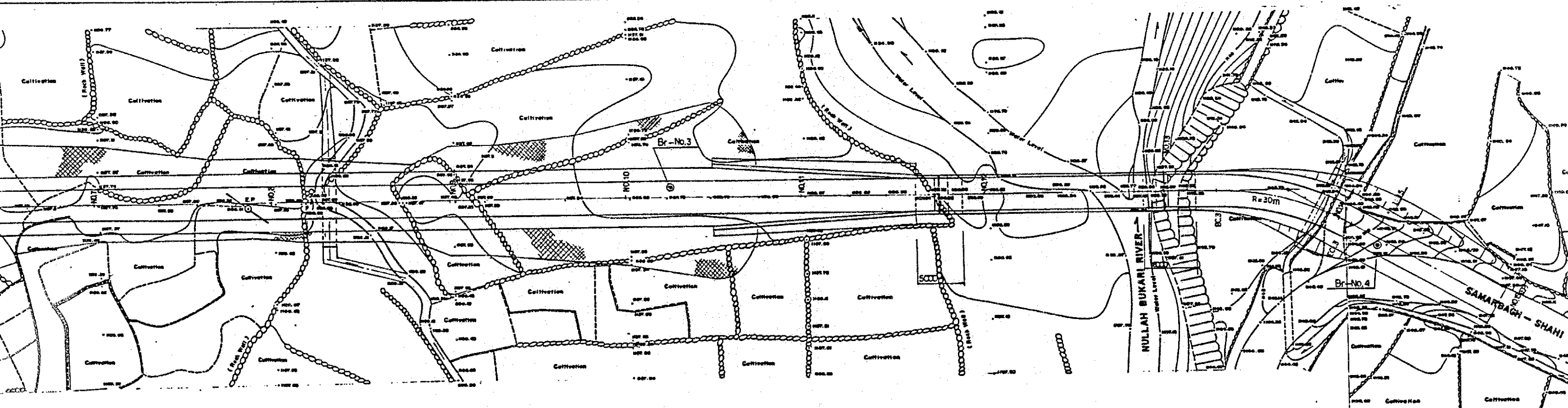
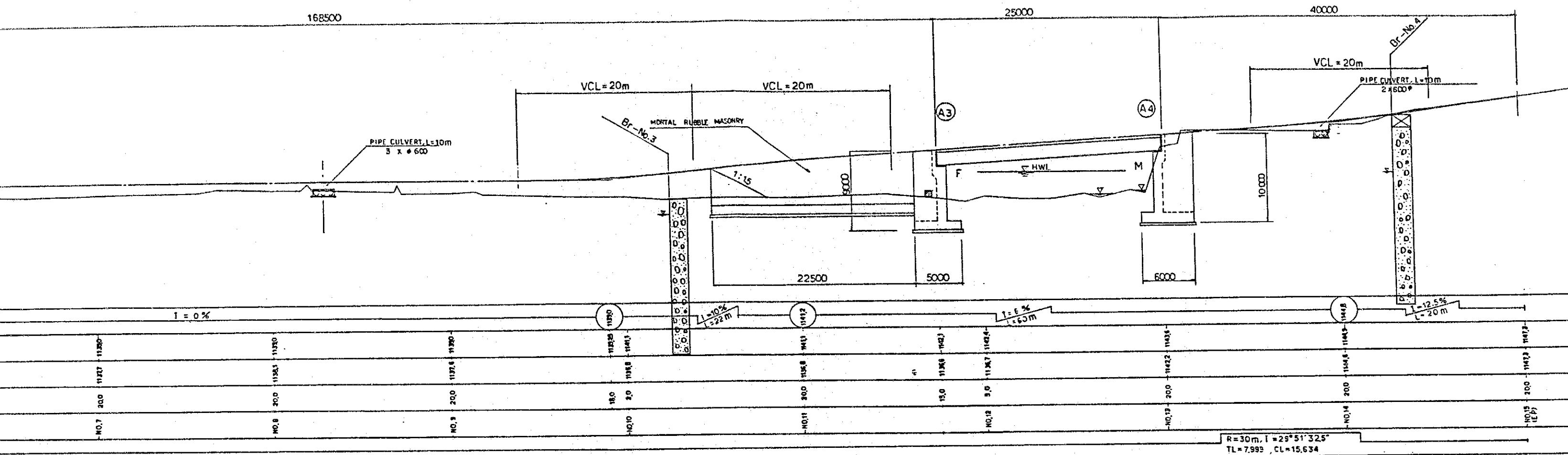
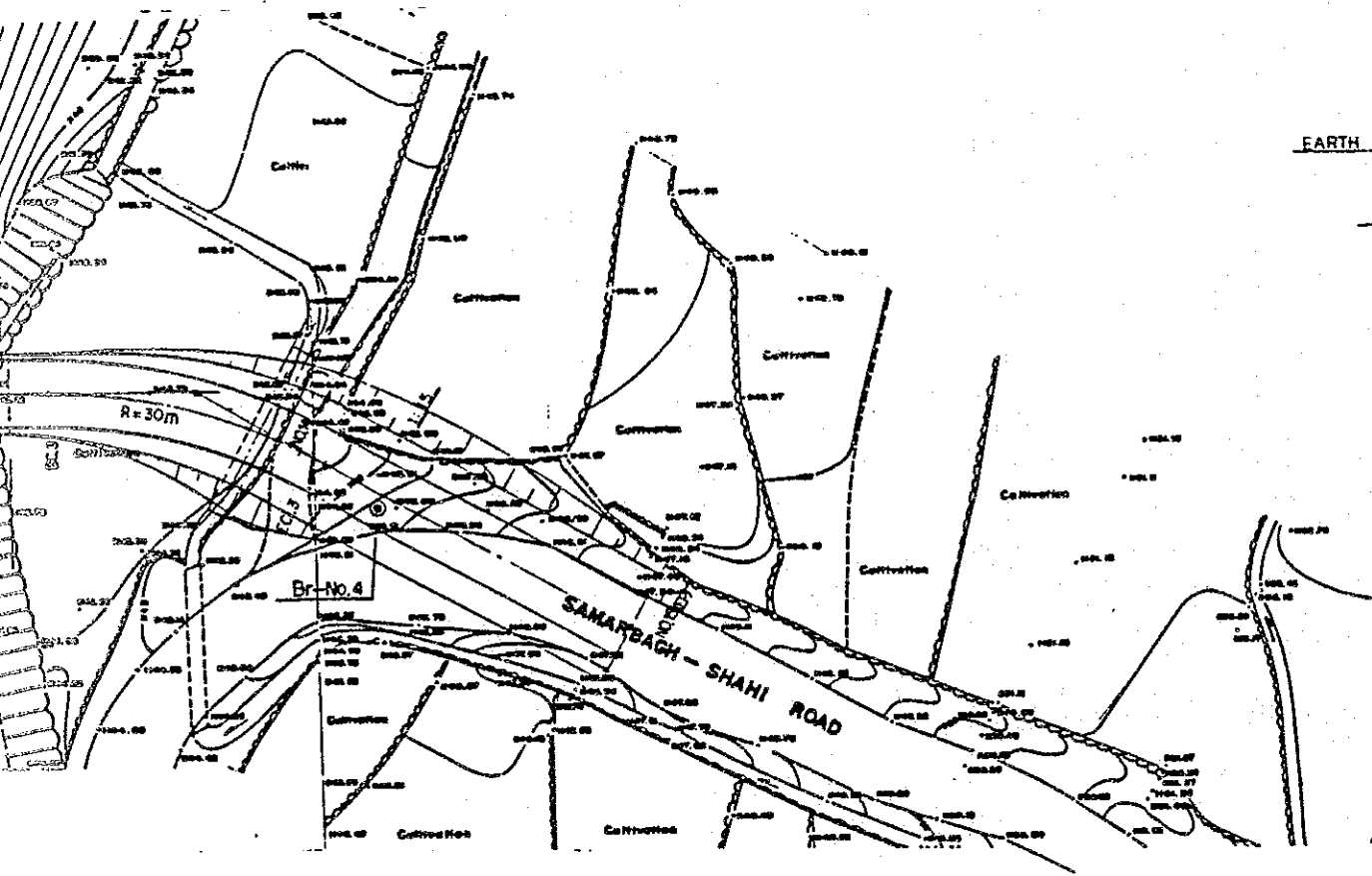
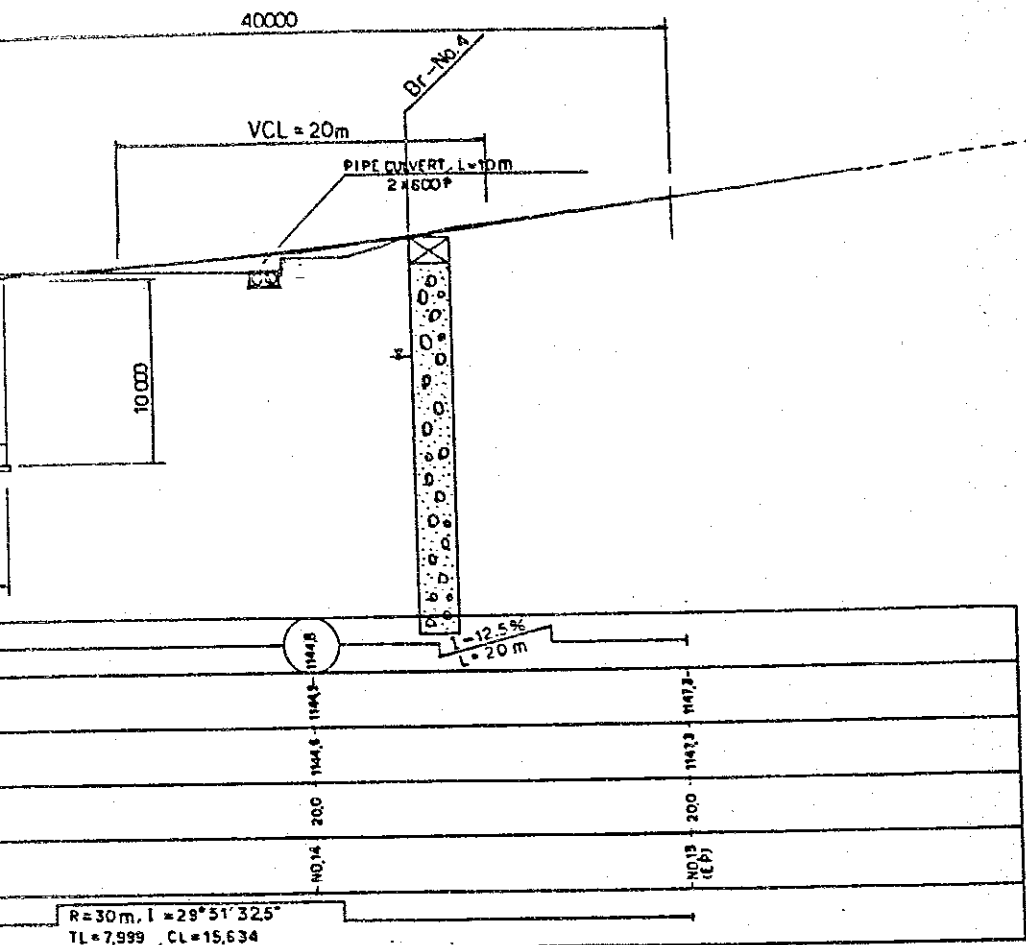


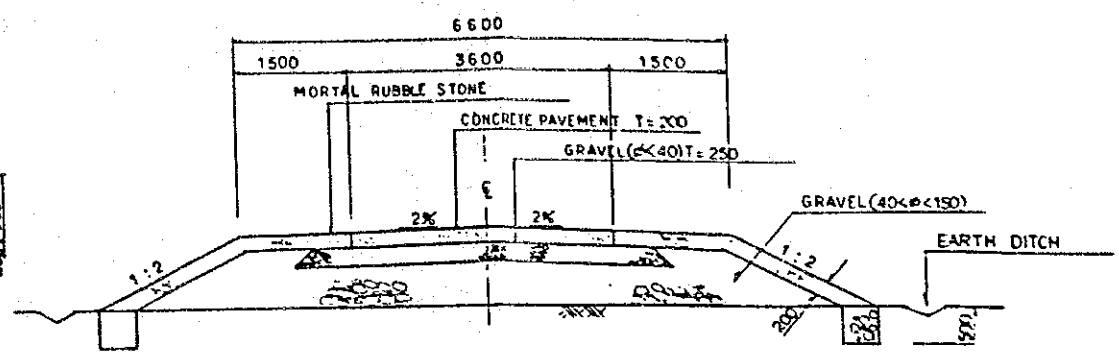
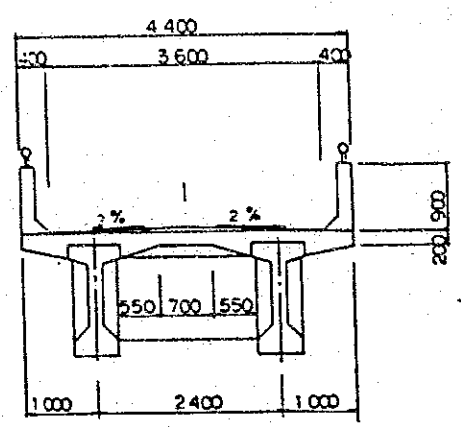
ELEVATION

