

APPENDIX 10-2-4 ***** FINANCIAL ANALYSIS FOR THE STUDY ON THE IMPROVEMENT PLAN
FOR TRANSSHIPMENT FACILITIES AT ZAMYN-UUD STATION IN MONGOLIA PLAN 2

	SENSITIVITY ANALYSIS (2)										INVESTMENT REVENUE		% UP		% DOWN	
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004				
PROFIT & LOSS STATEMENT																
OPERATING REVENUE	0	17534	34801	57219	59289	61208	78933	81218	81218	101522	101522	101522				
OPERATING COST	0	5873	11695	16322	16634	16928	17222	17500	17500	17500	17500	17500				
PERSONNEL COST	0	1724	3423	4502	4663	4816	4968	5112	5112	5112	5112	5112				
ENERGY COST	0	1603	3181	4195	4395	4476	4618	4752	4752	4752	4752	4752				
MAINTENANCE COST	0	2545	5091	7636	7636	7636	7636	7636	7636	7636	7636	7636				
DEPRECIATION	0	18079	36158	54237	54237	54237	54237	54237	54237	54237	54237	54237				
OPERATING PROFIT	0	-6418	-13051	-13340	-11601	-9957	7474	9481	9481	29786	29786	29786				
INTEREST	0	2284	4380	16203	15709	15171	14588	13646	12644	11623	10265	11474				
NET PROFIT	0	-8701	-17432	-29543	-27310	-25127	-7114	-4165	-3163	18163	19520	18311				
ACCUMULATED NET PROFIT	0	-8701	-26133	-55676	-82986	-108114	-115228	-119393	-122556	-104393	-84873	-66562				
FINANCE PROGRAM																
FINANCE IN FOREIGN CURRENCY																
BORROWING	437311	440591	443895	0	0	0	0	0	0	0	0	0				
REPAYMENT	0	0	0	0	0	0	0	0	0	0	0	0				
LOAN BALANCE	437311	877902	1321798	1321798	1321798	1321798	1321798	1321798	1321798	1321798	1321798	1321798				
INTEREST DURING CONSTRUCTION	3255	6535	9840	0	0	0	0	0	0	0	0	0				
INTEREST	0	0	0	9913	9913	9913	9913	9913	9913	9913	9913	9913				
FINANCE IN LOCAL CURRENCY																
BORROWING	114192	104815	95466	0	0	0	0	0	0	0	0	0				
REPAYMENT	0	0	0	24694	26926	29109	47123	50072	51073	63751	0	0				
LOAN BALANCE	114192	219007	314474	289780	262853	233744	186622	136550	85476	21726	98685	79912				
INTEREST	0	2284	4380	6289	5796	5257	4675	3732	2731	1710	485	1974				
CASH FLOW STATEMENT																
CASH FLOW																
OPERATING PROFIT	-548248	-536587	-525142	40897	42635	44280	61711	63718	63718	75374	-22634	74307				
DEPRECIATION	0	-6418	-13051	-13340	-11601	-9957	7474	9481	9481	29786	29786	29786				
INVESTMENT (-)	0	18079	36158	54237	54237	54237	54237	54237	54237	54237	54237	54237				
SALVAGE VALUE	548248	548248	548248	0	0	0	0	0	0	0	0	0				
FIRR	0	0	0	0	0	0	0	0	0	0	0	0				

1.0396%

(UNIT: THOUSAND TUGRIK)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
PROFIT & LOSS STATEMENT												
OPERATING REVENUE	101522	101522	101522	101522	101522	101522	101522	101522	101522	101522	101522	101522
OPERATING COST	17500	17500	17500	17500	17500	17500	17500	17500	17500	17500	17500	17500
PERSONNEL COST	5112	5112	5112	5112	5112	5112	5112	5112	5112	5112	5112	5112
ENERGY COST	4752	4752	4752	4752	4752	4752	4752	4752	4752	4752	4752	4752
MAINTENANCE COST	7636	7636	7636	7636	7636	7636	7636	7636	7636	7636	7636	7636
DEPRECIATION	54237	54237	54237	54237	54237	54237	54237	54237	54237	54237	54237	54237
OPERATING PROFIT	29786	29786	29786	29786	29786	29786	29786	29786	29786	29786	29786	29786
INTEREST	10768	9854	11496	10596	9852	8919	10101	9173	8421	7652	6849	6188
NET PROFIT	19017	19932	18289	19189	19934	20867	19685	20612	21364	22133	22937	23597
ACCUMULATED NET PROFIT	-47545	-27613	-9324	9866	29800	50666	70351	90963	112328	134461	157398	180995

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
FINANCE PROGRAM												
FINANCE IN FOREIGN CURRENCY												
BORROWING	0	0	0	0	0	0	0	0	0	0	0	0
REPAYMENT	44060	44060	44060	44060	44060	44060	44060	44060	44060	44060	44060	44060
LOAN BALANCE	1189618	1145558	1101498	1057438	1013378	969318	925258	881198	837138	793079	749019	704959
INTEREST DURING CONSTRUCTION	0	0	0	0	0	0	0	0	0	0	0	0
INTEREST	9170	8840	8509	8179	7848	7518	7167	6857	6526	6196	5865	5535

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
FINANCE IN LOCAL CURRENCY												
BORROWING	0	98638	0	0	0	75613	0	0	0	0	0	94972
REPAYMENT	29194	0	28466	20717	30111	0	29862	21074	21911	23661	16508	0
LOAN BALANCE	50717	149355	120889	100172	70061	145673	115812	94738	72827	49166	32658	127630
INTEREST	1598	1014	2987	2418	2003	1401	2913	2316	1895	1457	983	653

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
CASH FLOW STATEMENT												
CASH FLOW												
OPERATING PROFIT	29786	29786	29786	29786	29786	29786	29786	29786	29786	29786	29786	29786
DEPRECIATION	54237	54237	54237	54237	54237	54237	54237	54237	54237	54237	54237	54237
INVESTMENT (-)	0	128746	0	8649	0	106656	0	9715	9631	8649	16606	128746
SALVAGE VALUE	0	0	0	0	0	0	0	0	0	0	0	0
FIRR	84022	-44724	84022	75374	84022	-22634	84022	74307	74392	75374	67417	-44724

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(UNIT: THOUSAND TUGRIK)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	TOTAL
=====										
PROFIT & LOSS STATEMENT										
=====										
OPERATING REVENUE	101522	101522	101522	101522	101522	101522	101522	101522	101522	2907928
OPERATING COST	17500	17500	17500	17500	17500	17500	17500	17500	17500	539667
PERSONNEL COST	5112	5112	5112	5112	5112	5112	5112	5112	5112	157008
ENERGY COST	4752	4752	4752	4752	4752	4752	4752	4752	4752	145947
MAINTENANCE COST	7636	7636	7636	7636	7636	7636	7636	7636	7636	236712
DEPRECIATION	54237	54237	54237	54237	54237	54237	54237	54237	54237	1681339
OPERATING PROFIT	29786	29786	29786	29786	29786	29786	29786	29786	29786	886922
INTEREST	7757	8916	7964	6994	6371	5369	4347	3304	4374	293254
NET PROFIT	22028	20870	21821	22792	23414	24416	25439	26481	25412	393669
ACCUMULATED NET PROFIT	203023	223893	245714	268506	291920	316336	341775	368257	393669	
=====										
FINANCE PROGRAM										
=====										
FINANCE IN FOREIGN CURRENCY										

BORROWING	0	0	0	0	0	0	0	0	0	1321798
REPAYMENT	44060	44060	44060	44060	44060	44060	44060	44060	44060	1013378
LOAN BALANCE	660899	616839	572779	528719	484659	440599	396539	352479	308419	30130401
INTEREST DURING CONSTRUCTION	0	0	0	0	0	0	0	0	0	19630
INTEREST	5205	4874	4544	4213	3883	3552	3222	2891	2561	211901
=====										
FINANCE IN LOCAL CURRENCY										

BORROWING	74451	0	0	0	0	0	0	69998	0	805104
REPAYMENT	0	31047	31998	14605	33591	34593	35616	0	35589	750063
LOAN BALANCE	202081	171034	139036	124432	90841	56247	20632	90630	55041	4122691
INTEREST	2553	4042	3421	2781	2489	1817	1125	413	1813	81353
=====										
CASH FLOW STATEMENT										
=====										
CASH FLOW										

