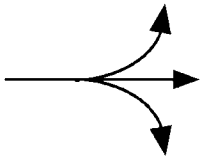
2. Design Traffic Volume
(Growth Rate : 5% / Year, After 5 Years)



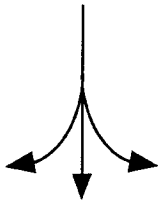
3. Number of Lanes after Improvement



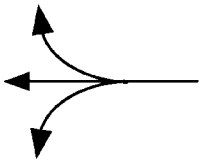
4. Phase



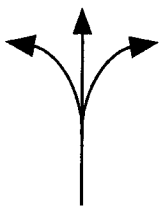
1 ϕ



2 ϕ



3 ϕ



4 ϕ

The Result of Intersection Analysis

East Crossroad (After 5 Years)

Roads		A			B			C			D				
Direction		Right	Straight	Left	Right	Straight	Left	Right	Straight	Left	Right	Straight	Left		
Number of Lanes		1	2	1	1	2	1	1	2	1	1	2	1		
Basic Capacity (Veh./hour)		1,800	4,000	1,800	1,800	4,000	1,800	1,800	4,000	1,800	1,800	4,000	1,800		
Lane Width Factor		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		
(Lane Width) m		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Vertical Gradient Factor		1.0	1.0	1.0	0.99	0.99	0.99	1.0	1.0	1.0	0.95	0.95	0.95		
(Vertical Gradient) %		1	1	1	−2	−2	−2	−1	−1	−1	2	2	2		
Heavy Vehicle Factor		0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97		
(Heavy Vehicle Rate) %		5	5	5	5	5	5	5	5	5	5	5	5		
(Pedestrian Factor) %		No Effective			No Effective			No Effective			No Effective				
(Effective Green Time) Second		22	22	22	18	18	18	12	12	12	14	14	14		
Saturation Flow Rate (Veh./hour)		1,746	3,880	1,746	1,729	3,841	1,729	1,746	3,880	1,746	1,659	3,686	1,659		
Traffic Volume (Veh./hour)		321	666	380	380	553	311	225	483	143	143	400	232		
Flow Ratio		0.184	0.172	0.218	0.220	0.144	0.180	0.129	0.124	0.082	0.086	0.108	0.140	Saturation of Phase	Saturation of Intersection
Minimum Phase	1 ϕ			0.218										0.218	
	2 ϕ						0.180							0.180	0.662
	3 ϕ								0.124					0.124	
	4 ϕ												0.140	0.140	

The Result of Intersection Analysis

East Crossroad (After 10 Years)

Roads		A			B			C			D				
Direction		Right	Straight	Left	Right	Straight	Left	Right	Straight	Left	Right	Straight	Left		
Number of Lanes		1	2	1	1	2	1	1	2	1	1	2	1		
Basic Capacity (Veh./hour)		1,800	4,000	1,800	1,800	4,000	1,800	1,800	4,000	1,800	1,800	4,000	1,800		
Lane Width Factor		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		
(Lane Width) m		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Vertical Gradient Factor		1.0	1.0	1.0	0.99	0.99	0.99	1.0	1.0	1.0	0.95	0.95	0.95		
(Vertical Gradient) %		1	1	1	−2	−2	−2	−1	−1	−1	2	2	2		
Heavy Vehicle Factor		0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97		
(Heavy Vehicle Rate) %		5	5	5	5	5	5	5	5	5	5	5	5		
(Pedestrian Factor) %		No Effective			No Effective			No Effective			No Effective				
(Effective Green Time) Second		54	54	54	44	44	44	31	31	31	34	34	34		
Saturation Flow Rate (Veh./hour)		1,746	3,880	1,746	1,729	3,841	1,729	1,746	3,880	1,746	1,659	3,686	1,659		
Traffic Volume (Veh./hour)		410	850	486	486	706	397	287	616	183	183	510	296		
Flow Ratio		0.235	0.219	0.278	0.281	0.184	0.230	0.164	0.159	0.105	0.110	0.138	0.179	Saturation of Phase	Saturation of Intersection
Minimum Phase	1 ϕ			0.278										0.278	
	2 ϕ						0.230							0.230	0.845
	3 ϕ								0.159					0.159	
	4 ϕ												0.179	0.179	