S = 1:200

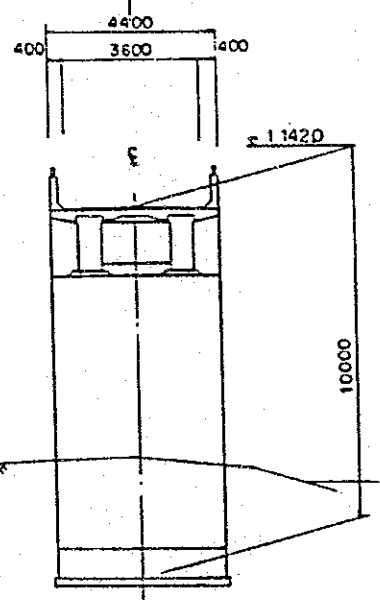




CROSS SECTION
S = 1:50



A2 ABUTMENT
S = 1:100



NO. 11+0

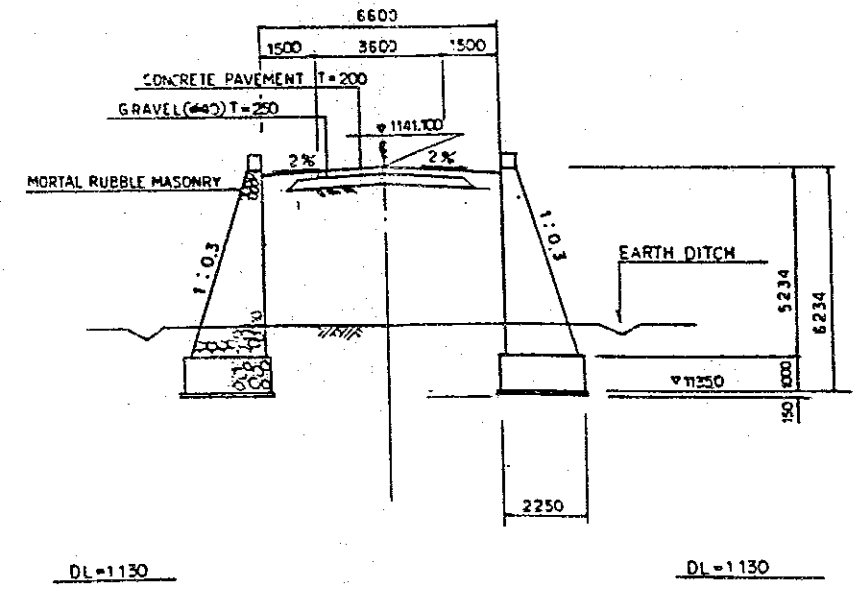


Fig.6.11 General Layout Plan of the No.14 Bukari Khawar Bridge

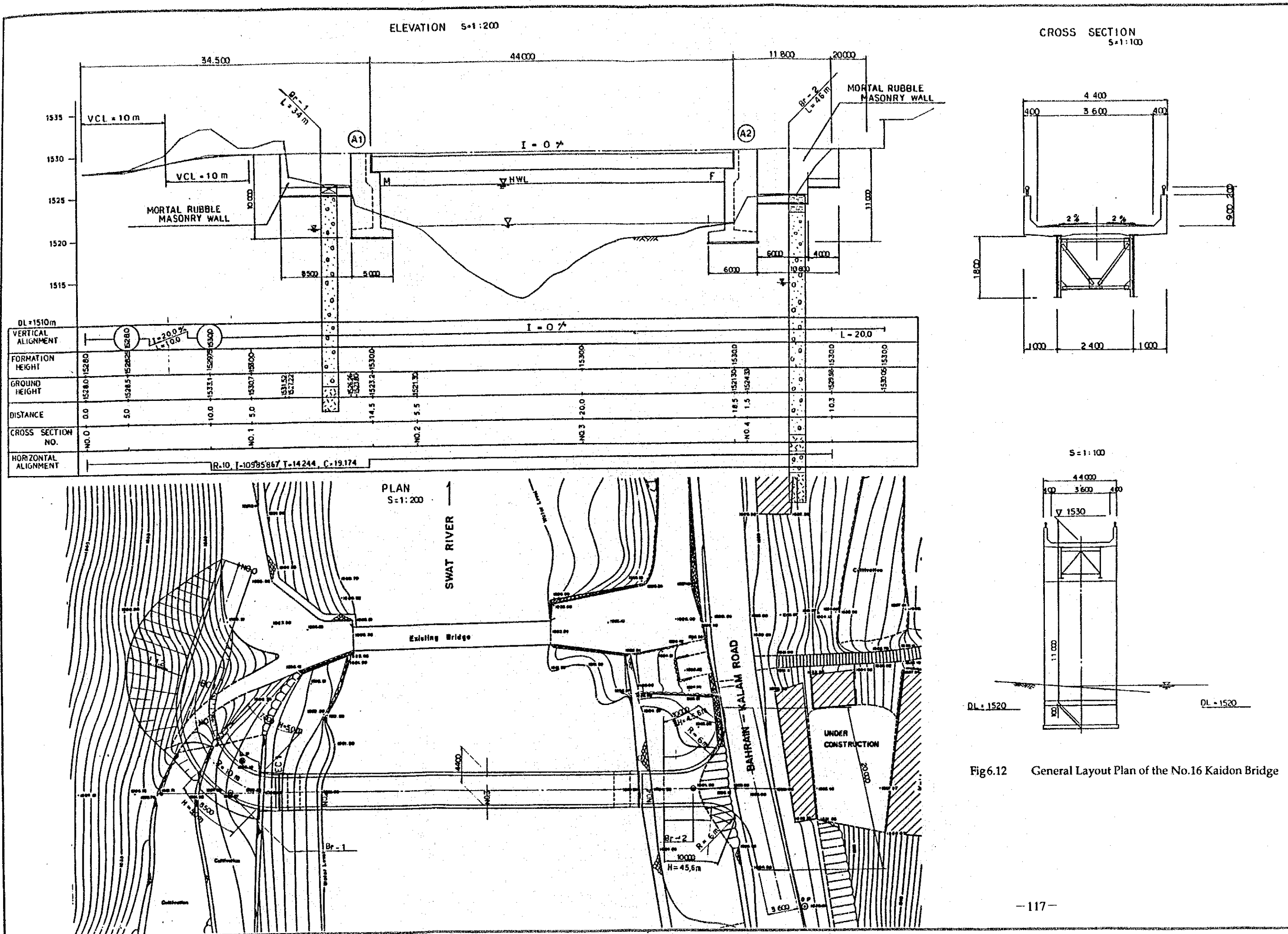
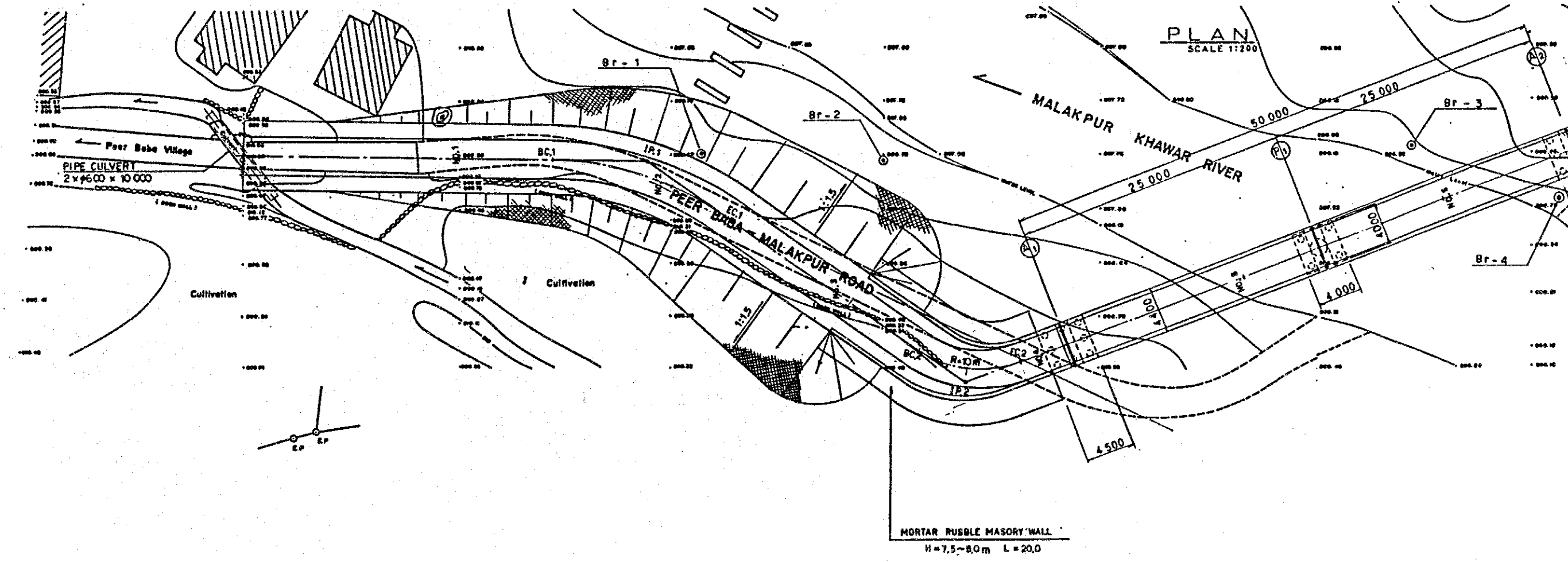
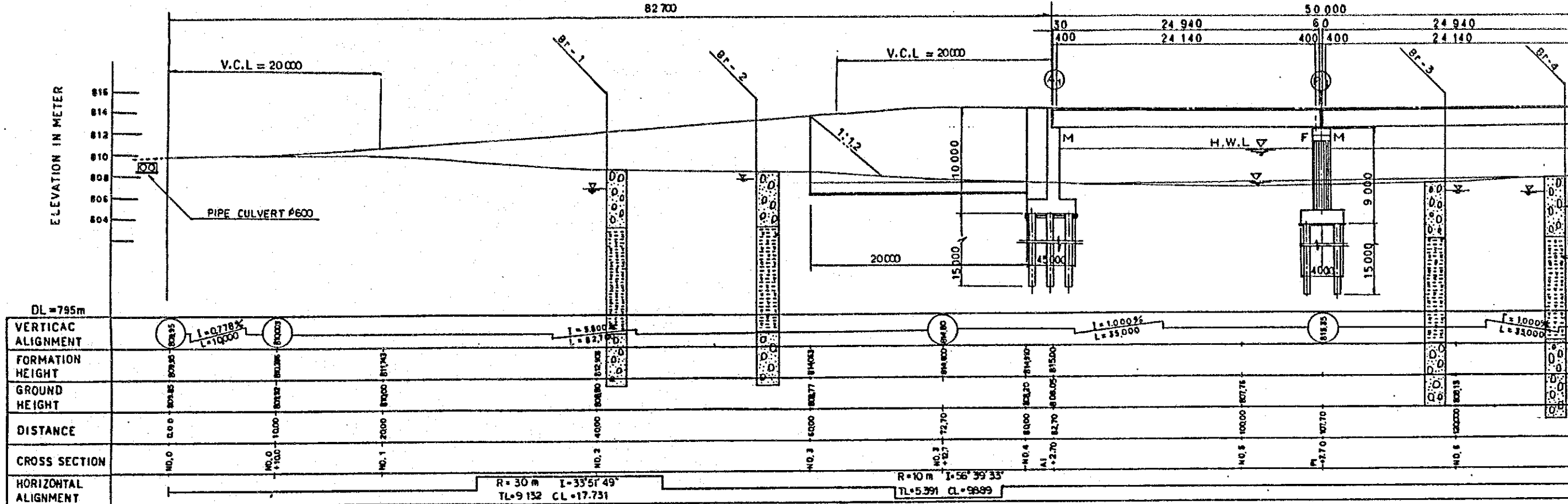
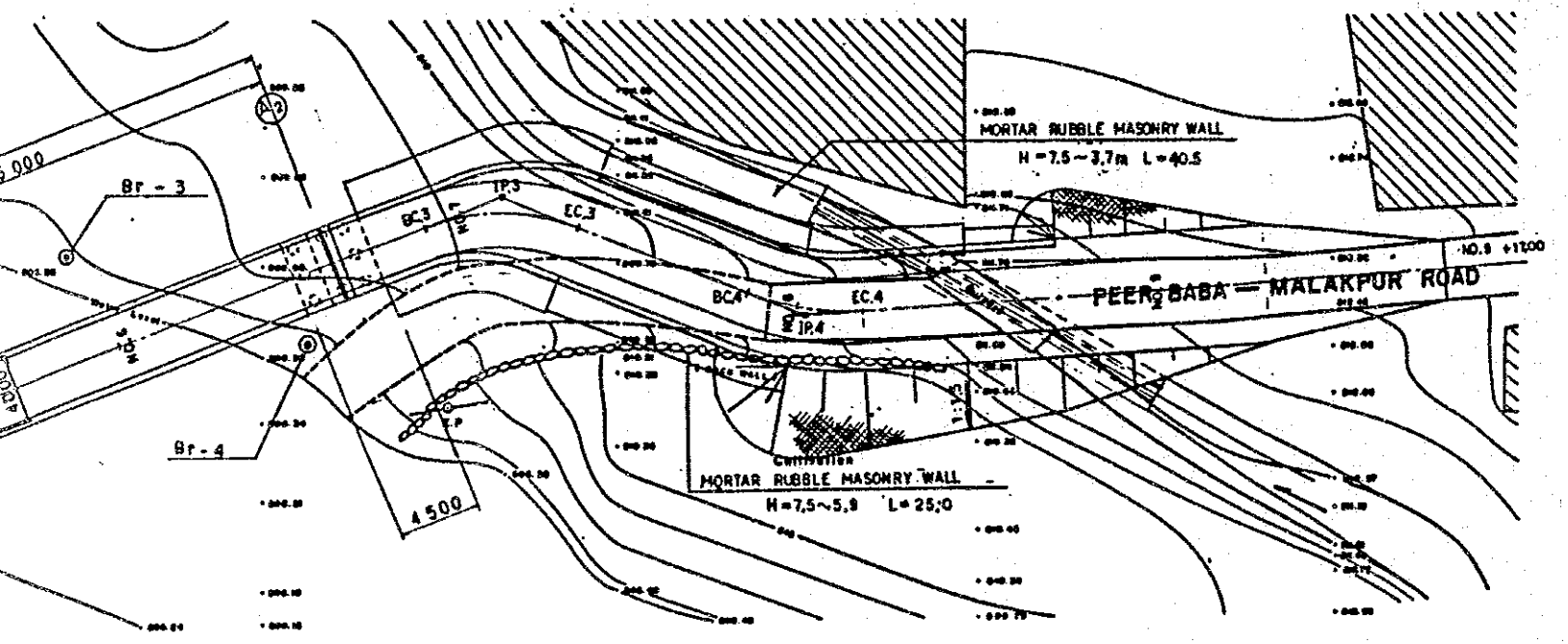
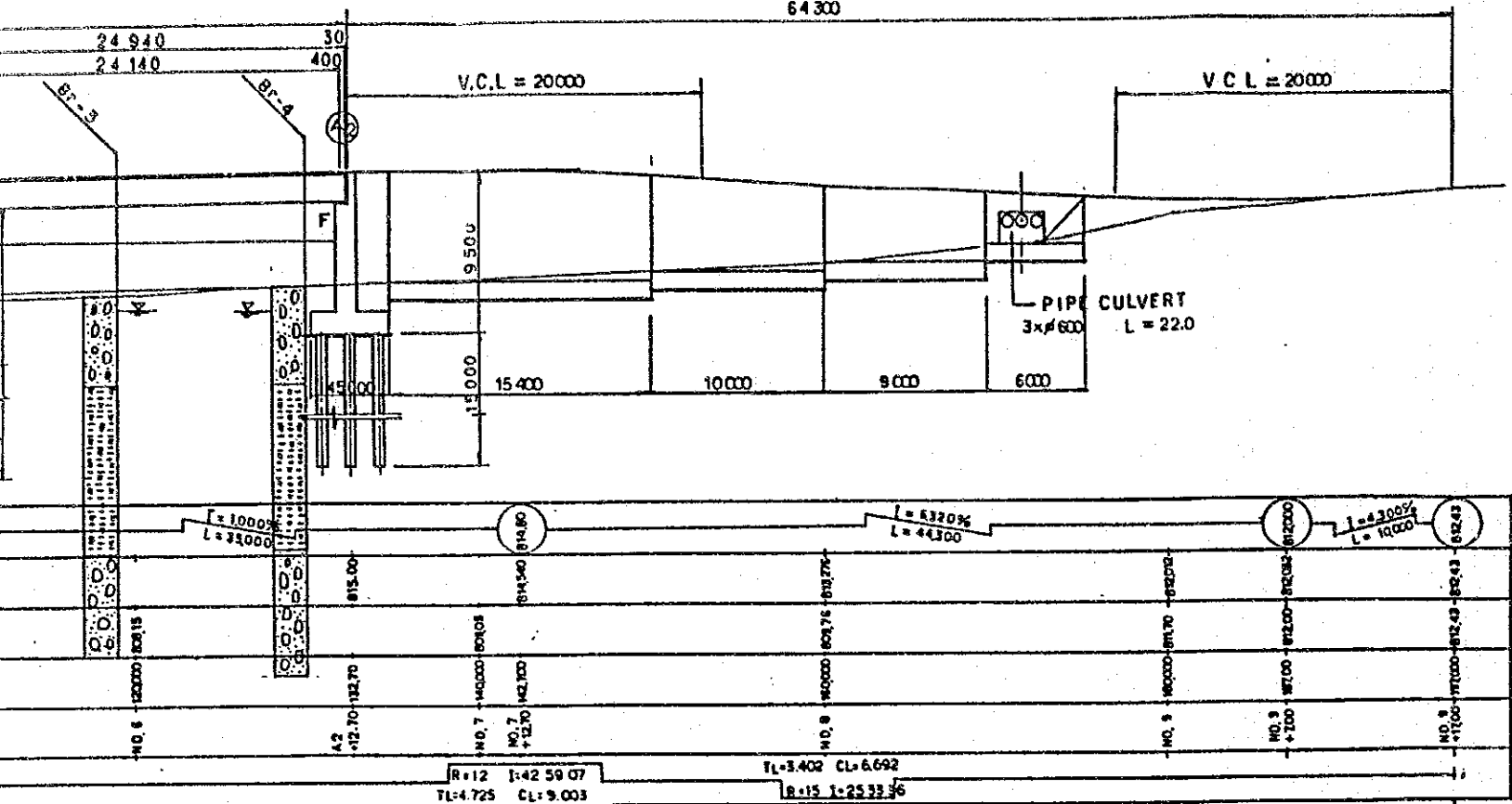


Fig.6.12 General Layout Plan of the No.16 Kaidon Bridge

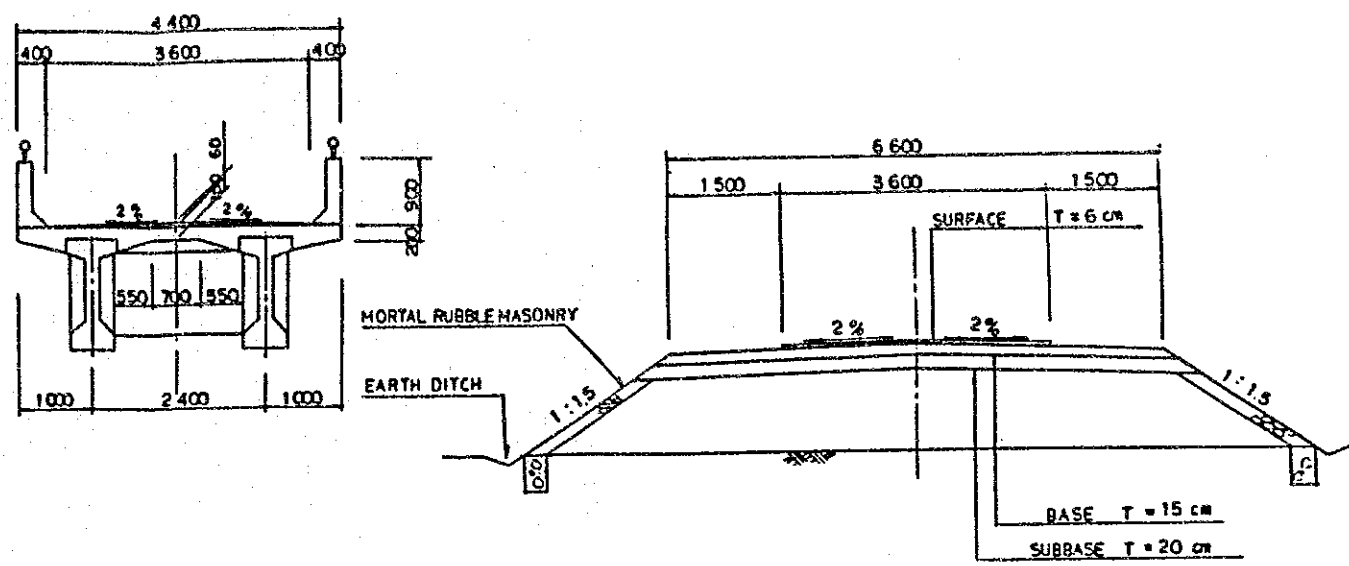
ELEVATION
SCALE=1:200



ION
SCALE=1:1000



TYPICAL CROSS SECTION
5=1:50



CROSS SECTION
5=1:100

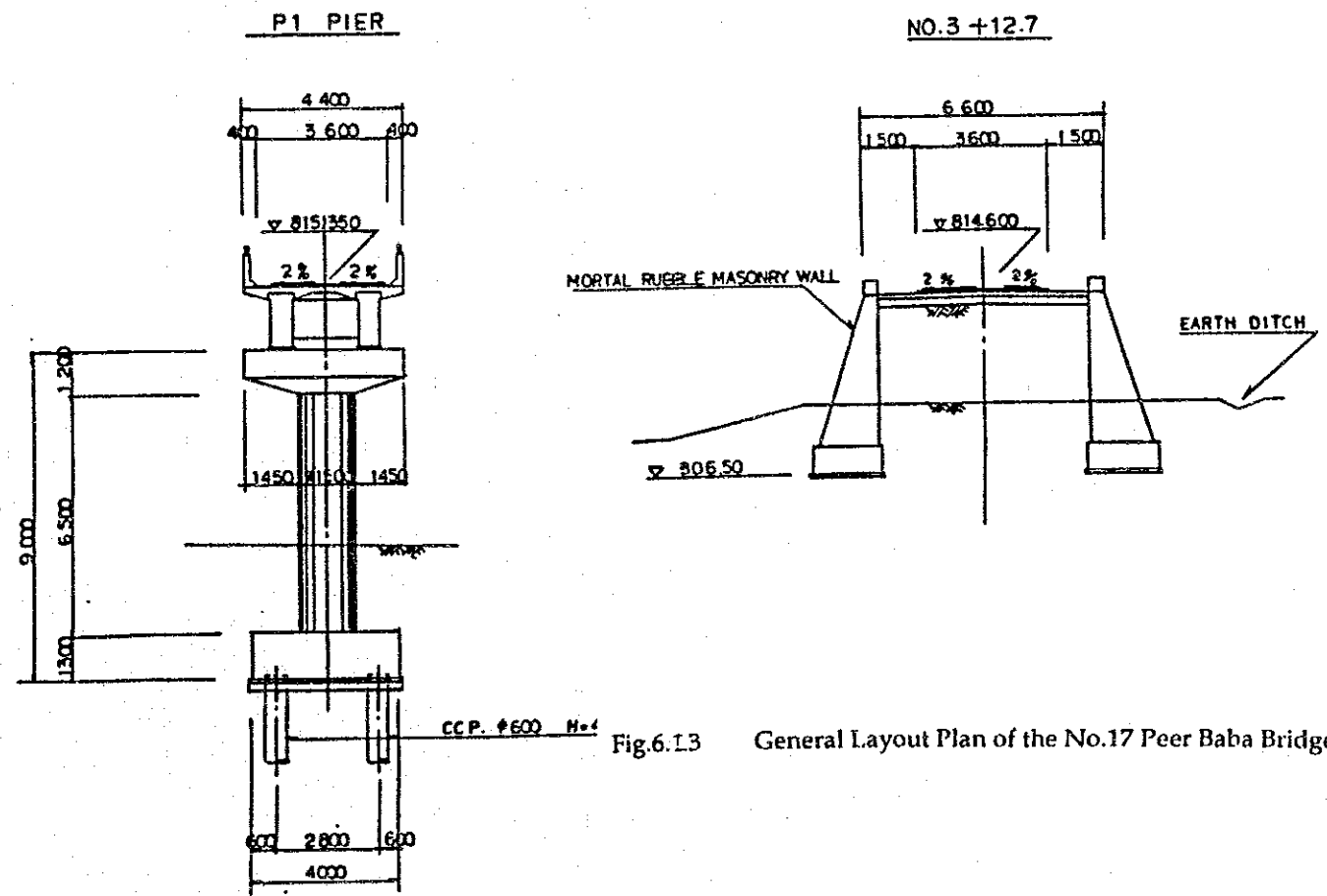
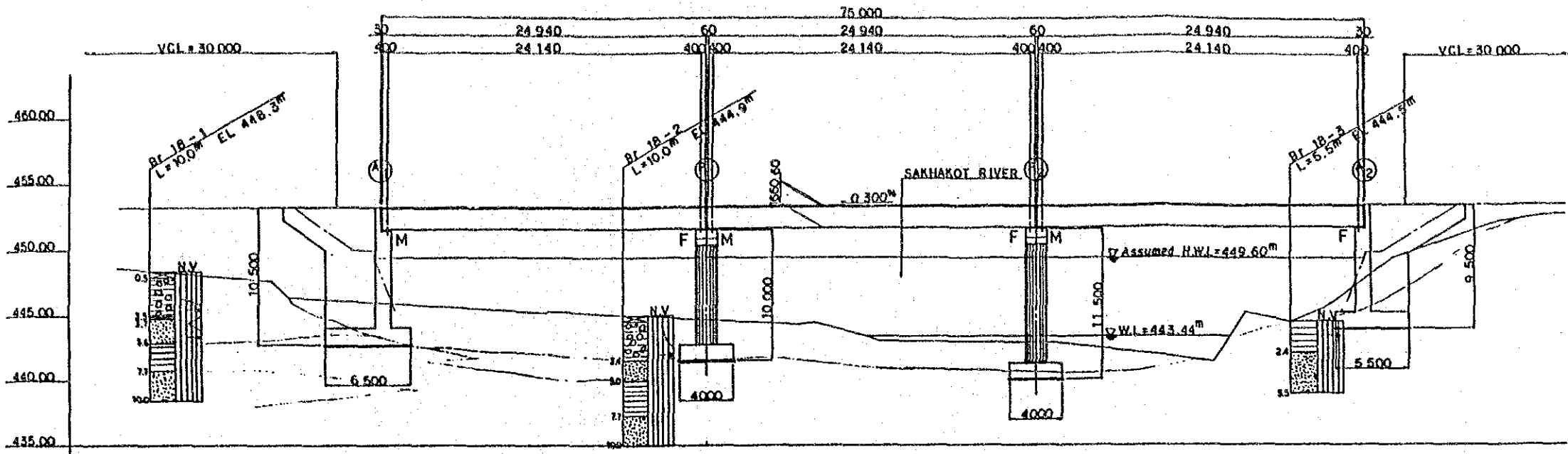
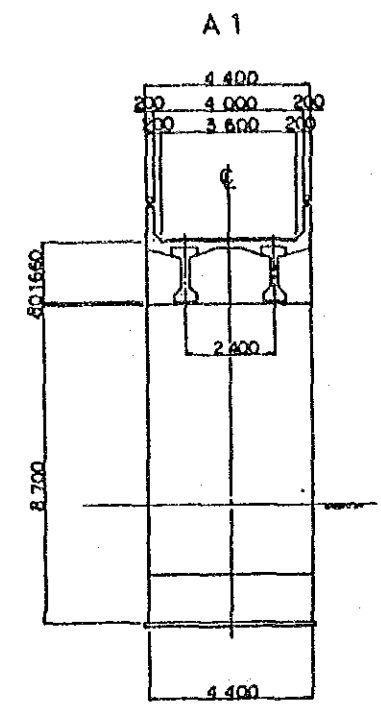