OPERATING PROFIT	29786	29786	29786	29786	29786	29786	29786	29786	29786	886922
DEPRECIATION	54237	54237	54237	54237	54237	54237	54237	54237	54237	1681339
INVESTMENT (-)	106656	0	0	18364	0	0	0	106656	0	2418837
SALVAGE VALUE	0	0	0	0	0	0	0	0	0	409146
FIRR										
=====										
	-22634	84022	84022	65658	84022	84022	84022	-22634	493168	358569
=====										
WEIGHTED AVERAGE INTERES 0.9004%										

APPENDIX 10-2-5 ***** FINANCIAL ANALYSIS FOR THE STUDY ON THE IMPROVEMENT PLAN
FOR TRANSHIPMENT FACILITIES AT ZAMYN-UUD STATION IN MONGOLIA PLAN 2

(UNIT: THOUSAND TUGRIK)

SENSITIVITY ANALYSIS (3)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
OPERATING REVENUE	0	17534	34801	57219	59269	61208	78933	81218	81218	101522	101522	101522
OPERATING COST	0	5873	11695	16322	16634	16928	17222	17500	17500	17500	17500	17500
PERSONNEL COST	0	1724	3423	4502	4663	4816	4968	5112	5112	5112	5112	5112
ENERGY COST	0	1603	3181	4185	4335	4476	4618	4752	4752	4752	4752	4752
MAINTENANCE COST	0	2545	5091	7636	7636	7636	7636	7636	7636	7636	7636	7636
DEPRECIATION	0	19887	39774	59660	59660	59660	59660	59660	59660	59660	59660	59660
OPERATING PROFIT	0	-8225	-16667	-18764	-17025	-15381	2050	4057	4057	24362	24362	24362
INTEREST	0	2512	4841	17893	17433	16929	16382	15476	14511	13527	12216	13732
NET PROFIT	0	-10738	-21509	-36657	-34458	-32310	-14332	-11418	-10453	10835	12146	10630
ACCUMULATED NET PROFIT	0	-10738	-32246	-68903	-103361	-135671	-150003	-161421	-171874	-161039	-148893	-138263

PROFIT & LOSS STATEMENT

=====

OPERATING REVENUE

=====

OPERATING COST

=====

PERSONNEL COST

=====

ENERGY COST

=====

MAINTENANCE COST

=====

DEPRECIATION

=====

OPERATING PROFIT

=====

INTEREST

=====

NET PROFIT

=====

ACCUMULATED NET PROFIT

=====

FINANCE PROGRAM

=====

FINANCE IN FOREIGN CURRENCY

=====

BORROWING

=====

REPAYMENT

=====

LOAN BALANCE

=====

INTEREST DURING CONSTRUCTION

=====

INTEREST

=====

FINANCE IN LOCAL CURRENCY

=====

BORROWING

=====

REPAYMENT

=====

LOAN BALANCE

=====

INTEREST

=====

CASH FLOW STATEMENT

=====

CASH FLOW

=====

OPERATING PROFIT

=====

DEPRECIATION

=====

INVESTMENT (-)

=====

SALVAGE VALUE

=====

FIRR

=====

APPENDIX 10-2-5

(UNIT: THOUSAND TUGRIK)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
PROFIT & LOSS STATEMENT												
OPERATING REVENUE	101522	101522	101522	101522	101522	101522	101522	101522	101522	101522	101522	101522
OPERATING COST	17500	17500	17500	17500	17500	17500	17500	17500	17500	17500	17500	17500
PERSONNEL COST	5112	5112	5112	5112	5112	5112	5112	5112	5112	5112	5112	5112
ENERGY COST	4752	4752	4752	4752	4752	4752	4752	4752	4752	4752	4752	4752
MAINTENANCE COST	7636	7636	7636	7636	7636	7636	7636	7636	7636	7636	7636	7636
DEPRECIATION	59660	59660	59660	59660	59660	59660	59660	59660	59660	59660	59660	59660
OPERATING PROFIT	24362	24362	24362	24362	24362	24362	24362	24362	24362	24362	24362	24362
INTEREST	13146	12334	14339	13551	12938	12122	13636	12834	12230	11612	10960	10469
NET PROFIT	11216	12028	10023	10811	11424	12240	10726	11528	12132	12750	13402	13892
ACCUMULATED NET PROFIT	-127047	-115020	-104996	-94185	-82761	-70521	-59795	-48267	-36135	-23385	-9982	3910
FINANCE PROGRAM												
FINANCE IN FOREIGN CURRENCY												
BORROWING	0	0	0	0	0	0	0	0	0	0	0	0
REPAYMENT	48466	48466	48466	48466	48466	48466	48466	48466	48466	48466	48466	48466
LOAN BALANCE	1308580	1260114	1211648	1163182	1114716	1066250	1017784	969318	920852	872386	823921	775455
INTEREST DURING CONSTRUCTION	0	0	0	0	0	0	0	0	0	0	0	0
INTEREST	10087	9723	9360	8996	8633	8269	7906	7543	7179	6816	6452	6089
FINANCE IN LOCAL CURRENCY												
BORROWING	0	118399	0	0	0	93887	0	0	0	0	0	116534
REPAYMENT	22410	0	21218	12492	22619	0	21920	12036	12733	14431	6331	0
LOAN BALANCE	130537	248936	227718	215226	192608	286495	264574	252538	239805	225374	219043	335577
INTEREST	3059	2611	4979	4554	4305	3852	5730	5291	5051	4796	4507	4381
CASH FLOW STATEMENT												
CASH FLOW												
OPERATING PROFIT	84022	-57599	84022	74509	84022	-33299	84022	73336	73429	74509	65756	-57599
DEPRECIATION	24362	24362	24362	24362	24362	24362	24362	24362	24362	24362	24362	24362
INVESTMENT (-)	59660	59660	59660	59660	59660	59660	59660	59660	59660	59660	59660	59660
SALVAGE VALUE	0	141621	0	9514	0	117322	0	10687	10594	9514	18266	141621
FIRR	0	0	0	0	0	0	0	0	0	0	0	0

(UNIT: THOUSAND TUGRIK)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	TOTAL
PROFIT & LOSS STATEMENT										
OPERATING REVENUE	101522	101522	101522	101522	101522	101522	101522	101522	101522	2907928
OPERATING COST	17500	17500	17500	17500	17500	17500	17500	17500	17500	539667
PERSONNEL COST	5112	5112	5112	5112	5112	5112	5112	5112	5112	157008
ENERGY COST	4752	4752	4752	4752	4752	4752	4752	4752	4752	145947
MAINTENANCE COST	7636	7636	7636	7636	7636	7636	7636	7636	7636	236712
DEPRECIATION	59660	59660	59660	59660	59660	59660	59660	59660	59660	1849473
OPERATING PROFIT	24362	24362	24362	24362	24362	24362	24362	24362	24362	518788
INTEREST	12437	13957	13162	12350	11927	11091	10238	9368	10827	400977
NET PROFIT	11925	10405	11200	12012	12435	13271	14124	14994	13535	117811
ACCUMULATED NET PROFIT	15835	26240	37440	49452	61887	75158	89283	104277	117811	
FINANCE PROGRAM										
FINANCE IN FOREIGN CURRENCY										
BORROWING	0	0	0	0	0	0	0	0	0	1453977
REPAYMENT	48466	48466	48466	48466	48466	48466	48466	48466	48466	1114716
LOAN BALANCE	726989	678523	630057	581591	533125	484659	436193	387727	339261	33143441
INTEREST DURING CONSTRUCTION	0	0	0	0	0	0	0	0	0	21593
INTEREST	5725	5362	4998	4635	4271	3908	3544	3181	2817	233091
FINANCE IN LOCAL CURRENCY										
BORROWING	94202	0	0	0	0	0	0	91133	0	957557
REPAYMENT	0	21599	22395	3006	23630	24466	25319	0	24729	581788
LOAN BALANCE	429779	408180	385785	382779	359150	334684	309365	400498	375769	8770079
INTEREST	6712	8596	8164	7716	7656	7183	6694	6187	8010	167886
CASH FLOW STATEMENT										
CASH FLOW										
OPERATING PROFIT	-33299	84022	84022	63822	84022	84022	84022	-33299	534083	157600
DEPRECIATION	24362	24362	24362	24362	24362	24362	24362	24362	24362	518788
INVESTMENT (-)	59660	59660	59660	59660	59660	59660	59660	59660	59660	1849473
SALVAGE VALUE	117322	0	0	20200	0	0	0	117322	0	2660721
FIRR	0	0	0	0	0	0	0	0	450060	450060
WEIGHTED AVERAGE INTERES 1.0116%										

***Chapter* 11**

CHAPTER 11 DETERMINATION OF THE CARGO TRANSSHIPMENT FACILITIES IMPROVEMENT PLAN

In this Chapter, a comprehensive comparison between Plan 1 (gantry crane) and Plan 2 (reach stacker) is made to determine which is more appropriate as the cargo transshipment facilities for the year 2000.