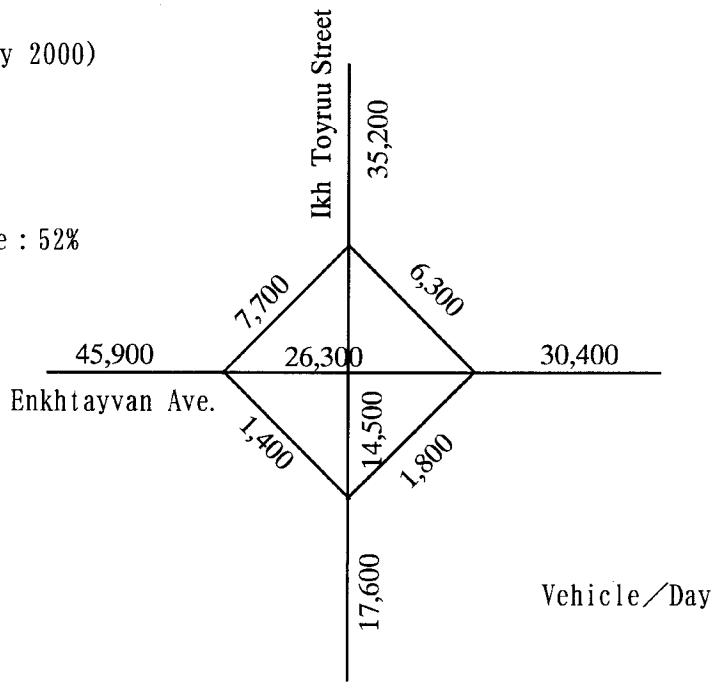
Analysis of West Crossroad

1. Existing Traffic Volume (May 2000)

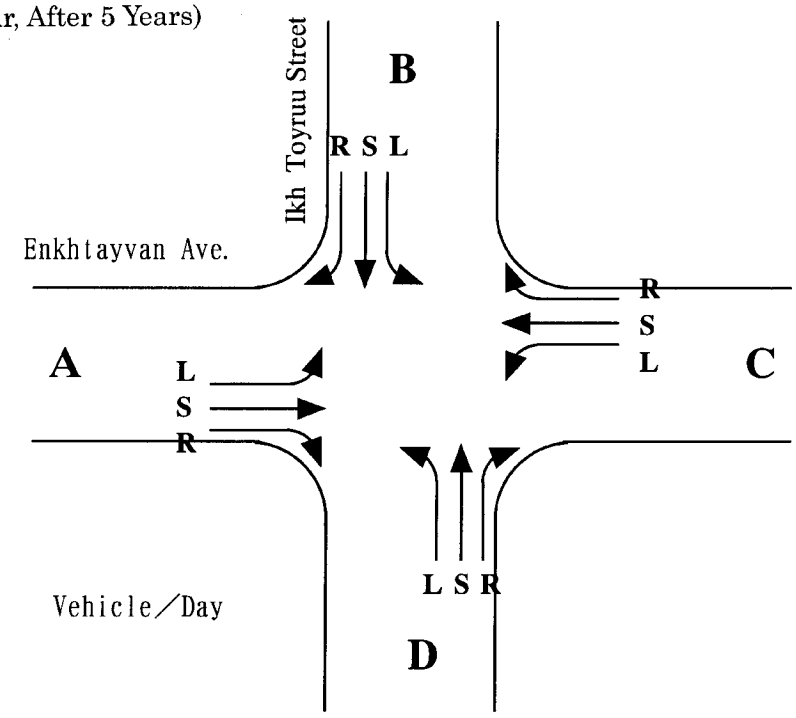
Peak Rate : 7%

Directional Distribution Rate : 52%

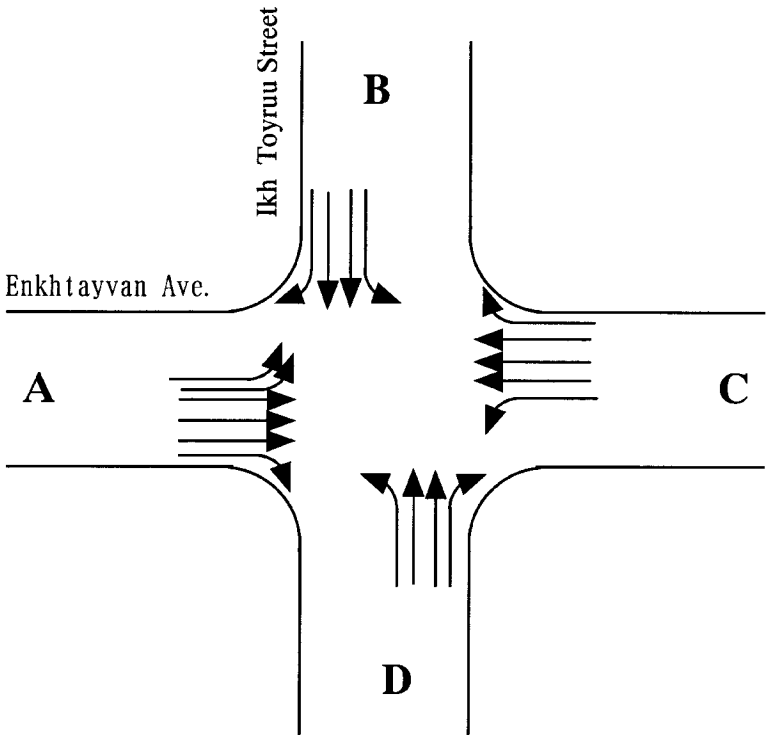
Heavy Vehicle Rate : 9%



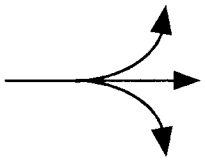
2. Design Traffic Volume
(Growth Rate : 5% / Year, After 5 Years)



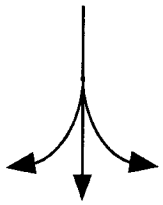
3. Number of Lanes after Improvement



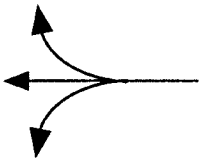
4. Phase



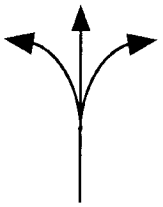
1 ϕ



2 ϕ



3 ϕ



4 ϕ

The Result of Intersection Analysis

West Crossroad (After 5 Years)

Roads		A			B			C			D				
Direction		Right	Straight	Left	Right	Straight	Left	Right	Straight	Left	Right	Straight	Left		
Number of Lanes		1	3	2	1	2	1	1	3	1	1	2	1		
Basic Capacity (Veh./hour)		1,800	6,000	3,600	1,800	4,000	1,800	1,800	6,000	1,800	1,800	4,000	1,800		
Lane Width Factor		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		
(Lane Width) m		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Vertical Gradient Factor		1.0	1.0	1.0	0.99	0.99	0.99	1.0	1.0	1.0	0.95	0.95	0.95		
(Vertical Gradient) %		1	1	1	−2	−2	−2	−1	−1	−1	2	2	2		
Heavy Vehicle Factor		0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94		
(Heavy Vehicle Rate) %		9	9	9	9	9	9	9	9	9	9	9	9		
(Pedestrian Factor) %		No Effective			No Effective			No Effective			No Effective				
(Effective Green Time) Second		32	32	32	23	23	23	26	26	26	22	22	22		
Saturation Flow Rate (Veh./hour)		1,692	5,640	3,384	1,675	3,722	1,675	1,692	5,640	1,692	1,607	3,572	1,607		
Traffic Volume (Veh./hour)		58	1,162	812	812	641	102	94	1,072	73	73	591	55		
Flow Ratio		0.034	0.206	0.240	0.485	0.172	0.061	0.055	0.190	0.043	0.045	0.165	0.034	Saturation of Phase	Saturation of Intersection
Minimum Phase	1 ϕ			0.240										0.240	0.767
	2 ϕ					0.172								0.172	
	3 ϕ								0.190					0.190	
	4 ϕ											0.165		0.165	