Fig.6.13 General Layout Plan of the No.17 Peer Baba Bridge

ELEVATION SCALE = 1 : 200



CROSS SECTION SCALE = 1 : 100



VERTICAL ALIGNMENT	L=1,065 L=64.800		L=0.300 L=110.000		LEVEL L=15.000	
FORMATION HEIGHT	453.12	453.16	453.28	453.31	453.35	453.49
GROUND HEIGHT	447.71	447.65	444.28	444.41	443.44	443.00
DISTANCE	71.4	79.2	113.0	120.0	138.0	151.6
CROSS SECTION NO.	NO. 4	A1 (NO. 4) (+8.0)	NO. 5	P1 (NO. 5) (+13.0)	NO. 6	P2 (NO. 6) (+18.0)
HORIZONTAL ALIGNMENT						

PLAN SCALE 1 : 200

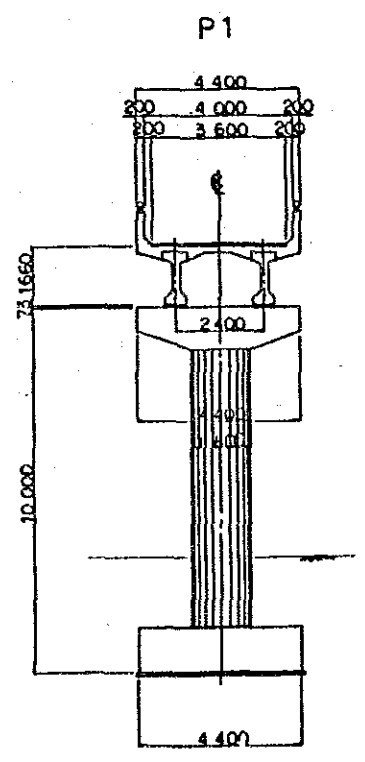
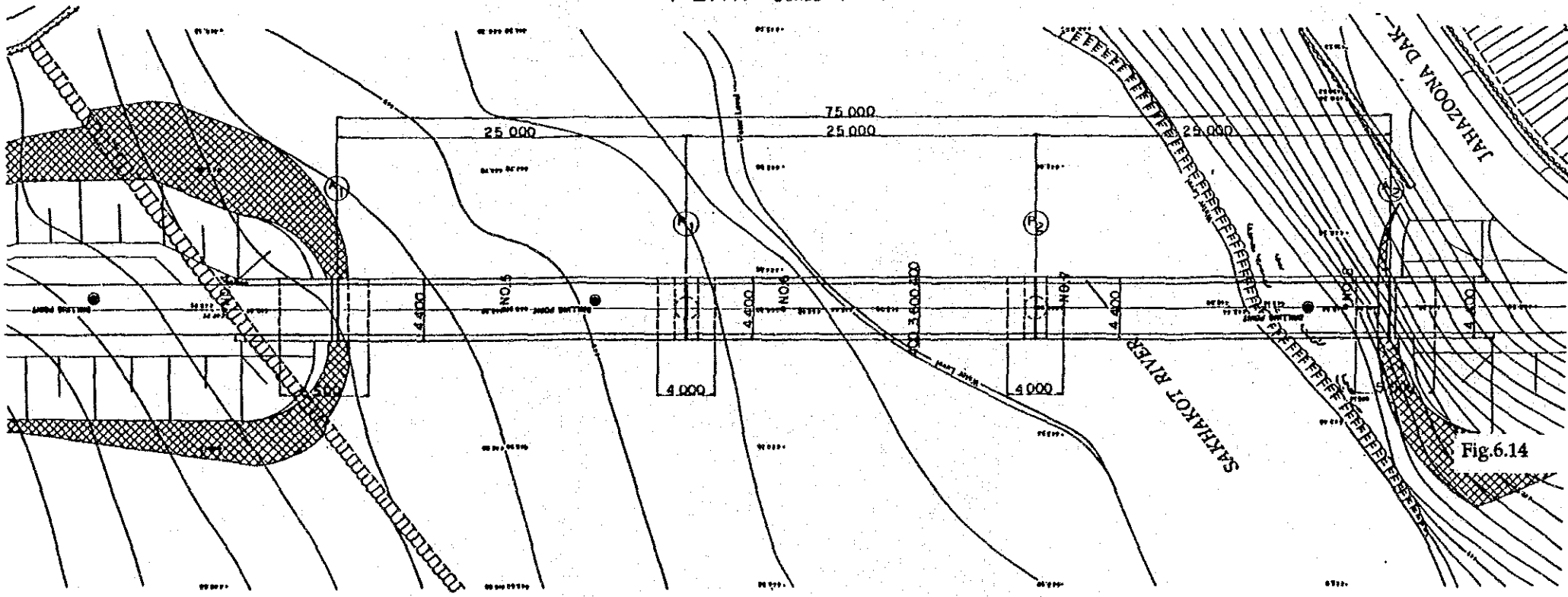
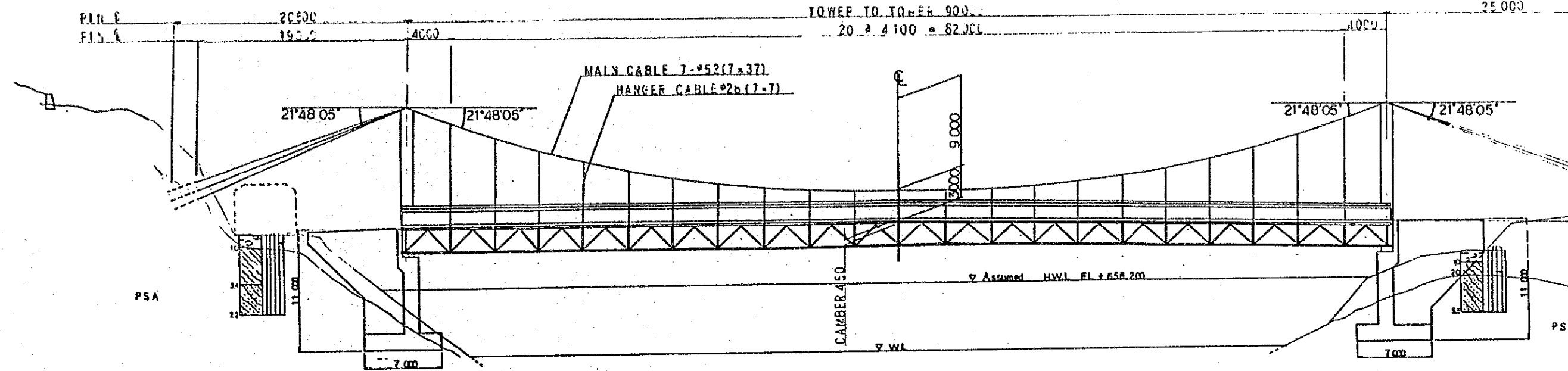


Fig.6.14 General Layout Plan of the No.18 Jahazona Dak Bridge

ELEVATION

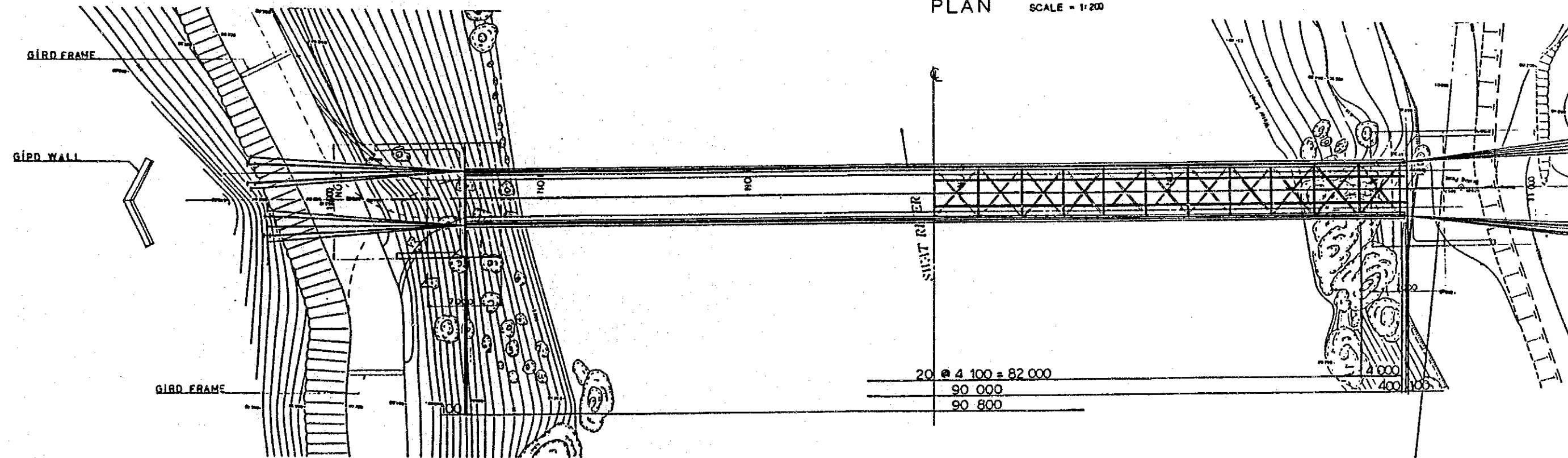
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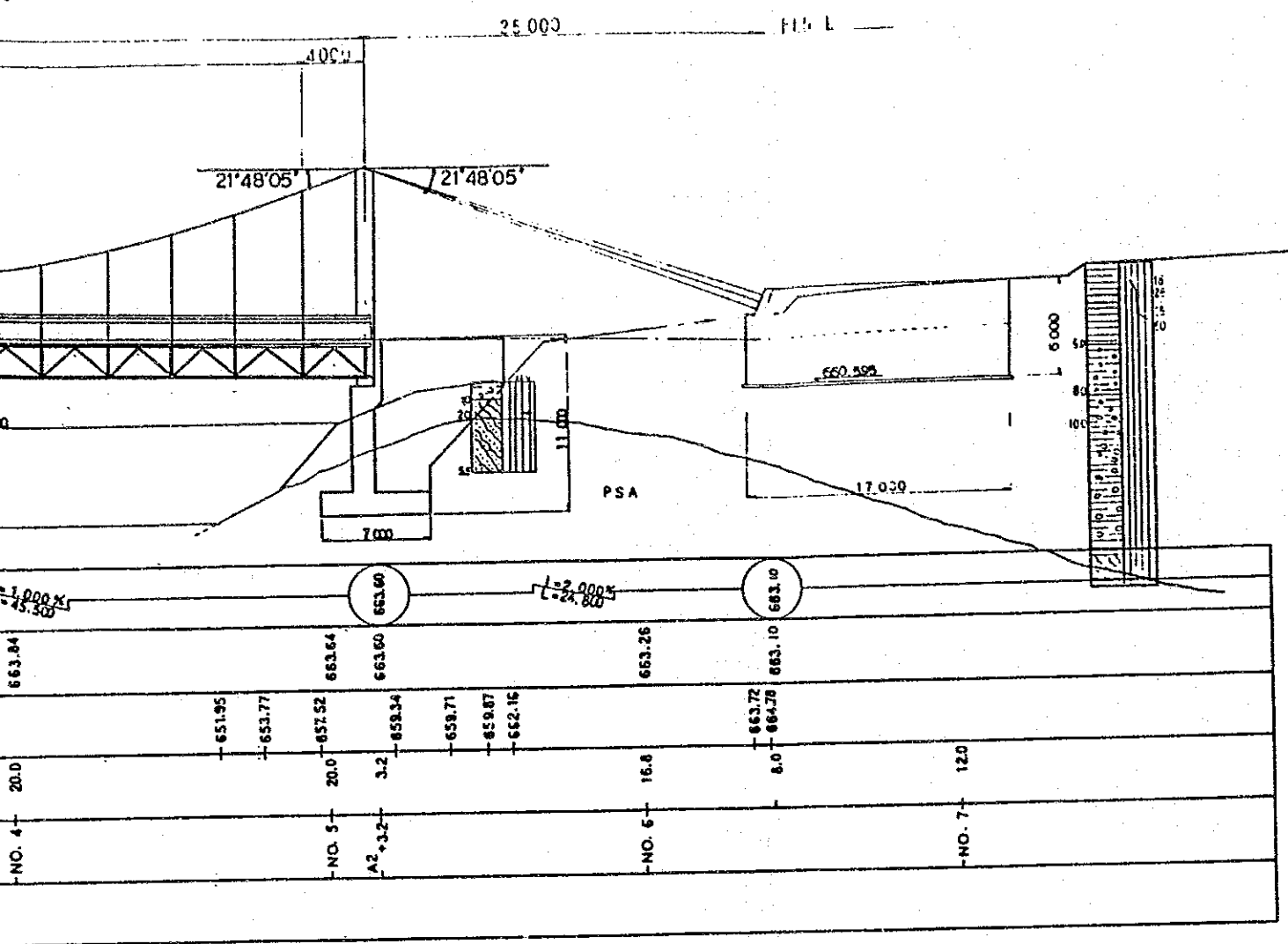


VERTICAL ALIGNMENT	FORMATION HEIGHT	GROUND HEIGHT	DISTANCE	STATION NO.	HORIZONTAL ALIGNMENT
663.40	663.40	672.53			
663.60	663.60	668.64			
663.68	663.68	662.06	0.0	NO. 0	
663.80	663.80	662.22	2.2		
664.05	664.05	661.90	10.0	NO. 1	
664.04	664.04	661.18	7.7		
664.05	664.05	657.58	20.0	NO. 2	
664.04	664.04	651.38	17.7	NO. 3	
663.84	663.84	651.95	20.0	NO. 4	
663.64	663.64	653.77	20.0	NO. 5	
663.60	663.60	657.52	3.2	NO. 6	
663.34	663.34	659.34			
663.60	663.60	659.71			
663.60	663.60	659.87			
663.60	663.60	662.16			

