5. Cost Estimation Borne by the Receipient Country

Land Acquisition

Unit:Thousand VND

Bridge No.	Province	Name of Bridge	Paddy			Farm			Other *			Grand total
			Unit cost VND/SQM	Quantity SQM	Total VND	Unit cost VND/SQM	Quantity SQM	Total VND	Unit cost VND/SQM	Quantity SQM	Total VND	VND
1	Ha Tay	Duc Khe	19.2			16.6			2.8	857.8	2,402	2,402
3		Chuoc	18.7			12.5			2.6	1,032.0	2,683	2,683
5	Ha Bac	Dong Dinh	16.0	721.8	11,549	12.0			2.6	694.1	1,805	13,353
6	Hai Hung	Tu O	19.2			16.6			2.8	1,348.3	3,775	3,775
8		Hau	19.2			16.6			2.8	1,381.8	3,869	3,869
9	Hoa Binh	Ben The	16.0	223.9	3,582	12.0			2.8	279.5	783	4,365
11		Lac	16.0	440.0	7,040	12.0			2.2	307.6	677	7,717
12		Vu Ban	16.0			12.0			2.2	2,677.2	5,890	5,890
13	Bac Thai	Ky Phu	12.1			10.5			2.2	1,108.5	2,439	2,439
15	Vinh Phu	Luong Nha	12.0			10.0			2.4	622.7	1,494	1,494
16		Suong	12.0	542.9	6,515	10.0	321.1	3211.0	2.4			9,726
17	Ninh Binh	Yen Tho	19.2	1,045.0	20,064	14.0			2.4	620.5	1,489	21,553
18		Hoanh Truc	19.2			14.0			2.8	885.5	2,479	2,479
20	Thai Binh	Dong Quach	19.2	114.5	2,198	14.0	135.8	1901.2	2.8	2,764.7	7,741	11,841
22	Lang Song	Nao Hoa	9.8	832.7	8,160	5.6			2.8	2,336.0	6,541	14,701
23	Tuyen Qung	Quang	9.8			5.6			2.4	1,448.6	3,477	3,477
27	Cao Bang	Pho Tra Linh	6.3			3.7			2.4	581.8	1,396	1,396
31	Son La	Trong Panh	6.3	1,788.1	11,265	3.7			2.4	241.9	581	11,846
33	Ha Giang	Kuoi Nieng	6.5			3.2			2.4	2,726.2	6,543	6,543
34		Kuoi Kieng	6.5	199.0	1,294	3.2			2.2	554.7	1,220	2,514
37	Lai Chou	Na Sang-2	6.3			3.7	1111.9	4114.0	2.2			4,114
Total					71,667			9226.2			57,284	138,177

Note:

* : Forestry, Wasteland, Vacant land etc.

Source of unit cost: PMU-18

A2-1 Bridge Construction (3/3)
Cost Estimation Borne By Viet Nam

Lease Land Cost for Construction Yard

Unit:Thousand VND

Bridge No.	Province	Name of Bridge	Paddy			Farm			Other *			Lease Period (Year)	Grand total VND
			Unit cost VND/m² · year	Quantity m²	Total VND	Unit cost VND/m² · year	Quantity m²	Total VND	Unit cost VND/m² · year	Quantity m²	Total VND		
1	Ha Tay	Duc Khe	3.8	6,700	25,460	3.0	0	0	1.0	0	0	2	50,920
3		Chuoc	3.8	0	0	3.0	0	0	1.0	5,400	5,400	2	10,800
5	Ha Bac	Dong Dinh	3.2	5,500	17,600	3.0	0	0	0.8	0	0	2	35,200
6	Hai Hung	Tu O	3.8	4,300	16,340	2.8	0	0	1.0	0	0	2	32,680
8		Hau	3.8	5,300	20,140	2.8	0	0	1.0	0	0	2	40,280
9	Hoa Binh	Ben The	3.2	6,500	20,800	2.5	0	0	1.0	0	0	2	41,600
11		Lac	3.2	5,400	17,280	2.5	0	0	1.0	0	0	1	17,280
12		Vu Ban	3.2	6,500	20,800	2.5	0	0	1.0	0	0	2	41,600
13	Bac Thai	Ky Phu	2.4	4,300	10,320	2.2	0	0	0.8	0	0	1	10,320
15	Vinh Phu	Luong Nha	2.4	5,200	12,480	2.2	0	0	0.8	0	0	2	24,960
16		Suong	2.4	0	0	2.2	4,500	9,900	0.8	0	0	2	19,800
17	Ninh Binh	Yen Tho	3.8	6,400	24,320	3.0	0	0	1.2	0	0	2	48,640
18		Hoanh Truc	3.8	4,900	18,620	3.0	0	0	1.2	0	0	3	55,860
20	Thai Binh	Dong Quach	3.8	6,400	24,320	3.0	0	0	1.2	0	0	3	72,960
22	Lang Song	Nao Hoa	2.5	6,700	16,750	2.0	0	0	0.8	0	0	2	33,500
23	Tuyen Qung	Quang	3.0	0	0	2.2	5,400	11,880	1.0	0	0	2	23,760
27	Cao Bang	Pho Tra Linh	2.8	4,400	12,320	2.5	0	0	1.0	0	0	2	24,640
31	Son La	Trong Panh	2.5	5,200	13,000	2.0	0	0	0.8	0	0	2	26,000
33	Ha Giang	Kuoi Nieng	2.5	0	0	2.2	0	0	0.8	4,300	3,440	2	6,880
34		Kuoi Kieng	2.5	5,200	13,000	2.2	0	0	0.8	0	0	2	26,000
37	Lai Chou	Na Sang-2	2.5	0	0	2.0	4,400	8,800	0.8	0	0	2	17,600
Total					283,550			30,580			8,840		661,280

Note:

* : Forestry, Wasteland, Vacant land etc.

Source of unit cost: PMU-18

A2-1 Bridge Construction (2/3)
Cost Estimation Borne by Viet Nam

Compensation of removal

Unit:Thousand VND

Bridge No.	Province	Name of Bridge	Permanent House			Temporary House			Grand total
			Unit cost VND/SQM	Quantity SQM	Total VND	Unit cost VND/SQM	Quantity SQM	Total VND	VND
1	Ha Tay	Duc Khe	559	506.9	283,357	292			283,357
3		Chuoc	559			292			
5	Ha Bac	Dong Dinh	566	120.9	68,429	296			68,429
6	Hai Hung	Tu O	689	160.9	110,860	336			110,860
8		Hau	548	503.6	275,972	302	37.0	11,174	287,146
9	Hoa Binh	Ben The	404			228	26.4	6,019	6,019
11		Lac	351			220			
12		Vu Ban	420			245	105.6	25,872	25,872
13	Bac Thai	Ky Phu	526	109.7	57,702	281			57,702
15	Vinh Phu	Luong Nha	477	199.5	95,161	265			95,161
16		Suong	388			216			
17	Ninh Binh	Yen Tho	498	68.7	34,212	234			34,212
18		Hoanh Truc	457			258	187.5	48,375	48,375
20	Thai Binh	Dong Quach	520	186.8	97,136	279	101.0	28,179	125,315
22	Lang Song	Nao Hoa	477	15.4	7,345	265	60.1	15,926	23,271
23	Tuyen Qung	Quang	526			281	147.3	41,391	41,391
27	Cao Bang	Pho Tra Linh	640	174.8	111,872	310	20.0	6,200	118,072
31	Son La	Trong Panh	310			218	29.6	6,452	6,452
33	Ha Giang	Kuoi Nieng	477			265	20.3	5,379	5,379
34		Kuoi Kieng	477			265	33.7	8,930	8,930
37	Lai Chou	Na Sang-2	310			218			
Total					1,142,046			203,897	1,345,943

Note:
Source of unit cost : PMU-18

A2-2 Steel Girder Supply (1/2)

Cost Estimation Borne by Viet Nam

Unit : Billion VND

Bridge No.	Province	Name of Bridge	Cost of Substructure(A)				Cost of Supperstructure(B)				Cost of Ap. Road(C)	Total (A+B+C)
			Abutment	Pier	Foundation	Sub-Total	Erection	Slab	Accesories	Sub-Total		
4	Ha Bac	Dong Vuong	0.342	0.110	0.143	0.595	0.324	1.029	0.195	1.548	0.184	2.327
10	Hoa Binh	Tinh	0.240	—	0.070	0.310	0.170	0.540	0.100	0.810	0.100	1.220
21	Lang Son	Dong Mo	0.630	—	0.200	0.830	0.450	1.440	0.270	2.160	0.260	3.250
25	Yen Bai	Lanh	0.251	—	0.080	0.331	0.170	0.550	0.120	0.840	0.120	1.291
26		Vai	0.210	—	0.071	0.281	0.160	0.490	0.090	0.740	0.090	1.111
29	Son La	Ban Ai	0.110	—	0.032	0.142	0.081	0.250	0.050	0.381	0.040	0.563
30		Ban Hinh	0.133	—	0.040	0.173	0.090	0.290	0.050	0.430	0.050	0.653
35	Lao Cai	Ban Vuoc	0.710	0.125	0.115	0.950	0.373	0.429	0.981	1.783	0.126	2.859
Total			2.626	0.235	0.751	3.612	1.818	5.018	1.856	8.692	0.970	13.274

Notes

- Construction Cost of Bridge : 12.304 Billion VND
- Construction Cost of Approach Road : 0.970 Billion VND
- Sourse of Cost : PMU-18

A2-2 Steel Girder Supply (2/2)

Cost Estimation Borde by Viet Nam

Land Aquisition and Compensation

Bridge No.	Province	Name of Bridge	Total Million VND
4	Ha Bac	Dong Vuong	100
10	Hoa Binh	Tinh	80
21	Lang Son	Dong Mo	0
25	Yen Bai	Lanh	50
26		Vai	60
29	Son La	Ban Ai	0
30		Ban Hinh	0
35	Lao Cai	Ban Vuoc	0
Total			290

Notes : Source of Cost ; PMU-18

6. Request Letter

'BỘ GIAO THÔNG VẬN TẢI
CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
MINISTRY OF TRANSPORT AND COMMUNICATIONS OF SRV

80 Tran Hung Dao
Hanoi

Tel : 252 079
Fax : 84 4 267 291
Telex : 412242 BGTVT VT

To: Mr. Kazuchica Sato
Team Leader
Basic Design Study Team
JICA

Subject: List of Bridges in the Project for Reconstruction of Bridges in the Northern Districts.

Dear Mr. Sato,

We would like to express our thank to you and to all members of the JICA Study Team for the support and assistance in the preparation for the Project.

Regarding the list of bridges to be included into the Project, we would like to make some proposals as follows:

1. Replacement of two bridges Pa Mo (No.37) and Nam Bun (No.38) by two other bridges Na Sang and Nam Thanh by name (in the same Lai Chau Province).

As you know bridges at Pa Mo and Nam Bun are located rather far from the existing road network which will bring a lot of difficulties when we come to the stage of construction.

These two other proposed bridges (Na Sang and Nam Thanh) are in the priority list for investment of the Province. We would like to provide you with some more information:

a/ Na Sang Bridge :
Located at Km16 on the Pom Lot - Sulu Road, 38 km from Dien Bien Town. It is on the way leading to ten mountainous populated communes, Dien Bien District (area of 121,800 ha, population of 35,000 people). Production here is mainly from agriculture and forestry. Average traffic volume is between 15 and 50 vehicles/day. Estimated length of the Bridge is 80 m. Now there is no bridge at all.

b/ Nam Thanh Bridge:
Located on the District road Dien Bien, 12 km from Dien Bien Town. It is on the way leading to 3 mountainous communes, Dien Bien District (area of 50,000 ha, population of 12,000 people). Production here is mainly from agriculture and forestry. Average traffic volume is about 12 vehicles/day. Estimated length of the bridge is 60 m. There exists now an old suspended bridge (built in 1968). It needs to be urgently replaced.

2. Thong Nhat Bridge (No.19) - Ninh Binh Province
This Bridge is very important for the socio-economic development in rural and coastal area of Ninh Binh Province. It is on the way leading to a riverport, providing good condition for combined transports between road and inland-waterway. If it will be constructed; it would bring benefits to about 50,000 people living along.

Because of above mentioned reasons we propose that Thong Nhat Bridge shall be kept in the list of bridges with the category 2 (provision of steel girder).

We hope that our proposal will be accepted. Thank you once again.

Yours Sincerely,

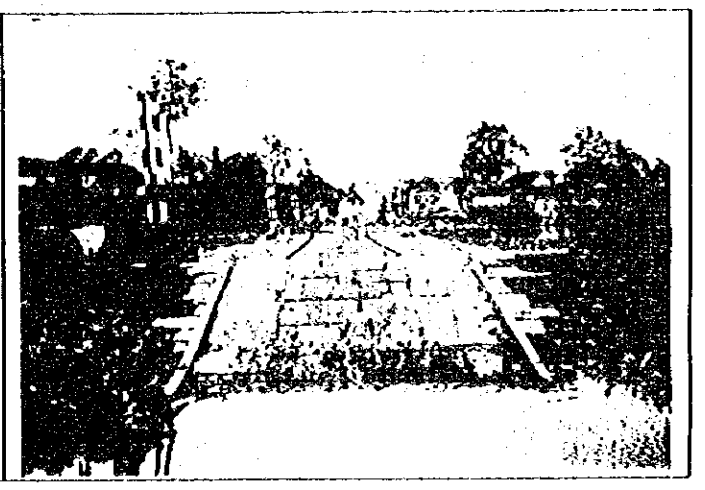
Hanoi, 23rd, August 1995

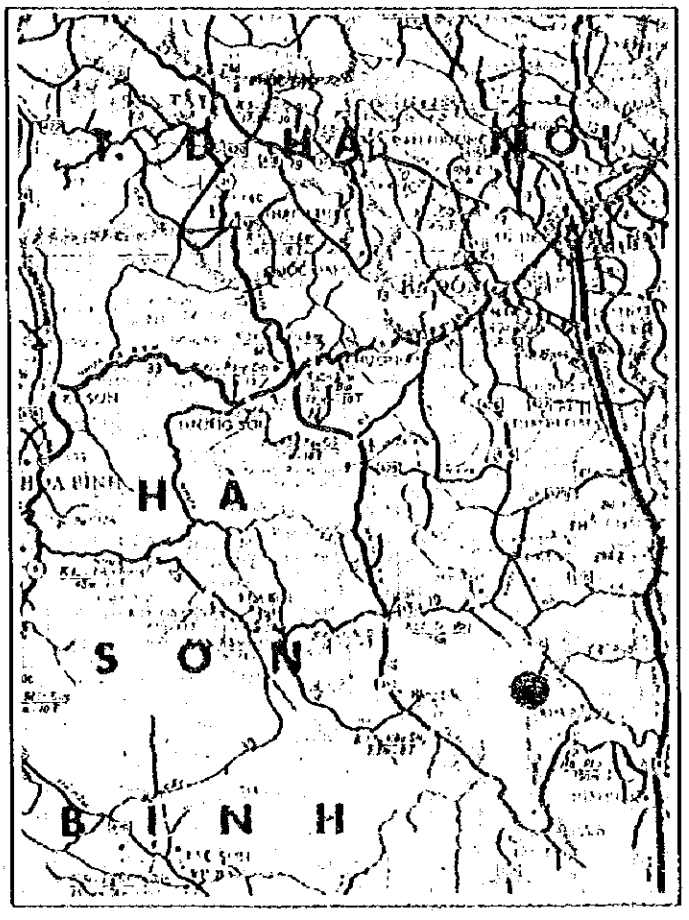
TRAN DOAN THO
Deputy Director General
Planning & Investment Department
Ministry of Transport