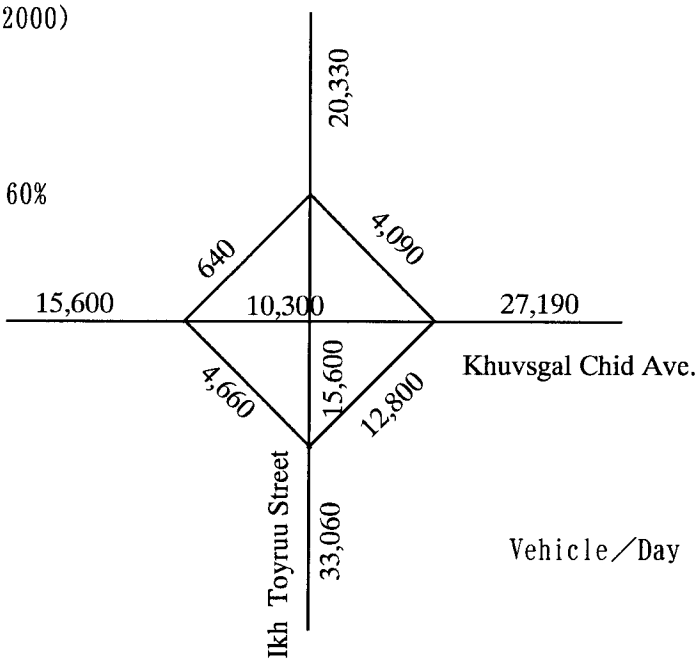
Analysis of In front of Geser Temple

1. Existing Traffic Volume (May 2000)

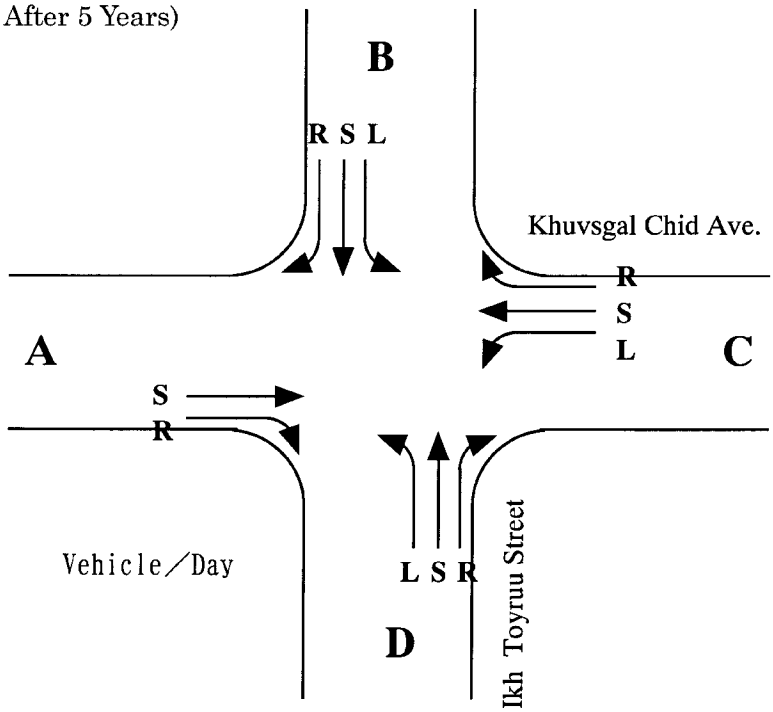
Peak Rate : 8%

Directional Distribution Rate : 60%

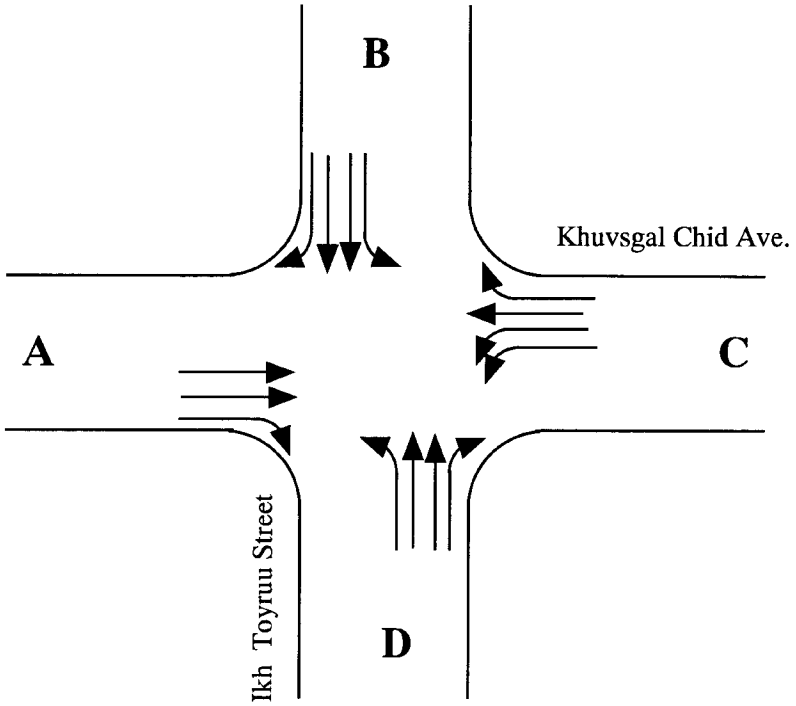
Heavy Vehicle Rate : 8%



2. Design Traffic Volume
(Growth Rate : 5% / Year, After 5 Years)

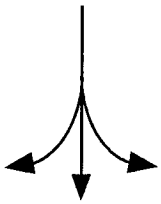


3. Number of Lanes after Improvement

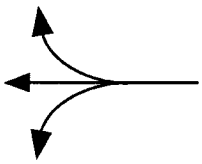


4. Phase

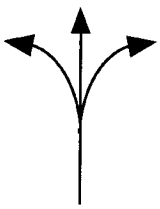
1 ϕ



2 ϕ



3 ϕ



4 ϕ

The Result of Intersection Analysis

In front of Geser Temple (After 5 Years)