PLAN

SCALE = 1:200





CROSS SECTION SCALE = 1:200

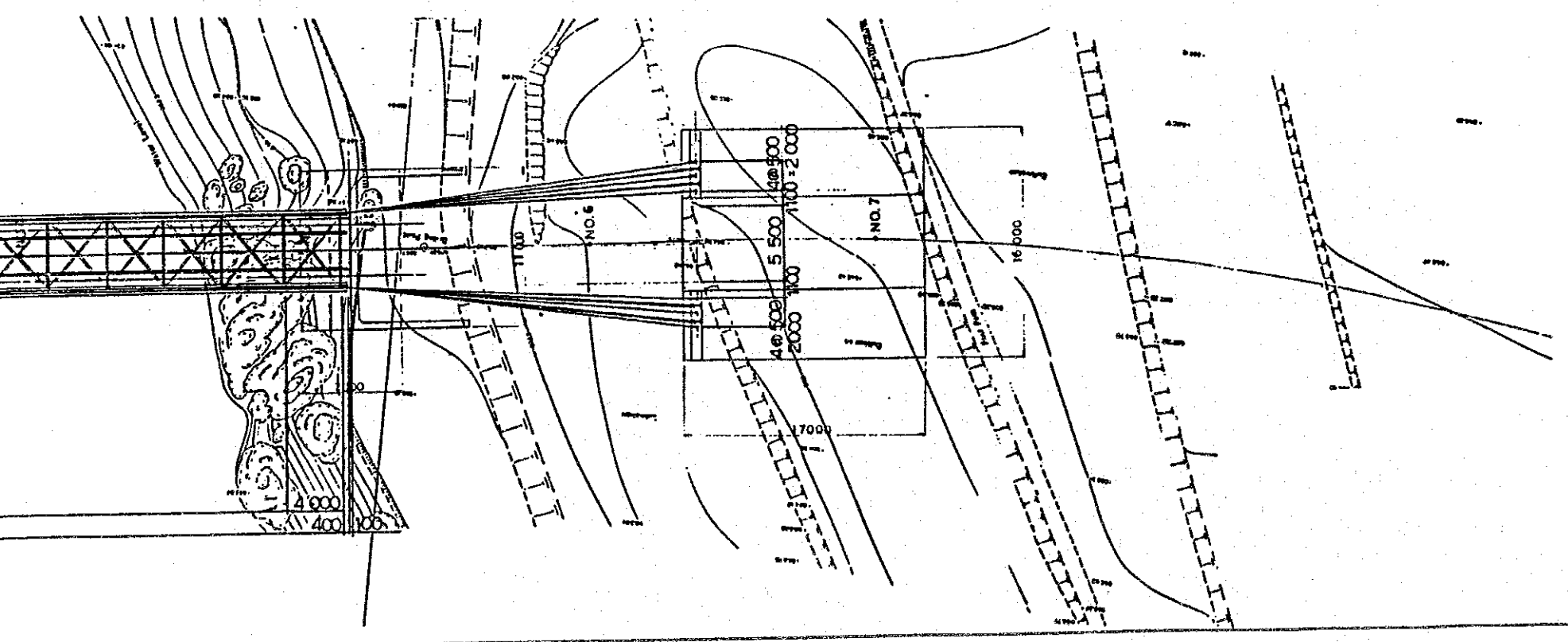
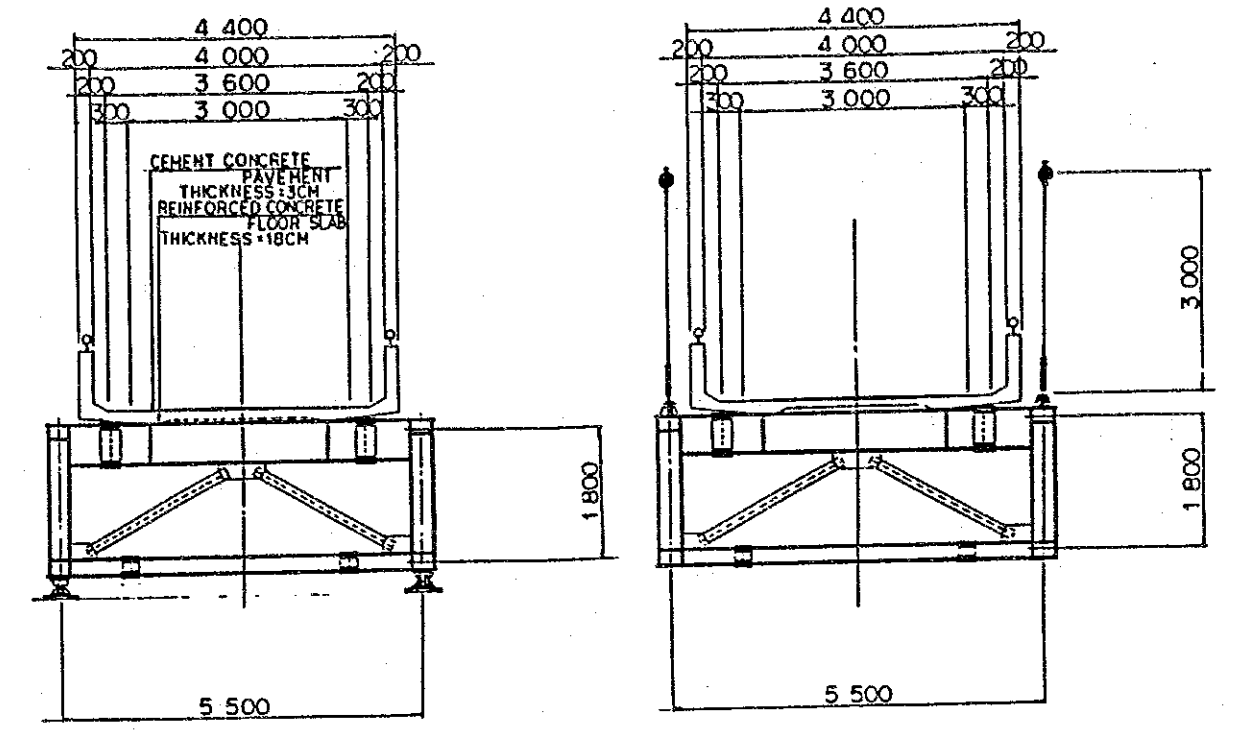


Fig.6.15 General Layout Plan of the No.19 Totakan Bridge

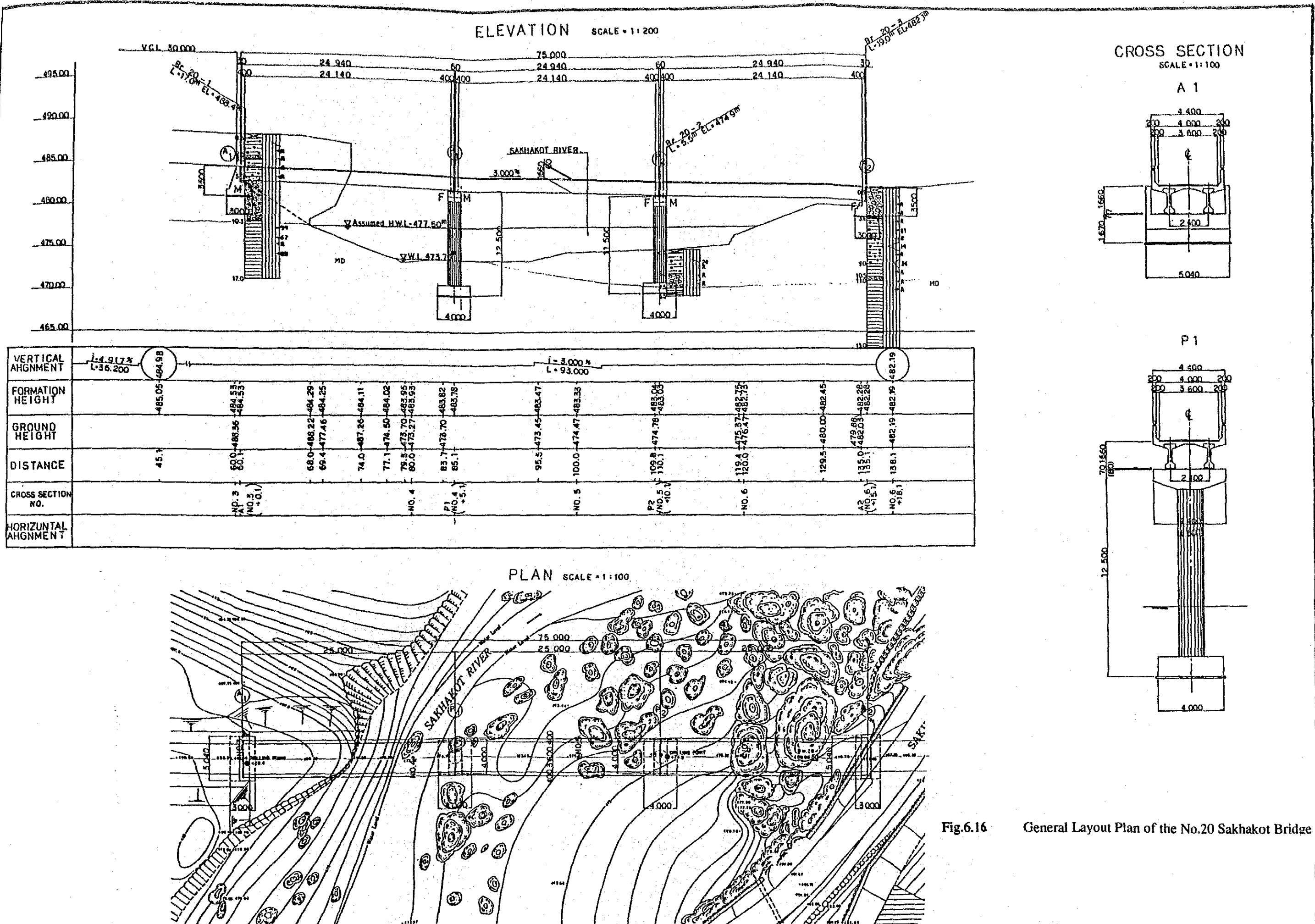


Fig.6.16 General Layout Plan of the No.20 Sakhakot Bridge

6.5 Approximate Quantities by Major Work Items

Quantities calculated based on the above general layout plans are summarized in Table 6-3.

6.6 Implementation Program

6.6.1 Principles of Implementation

(1) Principles of Phasing

Points to be considered for implementing the construction of 11 bridges are discussed in the preceding paragraph 3.2.2(2). Based on these, it is recommended to implement the construction of 11 bridges by way of phasing. As for phasing, grouping of bridges should be made taking into consideration the similarity of site conditions (geography, climate, accessibility etc.).

Construction works of No.11 Choni Bridge where the site conditions are quite different from the other 10 bridges, can not be executed in the winter season when the NCC Road is closed at Lowari Pass. Construction of No.11 Choni Bridge can not be completed within a single year (12 months). Accordingly, this bridge could not be implemented by the normal Japan's Grant Aid Program which is based on a single-year projects.

Consequently, the following phasing to implement the construction of 11 bridges is recommended:

- Phase I : 5 bridges (single year basis)
- Phase II : 5 bridges (single year basis)
- Phase III : 1 bridge (multi-year basis)

Table 6-3 Approx. Quantities by Major Work Items (Bridge Work Only)

	Unit	No.1	No.5	No.7	No.11	No.12	No.14	No.16	No.17	No.18	No.19	No.20
Bridge Deck Area	m ²	360	270	648	594	317	180	158	180	270	324	180
No. of Abutments	Each	4	2	2	2	2	4	2	2	2	2	2
No. of Piers	Each	3	2	-	-	1	-	-	1	2	-	2
No. of PC I-Beams	Each	10	6	-	-	-	4	-	4	6	-	6
Weight of Steel Members	Ton	-	-	230	144	85	-	43	-	-	98	-
Cable Length for Suspension	Ton	-	-	78	33	-	-	-	-	-	23	-
Saddles, Suspenders etc.	Ton	-	-	45	44	-	-	-	-	-	28	-
No. of Anchorage	Each	-	-	-	2	-	-	-	-	-	1	-
No. of Rock Anchor	Each	-	-	2	-	-	-	-	-	-	1	-
Cement Concrete	m ³	842	652	1,213	5,332	282	494	248	350	461	2,100	377
Rebar	Ton	77	75	135	222	27	51	28	28	41	116	37
Cast-in-place Pile(dia.60cm)	m	486	-	-	864	159	-	-	300	-	-	-

6.6.2 Subject Bridges by Phasing

(1) Phase I Project

Subject bridges are bridges not only categorized in high priorities but also advantageous in prompt mobilization owing to geographical situation that sites are close to Islamabad or Peshawar. The following 5 bridges are included in Phase I Project:

- No.1 Narlai Bridge (Abbottabad District)
- No.12 Khal Bridge (Dir District)
- No.18 Jahazoon Dak Bridge (Malakand Agency)
- No.19 Totakan Bridge (Malakand Agency)
- No.20 Sakhakot Bridge (Malakand Agency)

(2) Phase II Project

Subject bridges are the rest of high priority bridges excluded from Phase I except No.11 Choni Bridge. The bridges to be implemented in Phase II are as follows:

- No.5 Pashorai Bridge (Mansehra District)
- No.7 Panipa Bridge (Kohistan District)
- No.14 Bukari Khawar Bridge (Dir District)
- No.16 Kaidon Bridge (Swat District)
- No.17 Peer Baba Bridge (Buner District)

(3) Phase III Project

Subject bridge is the following for which construction would be stopped in winter:

- No.11 Choni Bridge (Chitral District)

6.6.3 Principles and Special Consideration for Project Implementation

(1) Phase I Project

The following has been taken into account for formulating the implementation of the 5 bridges of Phase I Project.

- a) As floods often take place from July to September, civil works in river water is deemed to be dangerous during this period. In this regard, safe construction methods and appropriate construction periods should be considered within the time limitation in case that required quantities of foundations and substructures in water are large.
- b) During the flood season, civil works should be limited to the on-land works for safety purposes.
- c) Delivery of machinery, girder members and other materials should be done in the dry season: March to June, and October to March.
- d) In some bridge sites, the following constraints are envisaged. Therefore, appropriate sizes of heavy equipment and girder members should be considered.
 - Working space is limited due to the existing houses, and other structures.
 - Existing access roads to the site are not in good condition.
 - Temporary access road required for the Project is relatively away from bridge site due to geographical situation.
- e) Land acquisition for permanent works and land lease for temporary use such as access roads and construction yards should be carried out by the Government of Pakistan prior to the commencement of the Project.

(2) Phase II Project

The following has been taken into account for formulating the implementation of the 5 bridges of Phase II Project.

- a) At No.16 Kaidon Bridge site, discharge of the Chitral River increases from April to June owing to thawing of snow in the northern mountains. In this regard, substructure works should be carried out before April.
- b) As floods often take place from July to September at sites of the rest 4 bridges, civil works in river water is deemed to be dangerous during this period. In this regard, substructure works should be completed by June.

- c) During the flood season, there would be a likelihood of access road blocks due to slope failures. Therefore, transportation of equipment and materials should be done during the dry season (from November to June).
- d) In case of No.7 Panipa Bridge, it would be difficult to obtain a large construction yard. In this regard, large size machinery should not be used. Blasting method is recommendable for rock excavation.
- e) Land acquisition for permanent works and land lease for temporary use such as access roads and construction yards should be carried out by the Government of Pakistan prior to the commencement of the Project.

(3) Phase III Project

The following were taken into consideration for the formulation of the implementation of No.11 Choni Bridge in Chitral District.

- a) NCC Road is closed at Lowari Pass due to snowfall in winter, from December to next May. During this period, Chitral Town is isolated, so that field works for this period should not be considered.
- b) As only half a year can be available for transportation on the NCC Road via Lowari Pass, the period from June to November of the first year of 1994 should be effectively used for delivery of steel truss members, wire ropes for cables and other materials. Such materials should be stocked at the site for immediate start of superstructure the next year.
- c) No field works should be done in winter from December to next May, and therefore substructure works should be carried out from June to November in the first year (probably 1994). Superstructure works should be carried out during the same months in next year.
- d) Land acquisition for permanent works and land lease for temporary use such as access roads and construction yards should be carried out by the Government of Pakistan prior to the commencement of the Project.

6.6.4 Supervisory Works

Immediately after signing the contract for the consulting services, Japanese team that consists of team leader, superstructure engineers, substructure engineers, soil/material engineer, cost estimator and document specialist will carry out detailed engineering design, preparation of tender document and assistance to the employer for tender open. In the construction stage, resident engineer and other experts will be assigned to supervise and advise the construction activities. Job demarcation of the key personnel is as follows:

(1)Team Leader

Conduct the implementation plan, tender evaluation, and other overall supervisory work regarding the construction works.

(2)Superstructure Engineer

Conduct detailed design of superstructures during design stage. In the course of construction stage, conduct the inspection on the fabrication of girders and erection works.

(3)Substructure Engineer

Conduct detailed design of foundations, substructures, retaining walls and culverts during design stage. In the course of construction stage, conduct the inspection on the foundation works, substructure works including tower construction of suspension bridge.

(4)Soil Material Engineer

Confirm the subsoil conditions of the foundation and supervises the foundation works and quality control activities of concrete works and others during construction stage.

(5)Cost Estimator

Review the cost analysis conducted in Basic Design Study and refine the project cost during design stage.

(6)Document Specialist

Prepare tender documents regarding construction works of the Project during design stage.

(7) Resident Engineer

Stay in NWFP and conduct the supervision on construction works and manage the engineering service team during construction stage.

6.6.5 Availability of Labors, Materials and Equipment

(1) Present Situation of Labor Force in Pakistan

Foremen and skilled labors are relatively well trained in Pakistan as long as the Basic Design Team investigated a project site where prestressed concrete erection was underway. These foremen and skilled labors are employed by Pakistani construction firms.

On the other hand, experiences of steel bridge erection works were only a few in the past, and the number of riggers for steel girder erection seems to be limited. In this regard, training of recruited riggers would be necessary for steel girder erection works by way of Japanese experts' supervision.

Demands for skilled labors might increase in the future if the construction of similar projects such as Indus Highway and Islamabad - Lahore Motorway start.

(2) Present Situation of Construction Materials

a) Cement

Annual production of cement in Pakistan is approximately 5 million tons. In the vicinity of the Project sites, cement is produced in Islamabad, which is produced based on BSI Standards and will be used for the Project.

b) Reinforcing Bars

Factories to produce reinforcing bars are in Karachi, Islamabad, Lahore and so on. Most of products are twisted-bars based on Grade 40 to Grade 60 of BSI Standards. In addition, deformed bars are produced based on Grade 40 and Grade 60 of ASTM Standards. According to the test results

by manufactures, qualities of deformed bars are relatively good for the use of bridge structures. On the other hand, it is allegedly informed that twisted bars have some problems in case of bending process due to less ductility.

c) Aggregates and Sands

As the bridge sites of the Project are located in hilly areas or mountains, a number of boulders and big volume of sands are existing on riverbeds. These boulders and sand will be used for the Project.

Suppliers of crushed stone are existing along some rivers sporadically in NWFP. Procurement of aggregates from these suppliers is recommended in the view point of quality assurance. Importation of new crushing plant from Japan is not favorable in the economic point of view for the Project.

d) Steel Materials

Steel fabricators, relatively in small scale, are operating to manufacture angle section and H-section members in Karachi, Lahore, etc. They seem to have less capacity to produce large-size members like plate girders or truss girders. In this regard, importation of steel materials is necessary for the Project.

(3) Construction Equipment

Construction equipment is available in Pakistan on rental basis. However, as the number and kind of equipment are very limited, major or special equipment for the Project will be imported from Japan taking into consideration the following:

a) Equipment, which is used only in short period such as for embankment works and pavement works, will be procured in Pakistan on rental basis.

b) Special equipment required for steel girder erection will be imported from Japan.

c) Equipment, which is dominant to keep time schedule and quality assurance, will be imported from Japan.

(4) Related Legislation for Construction Works

Competent authority of labor regulations is the Industries, Commerce, Labour, Mineral Development and Transport Department of NWFP in strict compliance with the labor law in Pakistan. Minimum wage of labor is Rs 60 per day at present. Standard working time is from 8:00 a.m. to 4:00 p.m. and Friday is holiday.

As for construction works, contractors have to provide the Employee Group Life Insurance against their local employees. In addition, the following insurances are popular in Pakistan:

- Insurance of Works
- Third Party Insurance
- Insurance of Contractor's Equipment
- Insurance of Transportation

In transportation from Karachi to Peshawar, toll charges are required whenever vehicles pass the provincial borders and long-span ridges.

6.6.6 Implementation Schedule

Time table of implementation schedule is shown in Fig. 6.17 which contains work items from the Exchange of Notes (E/N) between the Government of Japan and the Government of Pakistan to the completion of Phase I Project. The contents of major items are described below;

(1) Detailed design

Immediately after the E/N, contract for Consulting Services will be signed. The services will include the preparation of design drawings and contract documents required for tendering process.

(2) Tendering and Contracting

Pre-qualification (P/Q) of Tenderers for construction works will be done in Japan by the Consultant for the verification of P/Q document by JICA.