7. Overview of Bridge Site Survey Results

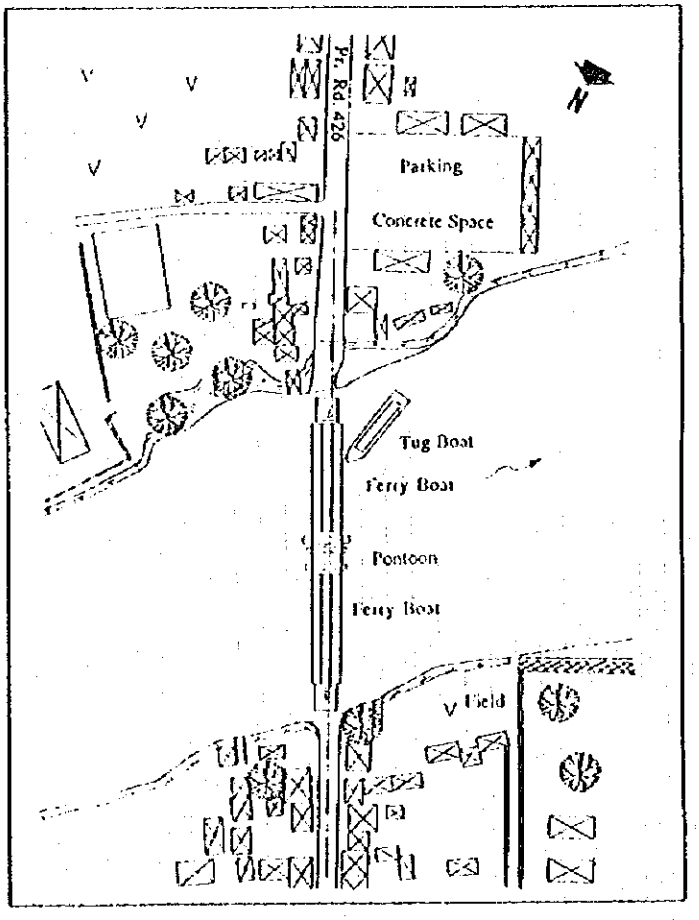
Br. No.	Bridge Name	Province	County	Village	Village Population	Road Jurisdiction	Area Land Use	Main Products	Purpose of Bridge Construction	Remarks
1	Duc Khe	Ha Tay	My Duc	Huong Son	-	Provincial Road	Agriculture/Tourism	Agricultural	Improved welfare, Economic advancement	Access Road to famous temple ; traffic increases during lunar New Year
2	Chua Ngoi		Ha Dong	(Ha Dong)	-	County Road	Urban	Agricultural	Improved welfare, Economic advancement	Located in urban area ; deleted.
3	Chuoc		Ba Vi	Ba Trai	-	County Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Bamboo bridge for pedestrians, bicycles, motorcycles (privately operated for toll)
4	Dong Vuong	Ha Bac	Yen The	Dong Vuong	30,000	County Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Bamboo bridge and small ferry for pedestrians, bicycles, motorcycles (privately operated for toll)
5	Dong Dinh		Luc Nam	Luc Son/Binh Son	17,200	County Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Automobile crossing in dry season only.
6	Tu O	Hai Hung	Ninh Thanh	Tan Trao	8,000	Provincial Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Small ferry for pedestrians, bicycles, motorcycle
7	Do Day		Tu Loc	Le Loi	9,800	Provincial Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Pontoon bridge for pedestrians, bicycles, motorcycle
8	Hau		Van Giang	Trung Hoa	10,000	Provincial Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Small ferry for pedestrians, bicycles, motorcycle
9	Ben The	Hoa Binh	Tan Lac	Quy My	2,000	Provincial Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Temporary wooden bridge for pedestrians, bicycles, motorcycle
10	Tinh		Da Bac	Tu Ly	10,000	County Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Automobile crossing in dry season only.
11	Lac		Mai Chau	Chieng Chau	3,200	County Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Superstructure crossable in dry season only
12	Vu Ban		Lac Son	Vu Ban	4,000	Provincial Road	Agriculture/Village	Agricultural	Improved welfare, Economic advancement	Deteriorated suspension bridge for pedestrians, bicycles, motorcycle. Automobile use submerged bridge.
13	Ky Phu	Bac Thai	Dai Tu	Ky Phu	27,000	County Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Bridge destroyed : temporary bridge for pedestrians, bicycles, motorcycle. Market held in vicinity
14	Phu Son 4		Phu Luong	Son Cam	-	County Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Located in urban area ; deleted.
15	Luong Nha	Vinh Phu	Thanh Son	Luong Nha	3,842	County Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Bridge ruined in 1995 flood ; previously used by 3800 villagers.
16	Suong		Song Thao	Huong Lung	14,900	Provincial Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Bamboo bridge for pedestrians, bicycles, motorcycle ; school in vicinity.
17	Yen Tho	Ninh Binh	Yen Mo	Yen Hoa	7,158	County Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Deteriorated concrete bridge crossable by pedestrians, bicycles, motorcycle
18	Hoanh Truc		Kim Son	Van Hai	6,200	County Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Bamboo bridge for pedestrians, bicycles, motorcycles.
19	Thong Nhat		Kim Son	Phat Diem	5,000	County Road	Urban	Agricultural	Improved welfare, Economic advancement	Located in urban area ; deleted.
20	Dong Quach	Thai Binh	Tien Hai	Tay Phong	104,000	County Road	Agriculture	Agricultural	Improved welfare, Economic advancement	5-ton limit bridge standing.
21	Dong Mo	Lang Son	Chi Lang	Dong Mo	5,000	Provincial Road	Agriculture/Village	Agricultural	Improved welfare, Economic advancement	Bridge deteriorated, automobiles unpassable.
22	Nao Hoa		Huu Lung	Son Ha/Ho Son	8,500	Provincial Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Manpowered ferry (vehicles up to 13 tons)
23	Quang	Tuyen Quang	Chiem Hoa	Xuan Quang	29,747	County Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Ferry for small vehicles
24	Yen Hoa		Na Hang	Yen Hoa	11,363	County Road	Agriculture	Agricultural	Improved welfare, Economic advancement	No access road ; access in rainy season difficult (approx. 40km)
25	Lanh	Yen Bai	Luc Yen	Lien Do	5,000	County Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Automobile crossing in dry season only.
26	Vai		Van Yen	Dong Cuong	7,000	Provincial Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Automobile crossing in dry season only.
27	Pho Tra Linh	Cao Bang	Tra Linh	Hung Quoc	-	County Road	Agriculture/Village	Agricultural	Improved welfare, Economic advancement	Deteriorated bridge for pedestrians, bicycles, motorcycles.
28	Mo Sat		Hoa An	Dan Chu	-	Provincial Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Manpowered ferry (rainy season only)
29	Ban Ai	Son La	Son La	Chieng Xam	-	Provincial Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Deteriorated bridge, 8-ton limit
30	Ban Hinh		Thuan Chau	Tong Co	-	Provincial Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Small vehicles crossable ; subgrade deteriorated
31	Tong Panh		Son La	Chieng An	-	County Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Destroyed by flood : temporary Bridge for pedestrians, bicycles, motorcycles.
32	Thac Ve	Ha Giang	Bac Quang	Bang Hanh	6,769	County Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Extremely poor access : construction difficult
33	Khuoi Nieng		Bac Quang	Vinh Bao	4,727	County Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Submerged bridge passable only during dry season.
34	Khuoi Kieng		Bac Quang	Dong Yen	7,420	County Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Bamboo raft crossing : automobile crossable only in dry season
35	Ban Vuoc	Lao Cai	Bat Sat	Ban Vuoc	8,120	County Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Suspension bridge for pedestrians, bicycles, motorcycles : Automobile crossable only in dry season.
36	Khe Chan		Van Ban	Son Thuy	6,570	County Road	Forestry	Agricultural	Improved welfare, Economic advancement	Manpowered ferry
37	Pa Mo	Lai Chau	Muong Te	Pa Mo	-	Provincial Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Road flooded ; unsurveyable due to landslide
38	Nam Bun		Muong Te	Nam Bun	-	Provincial Road	Agriculture	Agricultural	Improved welfare, Economic advancement	Road flooded ; unsurveyable due to landslide
37	Na Sang - 2		Dien Bien	Nua Ngam	4,370	Provincial Road	Agriculture/Pasture	Produce/Livestock	Improved welfare, Economic advancement	Former bridge carried away by flood ; automobiles crossable in low water, pedestrians use raft.
38	Nam Thanh		Dien Bien	Noang Luong	4,839	County Road	Agriculture/Forestry	Produce/Lumber	Improved welfare, Economic advancement	Suspension bridge passable by small vehicles ; no major problems

No. 1 DUC KHE BRIDGE





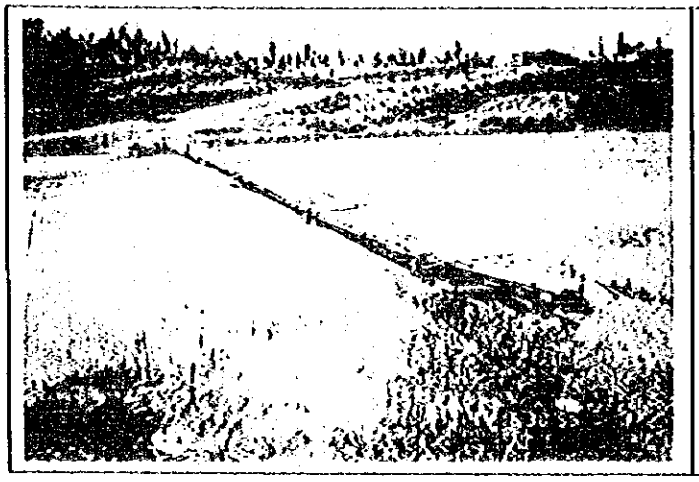
LOCATION MAP

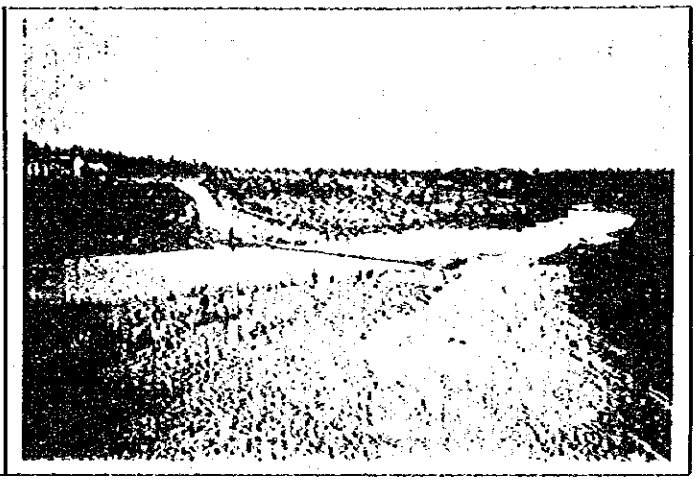


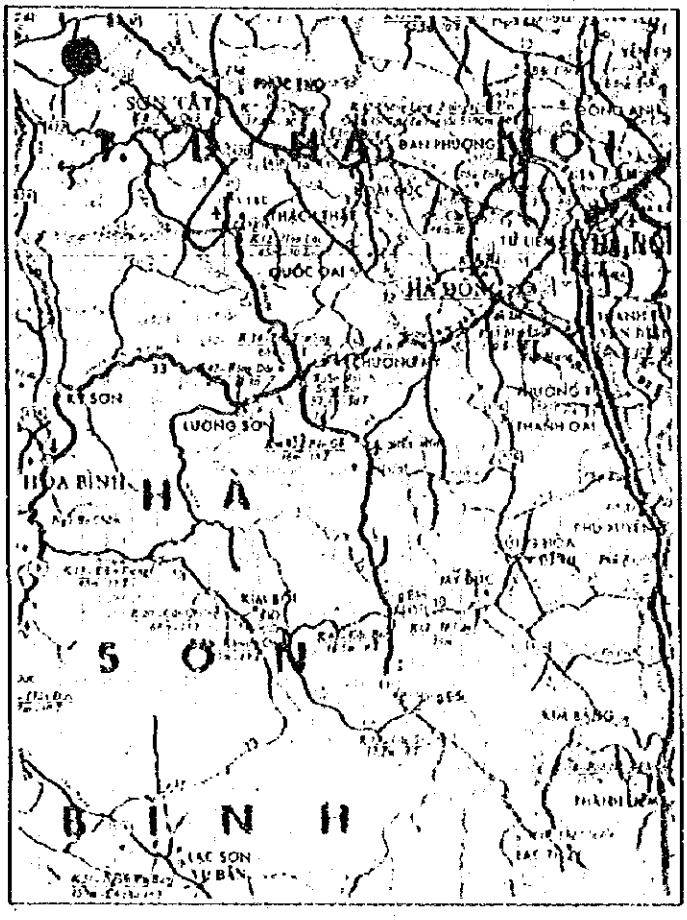
BRIDGE SITE MAP

Present Bridge Condition	Other Information
Ha Tay Province My Duc District Huong Son County Super Structure : Temporary Pontoon Bridge & Steel Plate Bridge Sub Structure : Flow Out Bridge Length : 71.0 m Width of Bridge : - Main Traffic : Pedestrians, Bicycle, Motorbike, Light Vehicle Access Road : Good (No Pavement)	• Access road is in good condition. • River width is 70 m to 80 m therefore 300 ton class ships are navigable. • Currently a temporary pontoon bridge is used, therefore only pedestrians can pass over the bridge. • This temporary pontoon bridge has been in use since 1970. • No problem in ship navigation to bridge site. Floating crane would be useful for construction of bridge. • Depth of water is around 3 m and velocity of flow is around 0.5 m/sec. • High water level is 1.0 m from current water level. • Coarse and fine aggregates are carried by dump truck from Hoa, Vinh Province.

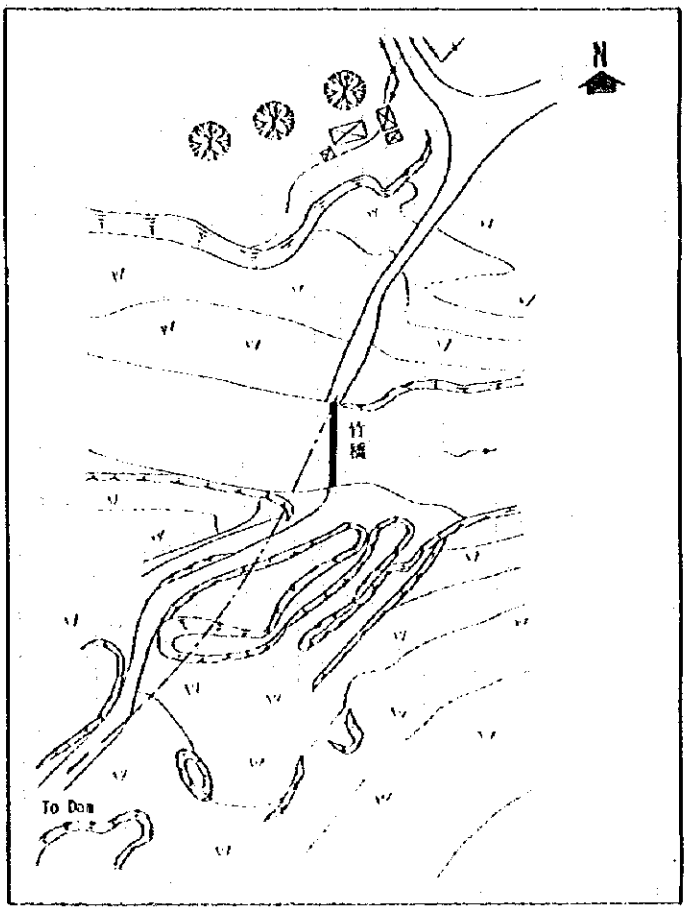
No. 3 CHUOC BRIDGE







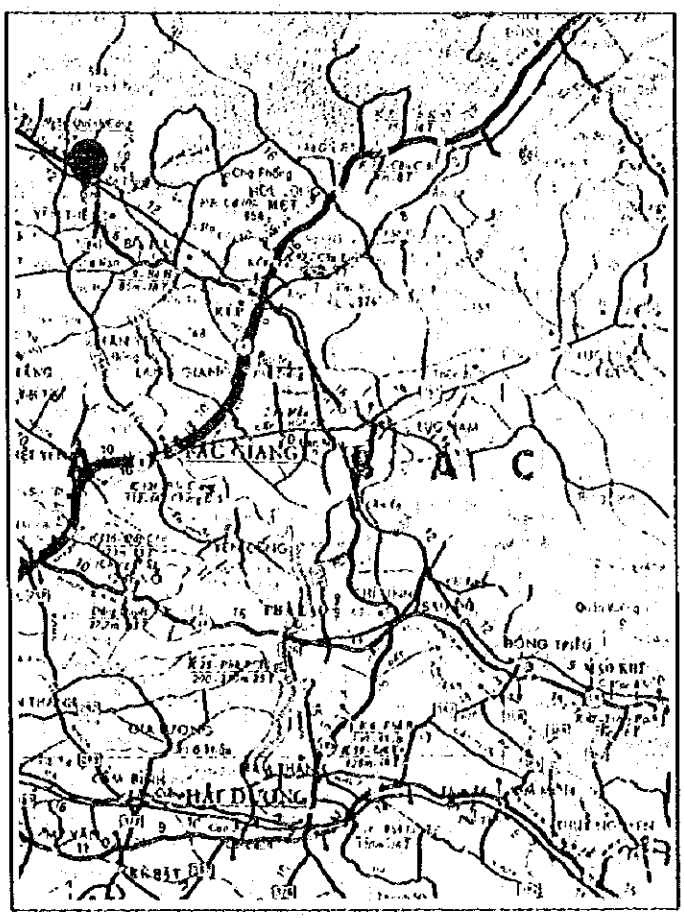
LOCATION MAP



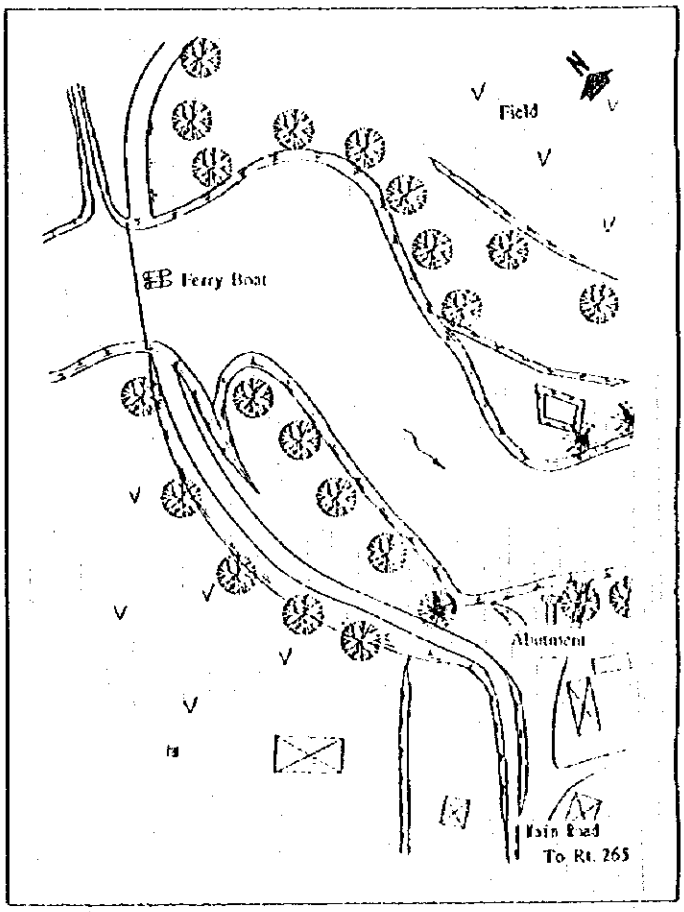
BRIDGE SITE MAP

Present Bridge Condition		Other Information
Ha Tay Province Ba Vi District Can Linh County		• Bridge site is located 50 km from Ha Noi. This bridge is a pedestrian bamboo bridge.
Super Structure	: Pedestrian Bamboo Bridge (Private Enterprise)	• This bridge is located in 1 km downstream from Suoi Hai Dam. (It is necessary to make arrangements before construction).
Sub Structure	: Temporary Bamboo Bridge	• Access road is in good condition
Bridge Length	: 50.0 m	• The nature of the soil in the area is mixed cobble stone.
Width of Bridge	: 2.0 m	• There is no hindrance for construction.
Main Traffic	: Bicycle, Motorbike only	• Coarse and fine aggregates are carried from Chuong My (about 70 km).
Access Road	: Non-Paved Road	