Roads		A			B			C			D				
Direction		Right	Straight	Left	Right	Straight	Left	Right	Straight	Left	Right	Straight	Left		
Number of Lanes		1	2		1	2	1	1	1	2	1	2	1		
Basic Capacity (Veh./hour)		1800	2000		1800	2000	1800	1800	2000	1800	1800	2000	1800		
Lane Width Factor		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		
(Lane Width) m		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Vertical Gradient Factor		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		
(Vertical Gradient) %		1	1		−1	−1	−1	−1	−1	−1	1	1	1		
Heavy Vehicle Factor		0.95	0.95		0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
(Heavy Vehicle Rate) %		8	8		8	8	8	8	8	8	8	8	8		
(Pedestrian Factor) %		No Effective			No Effective			No Effective			No Effective				
(Effective Green Time) Second		18	18		27	27	27	53	53	53	40	40	40		
Saturation Flow Rate (Veh./hour)		1,710	3,800		1,710	3,800	1,710	1,710	1,900	3,420	1,710	3,800	1,710		
Traffic Volume (Veh./hour)		181	401		26	607	159	238	600	746	746	910	272		
Flow Ratio		0.106	0.106		0.015	0.160	0.093	0.139	0.316	0.218	0.436	0.240	0.159	Saturation of Phase	Saturation of Intersection
Minimum Phase	1 ϕ		0.106											0.106	
	2 ϕ					0.160								0.160	0.821
	3 ϕ								0.316					0.316	
	4 ϕ											0.240		0.240	

6-2: Meteorological and Hydrological Data

Table-1 Monthly Average Temperature (1961-1998) [℃]

Observatory	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave.
Ulaanbaatar	-21.7	-17.3	-8.3	1.1	9.5	14.8	17.1	15.1	8.4	0.2	-11.1	-19.3	-1.0

Table-2 Monthly Maximum Temperature (1961-1999) [℃]

Observatory	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Maximum/ Observed Date
Ulaanbaatar	-1.8	8.5	18.3	25.0	31.6	34.5	38.0	34.6	29.1	22.5	13.0	6.1	38.0 /1999.7.24

Table-3 Monthly Minimum Temperature (1961-1998) [℃]

Observatory	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Minimum/ Observed Date
Ulaanbaatar	-39.6	-37.3	-33.0	-26.1	-10.4	-3.1	-0.2	-3.3	-13.5	-22.5	-33.1	-38.5	-39.6 /1979.1.30

Table-4 Monthly and Annual Average Rainfall (1961-1998) [mm]

Observatory	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Sub-Total (Nov-Mar)	Sub-Total (Apr-Oct)	Annual
Ulaanbaatar	1.7	1.9	3.2	7.7	13.1	48.4	74.4	70.5	30.2	8.4	4.4	3.0	14.1	252.7	266.9

Table-5 Maximum Daily Rainfall (1961-1998) [mm]

Observatory	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Maximum/ Observed Date
Ulaanbaatar	2.0	3.9	6.7	14.3	29.4	45.4	51.4	51.7	36.0	14.2	5.6	8.0	51.7
Observed Year	1994	1993	1981	1979	1978	1992	1984	1984	1975	1984	1972	1969	1984.8.27

Table-6 Average Rainy Days (1961-1998) [Days]

Observatory	Jun	Jul	Aug	Sep	Oct	Annual
Ulaanbaatar	13	18	16	9	6	62

Table-7 Maximum Past Rainfall (1961-1998) [mm]

Observatory	5 minute	10 minute	20 minute	40 minute	60 minute	90 minute	1440 minute	2880 minute
Ulaanbaatar	6.4	10.0	12.8	15.3	15.3	15.3	51.7	62.1

Table-8 Average Wind Velocity (1961-1998) [m/s]

Observatory	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Ulaanbaatar	1.4	2.0	2.7	3.5	3.6	3.2	2.8	2.6	2.6	2.4	1.8	1.5	2.5

Table-9 Maximum Wind Velocity (1961-1998) [m/s]

Observatory		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Ulaanbaatar	Max. Velocity	18	30	19	24	20	18	15	14	16	18	16	20	30
	Observed Year	1988	1998	1981	1986	1983	1984	1982	1995	1983	1993	1989	1997	1998.2.29

Table-10 Average Relative Humidity (1961-1998) [%]

Observatory	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Ulaanbaatar	77	72	61	51	47	55	63	65	62	61	70	77	63

6-3: Geological Data

Results of Laboratory Test

The soil samples for laboratory test are collected from each borehole, at a sampling depth of GL-2 m to GL-4 m. The soil is adjudged to be sandy gravel.

Results of Laboratory Test

Item	Results
Grain size analysis	Gravel : 76 % Sand : 22 % Cohesive soil : 2 %
Specific Gravity (Gs)	2.66
Water Content (%)	2.25
Degree of Saturation (%)	21.5
Wet Density ρt (g/cm^3)	2.15
Dry Density ρd (g/cm^3)	2.11
Cohesion*1 (kgf/cm^2)	(0.02)
Degree of Shear Resistance Angle*2 (ϕ °)	(37.9)
Coefficient of Permeability*3 (cm/sec)	(3.6×10^{-1}>)

*1 by Ia.V.Iurik Kief, 1976
*2 Standard of JPA $\phi = 15 + \sqrt{15N}$ (N = 35)
*3 by D_{20} Creager

Results of CBR Test

The samplings for Design CBR Test are obtained from ten locations, seven from Teeverchid Road, two from Western End of Enktaivan Avenue and one from Railway Crossing. The sampling depth is GL-1 m from the ground surface.