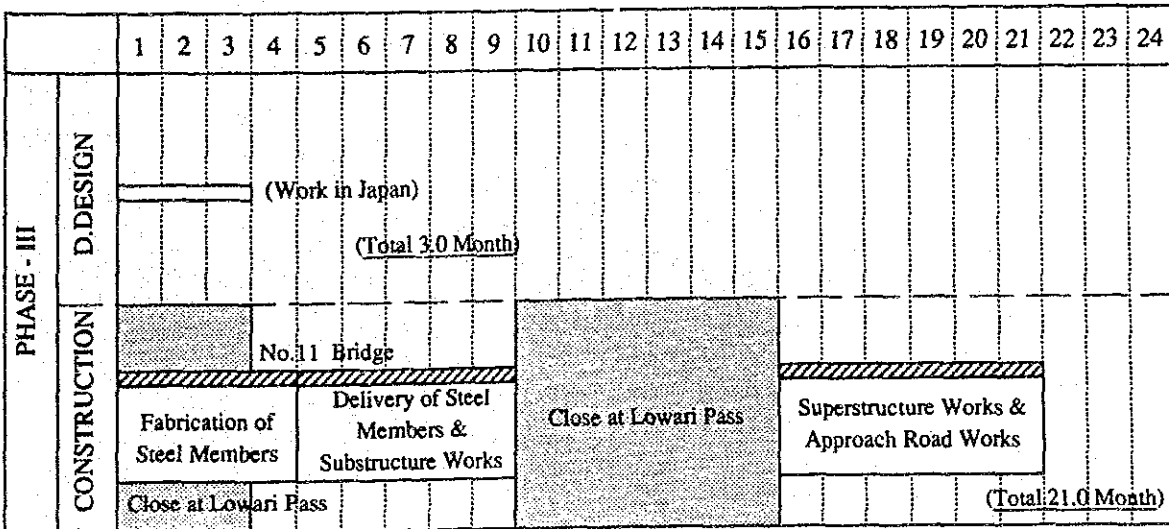
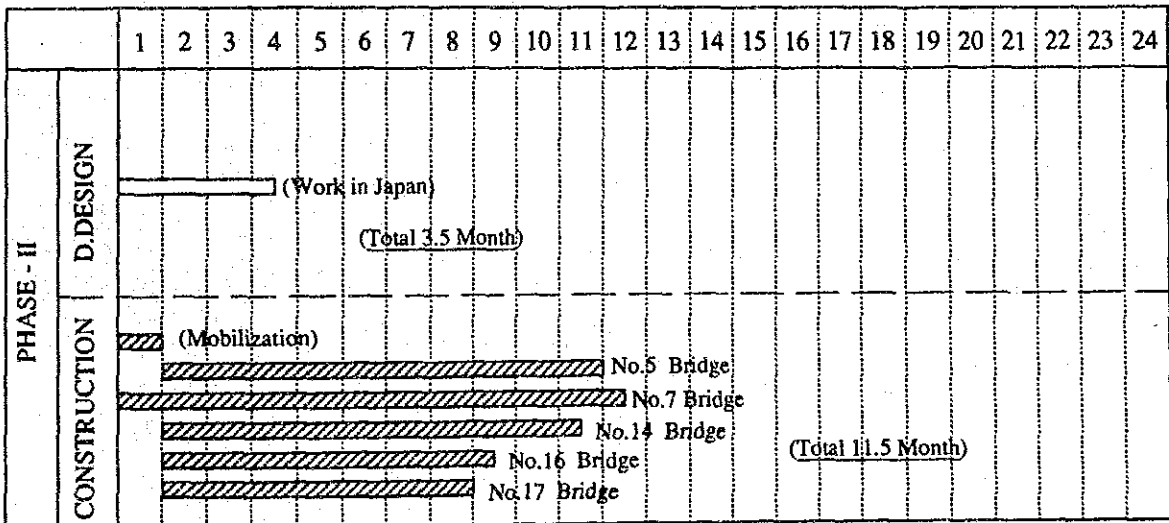
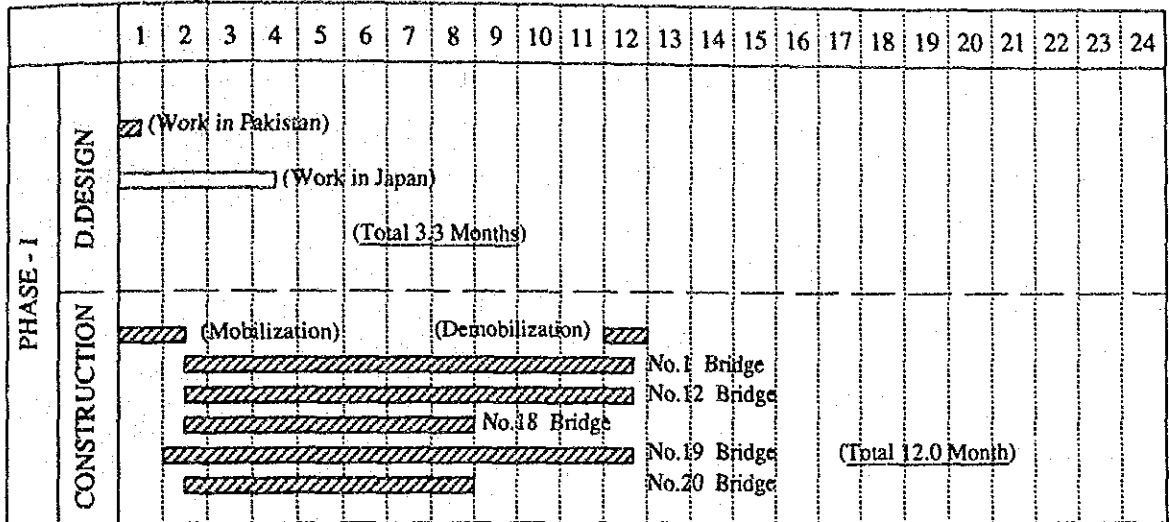
Evaluation of Tender and selection of the contractor for construction works will be done in Japan by the representatives from the Government of Pakistan and the Consultant in the presence of official(s) from JICA.

Negotiation and signing of the Contract will be done in Pakistan within 4 months after the E/N.

(3) Construction Works

Construction works will be mainly made up of mobilization, foundation work, substructure work, superstructure work, approach road construction and ancillary works such as river bank protection. Construction period is scheduled within 12 months to complete all facilities of Phase I and Phase II while 21 months will be required to complete all facilities of Phase III.

Fig 6.17 Tentative Implementation Schedule



6.6.7 Maintenance After Completion of the Projects

After final taking-over of the bridges from the Contractor, maintenance works for the respective bridges will be carried out by XEN offices, i.e. Mansehra Highway Div.(C&W Circle Abbotabad), Dir Highway Div.(C&W Circle Malakand) and Malakand C&W Div.(C&W Circle Malakand). Where final taking-over means taking-over at the end of the defects liability period which might be 1 year after substantial taking-over of each bridge.

CHAPTER 7

CONCLUSION AND RECOMMENDATIONS

CHAPTER 7 CONCLUSION AND RECOMMENDATIONS

7.1 Impact and Significance of the Project

As a result of the technical investigation and the social, economical and transportation research executed by the Study Team, the gist of the impact onto the economy and society, and the economical influential effect would be as enumerated below.

Present Situation	Facilities in The Project	Effects & Significance of The Project
<p>1) Most of bridges, connecting feeder roads with national highways or major provincial roads, consist of temporary suspension type structures with wooden decks to cross the rivers allowing traffic for only pedestrians, oxen and horses. At present, transport on such bridges forces people to load and unload agricultural products at the bridge entrances and to cut heavy timber logs into small sizes due to weight limitation, which results in degrading and damaging those quality and decreasing commodity values. The disadvantage not to allow vehicle-service hampers the social and economic growth of villages in such remote areas as well.</p>	<p>Replace the following 8 temporary suspension bridges connecting the feeder roads and national highways or major provincial roads by permanent type bridges that allow vehicle transportation:</p> <ul style="list-style-type: none"> - No.1 Narlai Bridge - No.5 Pashorai Bridge - No.7 Panipa Bridge - No.11 Choni Bridge - No.12 Khal Bridge - No.16 Kaidon Bridge - No.17 Peer Baba Bridge - No.19 Totakan Bridge. 	<ul style="list-style-type: none"> - Facilitate the transportation of agricultural products and lumber, and reduce the degradation of those products by way of elimination of unloading process and the weight limitation. - Provide bus and other vehicle operations to improve regional public services (e.g., medical and educational services). - Promote rescue services at the times of disaster and stabilize public welfare. - Dissolve the problem of the missing link in the existing traffic network.
<p>2) Despite being one of the major provincial roads, no bridge exists over the river crossing which allows only heavy vehicles to pass when water level is low.</p>	<p>Construct a bridge, Bukari Khawar Bridge, over the Nullah Bukari on a major provincial road Samar Bagh - Shahi Road.</p>	<ul style="list-style-type: none"> - avoid to detour during flood time and facilitate vehicle transportation throughout the year. - Provide bus and other vehicle operations to improve regional public services (e.g., medical and educational services). - Promote rescue services at the times of disaster and stabilize public welfare. - Dissolve the problem of the missing link in the existing traffic network.
<p>3) There exist concrete-type old bridges that have been deteriorated and are now in a serious condition due to insufficient bearing capacity. Further, flood water often flows over beams of the bridges to stop vehicle transportation. It is allegedly anticipated that serious calamity will take place in the vicinity of existing bridges when river-surface obstacles like drifting woods are piled up in between bridge structures by flood water. Since no railing of the bridges is existing by damages of the past floods, accidents of falling-down vehicles have been reported.</p>	<p>Replace the following 2 bridges by permanent-type bridges with sufficient free-board:</p> <ul style="list-style-type: none"> - No.18 Jahazoon Dak Bridge - No.20 Sakhakot Bridge. 	<ul style="list-style-type: none"> - Provide vehicle transport in safe condition. - Improve regional public services throughout the year and promote rescue services at the times of disaster. - Avoid the calamity by removing the existing bridges of which free-boards are quite inadequate.

7.2 Recommendations

The NWFP has numerous places requiring construction of bridges due to its steep mountains and rapid current rivers, and as for the type of bridges, it needs such bridges as suspension bridges requiring advanced technology in the structure.

Taking the above necessity and aforementioned impact and significance into consideration, the implementation of the subject project through the cooperation of Japanese Grant Aid Program would be most meaningful and thus its early implementation would be most desirable.

Further, it is recommended that technical cooperation be conducted in Japan by way of technology transfer under the JICA counterpart training program, and thus construction of a number of bridges would be implemented in the future by Pakistani own forces.

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MEMBER LIST

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Sakaide Office, 2nd Operation Bureau,
Honsyu-Shikoku Bridge Authority

Coordination Mr. Yodo KAKUZEN

First Project Management Division,
Grant Aid Project Management
Department, JICA

Chief of Consultant Mr. Hisashi OSHIMA

Nippon Koei Co., Ltd.

Bridge Design (1) Mr. Katsufumi MATSUZAWA

Nippon Koei Co., Ltd.

D) List of Persons Met in Pakistan

EAD, Islamabad

Mr. A.S. Huda
 Mr. Shahid Humayun
 Mr. Aftal Ikubal
 Mr. Fazul Rahman

Joint Secretary
 Deputy Secretary
 Deputy Joint Secretary

P&D Dept., NWFP

Mr. Mohammad Saleem Khan
 Mr. Khalid Aziz
 Mr. Abdul Jalil Mughal

Secretary
 Additional Chief Secretary
 Additional Secretary

C&W Dept., NWFP

Mr. Adam Khan
 Mr. Abdul Qayyum Khan
 Mr. Muhammad Afzal Khan
 Mr. Tariq Saeed Khan
 Mr. Shaukat Ali Ayub
 Mr. Habib Ali Khan
 Mr. Abdel Qasim
 Mr. Mohamad Ali Khan
 Mr. Abdel Ahad Khan

Secretary
 Acting Secretary cm Chief Engineer
 Chief Engineer
 Principal Engineer, Central Design Office
 Executive Engineer, Peshawar
 Executive Engineer Building, Dir
 Executive Engineer Highway, Dir
 Executive Engineer Highway, Chitral
 Executive Engineer Highway, Mansehra

Embassy of Japan

Mr. Koichi Murase

Economic Secretary

JICA Pakistan Office

Mr. Akihiro Mitarai
 Mr. Ryusuke Ishibashi
 Mr. Kazushige Aragaki
 Mr. Shoji Nishikawa
 Mr. Kaoru Iwasaki
 Mr. Hiroshi Yoshimura

Resident Representative
 Deputy Resident Representative
 Deputy Resident Representative
 Assist. Resident Representative
 Assist. Resident Representative
 Assist. Resident Representative

ACTIVITIES OF JICA BASIC DESIGN TEAM IN PAKISTAN

A) First Field Survey Mission (July ~ August, 1992)

Order of Date	Month/Day	Survey Activities
1	7/14 (Tue)	Arrived at Karachi
2	7/15 (Wed)	Moved from Karachi to Islamabad Meeting at JICA Pakistan Office Courtesy call to Economic Affairs Division (EAD) Courtesy call to Embassy of Japan
3	7/16 (Thi)	Moved from Islamabad to Peshawar Courtesy call to Planning & Development (P & D) Dept. Courtesy call and meeting with Communication & Works (C & W) Dept. regarding Inception Report
4	7/17 (Fri)	Internal Meeting Meeting with C & W Dept. regarding investigation schedule
5	7/18 (Sat)	Site investigation: No.18, 19 & 20 bridges
6	7/19 (Sun)	Meeting with C & W Dept.
7	7/20 (Mon)	Signing of Minutes of Discussions Meeting with C & W Dept. regarding site investigation schedule
8	7/21 (Tue)	Move from Peshawar to Abbottabad Site Investigation: No.1 bridge
9	7/22 (Wed)	Site investigation: No.1 & 2 bridges Moved from Abbottabad to Peshawar
10	7/23 (Thi)	Site investigation: No.12, 13 & 14 bridges (Mr. Kai, Mr. Iizuka & Mr. Aratsu left Peshawar & arrive at Islamabad. Report to Embassy of Japan, JICA Pakistan & EAD)
11	7/24 (Fri)	Data collection, and study on bridge location of Phase I Project
12	7/25 (Sat)	Finalize the time schedule on site investigation with C & W Dept. Preparatory works for mechanical borings & topo-surveys
13	7/26 (Sun)	Data collection, technical study on Phase I Project, social and traffic study, preparatory works for mechanical borings & topo-surveys
14	7/27 (Mon)	Moved from Peshawar ~ Timargara Site investigation: No.17 bridge Investigation on Phase I Project: mechanical boring, topo-survey, construction prices etc.
15	7/28 (Tue)	Moved from Timargara to Dasu (Kohistan) Site investigation: No.7 & 8 bridges Investigation on Phase I Project: mechanical boring, topo-survey, construction prices etc.

Order of Date	Month/Day	Survey Activities
16	7/29 (Wed)	Moved from Dasu to Mansehra Site investigation: No.5 & 6 bridges Investigation on Phase I Project: mechanical boring, topo-survey, construction prices etc.
17	7/30 (Thi)	Site investigation: No.4 bridge, Moved from Mansehra to Peshawar Investigation on Phase I Project: mechanical boring, topo-survey, construction prices etc.
18	7/31 (Fri)	Compilation of site investigation results Investigation on Phase I Project: mechanical boring, topo-survey, construction prices etc.
19	8/ 1 (Sat)	Meeting with C & W Dept. Compilation of site investigation results Investigation on Phase I Project: mechanical boring, topo-survey, construction cost data
20	8/ 2 (Sun)	Meeting with C & W Dept. Compilation of site investigation results Investigation on Phase I Project: mechanical boring, topo-survey, construction cost data
21	8/ 3 (Mon)	Meeting with C & W regarding site investigation to Chitral Investigation and study on Phase I Project: mechanical boring, topo-survey, comparative study on bridge types (Mr. Oshima & Mr. Ichikawa left Peshawar for Japan)
22	8/ 4 (Tue)	Meeting with C & W Investigation and study on Phase I Project
23	8/ 5 (Wed)	Moved from Peshawar to Saidu Sharif Site investigation: No.15 & 16 bridges Investigation and study on Phase I Project
24	8/ 6 (Thi)	Site investigation: No.17 bridge Moved from Saidu Sharif to Timargara Investigation and study on Phase I Project
25	8/ 7 (Fri)	Moved from Timargara to Chitral Investigation & study on Phase I Project
26	8/ 8 (Sat)	Site investigation: No.10 & 11 bridges Investigation & study on Phase I Project
27	8/ 9 (Sun)	Left Chitral for Mastuj but return from Brep due to road block by land slide Investigation & Study on Phase I Project (Mr. Hirotoni leave Peshawar for Japan)
28	8/10 (Mon)	Site Investigation: No.10 & 11 bridges Investigation on Phase I Project: mechanical boring & topo-survey

Order of Date	Month/Day	Survey Activities
29	7/11 (Tue)	Moved from Chitral to Mansehra Investigation on Phase I Project: mechanical boring & topo-survey
30	8/12 (Wed)	Site investigation: No.3 bridge Moved from Mansehra to Peshawar Investigation on Phase I Project
31	7/13 (Thi)	Study on priority of each bridge Investigation on Phase I Project
32	8/14 (Fri)	Study on priority of each bridge Compilation of collected data
33	8/15 (Sat)	Study on priority of each bridge Compilation of collected data Investigation on Phase I Project
34	8/16 (Sun)	Meeting with C & W Dept. Investigation on Phase I Project
35	8/17 (Mon)	Site investigation: No.3 bridge Investigation on Phase I Project
36	8/18 (Tue)	Study on priority of each bridge and bridge engineering Investigation on Phase I Project
37	8/19 (Wed)	Moved from Peshawar to Islamabad
38	8/20 (Thi)	Reporting to Embassy of Japan, JICA Pakistan Office (Mr. Matsuzawa, Mr. Ishibashi, Mr. Yoshida and Mr. Kokufu left Islamabad for Japan)
39	8/21 (Fri)	(Left Karachi)
40	8/22 (Sat)	(Arrived at Narita)

Order of Date	Month/Day	Survey Activities
1	10/20 (Tue)	Arrived at Karachi
2	10/21 (Wed)	Moved from Karachi to Islamabad Meeting at JICA Pakistan Office Courtesy call to EAD Courtesy call to Embassy of Japan
3	10/22 (Thi)	Moved from Islamabad to Peshawar Courtesy call to P & D Dept. Meeting with C & W Dept. regarding Interim Report
4	10/23 (Fri)	Internal meeting
5	10/24 (Sat)	Meeting with C & W Dept. regarding Phase II Project (which was divided to Phase II & III afterwards)
6	10/25 (Sun)	Meeting with P & W Dept. Signing of Minutes of Meeting with C & W Dept.
7	10/26 (Mon)	Site investigation: No.15, 16 & 17 bridges
8	10/27 (Tue)	Moved from Peshawar to Islamabad (Mr. Iizuka, Mr. Kakuzen, Mr. Oshima & Mr. Matsuzawa) Reporting to JICA Pakistan Office, Embassy of Japan EAD Investigation on Phase II & III Projects: mechanical boring & topo-survey (Mr. Ishibashi, Mr. Kokufu)
9	10/28 (Wed)	(Mr. Iizuka & Mr. Kakuzen left Islamabad for Japan) Moved from Islamabad to Peshawar (Mr. Oshima & Mr. Matsuzawa) Investigation on Phase II & III Projects: mechanical boring & Topo-survey (Mr. Ishibashi & Mr. Kokufu)
10	10/29 (Thi)	Moved from Peshawar to Timargara
11	10/30 (Fri)	Moved from Timargara to Chitral Site investigation: No.11 bridge
12	10/31 (Sat)	Site investigation: No.11 bridge
13	11/ 1 (Sun)	Moved from Chitral to Peshawar via Timargara
14	11/ 2 (Mon)	Meeting with C & W Dept. regarding temporary bridge under construction Investigation on Phase II & III Projects
15	11/ 3 (Tue)	Meeting with C & W Dept. regarding design criteria and standards Investigation on Phase II & III Projects
16	11/ 4 (Wed)	Meeting with C & W Dept. Investigation on Phase II & III Projects
17	11/ 5 (Thi)	Signing of Memorandum Investigation on Phase II & III Projects

Order of Date	Month/Day	Survey Activities
18	11/ 6 (Fri)	Compilation of site investigation results Investigation on Phase II & III Projects: mechanical boring, topo-survey, construction cost analysis data etc.
19	11/ 7 (Sat)	Meeting with C & W Dept. Investigation on Phase II & III Projects: mechanical boring, topo-survey, construction cost analysis data etc.
20	11/ 8 (Sun)	Moved from Peshawar to Islamabad Reporting to JICA Pakistan Office, Embassy of Japan (Mr. Oshima) Investigation on Phase II & III Project
21	11/ 9 (Mon)	(Mr. Oshima left Islamabad for Japan) Investigation on Phase ii & III Projects
22	11/10 (Tue)	Meeting with C & W Dept. Investigation on Phase II & III Projects
23	11/11 (Wed)	Study on bridge engineering aspect Investigation on Phase II & III Projects
24	11/12 (Thi)	ditto
25	11/13 (Fri)	Moved to Mansehra, site investigation: No.5 bridge Investigation on Phase II & III Projects
26	11/14 (Sat)	Moved from Mansehra to Peshawar Internal Meeting
27	11/15 (Sun)	Moved from Peshawar to Islamabad Reporting to JICA Pakistan Office
28	11/16 (Mon)	(Mr. Ishibashi & Mr. Kokufu left Islamabad for Japan) Moved from Islamabad to Peshawar
29	11/17 (Tue)	Meeting with C & W Study on bridge engineering aspect
30	11/18 (Wed)	Meeting with C & W regarding Phase II Project Study on bridge engineering aspect
31	11/19 (Thi)	Study on bridge engineering aspect
32	11/20 (Fri)	Compilation of collected data
33	11/21 (Sat)	Study on bridge engineering aspect
34	1/122 (Sun)	Meeting with C & W Dept.
35	11/23 (Mon)	Study on bridge engineering aspect Moved from Peshawar to Islamabad
36	11/24 (Tue)	Reporting to Embassy of Japan, JICA Pakistan Office Moved from Islamabad to Peshawar
37	11/25 (Wed)	Meeting with C & W Dept.