No. 4 DONG VUONG BRIDGE



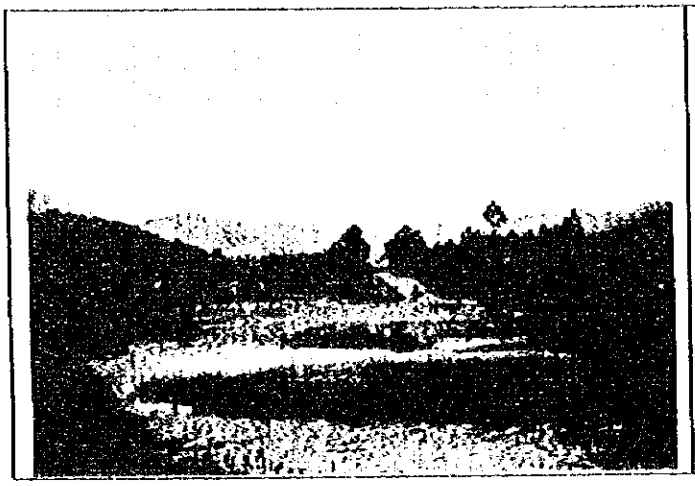
LOCATION MAP

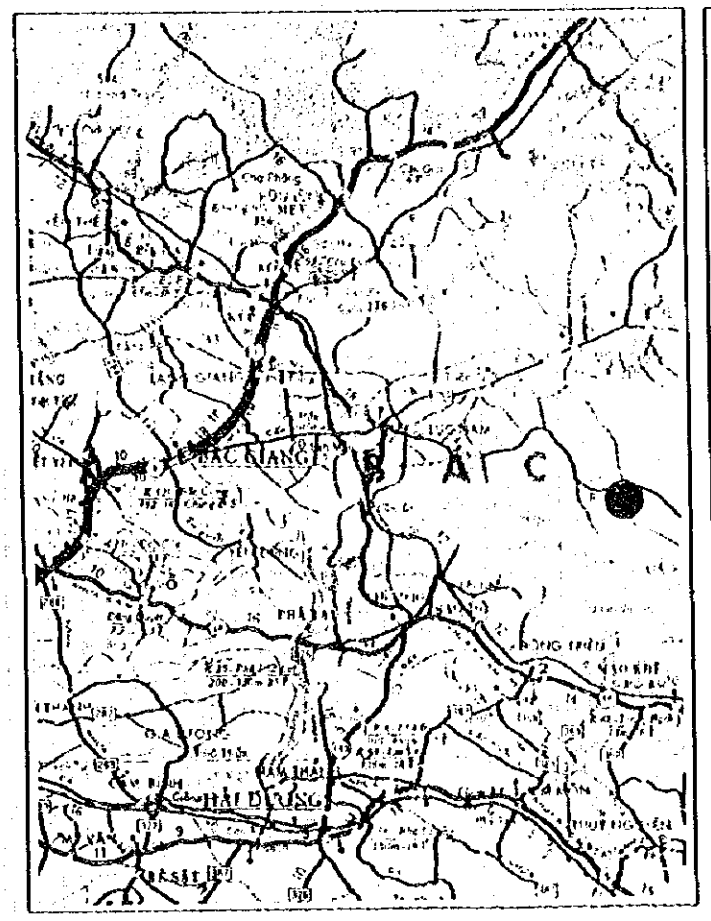


BRIDGE SITE MAP

Present Bridge Condition	Other Information
Ha Bac Province Yen The District Dong Vuong County Super Structure : Temporary Bamboo Bridge (Dry Season) Ferry Boat (Rainy Season) Sub Structure : - Bridge Length : River Width 30 m Width of Bridge : - Main Traffic : Bicycle, Motorbike, Pedestrians Access Road : Good (No Pavement)	• Three hours by car from Ha Noi to bridge site. • The Vehicle impossible pass through on the bridge during dry season cause by brook (L=20 m) before 500 m from proposed bridge point. • Local government had bridge plan and started construction, therefore only right bank abutment was constructed. Construction was suspended due to financial difficulties. • Pedestrians use bamboo bridge as detour road during dry season Ferry boat used during rainy season. • No problem for temporary yard. The nature of the soil is terrace deposit and in good condition (gravelly soil). • Existing road height is around 10 m from river bed.

No. 5 DONG DINH BRIDGE





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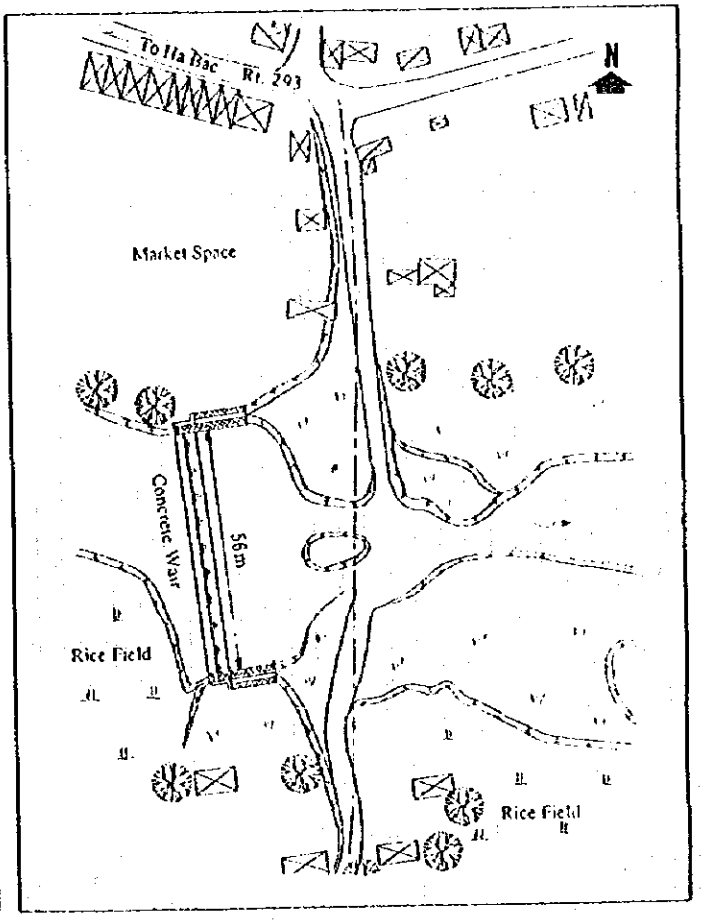


BRIDGE SITE MAP

Present Bridge Condition

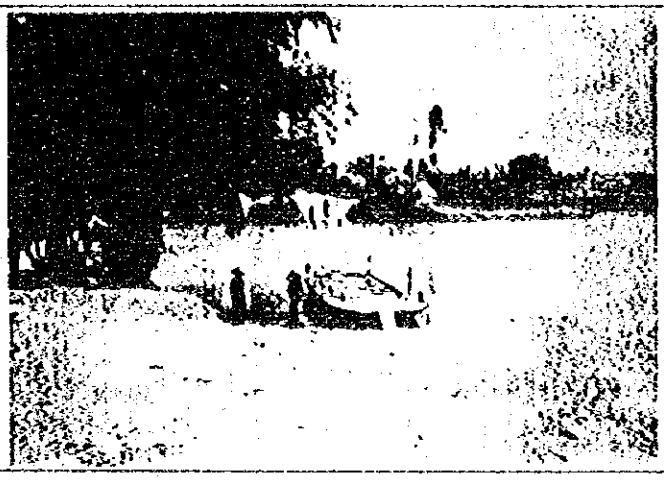
Ha Bac Province Luc Nam District Luc Son/Binh Son Country

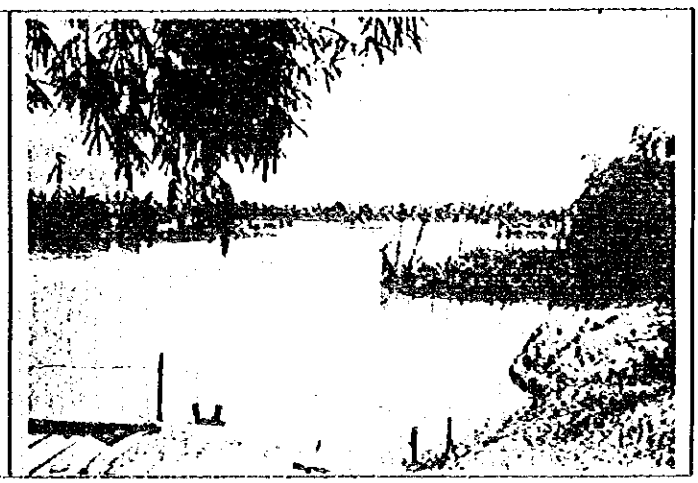
Super Structure	:	-
Sub Structure	:	-
Bridge Length	:	River Width 60 m
Width of Bridge	:	-
Main Traffic	:	People, Motorbike, Light Vehicle
Access Road	:	Poor (No Pavement)

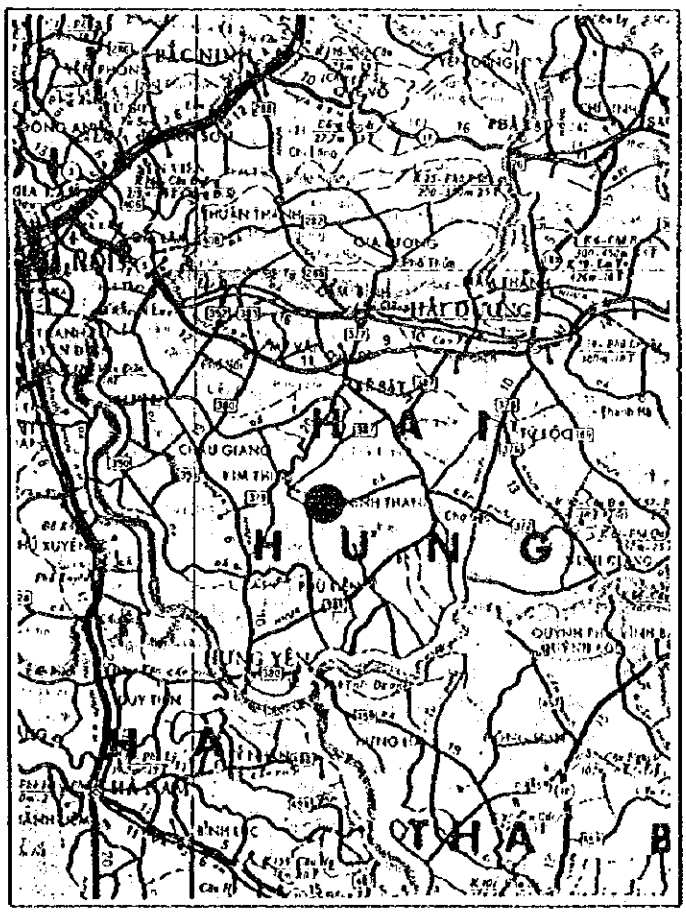
Other Information

- About two hours from Bac Giang to the bridge site.
- On the way Luc Nam river is crossed by ferry boat.
- On the way there are around 2 km of poor road. Difficulty in vehicle irrespective of season.
- There is no bridge on site
- Vehicles possible across the river bed only in dry season.
- People cross a weir upstream in rainy season. Closed to all traffic during flood season. Bridge site is located in mountain valley.
- River bed is sandy gravel (alluvium).
- Site area is of hard terrace deposit.
- No problem for temporary yard.

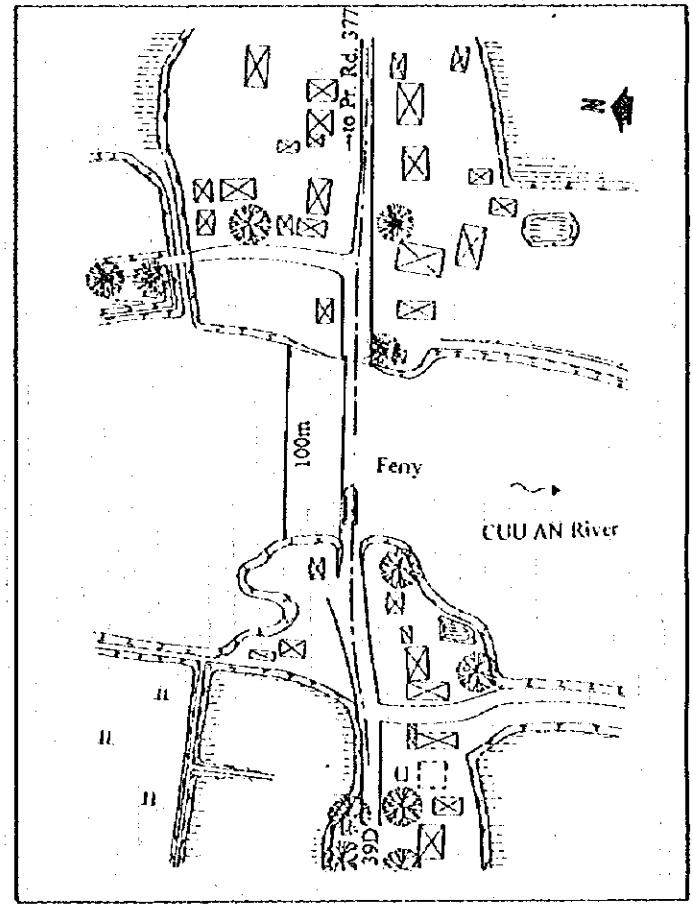
NO. 6 TU O BRIDGE







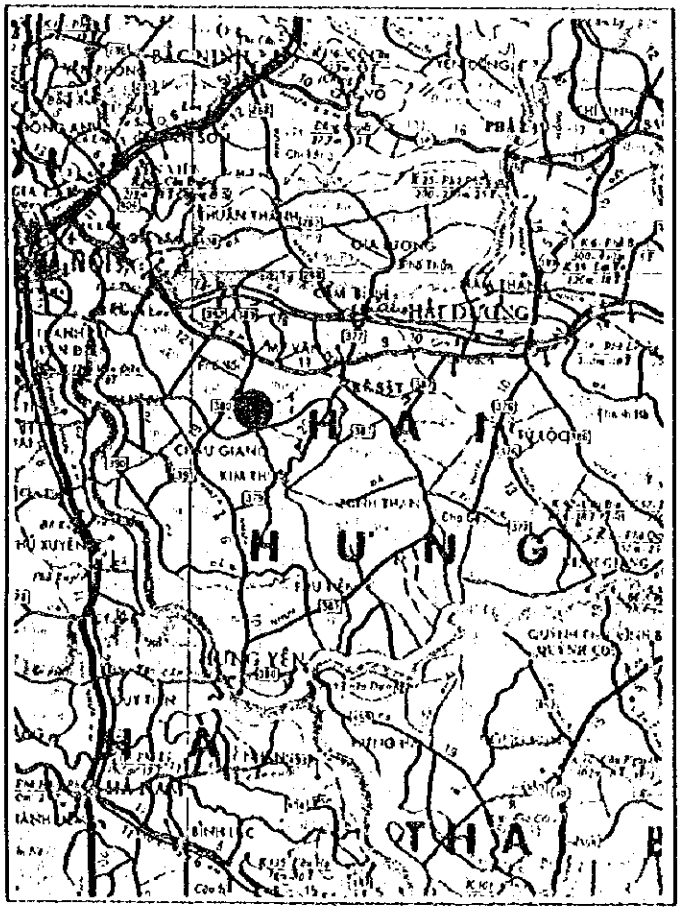
LOCATION MAP



BRIDGE SITE MAP

Present Bridge Condition	Other Information
P: Hai Hung D: Ninh Thanh C: Tan Trao Super Structure : Destroyed Sub Structure : - Bridge Length : 60 m Width of Bridge : - Main Traffic : Pedestrians, Bicycle, Motorbike Access Road : Gravel Road (W = 3 m)	• Ferry is available in place of bridge crossing. • Access road to the site is in bad conditin, in particular after rain fall. • During the dry season, truck (max. 5 ton) access is possible to the site. • Equipment and materials for bridge construction can be transported by canal. • Boat with weight of 100 ton can cruise the river. • Aggregate and sand for concrete are available from Kin Mon and Chin Ling districts, respectively.