Results of CBR Test

No./Location	Soil	Water Content (after Soaking)	CBR (%)
CB-1 Teeverchid Road	Gravelly Sandy	9.50 (9.60)	2.86
CB-2 Teeverchid Road	Clay	6.23 (5.27)	74.5
CB-3 Teeverchid Road	Sandy Gravel	4.40 (5.74)	91.52
CB-4 Teeverchid Road	Sandy Gravel	6.00 (5.44)	93.80
CB-5 Teeverchid Road	Sandy Gravel	5.22 (5.35)	100.00
CB-6 Teeverchid Road	Sandy Gravel	16.70 (16.45)	1.78
CB-7 Teeverchid Road	Sandy Clay	5.10 (5.86)	69.67
CB-8 Western End of Enktaivan	Sandy Gravel	3.75 (5.33)	100.00
Ave.	Sandy Gravel	11.80 (14.42)	2.22
CB-9 Western End of Enktaivan	Gravelly Sandy	4.08 (6.45)	59.87
Ave.	Clay		
CB-10 Railway Crossing	Sandy Gravel		

Calculated value : Average 59.6, Standard Deviation 41.68, Section CBR 17.95

BORING LOG

PRIJECT: Basic Design Study On The Project For Improvement Of Roads In Ulaanbaatar

DATE: June 4. 2000 ~

LOCATION: SelbeRiverLeft

HOLE NO.: BH-1 ELEVATION: ASL 1290.20 m MACHINE: Rotary

DEPTH: 20.00 m WATER LEVEL: G L 3.20 m SURVEY BY: GEOTECH

SCALE m	ELEVATION m	DEPTH m	THICKNESS m	SOIL: SYMBOL	VISUAL CLASSIFICATION	COLOR	OBSERVATION
	1289.	0.5	0.50		Surface Soil	Brown	Soil is clayey (Embankment)
1–20					Cobble and Sandy Gravel		Sand and clay are matrix ϕ=3-10cm Pebble Unhomogeneity Well graded sandstone and shale are pebble.
	1270.	20	19.5				
21–30							

DEPTH m	N/PENETRATION	NO. OF BLOWS AT EACH 10cm: 10 cm	20 cm	30 cm
1.15	38/30	8	14	16
1.45–2.15	50/28	15	17	18/8
2.43–3.15	30/30	9	10	11
3.45–4.15	50/18	25	25/8	
4.33–5.15	50/8	50/8		
5.23–6.15	50/6	50/6		
6.21–7.15	50/5	50/5		
7.20–8.15	50/5	50/5		
8.20–9.15	50/25	7	15	28/5
9.40–10.15	50/10	25		
10.25–11.15	50/15	41	9/5	
11.30–12.15	50/5	50/5		
12.20–13.15	50/11	33	17/1	
13.26–14.15	50/7	50/7		
14.22–15.15	50/10	50		
15.25–16.15	50/21	22	27	1/1
16.36–17.15	50/6	50/6		
17.21–18.15	50/7	50/7		
18.22–19.15	50/3	50/3		
19.18–20.15	50/2	50/2		
20.17				

N — VALUE: 10 20 30 40 50 60

INSITU TEST AND SAMPLING

DEPTH m	INSITU TEST or SAMPLING	NO
4	Core tube	1
4.5		

JICA

BORING LOG

PRIJECT: Basic Design Study On The Project For Improvement Of Roads In Ulaanbaatar

DATE: June 12. 2000

LOCATION: SelbeRiver Center

HOLE NO.: BH-2

ELEVATION: ASL 1289.80 m

MACHINE: Rotary

DEPTH: 20.00 m

WATER LEVEL: G L 2.80 m

SURVEY BY: GEOTECH

SCALE m	ELEVATION m	DEPTH m	THICKNESS m	SOIL: SYMBOL	SOIL: VISUAL CLASSIFICATION	SOIL: COLOR	SOIL: OBSERVATION	STANDARD PENETRATION: DEPTH m	N/PENETRATION	NO. OF BLOWS AT EACH 10cm: 10 cm	20 cm	30 cm
1							Surface soil is Coblle and Pebble	1.15	42/30	10	15	17
2							matrix is sand Gravel is well graded.	1.45 2.15	23/30	5	9	9
3							2. 8m Water level	2.45 3.15	27/30	3	10	14
4							Soil is unhomogeneity.	3.45 4.15	35/30	7	12	16
5								4.45 5.15	38/30	6	14	18
6							5m, Clayey Sandy Gravel	5.45 6.15	40/30	7	15	18
7								6.45 7.15	50/15	25	25/5	
8								7.30 8.15	50/14	26	24/4	
9								8.29 9.15	50/28	6	14	30/8
10					Cobble and Sandy Gravel	Brown		9.43 10.15	50/15	25	5	
11								10.30 11.15	50/3	50/3		
12								11.18 12.15	50/5	50/5		
13								12.20 13.15	50/7	50/7		
14								13.22 14.15	50/5	50/5		
15								14.20 15.15	50/3	50/3		
16								15.18 16.15	50/8	50/8		
17								16.23 17.15	50/2	50/2		
18								17.17 18.15	50/1	50/1		
19								18.16 19.15	50/5	50/5		
20	1269.	20	20.0					19.20 20.15	50/4	50/4		
21								20.19				

N — VALUE: 10 20 30 40 50 60

INSITU TEST AND SAMPLING: DEPTH m	INSITU TEST or SAMPLING	NO
3	Core tube	
3.5		

JICA

BORING LOG

PRIJECT	Basic Design Study On The Project For Improvement Of Roads In Ulaanbaatar	DATE	June 6. 2000
LOCATION	SelbeRiverRight	~	
HOLE NO.	BH-3	ELEVATION	ASL 1289.90 m
MACHINE	Rotary		
DEPTH	20.00 m	WATER LEVEL	G L 2.80 m
SURVEY BY	GEOTECH		

SCALE m	ELEVATION m	DEPTH m	THICKNESS m	SOIL: SYMBOL	SOIL: VISUAL CLASSIFICATION	SOIL: COLOR	SOIL: OBSERVATION
1							Surface soil is cobble and pebble(5-15cm)
2							Sand and clay are matrix Febble ϕ =3-10mm
3							
4							5m below Very dense
5							
6							
7							
8							
9							
10					Cobble and Sandy Gravel	Brown	
11							
12							
13							
14							
15							
16							
17							
18							
19							
20	1269.	20.0	20.0				
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