11-1 Criteria of Selection

The following criteria were adopted for the comparison between these two Plans to determine the recommendable plan under the specific natural conditions of Zamyn-Uud.

- (1) Transshipment work (safety, operation, efficiency, generally of usage and applicability to other categories of work)
- (2) Maintenance
- (3) Construction work
- (4) Total costs and investments to be borne by Mongolian Railway
- (5) Economic and financial benefits

11-2 Transshipment Work

Major specific features of gantry crane and reach stacker are already explained in 4-4-5-1 (2). To make a comparison between these two cargo handling equipment, other features are described below.

(1) Plan 1 (gantry crane)

The gantry crane is a motor-driven equipment to handle cargoes with wires in principle. When a container handling gantry crane is used for long size or heavy cargoes, a hook beam is used in place of the spreader. These devices can easily be exchanged with each other. Then, the crane works like an ordinary crane. It is also possible to use a container handling crane with the spreader as it is, where lifting wires are hung. Mongolian Railway is experienced in operation and maintenance.

(2) Plan 2 (reach stacker)

The reach stacker handles cargoes with hydraulic power. When a reach stacker is used for long size or heavy cargoes, the spreader is used as it is, where lifting wires are hung as shown in Figure 6-2-9. With this composition, a reach stacker can also work in place of a truck crane.

11-3 Construction Work

(1) Plan 1 (gantry crane)

It takes a longer time to manufacture a crane and assemble it at the installation site. A crane with a comparatively large capacity is required for the assembling work at the site. Though cranes are standardized to considerable extents, specifications must be discussed to meet the specific conditions of Zamyn-Uud.

(2) Plan 2 (reach stacker)

A reach stacker can be assembled in a shorter period. It requires a crane, possibly with a smaller capacity than that of the crane used for assembling a crane at the site. Specifications must be discussed to meet the specific conditions at Zamyn-Uud. The assembling work does not involve welding.

11-4 Maintenance

(1) Plan 1 (gantry crane)

a) Inspection and maintenance

A crane has a number of mechanical and electrical movable parts. The control equipment incorporates electronic devices. Attention must be paid therefore to these features in the maintenance work.

b) Frequency of maintenance work

Along with monthly and annual inspections, daily inspection is necessary before the start of operation. Special attention must be paid to the exposed parts including the lifting devices in view of the natural conditions at the site.

c) Trouble shooting

There will be no inconveniences to cope with troubles that are normally conceivable, if appropriate spare parts are stored in appropriate quantities. As for the high-tech control system, however, it is necessary to establish a system to obtain manufacture's cooperation in case a trouble occurs in the electronic parts.

(2) Plan 2 (reach stacker)

a) Inspection and maintenance

Special attention must be paid to the hydraulic devices and the electronic parts incorporated in the control equipment.

b) Frequency of maintenance work

Along with monthly and annual inspections, daily inspection is necessary before the start of operation. A reach stacker requires less maintenance work than a gantry crane, since it has less exposed parts.

c) Trouble shooting

There will be no inconveniences to cope with troubles that are normally conceivable, if appropriate spare parts are stored in appropriate quantities. As for the high-tech control and

hydraulic systems, however, it is necessary to establish a system to obtain manufacture's cooperation in case a trouble occurs in the sophisticated parts.

11-5 Investment Costs

(1) Investment Costs of Plan 1 and Plan 2

Table 11-5-1 compares the investment costs of Plan 1 and Plan 2.

Table 11-5-1 (In 1,000 Tg.)

1) Plan 1 (gantry crane)

Item	Foreign currency portion	Domestic currency portion
Civil work and architecture	606,942	298,714
Cargo handling equipment		
Container crane (2 sets)	162,560	
Gantry crane (1 set)	55,040	
Forklift/conveyor	9,526	
Auxiliary equipment	58,554	
Subtotal	285,680	
Signal and telecommunication	294,436	1,716
Power supply equipment	177,283	497
Total	1,364,346	300,922
Grand total	1,665,268	

2) Plan 2 (gantry crane)

Item	Foreign currency portion	Domestic currency portion
Civil work and architecture	596,094	309,258
Cargo handling equipment		
Reach stacker (2 sets)	78,080	
35-ton truck crane	18,880	
Forklift/conveyor	9,526	
Auxiliary equipment	17,351	
Subtotal	123,837	
Signal and telecommunication	294,436	1,716
Power supply equipment	177,283	497
Total	1,191,650	311,471
Grand total	1,503,121	

(2) **Comparison of the Investment Costs**

Plan 1 and Plan 2 necessitate the same amounts of investment for signal, telecommunication, power supply equipment and forklift/conveyor for the transshipment work of cargo in wagons. Plan 1 needs more funds for the crane foundation and less for the platform pavement. As a result, there is only a small difference of the cost for civil structure and architecture work between the two Plan. On the other hand, the cost of cargo handling equipment in Plan 1 is more than twice the cost in Plan 2. Consequently, the cost of Plan 1 is about 10% larger than the cost of Plan 2. From the viewpoint of the investment costs, therefore, Plan 2 is more advantageous than Plan 1.

11-6 Economic and Financial Analyses

(1) **Economic Analysis**

The economic analysis in Chapter 10 indicates that the EIRR of Plan 2, 26.2%, is far larger than that of Plan 1, 8.8%. This means that Plan 2 has larger benefit from the viewpoint of national economy.

(2) **Financial Analysis**

The economic analysis in Chapter 10 suggests that only Plan 2 is feasible. To study if the project is viable from the financial viewpoint, therefore, the team made financial analysis on Plan 2 assuming several cases of different conditions. See 10-2 for the detail.

11-7 Overall Evaluation

Through the above discussions, it has been proved as a conclusion that the cargo transshipment facilities using reach stackers as the main cargo handling equipment in Plan 2 is more advantageous in various aspects, particularly when the financial burden on Mongolian Railway is taken into account. Thus, this report adopts the cargo transshipment improvement plan based on the use of reach stackers.

***Chapter* 12**

CHAPTER 12 DETERMINATION OF OPTIONAL URGENT PROJECT

12-1 Basic Policy

Based on the following preconditions, an urgent project was prepared by selecting part of the facilities and layout envisaged for the year 2000.

- 1) The project must realize facilities to transship cargoes arriving by Chinese freight trains to Mongolian freight trains at Zamyn-Uud station.
- 2) The transshipment facilities must handle containers on gondola cars and flat cars as well as foodstuff, fertilizer and other cargoes of different packing styles loaded on wagons.
- 3) The project does not cover the transshipment facilities for construction materials, fluorite and other cargoes transported in gondola cars. However, these cargoes shall be dealt with by the container handling facilities.
- 4) To minimize the expenditure, the project does not include items that are not urgently required for the transshipment work. For this reason, facilities for car washing and locomotive maintenance and other auxiliary equipment will be considered in the whole layout for the year 2000.
- 5) Not only in the urgent project but also in the whole plan for the year 2000, the track layout and related facilities must be designed to facilitate linkage with the petroleum transshipment site which will be constructed and operated by another entity (Mongol Petroleum Import Corporation).
- 6) For the budgetary reason, the project cannot necessarily cope with the whole transshipment demands forecast at the time of its completion.
- 7) The project must be completed with as small an initial investment as possible.

12-2 Plan of Urgent Project

The team determined the urgent project according to the basic policy given in 12-1 by selecting part of the whole plan for the year 2000. The project consists of the following facilities and equipment.