NO. 8 HAU BRIDGE



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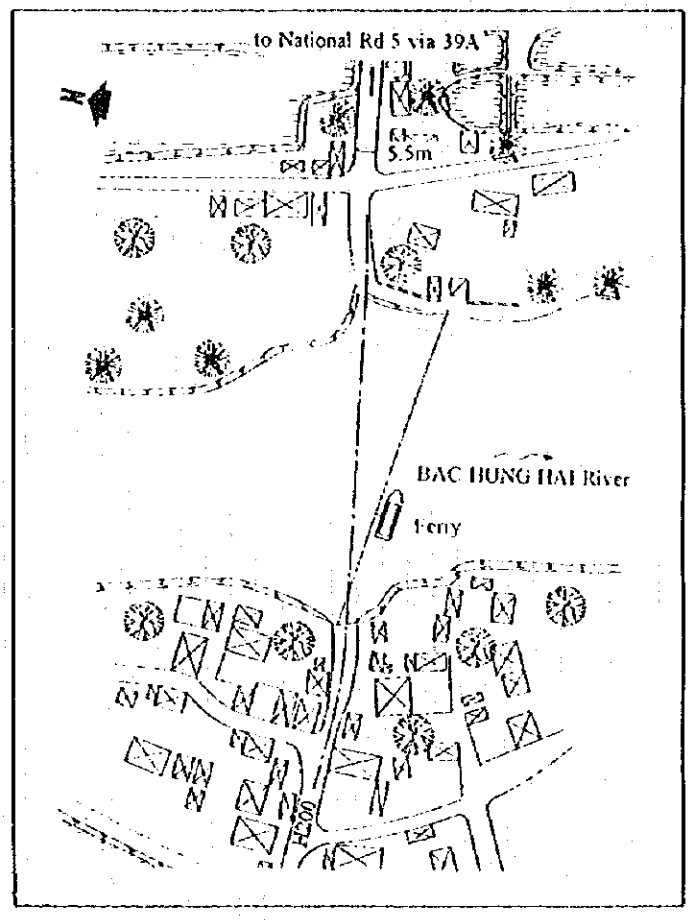
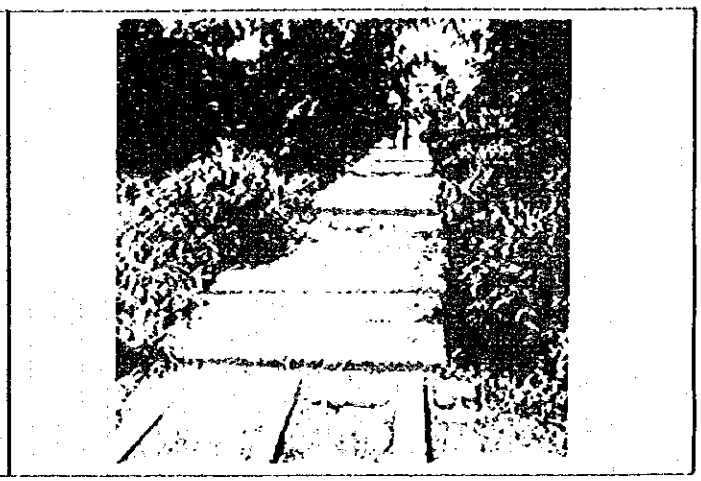
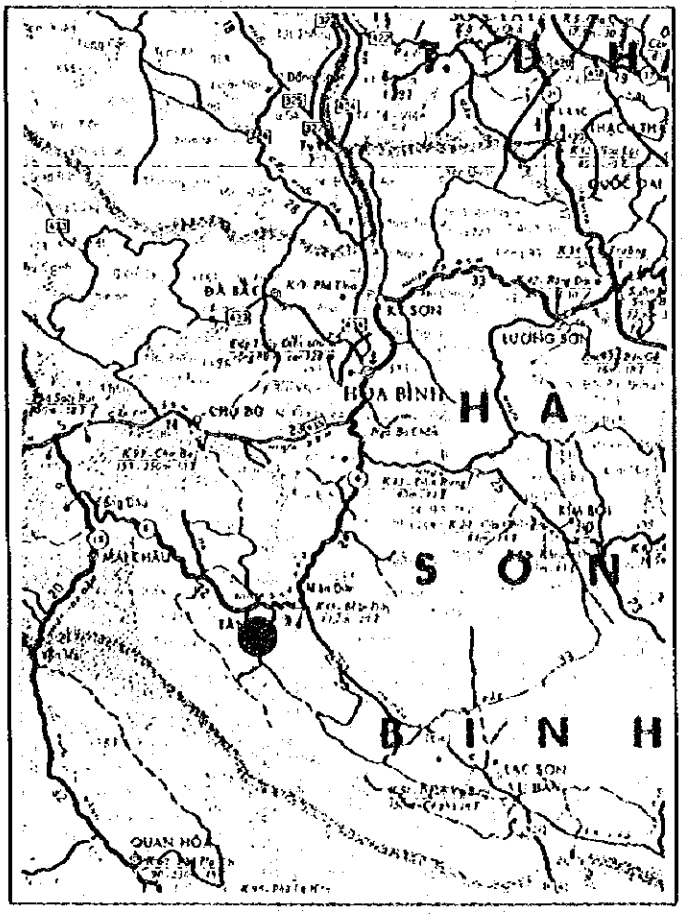


BRIDGE SITE MAP

Present Bridge Condition	Other Information
P: Hai Hung D: Van Giang C: Trung Hoa Super Structure : - Sub Structure : - Bridge Length : - Width of Bridge : - Main Traffic : Pedestrians, Bicycle Access Road : Dirt Road (W = 5 m)	• Local residents have a ferry service. • The width of river is about 60 m. • Boat with weight up to 100 ton cruises the river. • Access road to bridge site is in bad condition, only land cruiser can reach the site by land (12 km from My Van). • Local government has already studied about the feasibility of bridge construction (bridge length = 71 m). • Access road has an improvement plan starting at the end of 1995.

NO. 9 BEN THE BRIDGE





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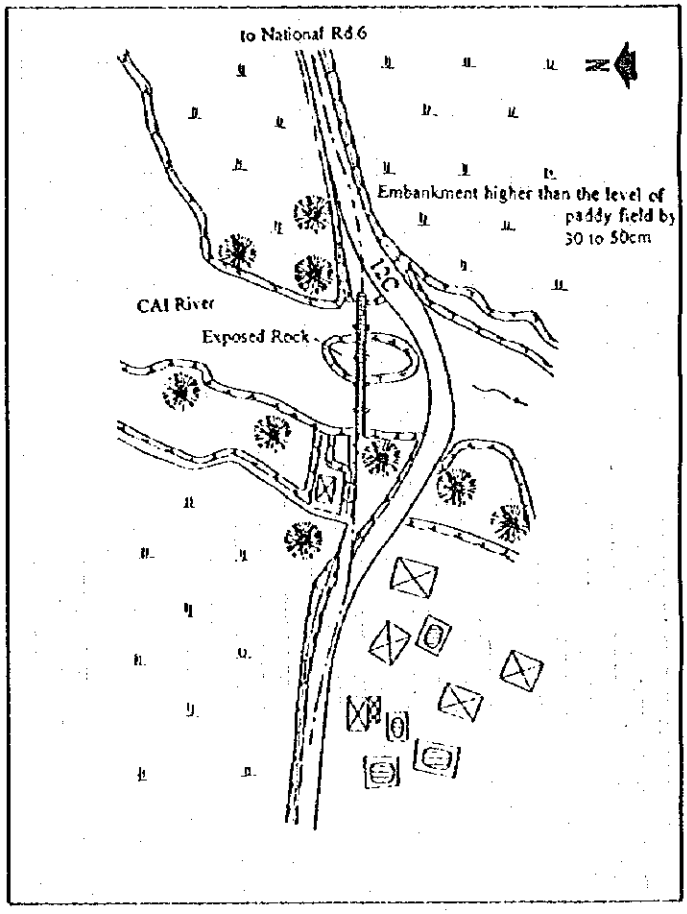
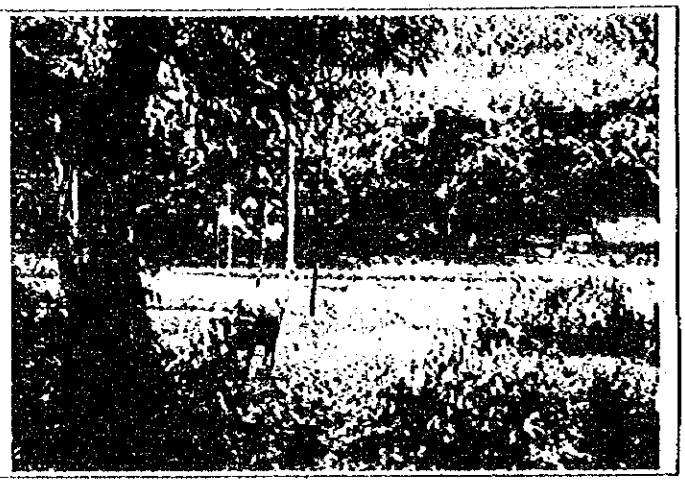
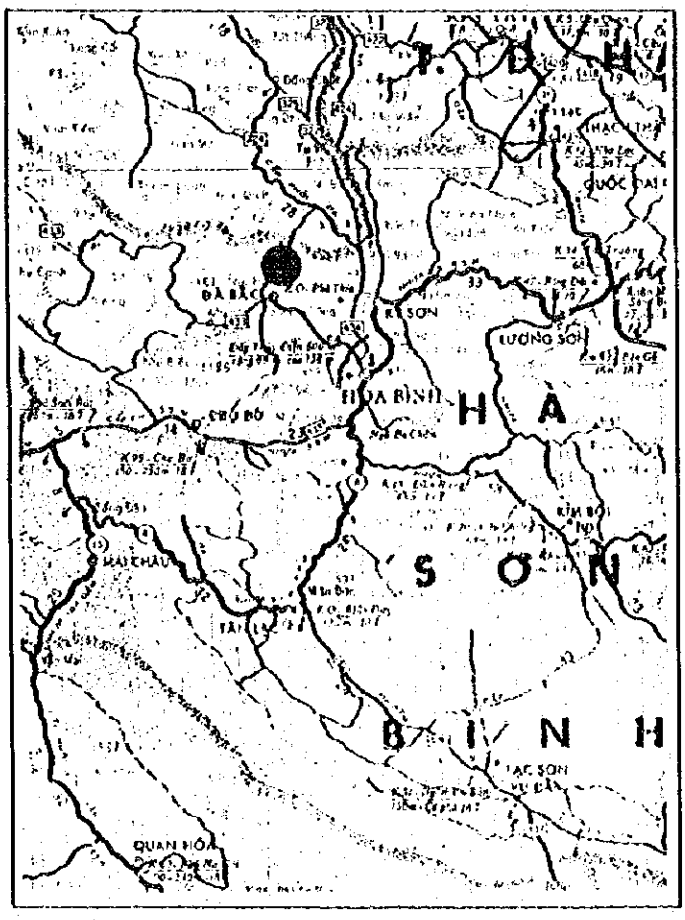


BRIDGE SITE MAP

Present Bridge Condition	Other Information
P: Hoa Binh D: Tan Lac C: Phong Phu Super Structure : - Sub Structure : - Bridge Length : - Width of Bridge : - Main Traffic : Pedestrians, Bicycle, Motorbike Access Road : Gravel Road	• Temporary bridge is for pedestrians, bicycle and Motorbike, automobiles cross the river bed only in dry season. • Rocks are exposed on river bed. Spread foundation can be applied. • District road 12 C will be improved from 1996 to 1998.

NO. 10 TINH BRIDGE





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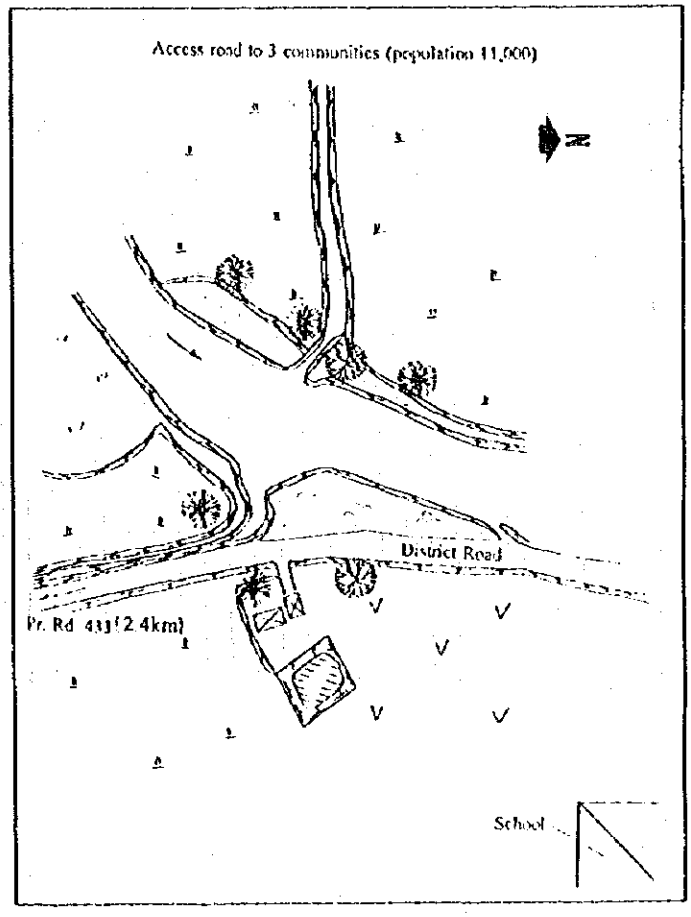
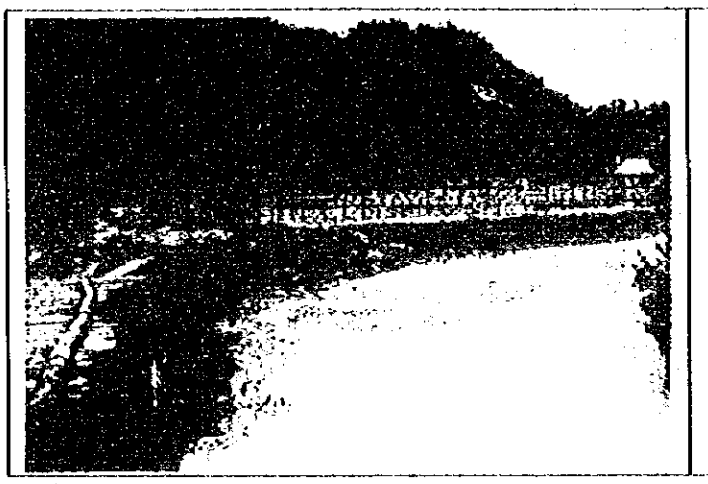
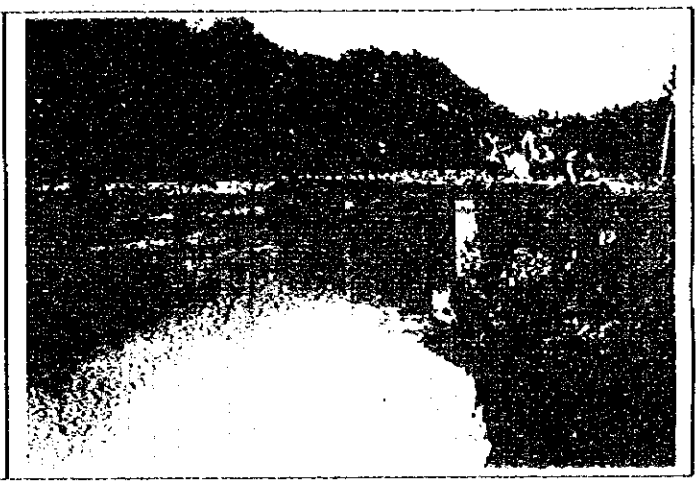


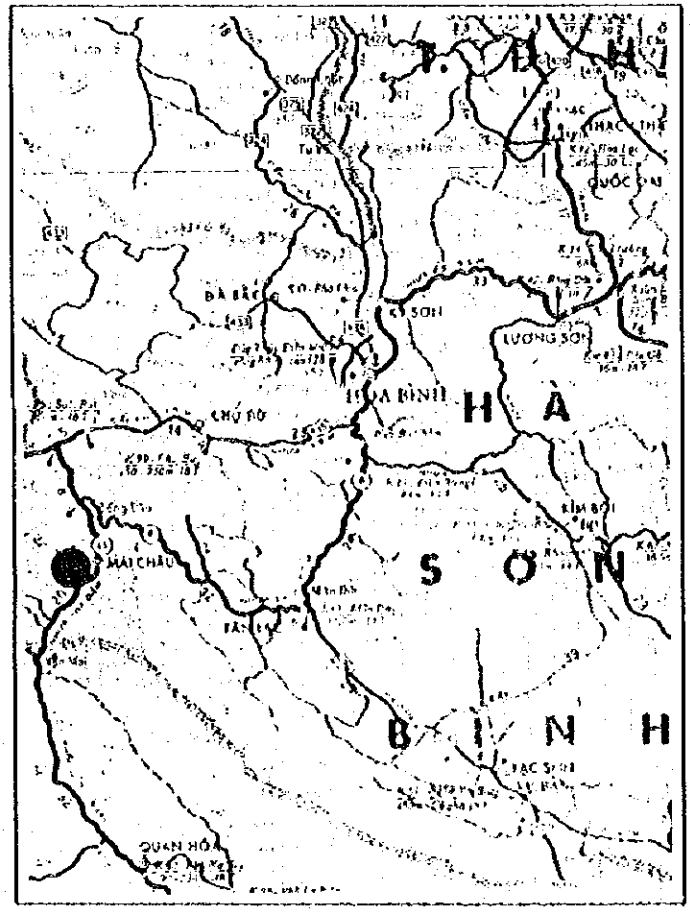
BRIDGE SITE MAP

Present Bridge Condition	Other Information
P: Hoa Binh D: Da Bac C: Tu Ly Super Structure : - Sub Structure : - Bridge Length : - Width of Bridge : - Main Traffic : Pedestrians, Bicycle, Motorbike Access Road : Gravel Road (W = 4.5 m)	• When water level is high, most traffic makes a detour at 3 km upstream. • The traffic is open to pedestrians and to heavy vehicles at present, in the dry season. • Traffic to three communities is blocked by the river. • Rocks are exposed on river bed. Spread foundation is likely to be applicable.