STANDARD PENETRATION

DEPTH m	N/PENETRATION	NO. OF BLOWS AT EACH 10cm: 10 cm	20 cm	30 cm
1.15	45/30	15	15	15
1.45 2.15	36/30	9	12	15
2.45 3.15	30/30	10	10	10
3.45 4.15	38/30	9	12	17
4.45 5.15	45/30	10	14	21
5.45 6.15	50/11	45	5/1	
6.26 7.15	50/4	50/4		
7.19 8.15	50/4	50/4		
8.19 9.15	50/9	50/9		
9.24 10.15	50/11	40	10/1	
10.26 11.15	50/15	41	9/5	
11.30 12.15	50/13	44	6/3	
12.28 13.15	50/15	28	22/5	
13.30 14.15	50/8	50/8		
14.25 15.15	50/15	38	12/5	
15.30 16.15	50/18	21	29/8	
16.33 17.15	50/10	50/10		
17.25 18.15	50/9	50/9		
18.24 19.15	50/8	50/8		
19.23 20.15	50/15	38	12/5	
20.30				

N — VALUE: 10 20 30 40 50 60

INSITU TEST AND SAMPLING

DEPTH m	INSITU TEST or SAMPLING	NO
2	Core tube	3
2.5		

JICA

6-4: Road Surface Condition Survey Data

Inventory Date	28,29,30,31 may	Surveyor Name	Chultemdorj

<1>	Street Name	Teeverchid Str.
<2>	Street No.	1.7.2000
<3>	Kind of Street	City Road
<4>	Length of St.	16.6674
<5>	Origin	
<6>	Destination	
7	Design Traffic Volume	
8	Design Load	

Notes: Inventory items for No.19,21,24,26,28 and 30 shall be inspected by examination or echnical/visual evaluation refering supplemental evaluation list.

Evaluation Point List

	Point	4	3	2	1	33	Barrier	good	partially	many damage	non
13	Terrain	DID	other urban	Flat	Mountain	34	Slope	Non	good	partially	many damage
17	Improved/not	Good	not good	bad	Not yet	35	Retaining Wall	Non	good	partially	many damage
18	Pavemen Type	Concrete	asphalt	surface treatment	Gravel	36	Drainage	good	partially	many damage	non
19	Trick of Pavs	Enough	Medium	Poor	Bad	37	Culvert	Non	good	partially	many damage
21	Flat/Roughness	Smooth	Medium/Rough	Poor	Bad	38	Manhole	Non	good	partially	many damage
22	Cracks	Non	10% or more	30%or more	50% or more	39	Road sign	good	partially	many damage	non
23	Whoel track/Rut	Non	10mm or more	30mm or more	50mm or more	40	Traffic sign	good	partial	many damage	non
25	Gaps	Non	10mm or more	20mm or more	30mm or more	41	Signed	good	partially	many damage	non
27	Damage of BC	Non	A few	1 point/10m2	many	42	Facility/toowice	good	partially	many damage	non
29	General Point	Good		bad	Dangerous	43	Tree	good	partially	many damage	non
31	Shoulder	2m or more	1m or more	1m or less	None	44	Illumination	good	partially	many damage	non
32	Sidewalk	5m or more	3m or more	1m or more	1m or less	45	Dangerous Place	Non	a few	many	urgent

<9>	Kin Post	2.7	3.99	4.8	6.342	7.2	7.7	8.334									
<11>	Length of Survey Area	2.7	1.29	0.81	1.542	0.858	0.5	0.634									
12	No. of Survey Area	1	2	3	4	5	6	7									
<13>	Terrian	4	4	4	4	4	4	4									
<14>	Width	7	7	7	7	10.5	12	7									
<15>	Traffic Lade Number	2	2	2	2	3	4	2									
<17>	Improved or not	3	2	2	2	2	2	2									
<18>	Type of pavement	3	3	3	3	3, 4	4, 3	3									
21	Flatness/Roughness	2	2	2	2	2	2	1									
<22>	Cracks	1	1	2	2	2	1	1									
<23>	Wheel truck/Rut	2	3	3	3	3	2	3									
<25>	Gaps	3	3	3	3	3	3	3									
<27>	Damage at basecourse	3	3	3	3	2	2	2									
<29>	General Visual Degree	1	2	2	2	2	2	2									
<31>	Shoulder Width	4	4	4	4	1	2	4									
<32>	Sidewalk widh	1	1	1	1	2	1	1									
<33>	Barrier	2	2	2	1	4	2	1									
<34>	Slope	3	3	3	3	3	3	3									
<35>	Retaining Wall	4	4	4	4	4	4	4									
<36>	Drainage	3	1	1	1	1	1	3									
<37>	Culvert	4	2	4	4	4	4	4									
<38>	Manhole	4	4	4	4	4	4	4									
<39>	Traffic Sign	3	3	3	1	1	1	3									
<40>	Road Sign	3	3	3	3	3	3	3									
<41>	Signal	1	1	1	1	1	1	1									
<42>	Facilities for Snow/Ice	1	1	1	1	1	1	1									
43	Tree	1	1	1	1	3	3	1									
<44>	Illumination	1	1	1	1	1	1	1									
<45>	Dangerous place	2	2	2	3	2	2	4									

Comparison with Results of Road Surface Consition Survey (2000,1998)

98

No	Item	A	B	C	D	E	F	G	
11	Length	0.63	0.50	0.86	1.54	0.81	1.29	2.70	8.33
21	Flatress/Roughness	2	2	2	2	3	3	4	3
22	Cracks	3	3	3	3	3	3	3	3
23	Ratting	3	3	3	3	3	3	3	3
25	Gaps	3	3	3	3	3	3	3	3
27	Damage at Basecourse	2	2	2	2	3	3	3	2
29	Visual Degree	3	3	3	3	3	3	3	3
	Evaluation Rank	2.5	2.5	2.5	2.5	3.0	3.0	3.4	2.9