12-2-1 Track, Civil Structure and Building

(1) Track

- 1) 1,435mm, gauge track
 - Departure and arrival track : 3 (existing tracks)
 - Sorting track : 3 (1 existing, 2 to be constructed)
 - Draw-out track : 1 (to be constructed)
 - Cargo transshipment track : 2 (1 each for wagon and gondola car/container car)
- 2) 1,520mm gauge track
 - Departure and arrival track : 6 (existing tracks to be extended)
 - Sorting track : 3 (1 existing, 2 to be constructed)
 - Draw-out track : 2 (existing, 1 track to be extended)
 - Cargo transshipment track : 2 (1 each for wagon and gondola car/container car)

(2) Civil Structure

Construction work of embankment and track bed for the above tracks, cargo transshipment platforms (for cargoes in wagon and containers) and roads.

(3) Building

Cargo handling office	: 150m ² × 2 floors
Cargo storage house	: 300m ²
Residential house	: 4,050m ² (for family use)
Garage (for reach stacker)	: 210m ²

12-2-2 Cargo Handling Equipment

Four 1.5-ton forklifts and four belt conveyors will be used for cargoes in wagon, and a reach stacker for containers.

12-2-3 Signal and Telecommunication Equipment

To improve the efficiency of shunting, maintenance, inspection and other work in the yard, fixed and portable radio communication equipment and talk-back equipment will be introduced for communications between ground crews. If the budget allows, a digital telephone exchange will preferably be introduced to replace the existing exchange which often fails to connect intended subscribers.

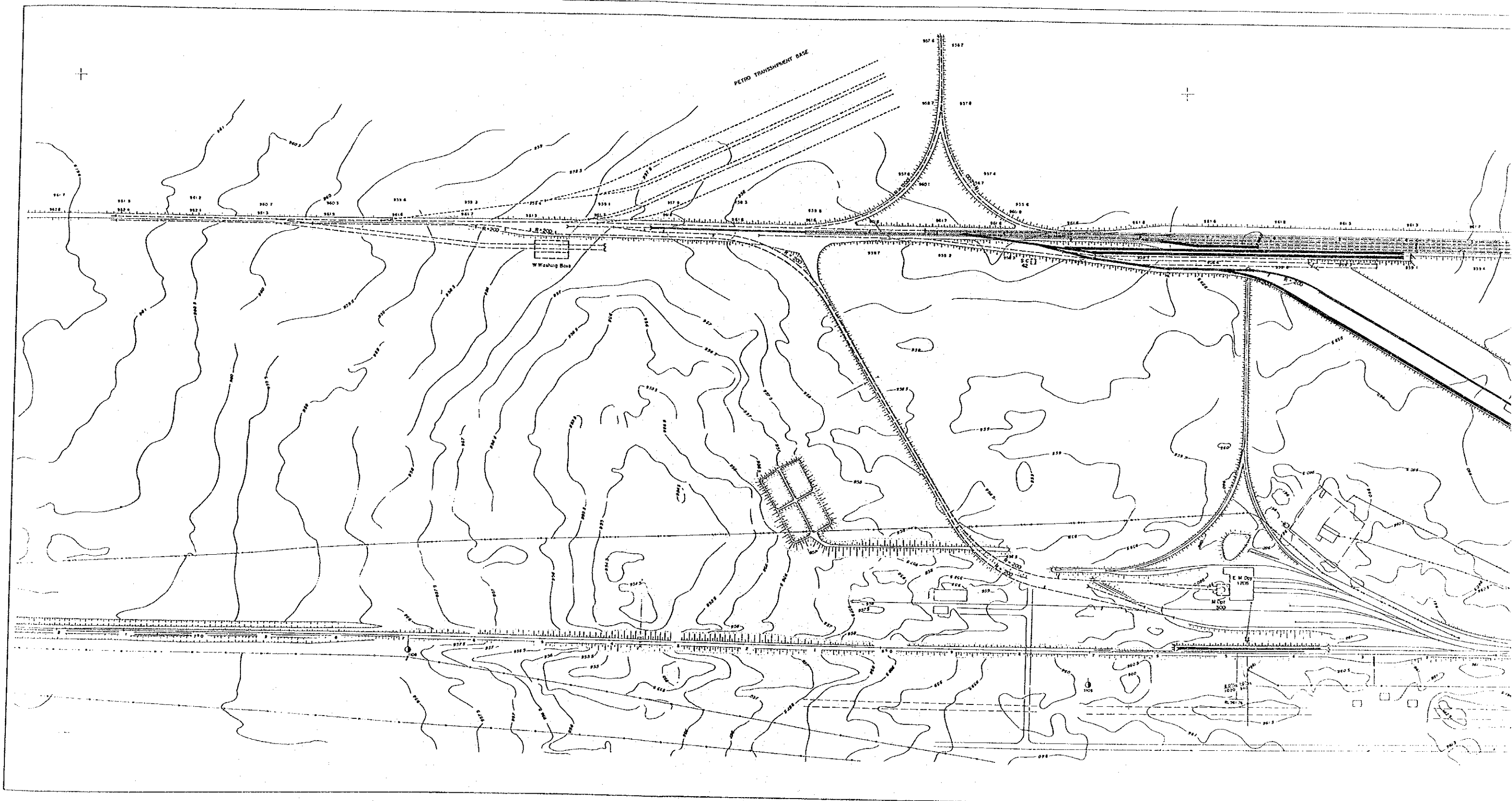
12-2-4 Power Equipment

The team planned to install lighting equipment with mercury flood lamps to maintain an average illumination density of 10 lux on the low platform, 100 lux with lamps fixed at the ceiling of the house on the high platform, and one lux for the storage and locomotive turn-out tracks, with necessary transformers and power supply cables. The existing two generators shall be replaced with two 750kW ones.

12-3 Alternative Urgent Projects

The urgent project includes construction of tracks, civil work and an access road to the transshipment site as the minimum requirements that are indispensable to implement any scale of cargo transshipment work. However, various combinations are conceivable in terms of machine type and quantity, for the cargo handling equipment within the extent of the whole plan for the year 2000. The choice solely depends on the funds to be invested. This report proposes, therefore, a combination of equipment that can be procured with the least amount of costs.

Figure 12-3-1 shows the overall layout of the facilities and equipment drawn in the urgent project plan. Figure 12-3-2 shows the layout of the transshipment facilities.