NO. 11 LAC BRIDGE







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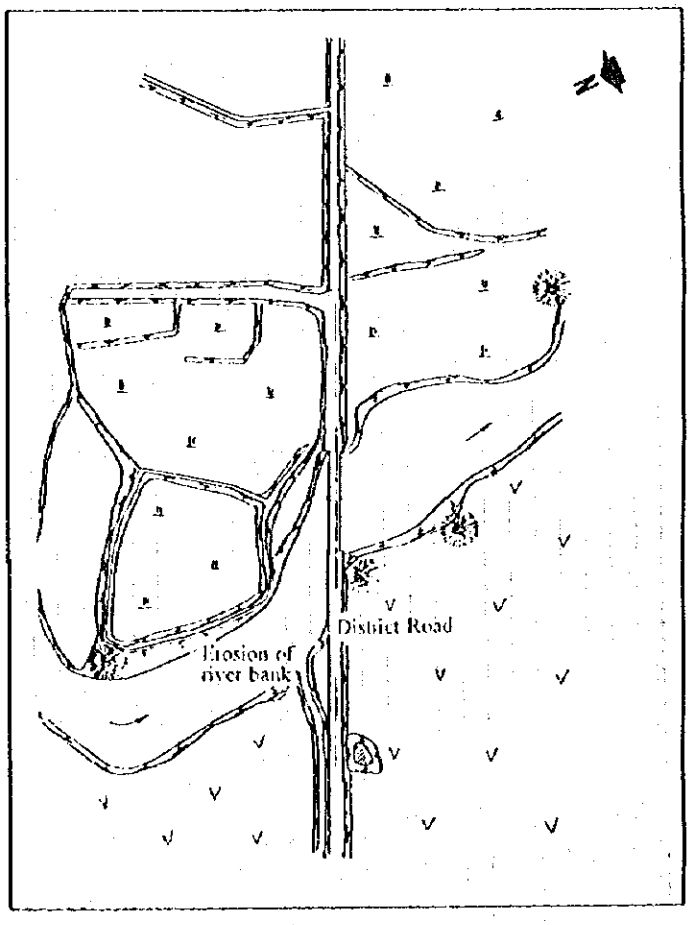
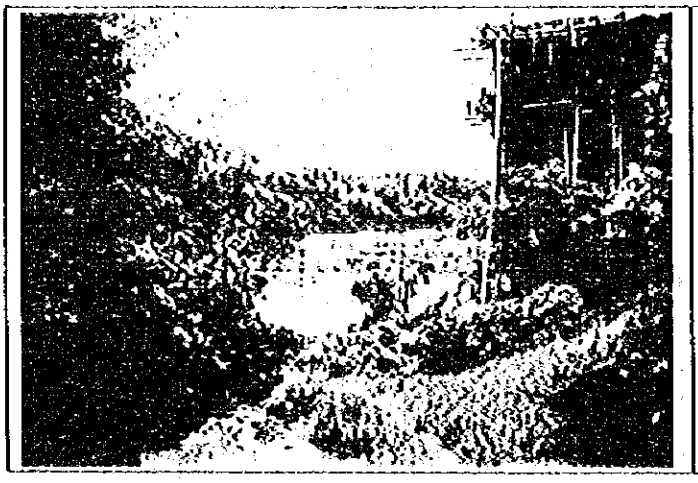
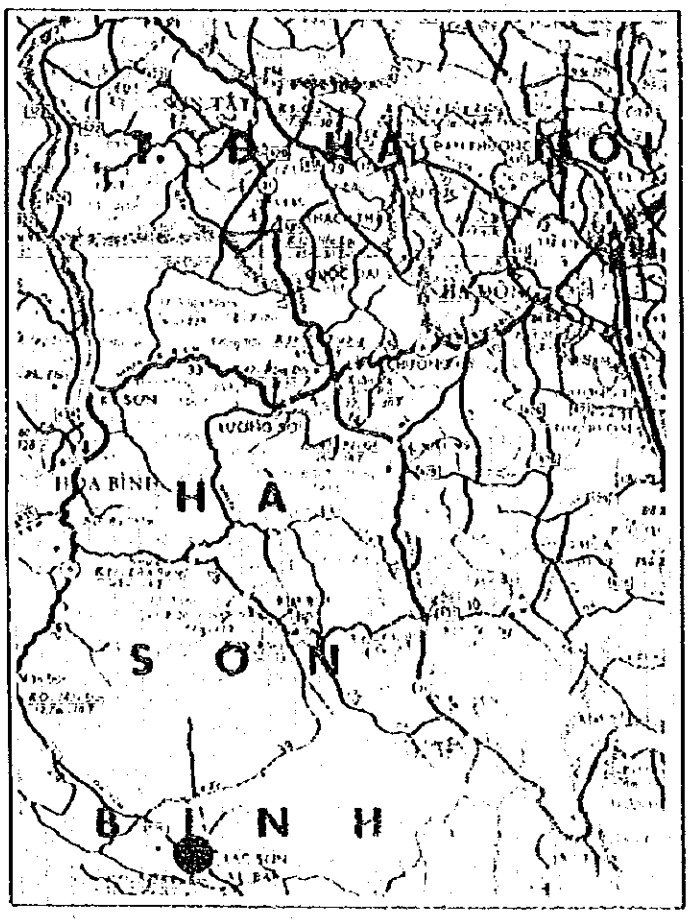


BRIDGE SITE MAP

Present Bridge Condition	Other Information
P: Hoa Binh D: Lac Son C: Tong Dau Super Structure : Wooden Bridge Sub Structure : Stone Masonry Bridge Length : 23.5 m Width of Bridge : 1.5 m Main Traffic : Pedestrians, Bicycle Access Road : Dirt Road	• A minority community is located along the access road. • The river bends at the bridge site. • Sub-soil is likely to be clay sediment. • Access road will be improved soon after completion of a proposed bridge.

NO. 12 VU BAN BRIDGE





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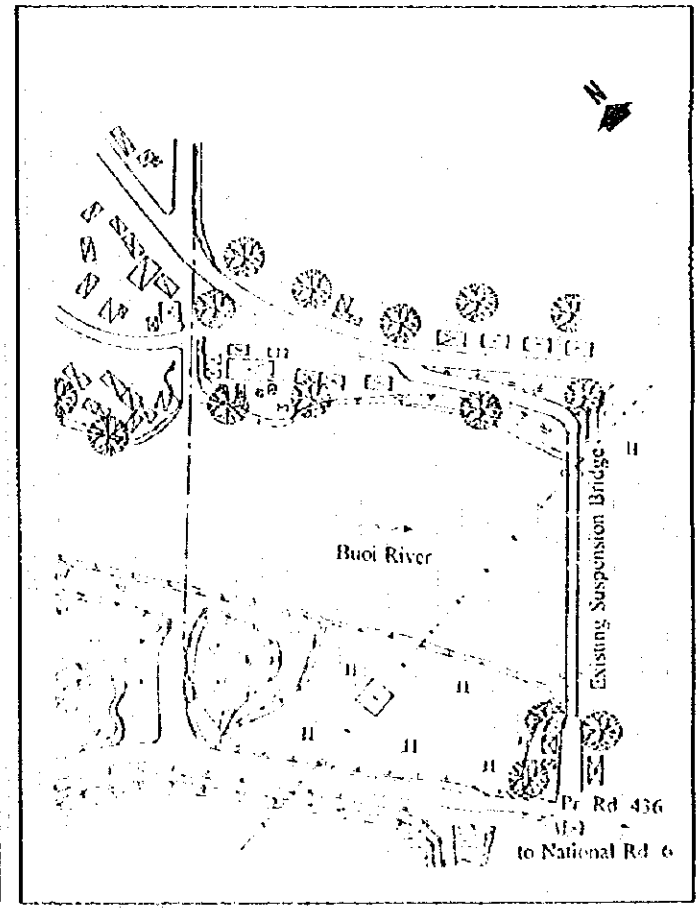


BRIDGE SITE MAP

Present Bridge Condition

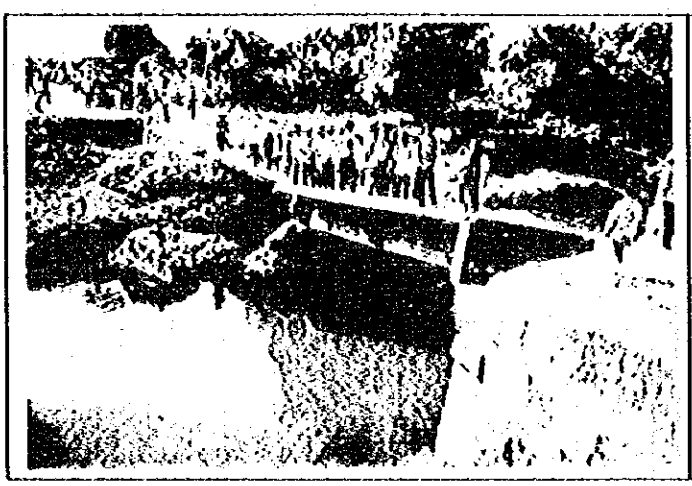
P: Hoa Binh D: Lac Son C: Lien Vu

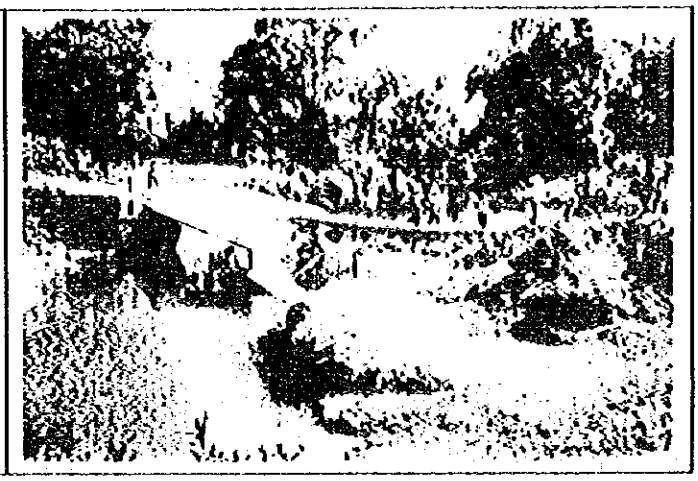
Super Structure	:	Steel Suspension Bridge
Sub Structure	:	Stone Masonry
Bridge Length	:	104 m
Width of Bridge	:	2.7 m
Main Traffic	:	Pedestrians, bicycle, Motorbike
Access Road	:	Paved with Macadam (Minh Binh Side) Gravel Road (Rt. 6 side)

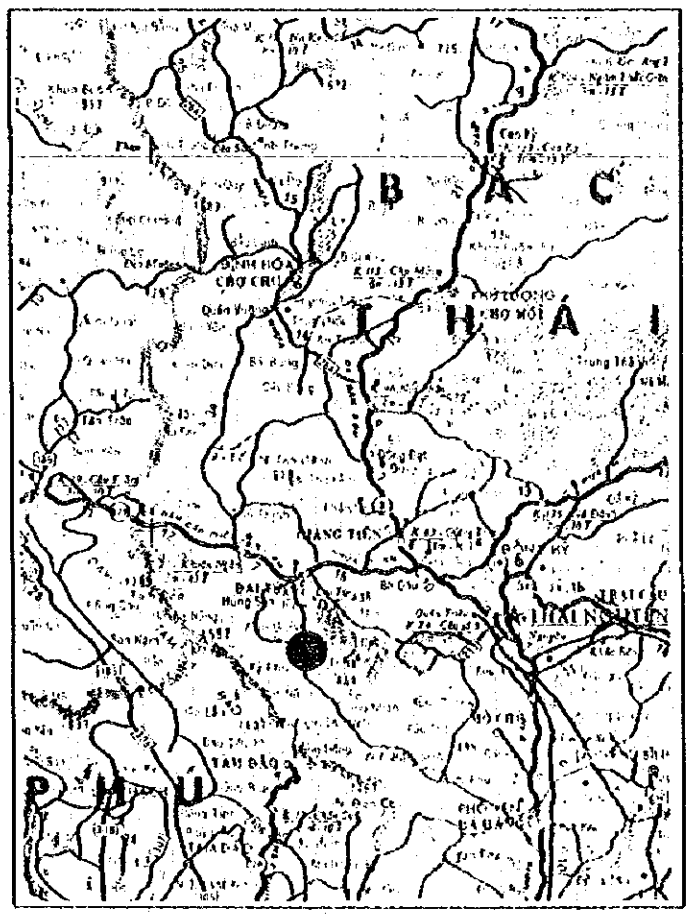
Other Information

- 27 km from the junction with Rt. 27.
- New bridge is proposed upstream of existing bridge.
- New bridge requires approach roads with the total length of 230 m.
- Existing bridge is a suspension bridge built at approximately 20 m above the surface of the river.
- At present, passage is only open to Motorbike riders and pedestrians.
- Construction material, such as crushed stones and sand can be procured within a range of 2 km.
- Depth of cover soil is expected to be less than a few meters.
- Spread foundation is applicable.

NO. 13 KY PHU BRIDGE







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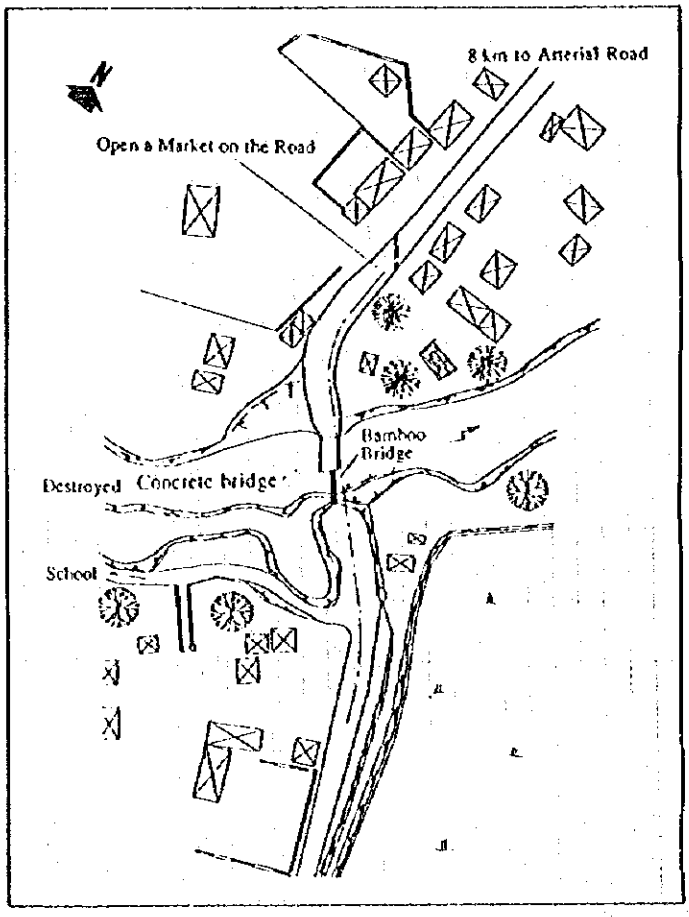
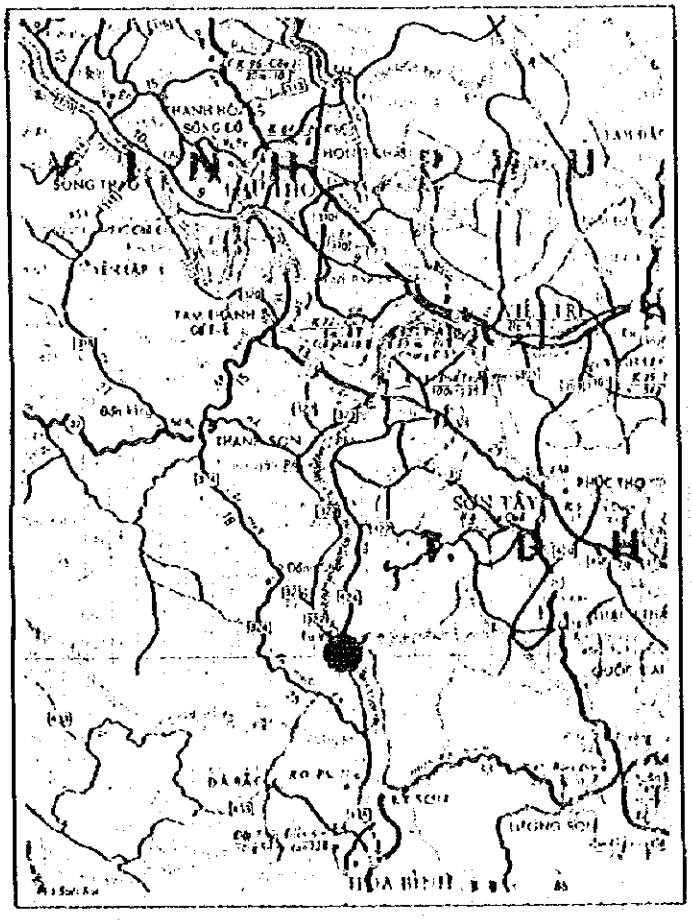


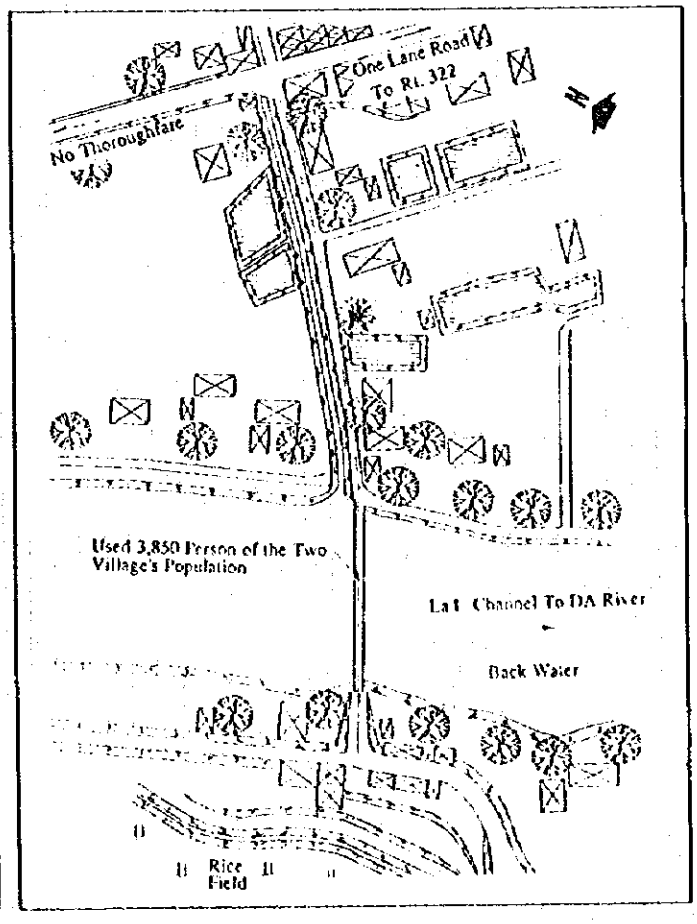
BRIDGE SITE MAP

Present Bridge Condition	Other Information
Bac Thai Province Dai Tu District Ky Phu County Super Structure : Half Damaged Temporary Wooden Bridge Sub Structure : Stone Masonry Bridge Length : 26.5 m Width of Bridge : 1.5 m Main Traffic : Pedestrians, Bicycle Access Road : 5 m Width Road (No Pavement)	• Around 8 km from Dai Tu to the bridge site, via Song Doung and Dai Tu. • No problem for access road. • Concrete bridge was destroyed due to scouring. • Only pedestrians and motorbikes can cross the bamboo bridge. • Vehicles cross the river bed around 1 km downstream. • A market is held 5 days a week. • Site area is a farming village. • River bed is sandy soil mixed with cobble stone.