00

No		A	B	C	D	E	F	G	
11	Length	0.63	0.50	0.86	1.54	0.81	1.29	2.70	8.33
21	Flatress/Roughness	1	2	2	2	2	2	2	2
22	Cracks	1	1	2	2	2	1	1	1
23	Ratting	3	2	3	3	3	3	2	3
25	Gaps	3	3	3	3	3	3	3	3
27	Damage at Basecourse	2	2	3	3	3	3	3	3
29	Visual Degree	2	2	2	2	2	2	1	2
	Evaluation Rank	1.8	2.0	2.4	2.4	2.4	2.2	1.9	2.1

		1	2	3	4
21	Flatress/Roughness	Bad	Poor	Rough	Smooth
22	Cracks	50% or more	30% or more	10% or more	Non
23	Ratting	50mm or more	30mm or more	10mm or more	Non
25	Gaps	30mm or more	20mm or more	10mm or more	Non
27	Damage at Basecourse	Many	1 point/10m2	Few	Non
29	Visual Degree	Dangerous	Bad	Poor	Non
	Evaluation Rank	4~3.5: Good	3.5~2.5: Fair	2.5~1.5: Poor	1.5~1.0: Bad

Table Evaluation for Road Surface Condition Survey (1998)

1998 / A

Category			Average Point	Weight Factor	Evaluated Point	Remark
Trafficability	21	Flatress/Roughness	2	0.35	0.70	
	29	Visual Degree	3	0.15	0.45	
Life of Pavement	22	Cracks	3	0.15	0.45	
	23	Ratting	3	0.10	0.30	
	25	Gaps	3	0.10	0.30	
	27	Damage at Basecourse	2	0.15	0.30	
		Total		1.00	2.50	
		Evaluation Rank	4~3.5: Good	3.5~2.5: Fair	2.5~1.5: Poor	1.5~1.0: Bad

1998 / B

Category			Average Point	Weight Factor	Evaluated Point	Remark
Trafficability	21	Flatress/Roughness	2	0.35	0.70	
	29	Visual Degree	3	0.15	0.45	
Life of Pavement	22	Cracks	3	0.15	0.45	
	23	Ratting	3	0.10	0.30	
	25	Gaps	3	0.10	0.30	
	27	Damage at Basecourse	2	0.15	0.30	
		Total		1.00	2.50	
		Evaluation Rank	4~3.5: Good	3.5~2.5: Fair	2.5~1.5: Poor	1.5~1.0: Bad

1998 / C

Category			Average Point	Weight Factor	Evaluated Point	Remark
Trafficability	21	Flatress/Roughness	2	0.35	0.70	
	29	Visual Degree	3	0.15	0.45	
Life of Pavement	22	Cracks	3	0.15	0.45	
	23	Ratting	3	0.10	0.30	
	25	Gaps	3	0.10	0.30	
	27	Damage at Basecourse	2	0.15	0.30	
		Total		1.00	2.50	
		Evaluation Rank	4~3.5: Good	3.5~2.5: Fair	2.5~1.5: Poor	1.5~1.0: Bad

1998 / D

Category			Average Point	Weight Factor	Evaluated Point	Remark
Trafficability	21	Flatress/Roughness	2	0.35	0.70	
	29	Visual Degree	3	0.15	0.45	
Life of Pavement	22	Cracks	3	0.15	0.45	
	23	Ratting	3	0.10	0.30	
	25	Gaps	3	0.10	0.30	
	27	Damage at Basecourse	2	0.15	0.30	
		Total		1.00	2.50	
		Evaluation Rank	4~3.5: Good	3.5~2.5: Fair	2.5~1.5: Poor	1.5~1.0: Bad

Table Evaluation for Road Surface Condition Survey (1998)

1998 / E

Category			Average Point	Weight Factor	Evaluated Point	Remark
Trafficability	21	Flatress/Roughness	3	0.35	1.05	
	29	Visual Degree	3	0.15	0.45	
Life of Pavement	22	Cracks	3	0.15	0.45	
	23	Ratting	3	0.10	0.30	
	25	Gaps	3	0.10	0.30	
	27	Damage at Basecourse	3	0.15	0.45	
		Total		1.00	3.00	
		Evaluation Rank	4~3.5: Good	3.5~2.5: Fair	2.5~1.5: Poor	1.5~1.0: Bad

1998 / F

Category			Average Point	Weight Factor	Evaluated Point	Remark
Trafficability	21	Flatress/Roughness	3	0.35	1.05	
	29	Visual Degree	3	0.15	0.45	
Life of Pavement	22	Cracks	3	0.15	0.45	
	23	Ratting	3	0.10	0.30	
	25	Gaps	3	0.10	0.30	
	27	Damage at Basecourse	3	0.15	0.45	
		Total		1.00	3.00	
		Evaluation Rank	4~3.5: Good	3.5~2.5: Fair	2.5~1.5: Poor	1.5~1.0: Bad

1998 / G

Category			Average Point	Weight Factor	Evaluated Point	Remark
Trafficability	21	Flatress/Roughness	4	0.35	1.40	
	29	Visual Degree	3	0.15	0.45	
Life of Pavement	22	Cracks	3	0.15	0.45	
	23	Ratting	3	0.10	0.30	
	25	Gaps	3	0.10	0.30	
	27	Damage at Basecourse	3	0.15	0.45	
		Total		1.00	3.35	
		Evaluation Rank	4~3.5: Good	3.5~2.5: Fair	2.5~1.5: Poor	1.5~1.0: Bad

Table Evaluation for Road Surface Condition Survey (2000)

2000 / A

Category			Average Point	Weight Factor	Evaluated Point	Remark
Trafficability	21	Flatress/Roughness	1	0.35	0.35	
	29	Visual Degree	1	0.15	0.15	
Life of Pavement	22	Cracks	3	0.15	0.45	
	23	Ratting	3	0.10	0.30	
	25	Gaps	2	0.10	0.20	
	27	Damage at Basecourse	2	0.15	0.30	
		Total		1.00	1.75	
		Evaluation Rank	4~3.5: Good	3.5~2.5: Fair	2.5~1.5: Poor	1.5~1.0: Bad