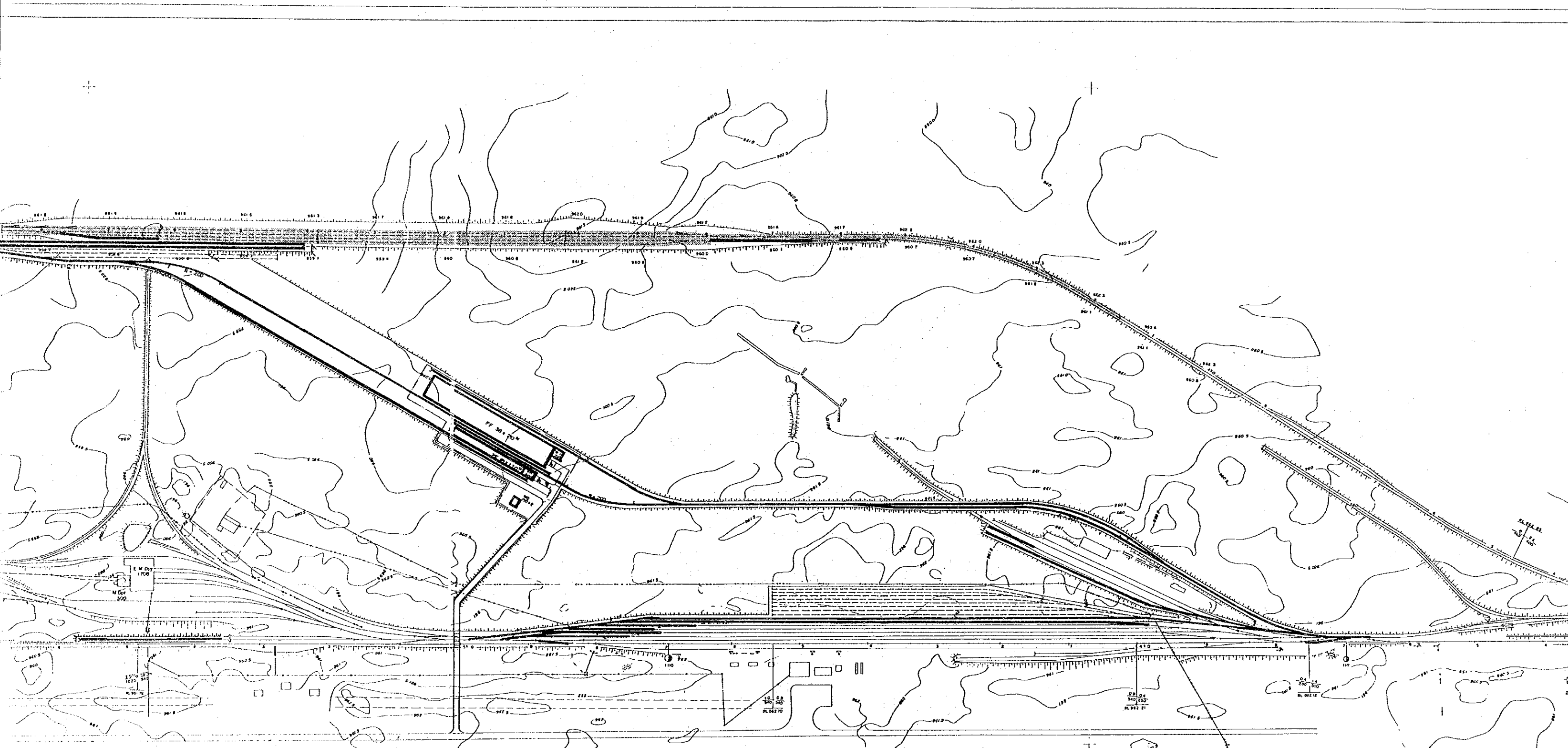
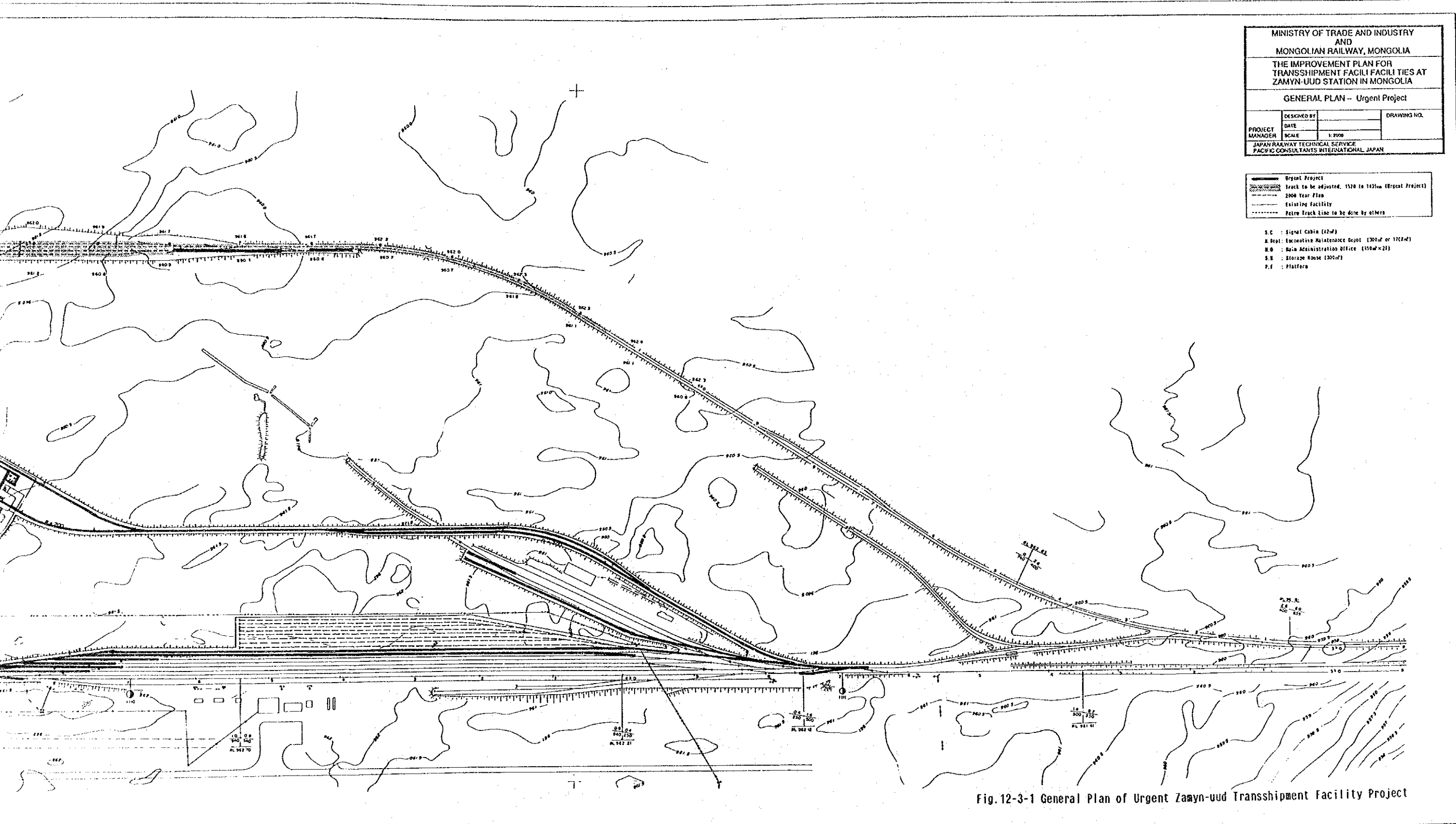


Fig. 12-3-1 General



MINISTRY OF TRADE AND INDUSTRY
 AND
 MONGOLIAN RAILWAY, MONGOLIA
 THE IMPROVEMENT PLAN FOR
 TRANSSHIPMENT FACILITIES AT
 ZAMYN-UUD STATION IN MONGOLIA
 GENERAL PLAN - Urgent Project

PROJECT MANAGER	DESIGNED BY	DRAWING NO.
	DATE	
	SCALE	1:2000

JAPAN RAILWAY TECHNICAL SERVICE
 PACIFIC CONSULTANTS INTERNATIONAL, JAPAN

Legend:
 - Urgent Project
 - Track to be adjusted, 1520 to 1435m (Urgent Project)
 - 2000 Year Flood
 - Existing Facility
 - Active Track Line to be done by others

S.C : Signal Cabin (47m)
 M. Rep: Executive Maintenance Depot (300m or 1100m)
 M.O : Main Administration Office (150m x 20)
 S.H : Storage House (300m)
 P.F : Platform