Order of Date	Month/Day	Survey Activities
38	11/26 (Thi)	Meeting with C & W Dept. Reporting to P & D Dept.
39	11/27 (Fri)	Leave Islamabad
40	11/28 (Sat)	Arrived in Narita

C) Draft Final Report Mission (March, 1993)

Order of Date	Month/Day	Survey Activities
1	3/8 (Mon)	Arrived at Islamabad(Mr.Iizuka, Mr.Oshima, Mr.Matsuzawa)
2	3/9 (Tue)	Meeting at JICA Pakistan Office Courtesy call to Embassy of Japan Courtesy call to EAD
3	3/10 (Wed)	Moved from Islamabad to Peshawar Submitting Draft Final Report and meeting with C & W Dept.
4	3/11 (Thi)	Courtesy call to P&D Dept. and discussion on Draft Final Report Meeting with C&W regarding Draft Final Report Arrived Karachi (Mr.Kakuzen)
5	3/12 (Fri)	Arrived Peshawar (Mr.Kakuzen) Internal Meeting
6	3/13 (Sat)	Signing of Minutes of Meeting with C & W Dept.
7	3/14 (Sun)	Visit to C&W Dept. Visit to P&W Dept.
8	3/15 (Mon)	Moved from Peshawar to Islamabad Reporting to JICA Pakistan Office, Embassy of Japan
9	3/16 (Tue)	Report to EAD(Mr.Iizuka, Mr.Kakuzen) Site Investigation on No.1 Narlai Bridge(Mr.Oshima, Mr.Matsuzawa)
10	3/17 (Thi)	Moved from Islamabad to Karachi
11	10/30 (Fri)	Moved from Karachi to Narita

MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY ON THE PROJECT
FOR CONSTRUCTION OF BRIDGES
IN NORTH WEST FRONTIER PROVINCE

In response to a request from the Government of the Islamic Republic of Pakistan (the Government of Pakistan), the Government of Japan decided to conduct a Basic Design Study on the Project for Construction of Bridges in North West Frontier Province in the Islamic Republic of Pakistan (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Islamic Republic of Pakistan the study team, which was headed by Mr. Takeo KAI, Civil Engineering Development Specialist, Institute for International Cooperation, JICA, and is scheduled to stay in the country from July 14 to August 21, 1992.

The team held discussions with the officials concerned of the Government of Pakistan and conducted a field survey in the study areas.

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

19, July, 1992

Takeo Kai

Mr. Takeo KAI
Leader
Basic Design Study Team
JICA

Adam Khan
Mr. Adam Khan
Secretary of C&W, NWFP-92

19.7.92
akhtar
12/7/92
(AKHTAR IQBAL)
Deputy Secretary,
Economic Affairs Division,
M.T.A., Government of Pakistan
Islamabad

ATTACHMENT

1. Objective

The objective of the Project is to construct and replace the new and dilapidated bridges in remote areas of North West Frontier Province (NWFP) for the improvement of socio-economic condition and living standard of people in the areas.

2. Executing Organization

Communication & Works Department, Government of NWFP is responsible for the administration and execution of the Project.

3. Request by the Government of Pakistan

The requested bridges, 20 nos. in total, are listed in Annexure-1.

4. Items Agreed by Both Sides

After discussion between the government of NWFP and the study team, the following items were finally agreed by both sides.

- 1) Five bridges will be included in Phase-1 Project study, which consists of bridges at the following sites:

No.1 Pind Gali Road (River Siran at Narlai), Abbottabad District

No.12 NCC Road-Km 135, Khal on Panjkora River, Dir District

No.18 Jahazoon Dak Bridge, Malakand District

No.19 Swat River between Tokatan Kamala, Malakand District

No.20 Sakhakot Village, Malakand District

Basic design on No.2 Bridge on Abbottabad-Murree Road (Harno Nullah at Desar, Abbottabad District) is excluded in the Phase-1 Project study, since budgetary allocation for approach road construction was not resolved yet by NWFP. Instead of No.2, No.12 Bridge was selected for the Study by the discussion between the study team and NWFP officials.

- 2) Carriage width of the respective bridges is 3.6m (1 lane).

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3) Design will be conducted on the basis of Road Bridge Design Standards of Japan. Live load should be the Second Class Load of them.

5. Japan's Grant Aid system

1) The Government of Pakistan has understood the system of Japan's Grant Aid explained by the team.

2) The Government of Pakistan will take necessary measures, described in Annexure-2 for smooth implementation of the Project, on condition that the Grant Aid by the Government of Japan is extended to the Project.

6. Schedule of the Study

1) The study team will proceed to further studies in Pakistan until August 21, 1992.

2) JICA will prepare the Interim Report in English, which covers the draft final design of Phase-1 Project and selection of bridges toward Phase-2 Project, and send the study team to Pakistan in order to explain its contents at the end of October, 1992. The study team will continue further studies in Pakistan until the end of November.

3) JICA will prepare the Draft Final Report in English, which contains draft final design of Phase-2 Project in addition to the contents of the Interim Report, and send the study team to Pakistan in order to explain the contents of Draft Final Report at the beginning of February, 1993.

4) JICA will complete the Final Report and send it to the Government of Pakistan until March, 1993.

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ANNEXURE-1

List of Requested Bridges

No.	Bridge Location	Region
1	Pind Gali Road (River Siran at Narlai)	Abbottabad
2	Abbottabad-Murree Road (Hamo Nullah at Desar)	Abbottabad
3	Sawar Gali Boi Road at Kuniar Kass	Abbottabad
4	Thakot Darband road, Shagai in Km-29	Mansehra
5	Karakurram Highway, Pashorai in Km-171	Mansehra
6	Dadar Sachan Road, Jabrai in Km-11	Mansehra
7	Kandia Valley Road, Bridge over Indus, Km-1	Kohistan
8	Kandia Valley Road, Jajshoe Km-18	Kohistan
9	Mastuj Broghal Pass, Darband	Chitral
10	NCC Naggar West Road, Km-1	Chitral
11	NCC Chitral Town Road	Chitral
12	NCC Road Km-135, Khal on Panjkora River	Dir
13	Bridge on Haya Serai, Khawar	Dir
14	Samar-Bagh Shahi Road, Km 2-3, Bukai Khawar	Dir
15	Mankial Bridge on Swat River, Km-1, Mankial Tarkana Road	Swat
16	Kaidon on Kaidon Goormai Road, Km-1, Swat River	Swat
17	Peer Baba Palakpur	Swat
18	Jahazoon Dak Bridge	Malakand
19	Swat River between Totakan Kamala	Malakand
20	Sakhakot Village	Malakand

ANNEXURE-2

Following necessary measures should be taken by the Government of Pakistan in case Japan's Grant Aid is executed.

- 1) to provide data and information necessary for the Project.
- 2) to secure land necessary for the execution of the Project and provide enough space for construction, such as temporary offices, working areas, stock-yards and others.
- 3) to construct/develop access roads/detours up to the sites prior to the commencement of the construction, for transportation of materials and equipment necessary for the project.
- 4) to demolish or remove existing facilities, if required for the execution of works.
- 5) to bear commission (banking charge) to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.
- 6) to exempt taxes and to take necessary measures for customs clearance of the materials, equipment and supplies brought for the project at the ports of disembarkation in Pakistan including dry port in Peshawar NWFP.
- 7) to accord Japanese Nationals whose services may be required in connection with the supply of products and the services under the verified contract such facilities as may be necessary for their entry into Pakistan and stay therein for the performance of their work.
- 8) to maintain and use properly and effectively the facilities constructed under the Grant.
- 9) to bear all the expenses other than those to be borne by the Grant, necessary for execution of the Project.

Ca. Kai

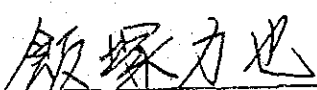
MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY ON THE PROJECT
FOR
CONSTRUCTION OF BRIDGES
IN
NORTH WEST FRONTIER PROVINCE

In October 1992, the Japan International Cooperation Agency (JICA) dispatched a Basic Design Study team on the Project for Construction of Bridges in North West Frontier Province (hereinafter referred to as "the Project") in the Islamic Republic of Pakistan, and through discussions, field survey, and technical examination of the results in Japan, has prepared the interim report of the study.


In order to explain and to consult the Pakistan side on the components of the interim report, JICA sent to Pakistan a study team, which is headed by Mr. Rikiya IIZUKA, Deputy General Manager for Sakaide Operation Office, Honshu Shikoku Bridge Authority, and is scheduled to stay in the country from 21 October to 27 November 1992.

In the course of discussions, both parties have confirmed the main items described on the attached sheets.

October 25, 1992



Mr. Rikiya IIZUKA
Leader
Basic Design Study Team
JICA



Mr. Adam Khan,
Secretary of C&W Department
NWFP

ATTACHMENT

1. Components for Interim Report

The Government of Pakistan has agreed and accepted the components of the Interim Report proposed by the team.

2. Phase I Project

The Government of Pakistan has agreed the implementation schedule proposed by the team, which indicates that the commencement of the detailed design be within a month after the Exchange of Notes between the Government of Japan and the Government of Pakistan and that of construction works be within the fourth month after the same Exchange of Notes.

As the Government of Pakistan knows the Japanese Grant Aid System explained by the team in July 1992, necessary measures by the Government of Pakistan including land acquisition, administrative proceedings etc. will be fulfilled in accordance with the proposed implementation schedule.

3. Phase II Project

After discussion between the Government of Pakistan and the study team regarding the Phase II Project, both parties have agreed unanimously regarding items (1), (2) and (3) as stated below:

(1) Selected Bridges for Phase II Project

Priority	Bridge to be Implemented by Phase II
1	No.7 Panipa Bridge in Kandia Valley over the Indus River, Kohistan District
2	No.11 Choni Bridge in Chitral Town over the Chitral River, Chitral District
3	No.14 Bukari Khawar Bridge near Samar Bagh over the Nullah Bukari, Dir District
4	No.17 Peer Baba Bridge near Peer Baba over the Malakpur Khawar, Buner District
5	No.16 Kaidon Bridge near Kaidon over the Swat River, Swat District
6	No.5 Pashorai Bridge near Pashorai over the Nandia Khawar, Mansehra District

(2) Carriage Width of the Respective Bridges

Bridge No.11: 2 lanes

Bridge No. 5, 7, 14, 16 and 17: 1 lane (same as Phase I Project)

(3) Design Criteria

Design criteria are ^{the} same as per Phase I Project.

4. Further Schedule of the Basic Design Study

The team will carry out field surveys in NWFP until 27 November 1992 to grasp characteristics of the sites of Phase-II Project.

Basic design on Phase II Project will be conducted in Japan.

The Draft Final Report will be prepared by the team and submitted to the Government of Pakistan in February 1993.

MEMBER LIST OF THE DISCUSSIONS

Pakistan Side

- 1) Mr. Adam Khan Secretary, C&W Dept., NWFP
- 2) Mr. Muhammad Afzal Khan Chief Engineer, C&W Dept., NWFP
- 3) Mr. Islam Khan S.E.H.Q., C&W Dept., Peshawar, NWFP
- 4) Mr. Muhammad Akber Khan S.O.Roads, C&W Dept., Peshawar, NWFP
- 5) Mr. Ikram Shah Executive Engineer, C&W Dept., Kohistan, NWFP
- 6) Mr. Muhammad Ali Executive Engineer, Highway Div., C&W Dept., Abbottabad, NWFP
- 7) Mr. Jamil-ur-Rahman Executive Engineer, Highway Div., C&W Dept., Mansehra, NWFP
- 8) Mr. Habib Ali Executive Engineer, Building Div., C&W Dept., Dir, NWFP
- 9) Mr. Khalid Jan Executive Engineer, C&W Dept., Peshawar, NWFP

Japanese Side

- 1) Mr. Rikiya IIZUKA Leader, JICA Study Team
Deputy General Manager, Sakaide
Operation Office, Honshu-
Shikoku Bridge Authority
- 2) Mr. Youdou KAKUZEN Member, JICA Study Team
(Project Coordinator)
First Project Management Div.,
Grant Aid Project Management
Dept., JICA
- 3) Mr. Hisashi OSHIMA Member, JICA Study Team
(Leader of Consultant Team)
Nippon Koei Co., Ltd.
- 4) Mr. Katsufumi MATSUZAWA Member, JICA Study Team
(Bridge Designer(1))
Nippon Koei Co., Ltd.
- 5) Mr. Akichika ISHIBASHI Member, JICA Study Team
(Geological Surveyor)
Nippon Koei Co., Ltd.
- 6) Mr. Yutaka KOKUFU Member, JICA Study Team
(Land Surveyor)
Nippon Koei Co., Ltd.


MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY ON THE PROJECT FOR
BRIDGE CONSTRUCTION IN NORTH WEST FRONTIER PROVINCE
OF THE ISLAMIC REPUBLIC OF PAKISTAN

In October, 1992, the Japan International Cooperation Agency (JICA) dispatched a Basic Design Study Team on the Project for Bridge Construction in North West Frontier Province (hereinafter referred to as "the Project") to Pakistan, and through discussions, field survey, and technical examination of the results in Japan, has prepared the Draft Report of the Study.

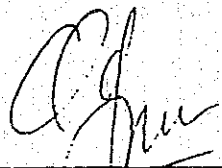
In order to explain and to consult the Pakistan side on the components of the Draft Report, JICA sent to Pakistan a study team, which is headed by Mr. Rikiya IIZUKA, Honshu-Shikoku Bridge Authority, and is scheduled to stay in the country from the 8th March to the 17th March, 1993.

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

The 13th March, 1993



Mr. Rikiya IIZUKA
Team Leader
Draft Report Explanation Team
JICA



Mr. Abdel Qayyum Khan
Secretary
Communications and Works Department
North West Frontier Province

Economic Affairs Division
Government of Pakistan, Islamabad

ATTACHMENT

1. Components of Draft Report

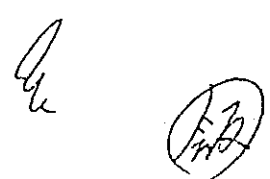
- (1) The Government of Pakistan have agreed and accepted in principle the contents of the Draft Report proposed by the Team.
- (2) The Government of Pakistan have understood and agreed that 5 bridges were selected for Phase II instead of 6 bridges in the last Minutes of Discussions dated October 25, 1992. Choni Bridge (No.11) is considered as Phase III due to the time constraints for the Project implementation.

2. Japan's Grant Aid System

- (1) The Government of Pakistan have understood the system of Japanese Grant Aid explained by the Team.
- (2) The Government of Pakistan will take the necessary measures described in Annex, for smooth implementation of the Project on condition that the Grant Aid by the Government of Japan is extended to the Project.

3. Further Schedule

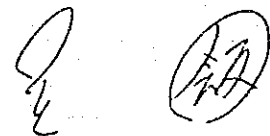
The Team will make the final Report in accordance with the confirmed items, and send it to the Government of Pakistan by the end of April, 1993.

Handwritten signature and a circular stamp containing the letters 'FIB'.

NECESSARY MEASURES TO BE TAKEN BY PAKISTAN SIDE

Following necessary measures should be taken by the Government of Pakistan on condition that the Grant Aid by the Government of Japan is extended to the Project:

1. To secure the sites for the Project;
2. To clear, level and reclaim the sites prior to commencement of the construction;
3. To construct the access road to the sites prior to commencement of the construction;
4. To ensure prompt processing of required internal formalities to secure the implementation of the Project;
5. To bear commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangements;
6. To exempt Taxes and to take necessary measures for customs clearance of the materials and equipment brought for the Project at the port of disembarkation;
7. To accord Japanese nationals whose services may be required in connection with the supply of products and services under the verified contract/s, such facilities as may be necessary for their entry into Pakistan and stay therein for the performance of their work;
8. To exempt Japanese nationals engaged in the Project from customs duties, internal taxes and other fiscal levies payable under the legislation of Pakistan in respect of any emoluments or allowances remitted to them from overseas;
9. To maintain and use properly and effectively the facilities constructed and equipment purchased under the Grant Aid; and
10. To bear all the expenses other than those to be borne by the Grant Aid.



MEMORANDUM OF DISCUSSIONS
ON
THE BASIC DESIGN STUDY
ON
THE PROJECT FOR CONSTRUCTION OF BRIDGES
IN NORTH WEST FRONTIER PROVINCE

Based on the Minutes of Discussions exchanged on July 19, 1992, officials concerned of the Government of Pakistan and JICA Study Team continued the study and exchanged views on the Basic Design on the Project. As a result, regarding the preparation of Interim Report, the both parties have agreed to the following:

- 1) The sites and related roads and rivers of the requested 20 bridges are as shown in Appendix-1.
- 2) The bridge locations to be incorporated in the basic design for Phase-1 Project are as follows:

Bridge No.1 over the River Siran, Pind Gali Road near Narlai

About 1 km upstream from the existing suspension bridge.