NO. 15 LUONG NHA BRIDGE



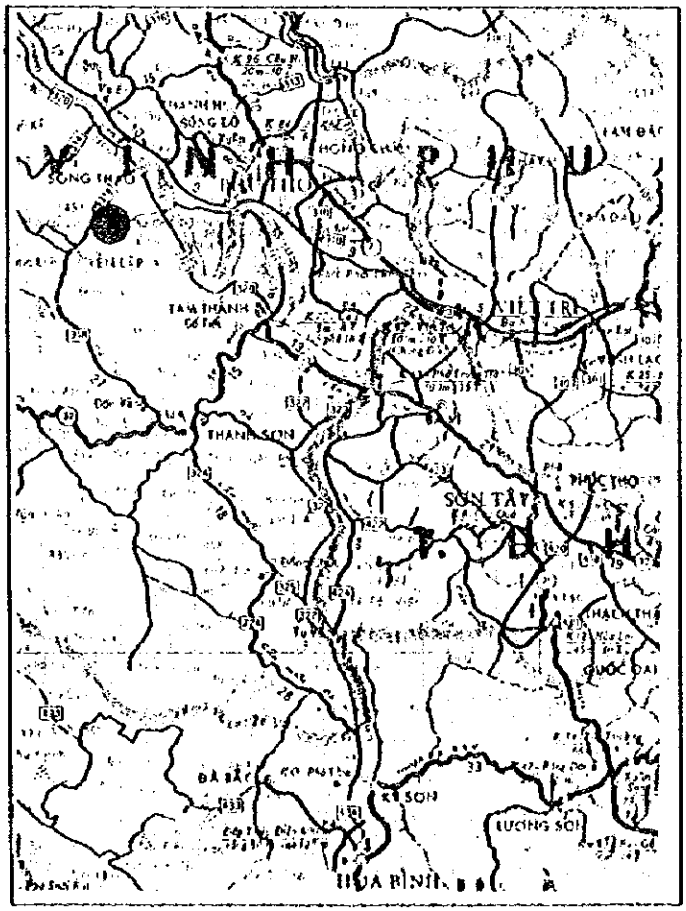
LOCATION MAP



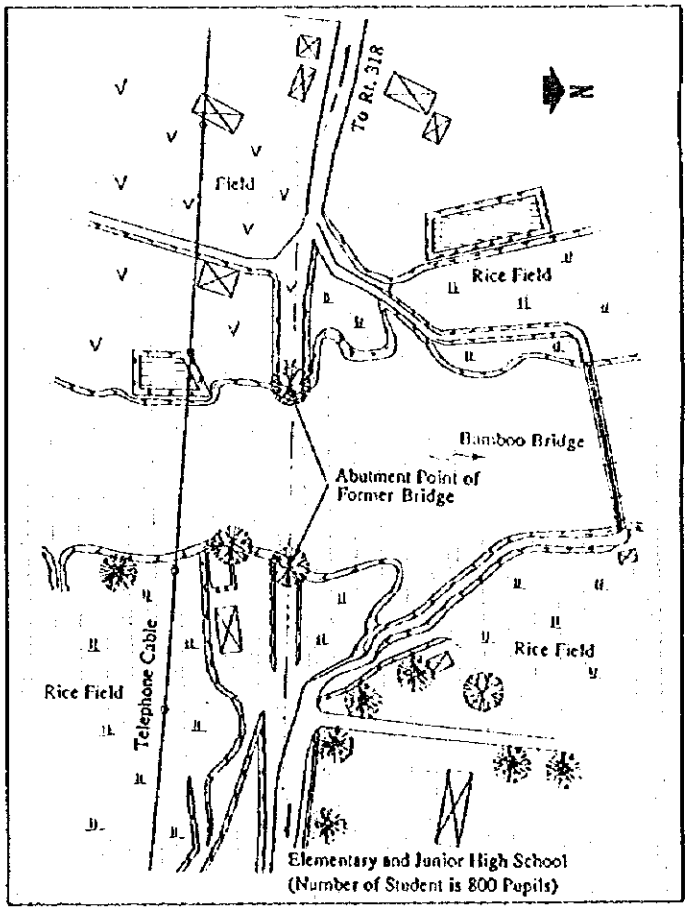
BRIDGE SITE MAP

Present Bridge Condition	Other Information
Vinh Phu Province Thanh Son District Luong Nha/Tu Vu County Super Structure : Plate Girder (Concrete Slab) Sub Structure : Pilebent (H Steel Girder) Bridge Length : 41.5 m (70 m When Log Bridge is Included) Width of Bridge : 2.5 m Main Traffic : Pedestrians, Bicycle, Light Vehicle Access Road : Good (No Pavement)	• 4 hours via Viet Thi from Ha Noi to bridge site. • Access road to the site is one lane and unpaved road. • Substructure of existing bridge has bad damage and Log Bridge is connected to both sides of river, therefore only pedestrians and motorbikes can pass over the bridge. Site is located along DA river. • DA river is tributary of Red river therefore equipment and materials for bridge will be transported by boat. • The nature of the soil is deposit from DA river (clay soil). • High water level is near deck slab during flood season. • Difference of water levels in flood season and in dry season is abou 5 m. • Superstructure was washed out by flood in August.

NO. 16 SUONG BRIDGE



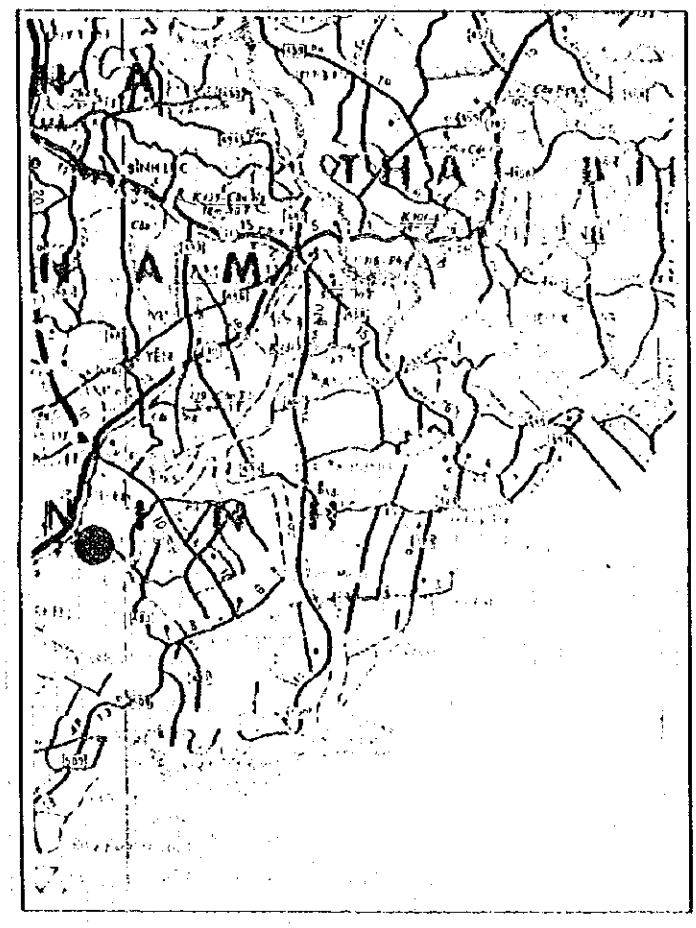
LOCATION MAP



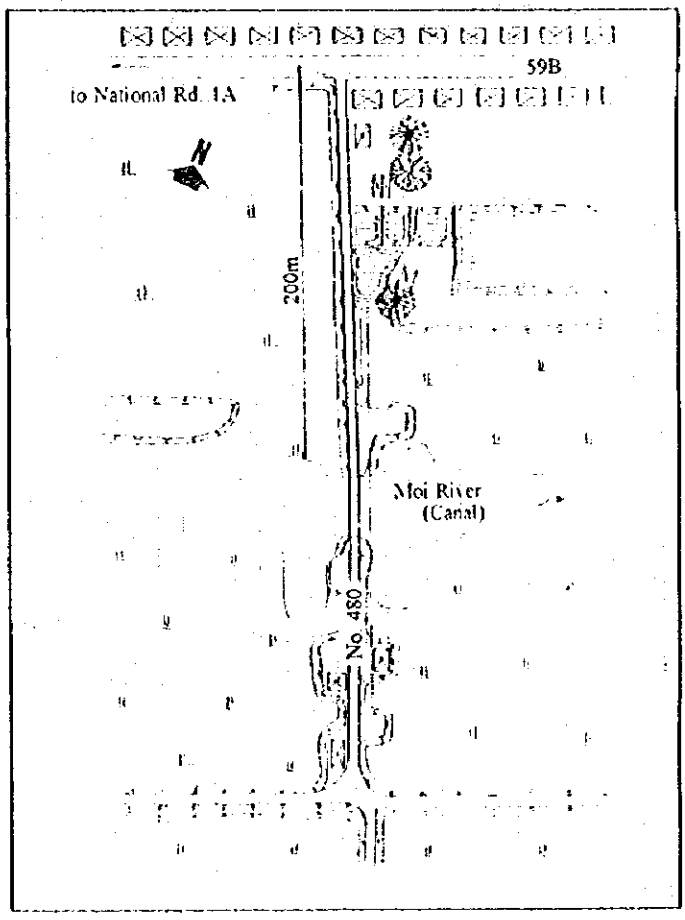
BRIDGE SITE MAP

Present Bridge Condition	Other Information
Vinh Phu Province Songu Thao District Fuong Lung County Super Structure : Temporary Bamboo Bridge Sub Structure : - Bridge Length : 42.5 m Width of Bridge : 1.5 m Main Traffic : Pedestrians, Bicycle Access Road : Good (No Pavement)	• Access road to the site is in poor condition during rainy season. However, 10 ton trucks are accessible to the site. • Former bridge was destroyed by bombing of U.S. military. • Existing bridge is made from bamboo therefore only pedestrians and motorcycle can pass over the bridge. However deposit bridge is closed during rainy season. • The nature of the soil is clay soil deposit. • Rocks are exposed upstream, therefore spread foundation can be applied. • New bridge is proposed upstream of the former bridge point.

NO. 17 THIEN THO BRIDGE



LOCATION MAP



BRIDGE SITE MAP

Present Bridge Condition

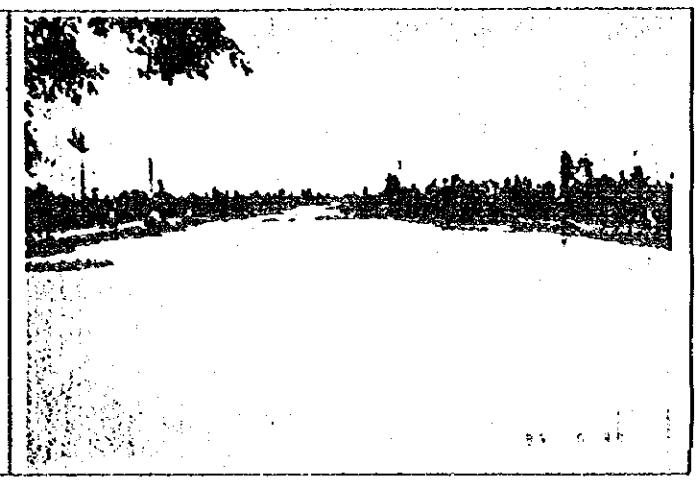
P: Ninh Binh D: Yen Mo C: Yen Hoa

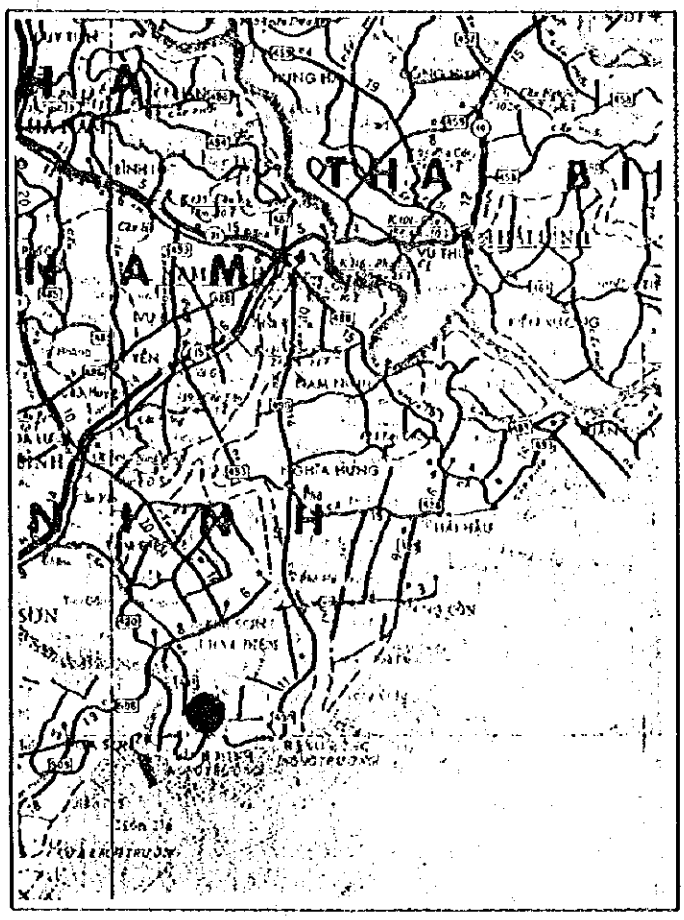
Super Structure	: Concrete (Heavily Damaged)
Sub Structure	: Pilebent
Bridge Length	: 28 m
Width of Bridge	: 2.6 m
Main Traffic	: Pedestrians, Bicycle, Motorbike
Access Road	: Good for 59B, Access Road for 59B is Gravel Road (W = 2.6 m)

Other Information

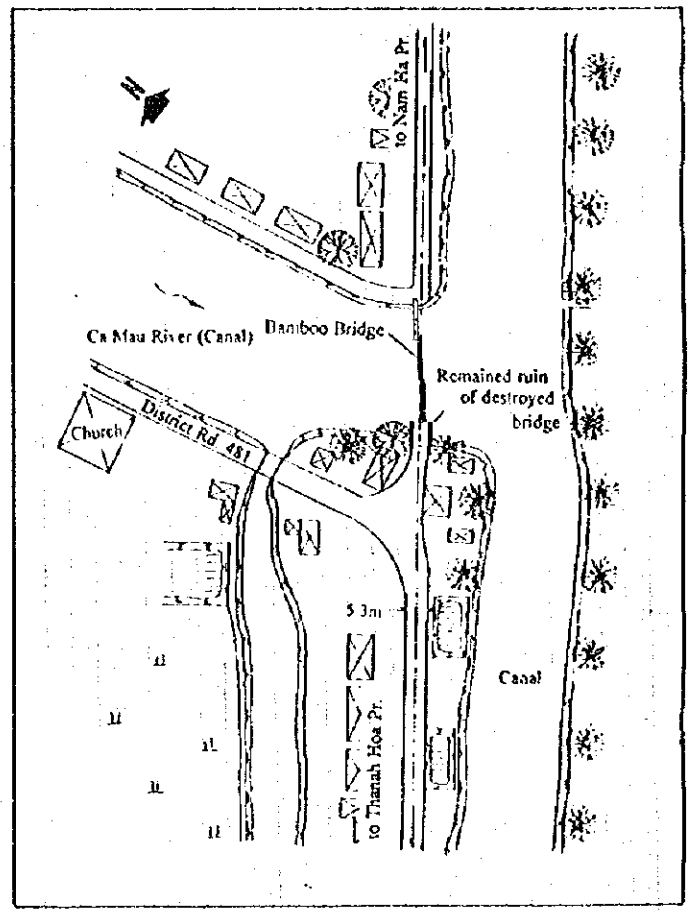
- The route is among paddy fields in a deltaic region.
- The width of the road is about 3 m.
- The length from the access road to the bridge site is approximately 200 m.
- Existing bridge has been heavily damaged and automobile traffic is impossible.
- At the time of flooding in 1994, the access road was inundate.