Fig.12-3-1 General Plan of Urgent Zamyn-uud Transshipment Facility Project

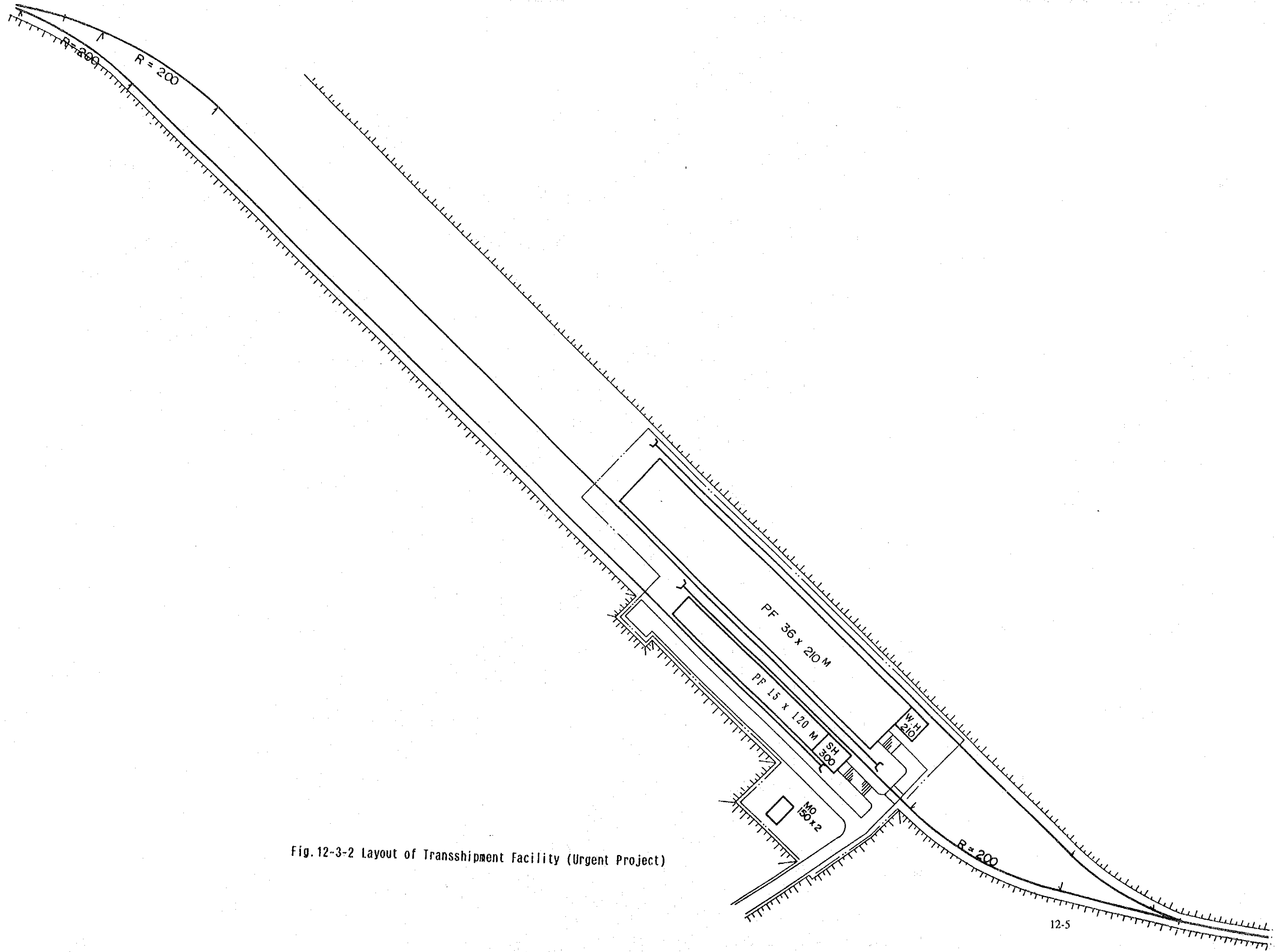


Fig. 12-3-2 Layout of Transshipment Facility (Urgent Project)

***Chapter* 13**

CHAPTER 13 EVALUATION OF EFFECTS ON THE ENVIRONMENT

13-1 Present Status of the Environment

See Chapter 2 "ANALYSIS OF PRESENT STATUS" for the summary of the social and natural conditions of the project site.

13-2 Factors to Affect the Environment

Table 13-2-1 shows the factors that would affect the environment when the project is implemented.

Table 13-2-1 Factors to Affect the Environment

Division	Factors to Affect the Environment
Construction	Cutting, construction of embankment, foundation and concrete structure, disposal of waste materials, breaking up of buildings, and transport of construction materials
Existence	Track structure, cargo transshipment facilities and rolling stock maintenance facilities
Operation	Rolling stock, cargo transshipment facilities and rolling stock maintenance facilities

Appendix 13-2-1 shows the cause and effect relationships generally considered in the evaluation of environmental preservation, from which factors relevant to this project have been picked out as shown in Table 13-2-2.

Table 13-2-2 Environment Items to be Affected by Detrimental Factors in This Project

Division	Environment Items
During the construction period	Noise, vibration, dust, waste materials , traffic safety
Existence of facilities	—
Operation of facilities	Noise, vibration, waste oil and sludge from rolling stock maintenance facilities, leak oil from oil filling facilities, and dust, residuum in cars, waste water and sludge from freight car washing facilities

Effects of these factors on the environment are evaluated below, based on the above classification of factors and environment items.

13-3 Measures to Preserve the Environment

13-3-1 During the Construction Period

(1) **Noise and Vibration**

The site where the facilities are to be constructed under this project is sufficiently distant from the residential area. In addition, the work is mainly to construct embankments and tracks. For these reasons, problems of noise and vibration will occur only in the transport of materials for the construction of embankment and other structures. As the measures to prevent these problems, the roads shall be improved and the trucks shall be regulated to run at reasonably low speeds.

(2) **Dust**

Since strong winds blow at the site as explained in Chapter 2, it is required to prevent dust in the construction of embankments. For this purpose, the roads shall be improved and windbreak fences shall be constructed where necessary. The residential area will not suffer from dust, since the construction site is located leeward.

(3) **Wastes**

Wastes shall be recycled as much as possible. Those that cannot be reused shall be treated so that they do not damage the environment and shall be disposed for reclamation.

(4) **Traffic Safety**

Due attention shall be paid to the traffic safety in the transport of construction materials, particularly those for embankments.

13-3-2 After the Commissioning of the Facilities

(1) **Noise and Vibration**

The facilities, located far distant from the residential area, will not produce high levels of noise and vibration. Therefore, they seem to be no detrimental effects on the environment.

(2) **Waste Oil and Sludge from the Rolling Stock Maintenance Facilities**

The rolling stock maintenance facilities are of small scales for daily and regular inspections, without having equipment for overhaul. Thus, they will exhaust only small quantities of oil and sludge. Therefore, a pit may be able to prevent the drain of these wastes.

(3) **Leak Oil from Oil Filling Facilities**

A pit shall be constructed to prevent oil leak from the oil filling facilities.

(4) **Dust, Residuum, Waste Water and Sludge from the Freight Car Washing Facilities**

The freight car washing facilities shall be constructed far from the residential area and the cargo transshipment site to the extent the work efficiency allows. In addition, the following measures shall be implemented.

1) **Dust**

Windbreak fences shall be installed at appropriate places in consideration of the wind direction.

2) **Residuum in cars**

Wastes shall be recycled as much as possible. Those that cannot be reused shall be treated so that they do not damage the environment and shall be disposed for reclamation.

3) **Waste water and sludge**

A sedimentation basin and purification facilities shall be installed to treat oil-contaminated waste water and sludge.

13-4 Summary of Evaluation

Measures explained in 13-3 will limit the effects of detrimental factors on the environment items and contribute to the preservation of good environment.

Appendix 13-2-1 Relationships between Evaluation Factors and Environment Items

Status of facilities	Environment Item	Living Environment										Natural Environment				Social and Cultural Environment			
		Noise	Vibra-tion	Shadow-ing	Jamm-ing	Air Pollution	Water Quality	Land Subsidence	Waste Materials	Hydro-logical	Meteoro-logical	Faunistical	Scenic Beauty	Cultural Assets	Dissection of Area				
Construction work	Deforestation	B															B		
	Cutting and embankment	B	B				B						B						
	Excavation of tunnel	B	B				B					B					B		
	Bridge* Elevated bridge	Excava-tion	B	B				B					B						
		Founda-tion	B	B									B						
		Struc-ture	B																
	Existence	Transport of materials and waste	B	B						B				B					
		Track structure			B	B												B	B
		Station facilities			B	B													
		Rolling stock base			B														B
Substation facilities																			
Operation	Rolling stock	A	A		B														
	Station facilities																		
	Rolling stock base	B	B						A				B						
	Substation facilities																		

Note:
A : Items to be checked.
B : Items to be checked when necessary.
C : Items not or little affected.

***Chapter* 14**

CHAPTER 14 TECHNOLOGY TRANSFER

14-1 General

Mongolian Railway was constructed and has been operated with the technical assistance from the former Soviet Union. However, it is said that the assistance has not been sufficient in recent years due to the changed political and economic situations of the Soviet Union. In the wake of the collapse of the former cooperator, it is expected that assistance from the West will increase in the future. Under the circumstances, it is necessary for Mongolian Railway to understand and introduce the modern technology developed in the Western countries. In implementing projects in Mongolia, therefore, the aid providers are required to make efforts to transfer technologies involved to Mongolia so that Mongolia acquires advanced technologies and subsequently the knowledge and capabilities for self-subsistence.

14-2 Technology Transfer during the Study

To transfer technologies and know-how involved in this study, including the method of approach to various problems, the team made the survey together with the Mongolian counterparts and had discussions with member of the Government of Mongolia, as explained below.

(1) Inception Report

Through the explanation of the inception report, the team gave sufficient knowledge of the method and objectives of the study to Mongolian people.