Bridge No.12 over the Panjkora River, NCC Road Km-135 near Khal

About 200 m downstream from the existing suspension bridge.

Bridge No.18 over the Sakhakot River, Jahazoon Dak - Ghawar Kille Road near Jahazoon Dak

About 30 m downstream from the existing reinforced concrete bridge.

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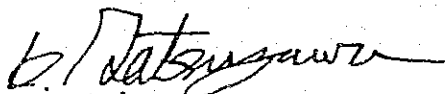
Bridge No. 19 over the Swat River, Totakan - Kamala Road near Totakan

About 70 m downstream from the existing suspension bridge.

Bridge No. 20 over the Sakhakot River, Sakhakot Village Road near Sakhakot

About 30 m downstream from the existing reinforced concrete bridge.

20, August, 1992


K. Matsuzawa

For Mr. Hisashi OSHIMA
Chief, Bridge Planner
Basic Design Study Team
JICA



Mr. Tariq Saeed Khan
Principal Engineer
Central Design Office
C&W

LIST OF BRIDGES

Bridge No	Name of Place	Name of Road	Name of River	District
No.1	Narlai	Pind Gali Rd.	Siran River	Abbottabad
No.2	Desal	Abbottabad - Murree Rd.	Daur River	Abbottabad
No.3	Kuniar Kass	Osia - Malkot Rd.	Kuniar Kass Nullah	Abbottabad
No.4	Shagai	Thakot - Darband Rd. Km-29	Indus River	Mansehra
No.5	Pashorai, KKH Km-171	(Pashorai - Ughas Banda Rd.)	Nandia Khawar	Mansehra
No.6	Jabrai	Dadar - Sachan - Battal Rd. Km-16	Jabrai River	Mansehra
No.7	Panipa	Kandia Valley Rd. Km-1	Indus River	Kohistan
No.8	Jajshoe	Kandia Valley Rd. Km-18	Jajshoe Nullah	Kohistan
No.9	Darband	Brep - Broghar Rd.	Yarkhun River	Chitral
No.10	Naggar	NCC - Naggar West Rd. Km-1	Chitral River	Chitral
No.11	Choni	NCC - Citral Town Rd.	Chitral River	Chitral
No.12	Khal	NCC Km-135	Panjhora River	Dir
No.13	Haya Serai	Balanbad - Lal Qila Rd.	Haya Serai Khawar	Dir
No.14	Bukari Khawar	Samar Bagh - Shahi Rd. Km-3	Nullah Bukari	Dir
No.15	Mankial	Mankial - Tarkana Rd. Km-1	Swat River	Swat
No.16	Kaidon	Kaidon - Goormai Rd. Km-1	Swat River	Swat
No.17	Peer Baba	Peer Baba - Malakpur Rd.	Malakpur Khawar	Buner
No.18	Jahazoon Dak	Jahazoon Dak - Ghawar Killely Rd.	Sakhakot River	Malakand Agency
No.19	Totakan	Totakan - Kamala Rd.	Swat River	Malakand Agency
No.20	Sakhakot	Sakhakot Village Rd.	Sakhakot River	Malakand Agency

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MEMORANDUM OF DISCUSSIONS
ON
THE BASIC DESIGN STUDY
ON
THE PROJECT FOR CONSTRUCTION OF BRIDGES
IN NORTH WEST FRONTIER PROVINCE

On the basis of Minutes of Discussions exchanged on October 25, 1992, officials concerned of the Government of Pakistan and JICA Study Team continued the study in Pakistan and exchanged views on the Phase I and Phase II Projects. Accordingly, the both parties have agreed to the following items:

1) Confirmation of Selected Bridges for Phase II Project

As a result of the field reconnaissance survey by the JICA Study Team on October 26, 1992, it has been revealed that a bridge construction is underway by local people's contribution at the Peer Baba bridge site (hereinafter referred to as "the local people's bridge").

The Government of Pakistan has inspected the site and collected necessary information from the persons concerned, and finally confirmed the necessity of constructing a road bridge at Peer Baba as the Phase II Project (hereinafter referred to as "the Phase II project bridge") as per the following reasons:

- The local people's bridge aims at pedestrian use and would not be able to carry heavy weight vehicles such as buses and trucks.
- As for road network aspect, the Phase II project bridge will facilitate vehicle passing on the Peer Baba - Malakpur Road while the local people's bridge will provide the inhabitants in its vicinity with pedestrian path.
- The local people's bridge is designed as a temporary structure, which has 9 nos. of 2.4m long span and 3.65m wide wooden deck, and its completion will be very soon, probably within a couple of months if fund is available. The free-board from riverbed to deck surface of the bridge is 1.7m, relatively smaller

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to flow the river discharge and drifting materials during floods. Further, foundation of piers are embedded in a shallow portion of the riverbed without sufficient rooting depths.

No other issue than No.17 Peer Baba Bridge was found at the sites of Phase II Project, and consequently it was confirmed that the JICA Study Team would continue field surveys and basic design on the selected 6 bridges for Phase II Project in accordance with item 3(1) of the Attachment of Minutes of Discussions dated October 25, 1992.

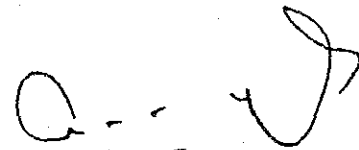
2) Recommendations of Design Criteria to Detailed Engineering Design of Phase I Project

Technical recommendations are described in the Attachment.

November 5, 1992



Mr. Hisashi OSHIMA
Chief, Bridge Planner
Basic Design Study Team
JICA



Mr. Adam Khan
Secretary of C&W Dept.
NWFP

ATTACHMENT

The following is technical recommendations, regarding design criteria in addition to those described in the Interim Report, toward the detailed engineering design on Phase I Project:

- a) Seismic Force: 0.1 of the dead weight of structures applied horizontally to the structures based on statically equivalent force method.
- b) Wind Velocity: 40 m/sec as design base wind velocity (10 m above ground, average for duration 10 minutes).
- c) Snow Load: Not to be considered.
- d) Design Clear Height of Roadway of NCC Road: $H = 4.5\text{m} + 0.3\text{m} = 4.8\text{m}$ (say, 16ft.) ----- applied to No.19 Totakan Bridge
(Suspension Type Bridge)

Where, 4.5m: Actual clear height, and
0.3m: Allowance of pavement thickness (overlay) for future maintenance.

e) Approach Road Elements

(1) Road Width Composition

- Shoulder: 1.5m
- Carriageway: 3.6m

(2) Embankment Slope

- In case of soil embankment: 1:1.5
- In case of granular embankment: 1:1.0

(3) Guard Block

Guard block in the following sizes will be placed on the shoulders where embankment height is 4m or more.

Sizes of Guard Block:

- Width = 60cm
- Height = 60cm (15cm to be embedded into shoulder)
- Length = 90cm

(4) Pavement Structure

Penetration Macadam method will be used for the surface layer of the pavement. Thickness of respective pavement layers are as follows:

- In Case of Soil Embankment:
 - Surface course = 6cm
 - Base course = 15cm
 - Subbase course = 20cm
- In Case of Granular Embankment:
 - Surface course = 6cm
 - Base course = 15cm
 - Subbase course = Nil

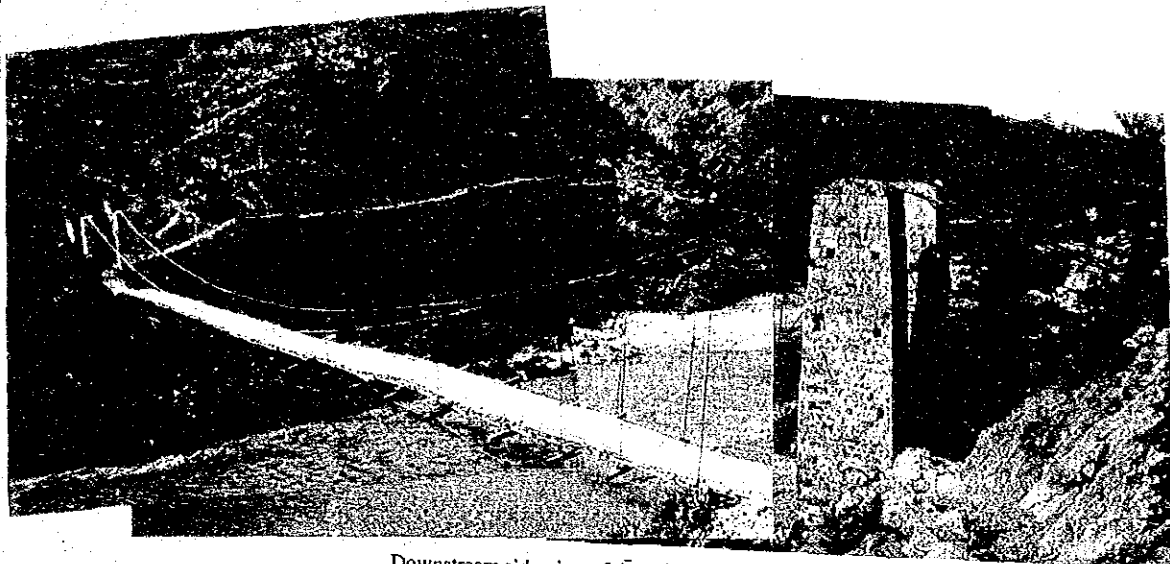
RECONNAISSANCE SURVEY RESULT

Site Condition of Requested Bridges

The requested bridges are 20 bridges located in 8 districts, i.e., ABBOTTABAD, MANSEHRA, KOHISTAN, CHITRAL, DIR, SWAT, MALAKAND and BUNER. (BUNER is a new district in the southern SWAT which was separated from SWAT in January, 1990).

Investigation study has been performed at the site on the location, related roads and crossing rivers to confirm the accuracy of the request. As a result, it was found that the Br. No. 3 Kunier Kass, Sawar Gali-Boi Road did not coincide with the actual site situation. Instead it was found that there exists a bridge on the Osia-Malkot road crossing over the Kunier Kass Nullah in the village of Kunier Kass. The investigation team have confirmed the above with C & W and decided to include this bridge in the further study. Other 19 bridges were confirmed to be correctly informed (refer Memorandum).

No.1 Narlai Bridge, Abbottabad District



Downstream side view of the existing Narlai Bridge



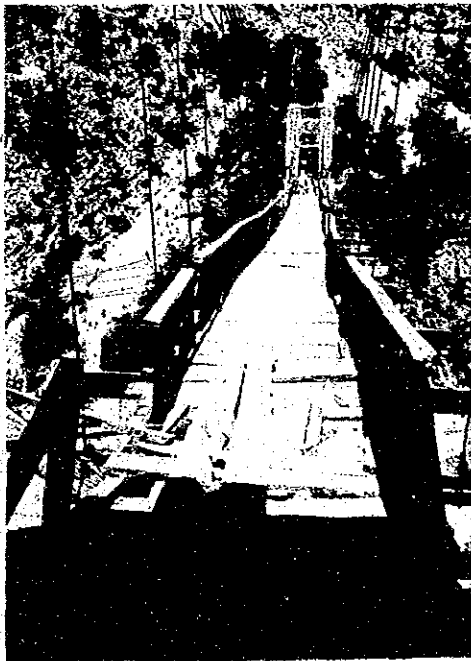
Proposed location viewed from left bank side

**BASIC DESIGN STUDY
ON
THE PROJECT FOR CONSTRUCTION OF BRIDGES IN NORTH WEST FRONTIER PROVINCE**

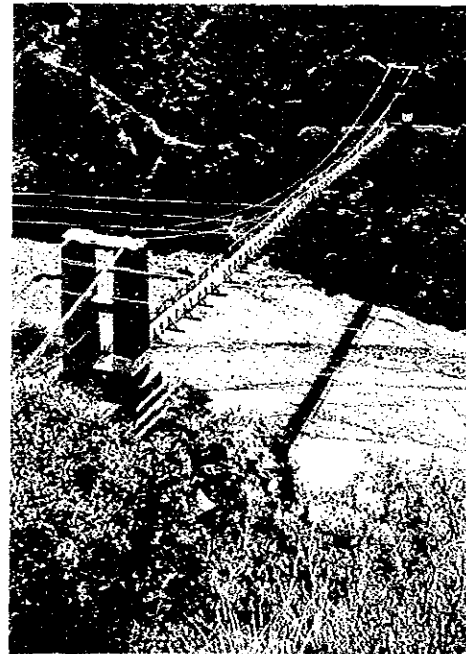
No.2 Desal Bridge, Abbottabad District



Downstream side view of the existing Desal Bridge



Condition of the present floor deck (Wooden members are decayed seriously.)



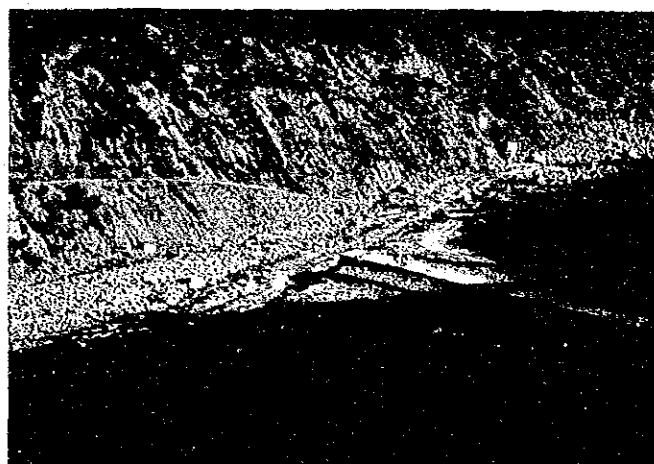
Existing bridge viewed from right bank side

**BASIC DESIGN STUDY
ON
THE PROJECT FOR CONSTRUCTION OF BRIDGES IN NORTH WEST FRONTIER PROVINCE**

No.3 Kunier Kass Bridge, Abbottabad District



Present condition of Kunier Kass Bridge (Box culvert constructed 5 years ago was washed away 2 years ago.)



Downstream side view from left bank side



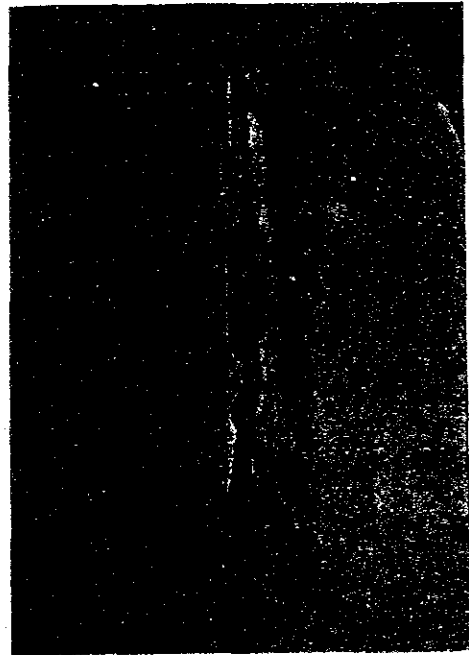
Existing bridge over the Jhelum River (This bridge connect Abbottabad district and Jammu and Kashmir.)

**BASIC DESIGN STUDY
ON
THE PROJECT FOR CONSTRUCTION OF BRIDGES IN NORTH WEST FRONTIER PROVINCE**

No.4 Shagai Bridge, Mansehra District



Probable location of the requested Shagai Bridge



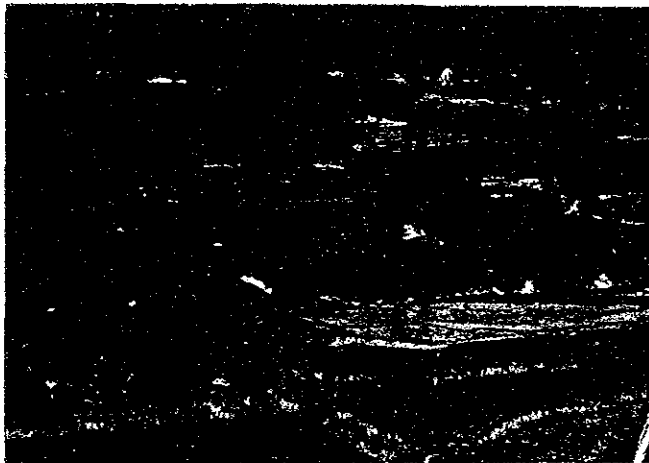
Rock island which appears when water level is low

BASIC DESIGN STUDY
ON
THE PROJECT FOR CONSTRUCTION OF BRIDGES IN NORTH WEST FRONTIER PROVINCE

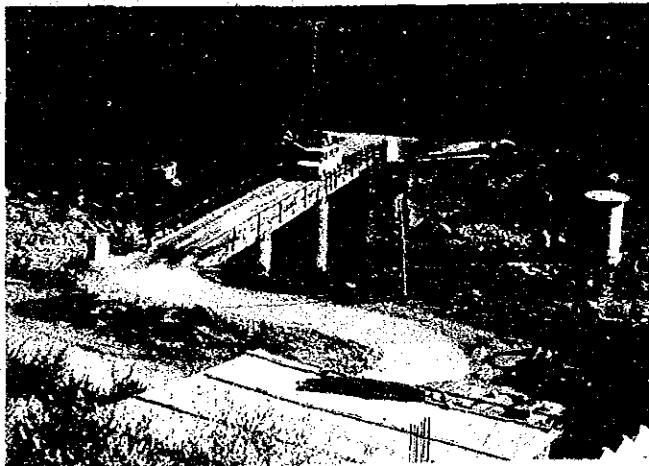
No.5 Pashorai Bridge, Mausehra District



Proposed location of Pashorai Bridge



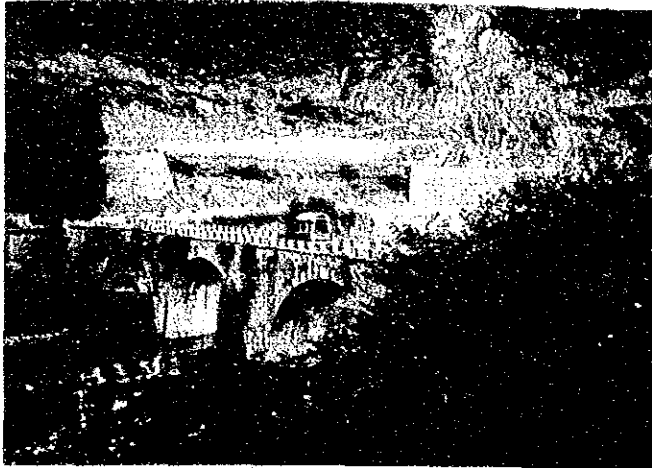
Existing Pashorai Bridge, approx. 2 km upstream from the proposed new bridge site



Existing vehicle transport bridge, approx. 4 km upstream from the proposed new bridge site

**BASIC DESIGN STUDY
ON
THE PROJECT FOR CONSTRUCTION OF BRIDGES IN NORTH WEST FRONTIER PROVINCE**

No.6 Jabrai Bridge, Mansehra District



Downstream side view of the existing Jabrai Bridge



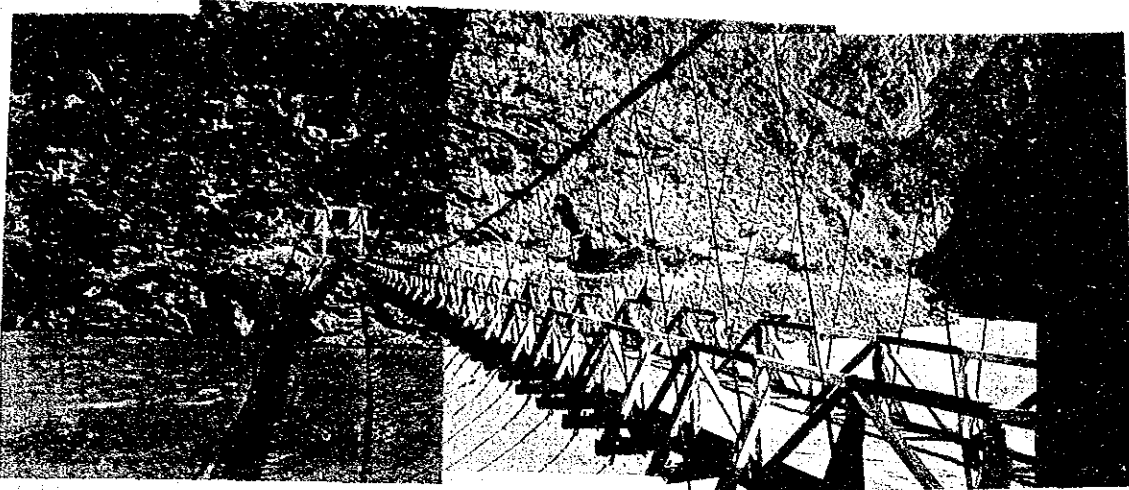
Condition of floor (Concrete slab is deteriorated.)