NO. 18 HONAH TRUC BRIDGE





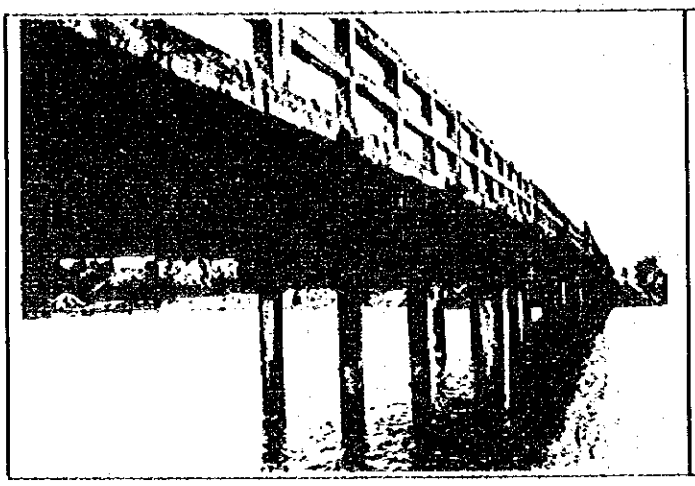
LOCATION MAP

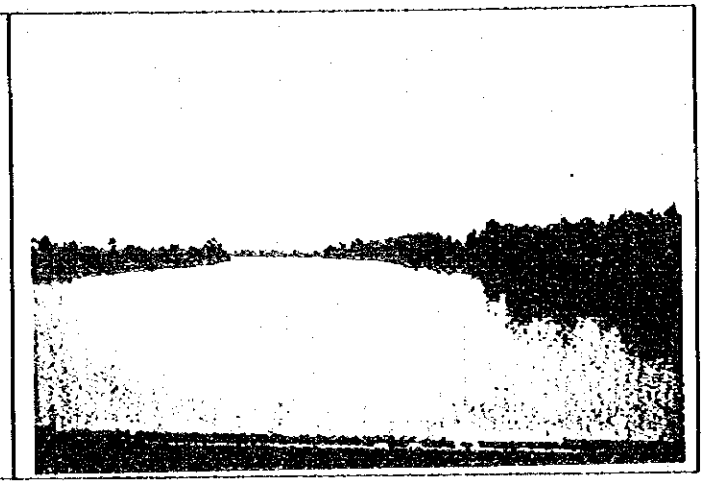


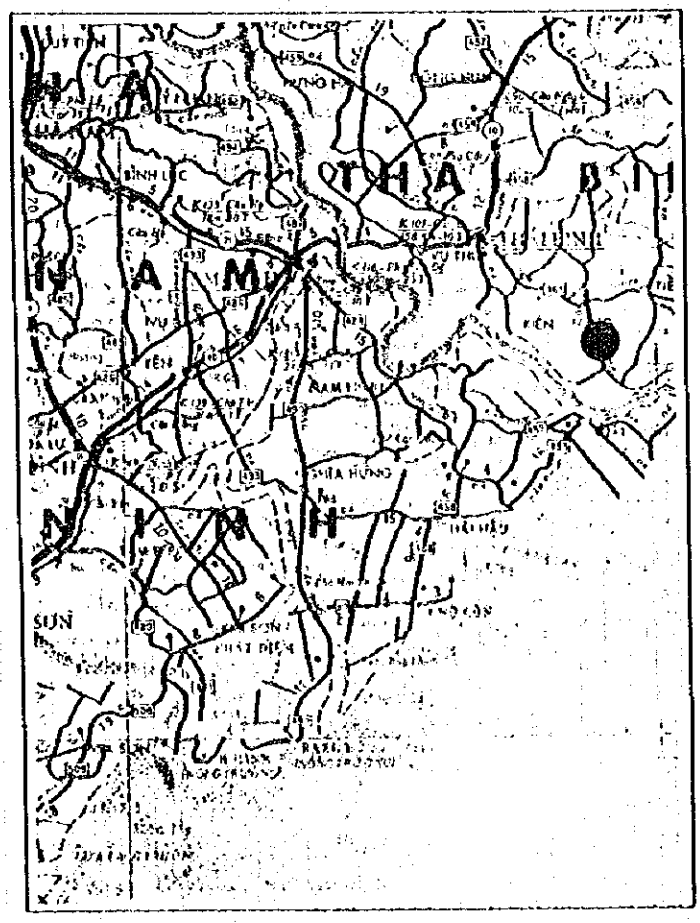
BRIDGE SITE MAP

Present Bridge Condition	Other Information
P: Ninh Binh D: Kim Son C: Van Hai Super Structure : Temporary Bamboo Bridge Sub Structure : Stone Masonry Bridge Length : 27.7 m Width of Bridge : 0.6 m Main Traffic : Pedestrians, Bicycle Access Road : Gravel Road (Good Condition)	• The route is among paddy fields in a deltaic region. • The condition of access road is not good but provides sufficient access to the site. • The road will be improved in 1996. • Bridge length is expected to be 45 m. • Water depth of the canal is around 1.5 m. • Equipment and materials for bridge construction will be transported by boat. • After completion of the bridge, three provinces will be connected along the coast.

NO. 20 DONG QUACH BRIDGE







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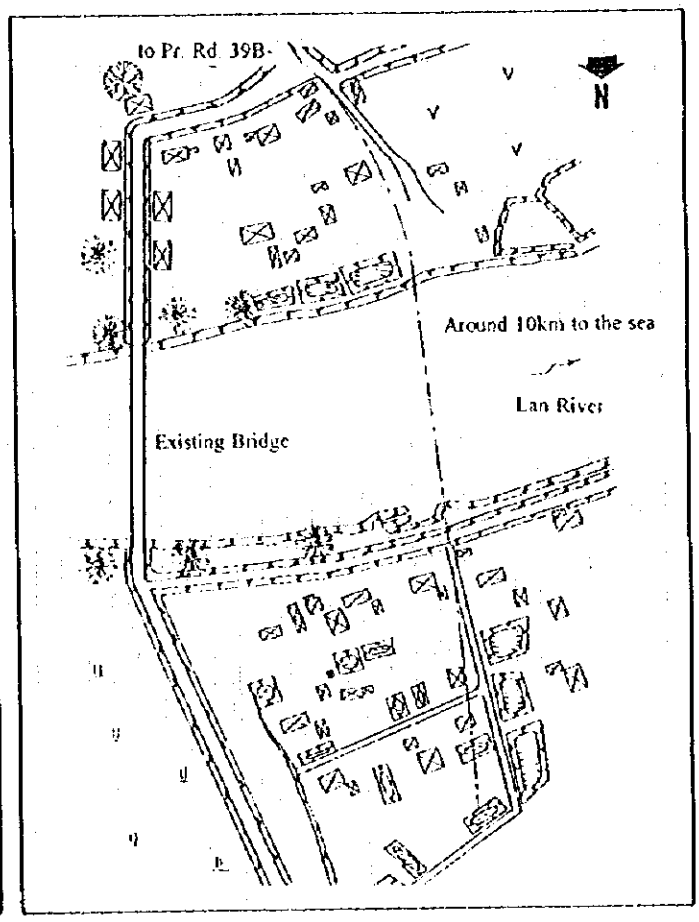
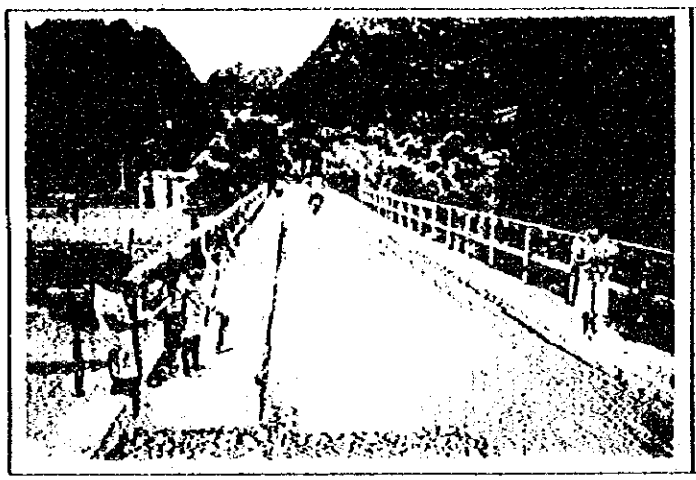
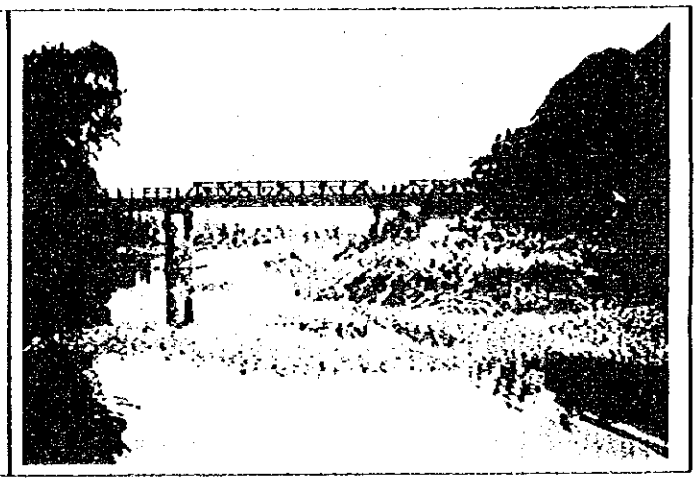


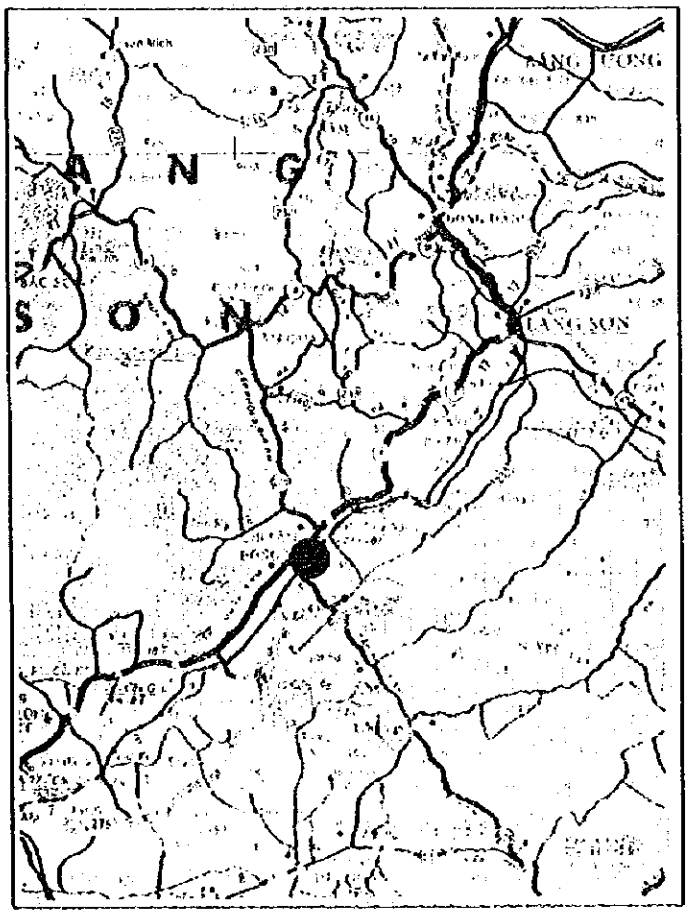
BRIDGE SITE MAP

Present Bridge Condition	Other Information
P: Thai Binh D: Tien Hai C: Nam Ha Super Structure : Concrete Deck, H-Beam Girder Sub Structure : Pilebent Bridge Length : 70.5 m Width of Bridge : 4.1 m Main Traffic : from People to Truck (5 t) Access Road : Gravel Road (Tien Hai Side) Paved Road with Macadam (Opposite Side)	• The surface of access road is in good condition. • Two bridges on access road have the load limit of 5 tons. • Deck slab and girder of the bridge are severely damaged. • The bridge site is accessible by boat (20 ~ 25 ton). • Sub-soil is presumed to be the sediment of the Red River. • Proposed bridge crosses as tch river downstream of existing bridge by 50 m.

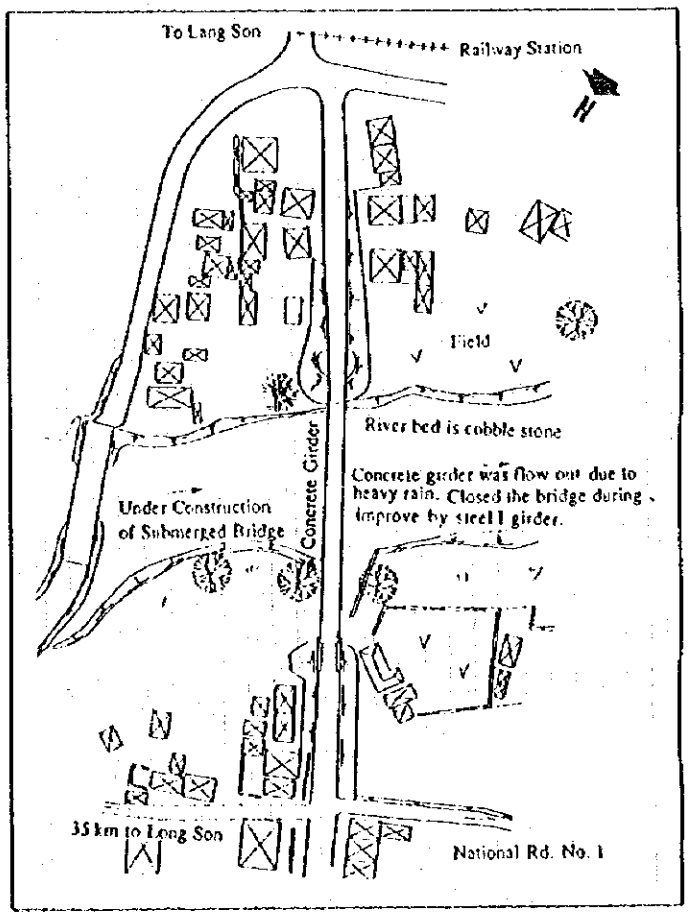
NO. 21 DONG MO BRIDGE







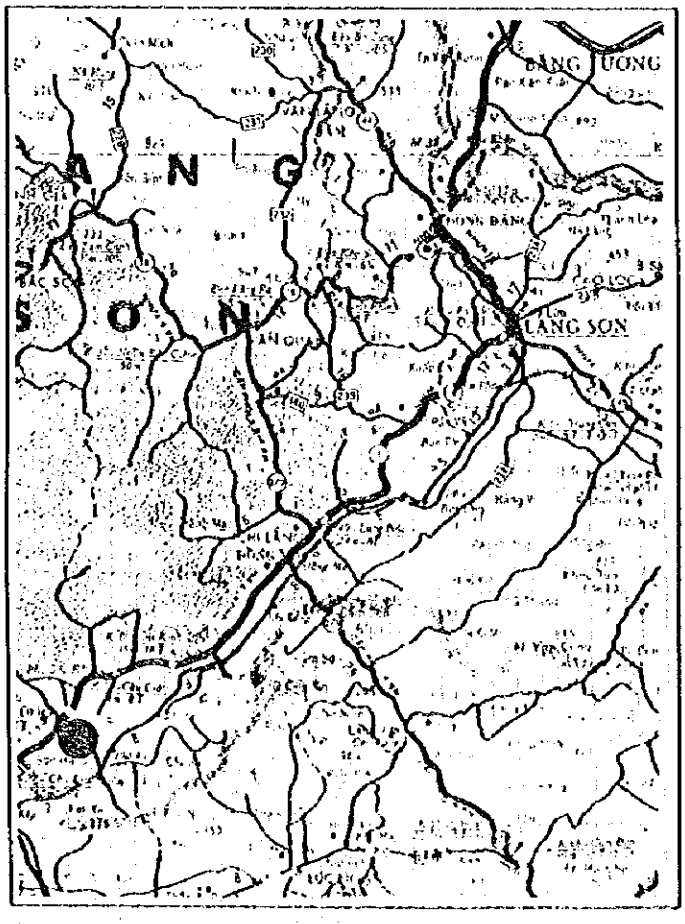
LOCATION MAP



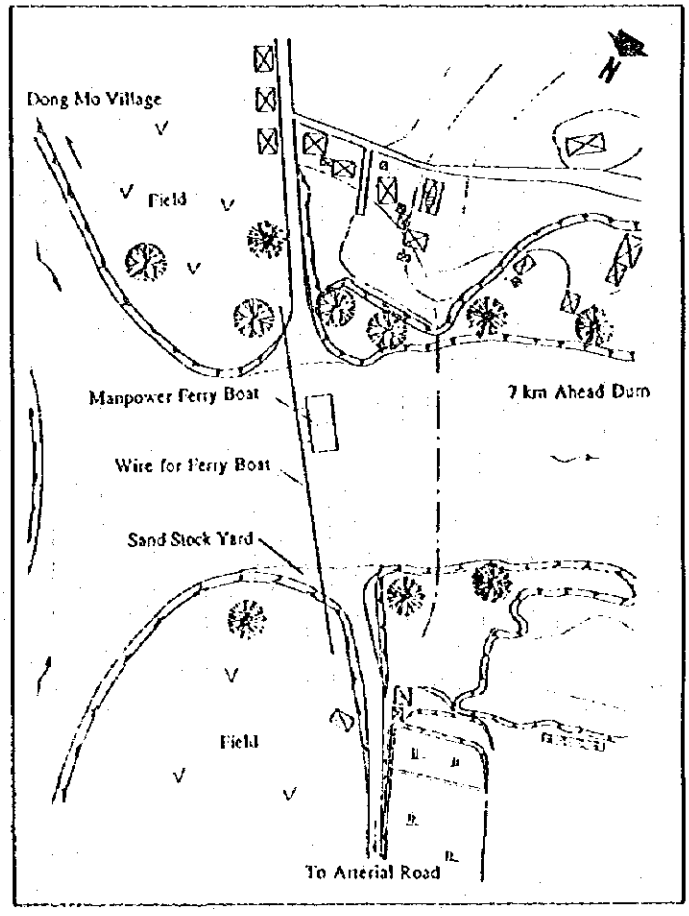
BRIDGE SITE MAP

Present Bridge Condition	Other Information
Lang Son Province Chi Lang District Dong Mo County Super Structure : RC Bridge Sub Structure : Stone Masonry Bridge Length : 64.3 m Width of Bridge : 5.0 m Main Traffic : Car Access Road : Good (Temporary Asphalt Pavement)	• The bridge is located in a town of Dong Mo district on the way to Land Son by National Highway No. 1 • This bridge is made of concrete. However, it is severely damaged due to flooding. • Existing bridge was improved but bridge has been heavily damaged and vehicle traffic is interrupted. • Fields are flooded every year (around 5 m up). • River bed is gravely sand. • Possible difficulty in obtaining temporary yard.