(2) Hearing and Data Collection

Through hearing and data collection, the team gave better knowledge of the objectives of data collection and the method of analysis to Mongolia counterparts.

(3) Planning at the Survey Site

Regarding the planning of facilities and equipment, the team showed materials for reference and explained precedent cases of similar projects in Japan so that the counterparts understand the approach in consulting services. For example, the team explained the method of drawing train operation diagrams and yard work diagrams in planning train operation, and various types of equipment including their advantages and disadvantages in planning the cargo handling equipment.

(4) Through the explanation of the report that contains the facilities planned and designed, the team made counterparts comprehend the contents, approaches and technologies incorporated in the project.

14-3 Technology Transfer in the Future

(1) Before the Completion of the Facilities

- 1) At the detailed design stage, the team will transfer know-how and technologies including the design concept and conditions, and methods of drawing and making design document, through on-the-job training of the counterparts or through the joint work with local consultants, so that Mongolian engineers can be designing by themselves in the future.
- 2) At the tendering and contracting stages, the team will transfer the knowledge of the practices in the Western countries to Mongolia, by making tender documents, evaluating qualification of tenders, and following contract procedures together with Mongolian people concerned.
- 3) During the construction period, Mongolian people will be able to experience the management practices in the West, including the methods of managing the construction work, trouble shooting with contractors quality control, process control and industrial relations, through the group work of local consultants, construction companies and Western consultants.
- 4) Engineers from manufacturers will train the Mongolian workers on the operation and maintenance of newly introduced machines, and signal and telecommunication equipment.

(2) After the Completion of the Facilities

Mongolian people will study the technique of operation and maintenance of the facilities and equipment under the guidance of experts from foreign countries.

***Chapter* 15**

CHAPTER 15 COMPREHENSIVE EVALUATION AND PROPOSAL

15-1 Comprehensive Evaluation and Proposal on the Short Term Cargo Transshipment Facilities

15-1-1 Evaluation of Plan and Survey

(1) Survey of the Present status

Most of the materials offered to the team were written with Russian letters in Mongolian language which pressed the team members to consume much time in understanding and made the study extremely difficult. Since information was not well documented so that the team could not help but collect information through hearing from the counterparts, who often different levels of knowledge and recognition for the operation and management of the existing facilities, making it rather difficult for the team to obtain correct information. One of the reasons for this situation may be that most of the technologies in Mongolia are originated in the former Soviet Union and, nevertheless, the technology transfer has not been made sufficiently. However, through the cooperation of the counterparts, the team could assess the present status of Mongolian Railway sufficiently enough to frame the short term cargo transshipment facilities.

(2) Demand Estimate

Mongolia is now in the transition period from a planned economy to a market economy. Its economy is not under the best conditions at present as the result of decreased assistance from the former Soviet Union. It is open to anybody's guess at present in which direction the economy will go in the future. This question also holds with the estimate of freight volume to be handled at Zamyn-Uud station. In this study, the demand was estimated on the assumption that it will grow in proportion to the increase of GDP, based on the agreement between the Government of Mongolia, Mongolian Railway and the study team. As the result, the team obtained an answer similar to the figure estimated by Mongolian Railway. It should be noted, however, that the estimated value is subject to change depending on the future course of Mongolian economy.

(3) Planning Cargo Handling Equipment

As the main cargo handling equipment, there are two types of machines, the conventional gantry crane and the reach stacker that made its debut lately as an advanced cargo handling machine, both having advantages and disadvantages in terms of function, operation and maintenance. After heated discussions at the advisory committee meetings, the reach stacker was adopted for its economy and from the viewpoint of national economy and smaller financial burdens on Mongolian Railway that were revealed through economic and financial analyses. Mongolian Railway did not show objection to this selection.

Regarding the civil structure, and electrical and signal equipment, the team also could establish the short term cargo transshipment facilities improvement plan, fully to utilize the existing facilities and reserve sufficient allowance for future expansion. As for the linkage with the petroleum transshipment site now planned by Petroleum Import Corporation of Mongolia, due

attention was paid in the track layout design to secure undisturbed shunting to and from the site and departure and arrival of petroleum transport trains.

(4) Economic and Financial Analyses

The economic analysis has proved that EIRR is as high as 26.2% when the short term cargo transshipment improvement plan is carried out. Since 8% is the break even point normally adopted in the evaluation of the effect of a project, it is obvious that Mongolian will gain benefits for the national economy from the implementation of the project.

The financial analysis also suggests that FIRR is slightly larger than the interest rate of domestic loans. This means that the project will bring about profits to Mongolian Railway.

Consequently, it can be said that the project is worth implementation as the result of economic and financial analyses.

(5) Evaluation of Environmental Preservation

Unlike in urban areas, construction of cargo transshipment facilities in a desert area has little effects on the environment. Nevertheless, this plan incorporates installation of facilities to prevent drain of waste oil and sludge from the rolling stock maintenance and oil filling facilities along with adoption of other measures to satisfactorily protect the environment.

(6) Advantages of Mongolia's Self-Subsistence in Cargo Transshipping Work

After the cargo transshipment facilities are commissioned, cargo transshipping work, hitherto totally entrusted to China, can be shifted to Mongolia according to the international rule, thereby making Mongolia stand at an equal footing with China. The cargo transshipment facilities in Mongolia will also eliminate the freight cars now stagnating at Erenhot in China, 700 to 800 in number, to smoothen the rotation of freight cars leased from Russia and save the rental charges Mongolia is now paying to Russia in foreign exchange. A faster rotation of freight cars also means faster deliveries of cargoes including consumer commodities which will contribute to the stabilization of prices.

(7) Employment Opportunities

The construction work and operation of the cargo transshipment facilities at Zamyn-Uud will create employment opportunities and contribute to a reduction of unemployment in Mongolia as their direct effect. This tendency would be accelerated by the economic activities vitalized as the result of smoother circulation of cargoes.

15-1-2 Measures to be Taken in Parallel

(1) Procurement of Rolling Stock

Procurement of rolling stock is not reviewed in this study, since it is out of the scope of work. It is necessary, however, to introduce shunting locomotives to Zamyn-Uud station for shunting, sorting and other operations in the yard on the two different gauges, in parallel with the construction of the cargo transshipment facilities. In addition, freight cars such as wagons, gondola cars and container cars are also required for efficient transshipment and transport of

cargoes, which should be determined through a full-scale study on the necessity for Mongolian Railway as a whole.

(2) Plan of Petroleum Transshipment Facilities

This study has concluded that the existing petroleum transshipment facilities can cope with the demand of petroleum transshipment up to the year 2000, as far as they are properly operated and maintained. However, the new petroleum transshipment facilities planned by Petroleum Import Corporation seem to be indispensable in the future, when the increasing demand is taken into consideration. Therefore, it is appropriate to promote the plan as it is scheduled.

(3) Maintenance of Locomotive

The short term cargo transshipment facilities improvement plan finalized through this study includes the small scale rolling stock maintenance facilities mainly for daily and monthly inspections and contingent repair. However, it excludes large scale facilities for overhaul of locomotives, which should be discussed in line with the overall policy of Mongolian Railway to cover the overhaul of its total fleet of locomotives. In case Chinese gauge locomotives are introduced to Zamyn-Uud station in the future, a policy should be established regarding how and where their maintenance should be implemented.

(4) Improvement of Cargo Handling Stations

The cargo transshipment facilities at Zamyn-Uud station are planned to handle 40-ft containers that come from China. Accordingly, other cargo handling stations in Mongolia should be equipped with the capability to load and unload 40-ft containers.

(5) Implementation of this project is urgently required for Mongolia. Given the enormous scale and costs involved, however, it is recommended to promote the construction of facilities step by step keeping pace with the increasing demands. In view of the present economic status of the country and the potential benefits of the project, grant aids from foreign countries are preferable at the initial stage and soft loans of low interest rates from loan providing organization are required at later stages.

(6) Operation and Management Costs

To effectively operate the cargo transshipment facilities as envisaged in the plan, the Government of Mongolia and Mongolian Railway are requested to be ready for the operation and management costs incurred in the transshipment work at Zamyn-Uud station.

15-1-3 Proposal

- (1) A necessary number of shunting locomotives (1,435mm and 1,520mm gauges) must be procured in time for commissioning the cargo transshipment facilities at Zamyn-Uud station. The number of locomotives must be increased later as required by the increase of transshipment workload.
- (2) It is recommended to promote the construction of facilities step by step keeping pace with the increasing demands.