2000 / B

Category			Average Point	Weight Factor	Evaluated Point	Remark
Trafficability	21	Flatress/Roughness	2	0.35	0.70	
	29	Visual Degree	1	0.15	0.15	
Life of Pavement	22	Cracks	2	0.15	0.30	
	23	Ratting	3	0.10	0.30	
	25	Gaps	2	0.10	0.20	
	27	Damage at Basecourse	2	0.15	0.30	
		Total		1.00	1.95	
		Evaluation Rank	4~3.5: Good	3.5~2.5: Fair	2.5~1.5: Poor	1.5~1.0: Bad

2000 / C

Category			Average Point	Weight Factor	Evaluated Point	Remark
Trafficability	21	Flatress/Roughness	2	0.35	0.70	
	29	Visual Degree	2	0.15	0.30	
Life of Pavement	22	Cracks	3	0.15	0.45	
	23	Ratting	3	0.10	0.30	
	25	Gaps	3	0.10	0.30	
	27	Damage at Basecourse	2	0.15	0.30	
		Total		1.00	2.35	
		Evaluation Rank	4~3.5: Good	3.5~2.5: Fair	2.5~1.5: Poor	1.5~1.0: Bad

2000 / D

Category			Average Point	Weight Factor	Evaluated Point	Remark
Trafficability	21	Flatress/Roughness	2	0.35	0.70	
	29	Visual Degree	2	0.15	0.30	
Life of Pavement	22	Cracks	3	0.15	0.45	
	23	Ratting	3	0.10	0.30	
	25	Gaps	3	0.10	0.30	
	27	Damage at Basecourse	2	0.15	0.30	
		Total		1.00	2.35	
		Evaluation Rank	4~3.5: Good	3.5~2.5: Fair	2.5~1.5: Poor	1.5~1.0: Bad

Table Evaluation for Road Surface Condition Survey (2000)

2000 / E

Category			Average Point	Weight Factor	Evaluated Point	Remark
Trafficability	21	Flatress/Roughness	2	0.35	0.70	
	29	Visual Degree	2	0.15	0.30	
Life of Pavement	22	Cracks	3	0.15	0.45	
	23	Ratting	3	0.10	0.30	
	25	Gaps	3	0.10	0.30	
	27	Damage at Basecourse	2	0.15	0.30	
		Total		1.00	2.35	
		Evaluation Rank	4~3.5: Good	3.5~2.5: Fair	2.5~1.5: Poor	1.5~1.0: Bad

2000 / F

Category			Average Point	Weight Factor	Evaluated Point	Remark
Trafficability	21	Flatress/Roughness	2	0.35	0.70	
	29	Visual Degree	1	0.15	0.15	
Life of Pavement	22	Cracks	3	0.15	0.45	
	23	Ratting	3	0.10	0.30	
	25	Gaps	3	0.10	0.30	
	27	Damage at Basecourse	2	0.15	0.30	
		Total		1.00	2.20	
		Evaluation Rank	4~3.5: Good	3.5~2.5: Fair	2.5~1.5: Poor	1.5~1.0: Bad

2000 / G

Category			Average Point	Weight Factor	Evaluated Point	Remark
Trafficability	21	Flatress/Roughness	2	0.35	0.70	
	29	Visual Degree	1	0.15	0.15	
Life of Pavement	22	Cracks	2	0.15	0.30	
	23	Ratting	3	0.10	0.30	
	25	Gaps	3	0.10	0.30	
	27	Damage at Basecourse	1	0.15	0.15	
		Total		1.00	1.90	
		Evaluation Rank	4~3.5: Good	3.5~2.5: Fair	2.5~1.5: Poor	1.5~1.0: Bad

Table Rating of Soundness Evaluation for the Selbe River Bridge

Evaluation Item			Rating Point (E.P.)	Bridge (E.P.)	Weight Factor(W/F)	Point (E.P.)*(W/F)
Durability	Degree of superstructure damage and defect		good to bad 1 2 3 4	3	0.6	1.8
	Degree of substructure damage and defect		good to bad 1 2 3 4	3	0.4	1.2
Load Capacity	Low traffic volume (heavy vehicle with axle load less than 7 ton)		1		0.2	
	High traffic volume (heavy vehicle with axle load greater than 7 ton)(Heavy Vehicle ratio 12%)		3	3	0.2	0.6
Function	Constructed record	Constructed after 1970 (use less than 30 years)	1		0.1	
		Constructed before 1970 (use more than 30 years)	3	3	0.1	0.3
	Effective width and Flood flow	Sufficient width for traffic capacity and flood flow	1		0.2	
		Insufficient width for traffic capacity and flood flow	3	3	0.2	0.6
Overall evaluation for bridge (Range of point)		D: Sound	1.5~2.5		Min. 1.5	D
		C: Fairly sound	2.5~3.5			C
		B: Unsound / Lack of safety	3.5~4.25			B
		A: Danger	4.25~5.5		Max. 5.5	A 4.5

Table Rating of Soundness Evaluation for Central Market Bridge

Evaluation Item			Rating Point (E.P.)	Bridge (E.P.)	Weight Factor(W/F)	Point (E.P.)*(W/F)
Durability	Degree of superstructure damage and defect		good to bad 1 2 3 4	3	0.6	1.8
	Degree of substructure damage and defect		good to bad 1 2 3 4	3	0.4	1.2
Load Capacity	Low traffic volume (heavy vehicle with axle load less than 7 ton)		1		0.2	
	High traffic volume (heavy vehicle with axle load greater than 7 ton)(Heavy Vehicle ratio 12%)		3	3	0.2	0.6
Function	Constructed record	Constructed after 1970 (use less than 30 years)	1		0.1	
		Constructed before 1970 (use more than 30 years)	3	3	0.1	0.3
	Effective width and Flood flow	Sufficient width for traffic capacity and flood flow(No river)	1	1	0.2	0.2
		Insufficient width for traffic capacity and flood flow	3		0.2	
Overall evaluation for bridge (Range of point)		D: Sound	1.5~2.5		Min. 1.5	D
		C: Fairly sound	2.5~3.5			C
		B: Unsound / Lack of safety	3.5~4.5			B 4.1
		A: Danger	4.5~5.5		Max. 5.5	A