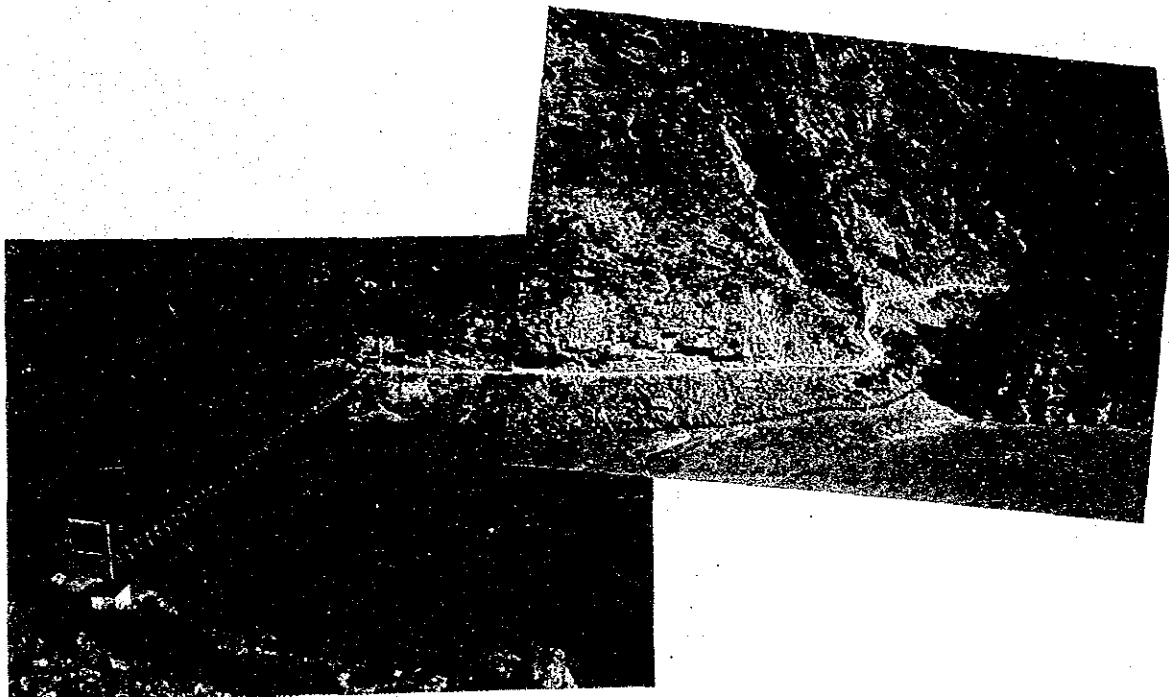
Condition of arch springing (Stone structure seems sufficient to carry vehicles.)

BASIC DESIGN STUDY
ON
THE PROJECT FOR CONSTRUCTION OF BRIDGES IN NORTH WEST FRONTIER PROVINCE

No.7 Panipa Bridge, Kohistan District

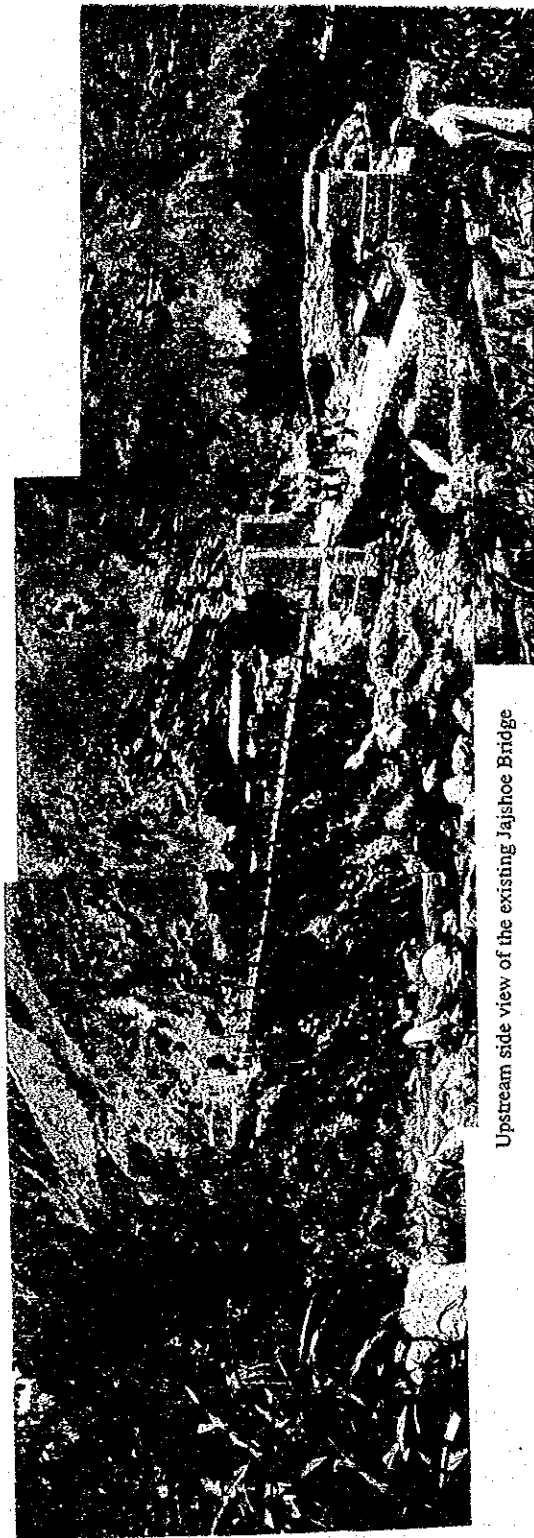


Existing Panipa Bridge over the River Indus viewed from left bank side (The confluence of the Indus with Kandia River can be seen at the right side.)

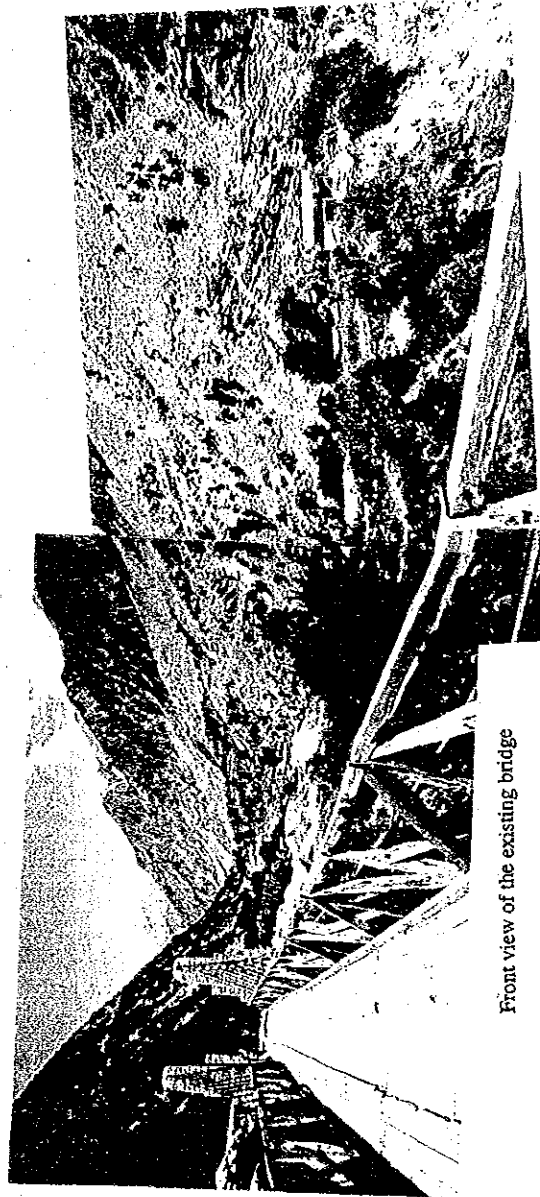


**BASIC DESIGN STUDY
ON
THE PROJECT FOR CONSTRUCTION OF BRIDGES IN NORTH WEST FRONTIER PROVINCE**

No.8 Jajshoe Bridge, Kohistan District



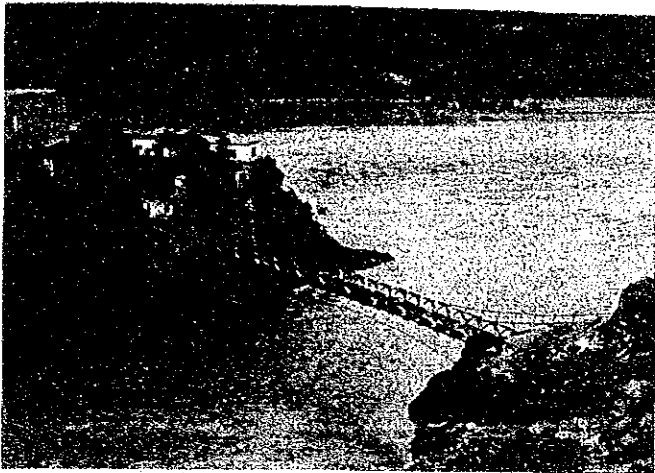
Upstream side view of the existing Jajshoe Bridge



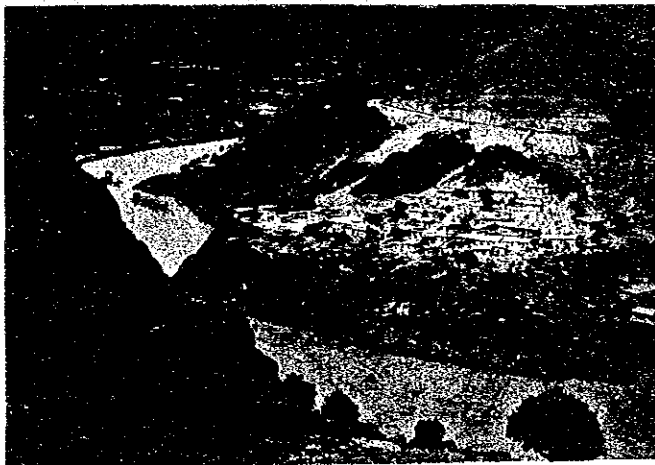
Front view of the existing bridge

BASIC DESIGN STUDY
ON
THE PROJECT FOR CONSTRUCTION OF BRIDGES IN NORTH WEST FRONTIER PROVINCE

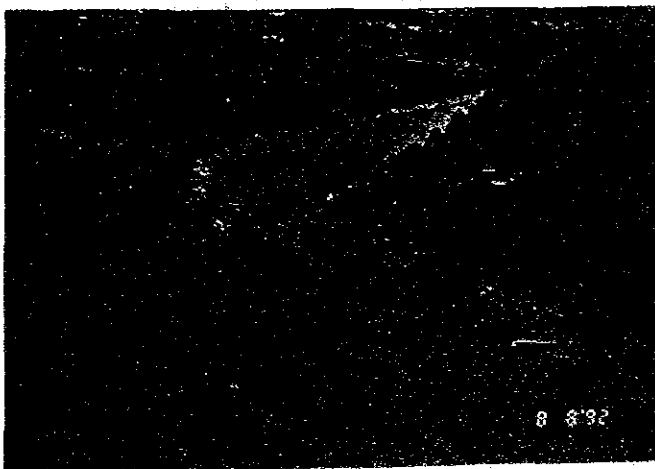
No.10 Naggar Bridge, Chitral District



Downstream side view of the existing Naggar Bridge at Naggar Fort



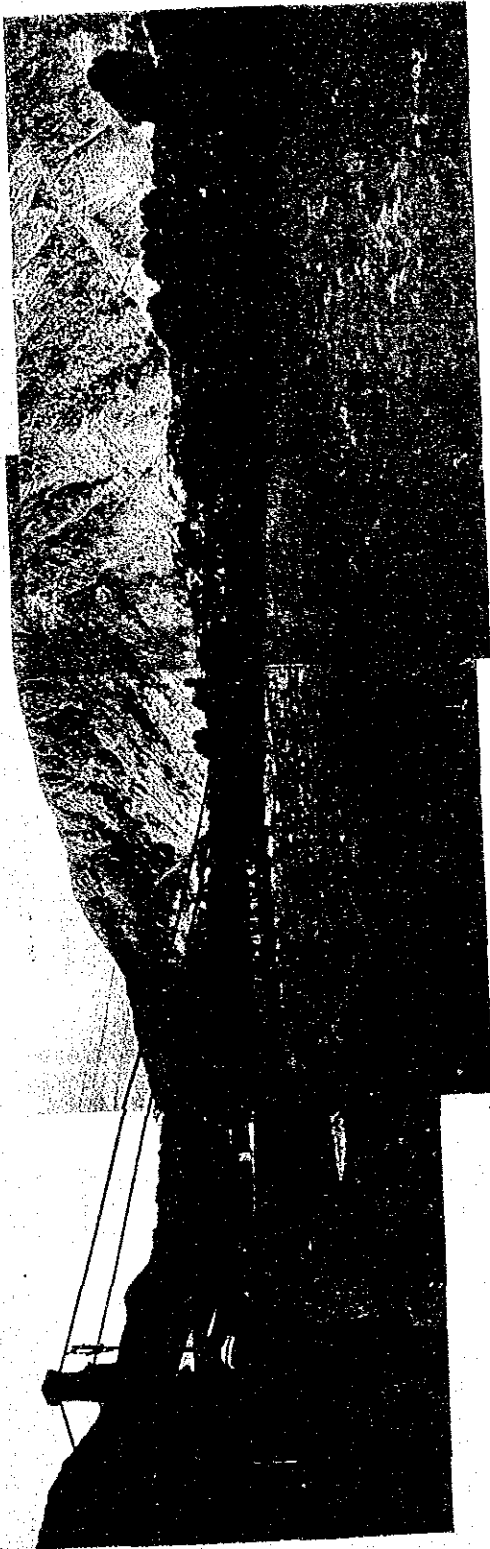
Probable location of the requested new bridge site, approx. 5 km upstream from Naggar Fort



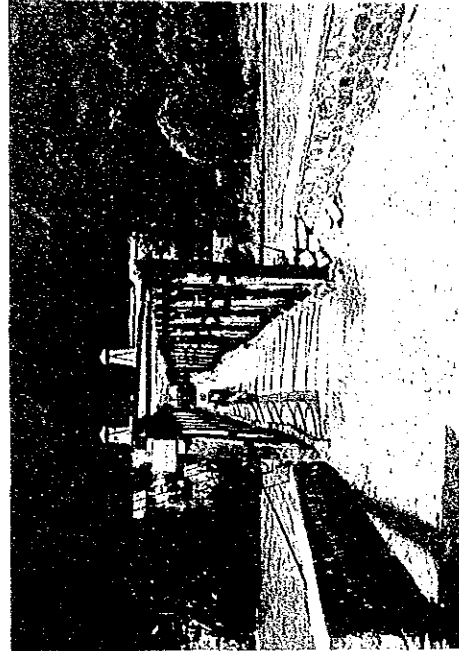
Another probable location of the requested new bridge site, approx. 10 km upstream from Naggar Fort

BASIC DESIGN STUDY
ON
THE PROJECT FOR CONSTRUCTION OF BRIDGES IN NORTH WEST FRONTIER PROVINCE

No.11 Choni Bridge, Chitral District



Upstream side view of the existing Choni Bridge



Front view of the existing Choni Bridge



Condition of Floor deck (Wooden members are decayed seriously.)

BASIC DESIGN STUDY
ON
THE PROJECT FOR CONSTRUCTION OF BRIDGES IN NORTH WEST FRONTIER PROVINCE

No.12 Khal Bridge, Dir District



Downstream side view of the existing Khal Bridge



Front view of the existing Khal Bridge



Proposed location of new bridge viewed from left bank side

BASIC DESIGN STUDY
ON
THE PROJECT FOR CONSTRUCTION OF BRIDGES IN NORTH WEST FRONTIER PROVINCE

No.13 Haya Serai Bridge, Dir District



Downstream side view of the existing Haya Serai Bridge



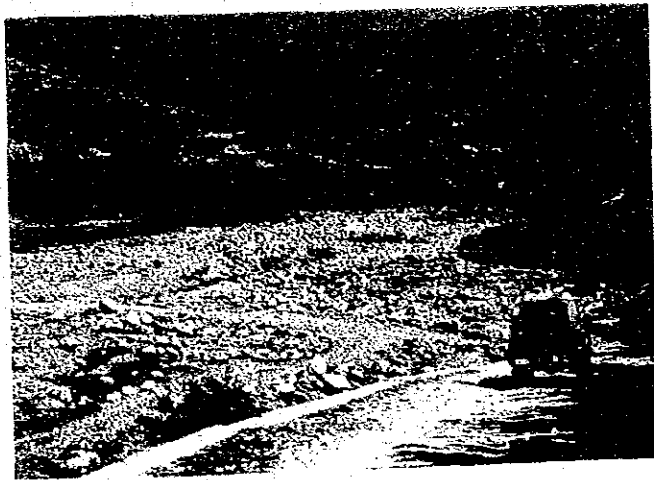
Front view of the existing Haya Serai Bridge (All the structure elements seem to be in good condition.)

BASIC DESIGN STUDY
ON
THE PROJECT FOR CONSTRUCTION OF BRIDGES IN NORTH WEST FRONTIER PROVINCE

No.14 Bukari Khawar Bridge, Dir District



Downstream side view of the proposed location of Bukari Khawar Bridge (At present, vehicles cross riverbeds.)



Approach on the left side bank



Approach on the right side bank

BASIC DESIGN STUDY
ON
THE PROJECT FOR CONSTRUCTION OF BRIDGES IN NORTH WEST FRONTIER PROVINCE