- (3) It is preferable for Mongolian Railway to have facilities for overhaul of locomotives. In case Chinese gauge locomotives are introduced to Zamyn-Uud station in the future, a policy should be established regarding how and where their maintenance should be implemented.
- (4) It is urgently required to improve all the cargo handling stations in Mongolia to cope with the demands in the future. In particular, the cargo handling facilities at Ulaanbaatar station should be strengthened on a priority basis.
- (5) To promote the project, it is indispensable to introduce financial assistance from foreign countries.
- (6) The Government of Mongolia is requested to appropriate sufficient amounts of budget to the project on a priority basis.
- (7) Mongolian Railway undertakes a wide range of freight and passenger transport within Mongolia and with neighboring countries. In view of the nature of railway business in which four categories of business scopes, domestic, international, passenger and freight transports, are closely linked, a comprehensive master plan should be established to improve the efficiency of Mongolian Railway as a whole, let alone the construction of new cargo transshipment facilities at its border station.
- (8) Prior to commissioning the cargo transshipment facilities, it is recommended to systematically train the engineers and workers involved on the operation and maintenance of the system.

15-2 Comprehensive Evaluation and Proposal for the Urgent Project

15-2-1 Effects of the Project

After the collapse of the former Soviet Union, the Mongolian trade with the socialist countries has sharply decreased, while increasingly larger quantities of cargoes are now coming from the southern route via China. The difference of track gauge between Mongolia and China requires transshipment of cargo arriving through China at the border station of Mongolia. Since Mongolia does not have transshipment facilities at its border station, however, cargoes are currently being transshipped in China, against the international rule that stipulates the recipient country's responsibility for cargo transshipment in such a situation. On the other hand, a large number of freight cars are said to be stagnating at Erenhot, Chinese cargo transshipping station at the border, due to insufficient capacity of transshipment. Under the circumstances, a plan to construct cargo transshipment facilities at Zamyn-Uud, the Mongolian station facing Erenhot across the border has come to the fore in Mongolia, as a national project to motivate the economic recovery of the country.

In this context, the Government of Mongolia requested the Government of Japan in November, 1990 to make a feasibility survey of the cargo transshipment facilities at the border station of Zamyn-Uud. Thus, Japan sent a project formation survey team to the country, in July 1991, and a mission of Japan International Cooperation Agency (JICA) in April, 1992 to discuss the scope of

work of full-scale survey. According to the results of these surveys, the Governments of Mongolia and Japan concluded an agreement on the Scope of Work for a full-scale survey, based on which the full-scale study team has established a short term cargo transshipment facilities improvement plan, and picked out part of it as the urgent project. The potential effects of the urgent project are summarized below.

(1) Shorter Cargo Delivery Time

The additional capacity of cargo transshipment at the border between Mongolia and China will shorten the delivery time of cargoes. Thus, cargoes and commodities will reach their destinations earlier after the commissioning of the new cargo transshipment facilities at Zamyn-Uud.

(2) Cutting Drain of Foreign Exchange

The freight cars leased from Russia are staying for unnecessarily long hours at Erenhot due to the shortage of transshipment capacity of the station, thereby compelling Mongolian Railway to pay rental charges including those for the days when the cars have uselessly stagnated in China. Commissioning its own cargo transshipment facilities will stop the drain of the valuable foreign exchange from Mongolia.

(3) Creation of Employment Opportunities

The construction work under the urgent project and operation of the cargo transshipment facilities at Zamyn-Uud will create employment opportunities and contribute to a reduction of unemployment in Mongolia as their direct effect. This tendency would be accelerated by the economic activities vitalized as the result of smoother circulation of cargoes.

(4) Equal Footing of Mongolia

The initiative for the freight train operation across the border is inclined to rest with China at present, since China monopolizes the cargo transshipment work and subsequently has the control of wagon movement in its hand. In addition, Mongolia is forced to be in a position to accept virtually any revision of transshipment fees due to the lack of self-subsistence. After commissioning its own cargo transshipment facilities, Mongolia will be on a par with neighboring countries for the first time and acquire an equal floor in the international community.

(5) Economic Analysis

The economic analysis in this study has proved that the construction of cargo transshipment facilities at the border station is viable from the viewpoint of national economy.

(6) Financial Analysis

The financial analysis has proved that the operation of the cargo transshipment facilities at Zamyn-Uud station will be profitable to Mongolian Railway under some conditions when the saving of transshipment fees now being paid to China alone is taken into consideration. There are other factors favorable to Mongolia but not considered in the analysis due to the lack of data, such as revenue from the petroleum transshipment, saving of rental charges for the freight cars, and shorter rotation period of freight cars, all of which reinforce the potential profitability of the project.

(7) **Contribution to National Economy**

Smother transport will facilitate import of cargo required for the development of the country and enhance the productivity of agriculture, manufacturing and other industries as a whole.

15-2-2 Conclusion

It can be concluded from the above that the implementation of the project will lead to the development of industries, improvement of living standards, vitalization of national economy, and enhancement of Mongolia's position in the international society. Thus, it is recommended to urgently promote the project with assistance including grant loans from developed countries.

APPENDIX

APPEDIX 1 Composition of Study Team

Advisory Committee

Naoto EGAWA Chairman, Transport planning	Director, Railway Division, Chubu District Transport Bureau, Ministry of Transport
Shigemasa SATO Cargo transshipment system planning	Deputy Director of the Division, Railway Bureau, Ministry of Transport
Masaki KAMIURA Stating yard planning	Manager, Grand Facility Maintenance Office, Railway Operation Headquarters, Japan Freight Railway Company

Coordinator

Shingo SAITO Coordinator	Staff, First Development Study Division, Social Development Study Department, Japan International Cooperation Agency
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Study Team

Name	Assignment
Masaaki FUJIMOTO	Team leader
Makio KASAI	Planning, transportation
Kazuyosi WATANABE	Planning, roadbed, structure and station
Yutaka WADA	Planning, signal and telecommunication facilities
Kuniaki HASHIMOTO	Planning, rolling stock and cargo handling facilities
Taro IWATA	Operation and management, and financial analysis
Ryuichi OZAWA	Demand estimate and economic analysis
Hikaru ISHIKAWA	Designing, civil work
Fumio OKABE	Designing, electrical equipment
Toshikazu ONO	Designing, mechanical equipment

APPENDIX 2 Members of the Government of Mongolian Contacted by the Team and Counterparts

MINISTRY OF TRADE AND INDUSTRY

Mr. Ts. Tsogt	Minister
Mr. Yondon	First Deputy Minister
Mr. H. Naranhuu	Director of Industry and Foreign Investment Policy Department
Mr. N. Batsaikhan	Assistant of the Minister
Mss. L. Nusunbuyan	Assistant of Director
Mr. T. Legjeem	Office of Foreign Trade Policy Department

MINISTRY OF TRANSPORT AND COMMUNICATION

Mr. S. Jamts	Senior Expert of International Division
Mr. L. Gombo	Senior Official of Foreign Relation Division

NATIONAL DEVELOPMENT BOARD UNDER THE PRIME MINISTER

Mr. C. Ganzorig	Deputy Director-General
Mr. B. Doyoddozj	Expert of Department Economic Cooperation

MONGOLIAN RAILWAY

Mr. Rash	Chairman
Mr. J. Nyamaa	Chief Engineer
Mr. D. Dashtseveg	Chief of Engineering Division
Mr. D. Badarch	Senior Engineer of Engineering Division
Mr. Ch. Lhagvasuren	Chief Engineer of Traffic Management Department
Mr. D. Sukhetomor	Chief of Signal and Communication Department
Mr. S. Bat-ochir	Chief of Car Facilities Department
Mr. N. Khurelsukhe	Chief Engineer of Power and Water Supply Section
Mr. M. Gantulga	Deputy-Chief of Finance Department
Mr. B. Jigjdsuren	Deputy-Chief of Civil Engineering Department
Mss. D. Nyamtuya	Senior Engineer of Track Facilities Department
Mr. Ts. Ganbileg	Senior Engineer of Loco. Facilities Department
Mr. M. Batku	Senior Engineer of Design Division
Mr. L. Tudev	Deputy-Chief of Economic Department

JICA