NO. 22 NAO HOA BRIDGE



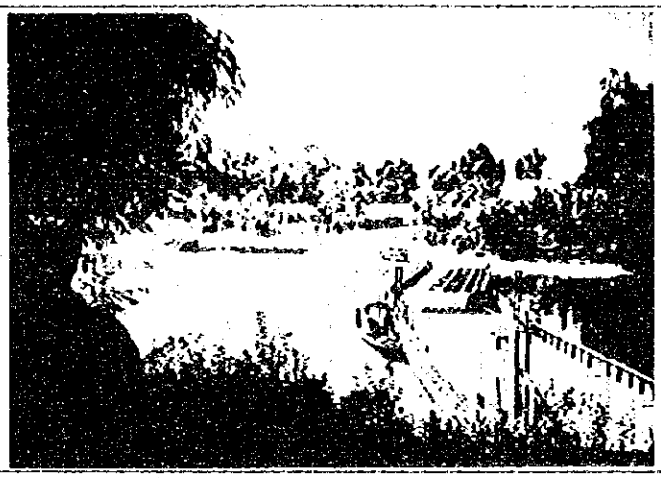
LOCATION MAP

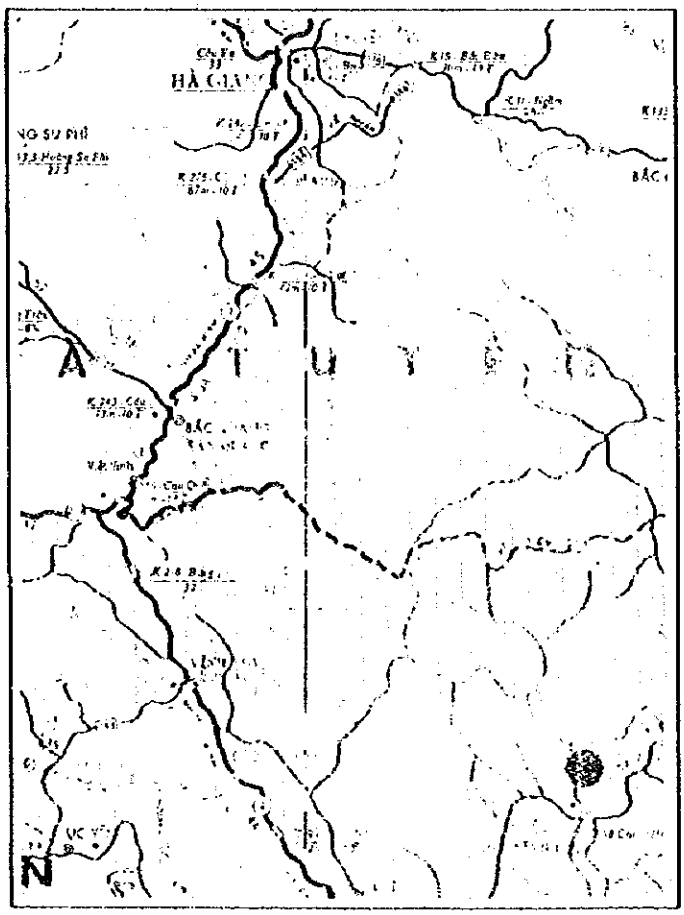


BRIDGE SITE MAP

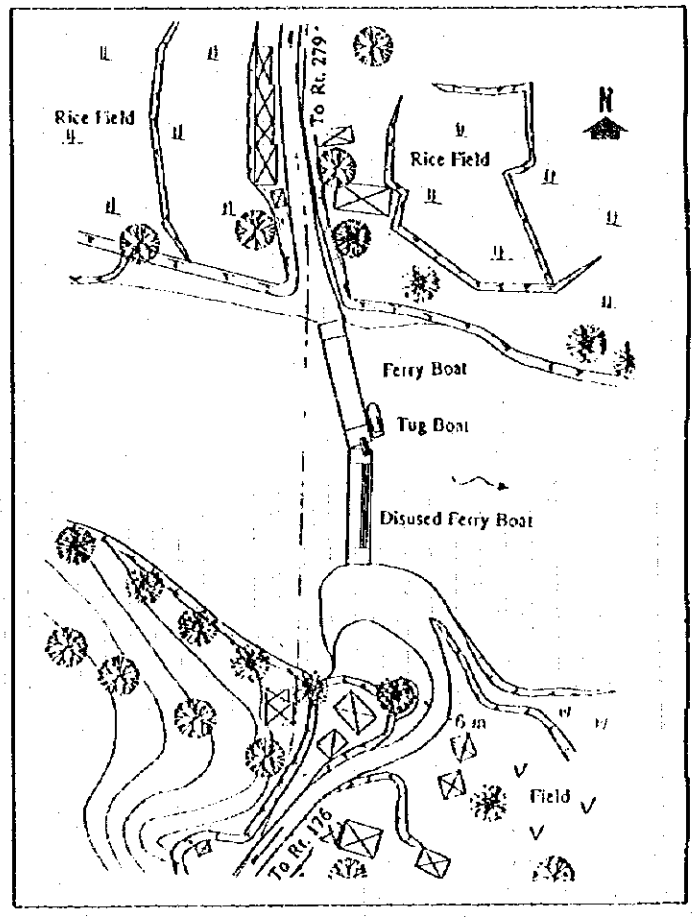
Present Bridge Condition	Other Information
Lang Son Province Chi Lang District Son Ha/Ho Son County Super Structure : Manpowered - Ferry Boat Sub Structure : - Bridge Length : 80.0 m Width of Bridge : - Main Traffic : Pedestrians, Bicycle, Vehicle (Max. 13 ton) Access Road : Good (No Pavement)	• 13 km from National Highway No. 1 to the bridge site. • Access road to the site is in good condition. • Actually no bridge on site, crossers use manpowered ferry boat. • There are sand pits in the river near site. • No problem for temporary yard. New bridge is proposed 50 m downstream from ferry boat landing. • Approach road will be required (around 400 m length).

NO. 23 QUANG BRIDGE





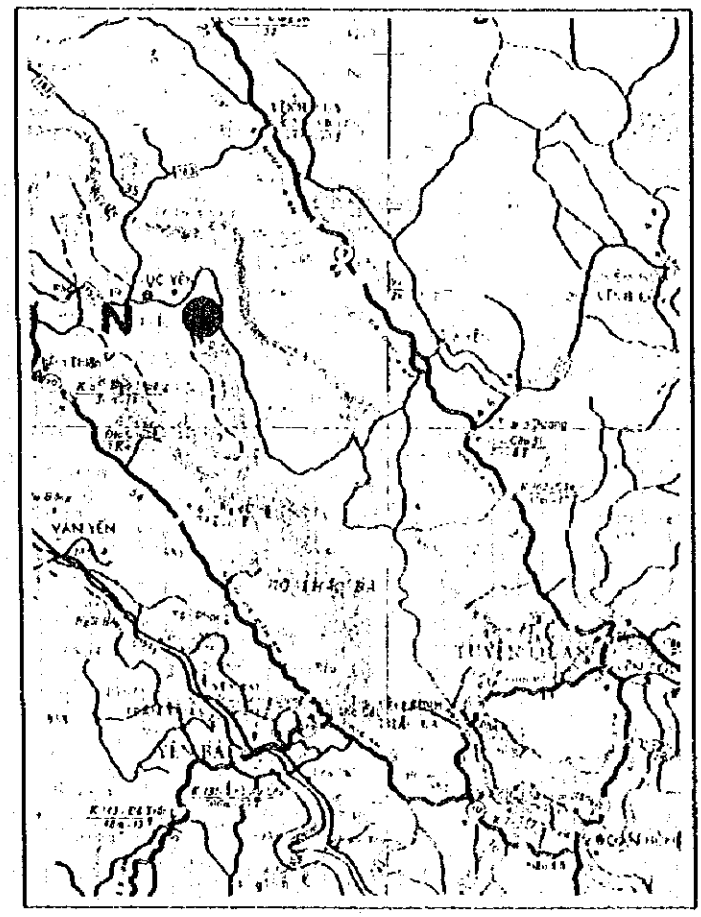
LOCATION MAP



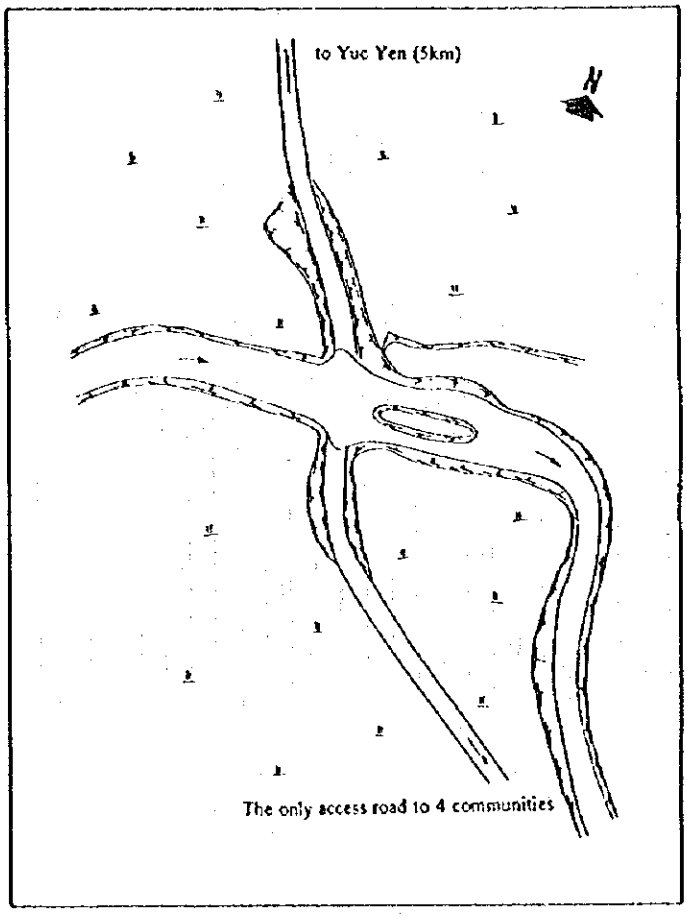
BRIDGE SITE MAP

Present Bridge Condition		Other Information
Tuyen Quang Province Chiem Hoa District Xuan Quang County		• One and a half hours from National Road No. 2 to the site.
Super Structure	: Ferry Boat	• Access road is mountain road in good condition.
Sub Structure	: Flow Out	• This road will be improved by 1997.
Bridge Length	: 60.0 m	• River bed is sand with cobble stone.
Width of Bridge	: -	• There are sand pits in the river.
Main Traffic	: Pedestrians, Bicycle, Motorbike, Light Vehicle	• Proposed bridges site is located 6 km from province capital Chiem Hoa.
Access Road	: Nonnal	• High water level is 3 m up from normal water level during flood season.
		• Vehicles use ferry boat.
		• The nature of the soil is gravel, sand and clay.
		• Terrace is sand and hard clay.

NO. 25 LANH BRIDGE



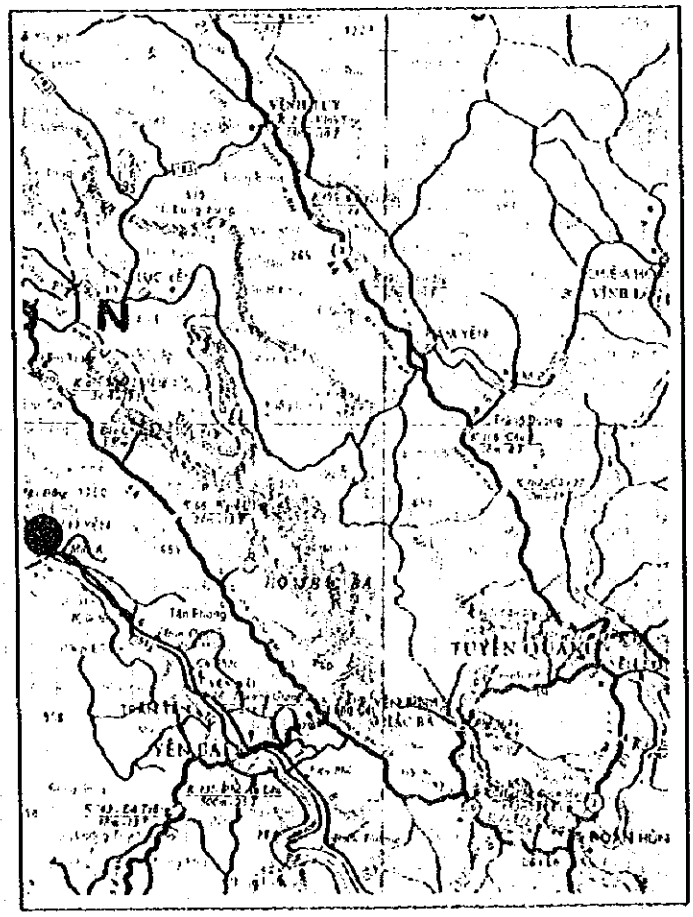
LOCATION MAP



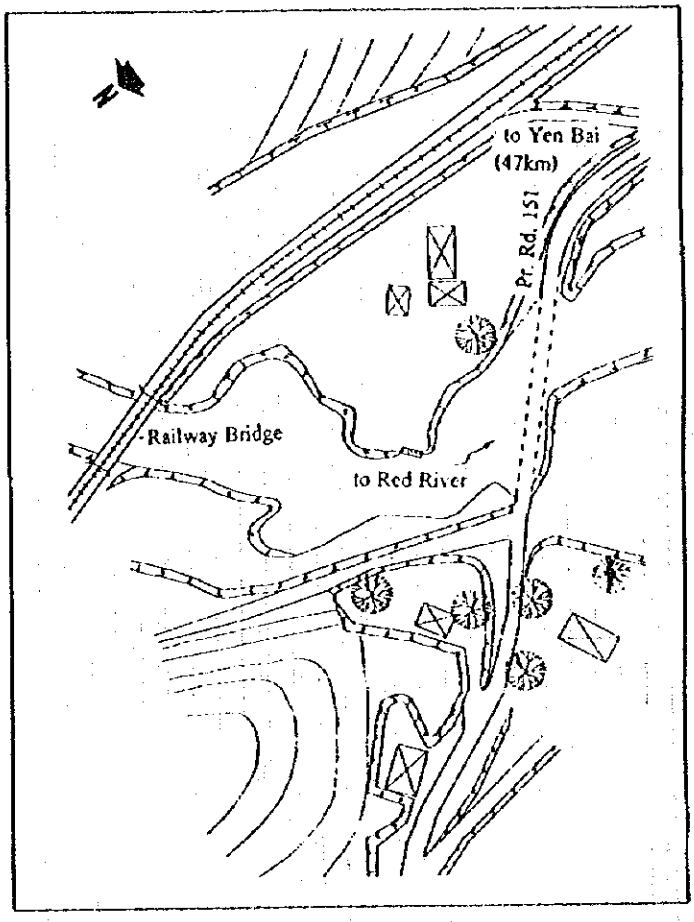
BRIDGE SITE MAP

Present Bridge Condition	Other Information
P: Yen Bai D: Luc Yen C: Lieu De Super Structure : - Sub Structure : - Bridge Length : - Width of Bridge : - Main Traffic : Pedestrians, Bicycle, Motorbike Access Road : Dirt Road	• The distance between Luc Yen and bridge site is 5 km. • Access road to the site is narrow and in bad condition, in particular, after rainfall. • Proposed bridge crosses the river with the length of 15 m. • The site is among the paddy fiels. • Spread foundation is expected to be acceptable. • When river depth is shallow, people cross the river bed.

NO. 26 BAI BRIDGE



LOCATION MAP



BRIDGE SITE MAP

Present Bridge Condition

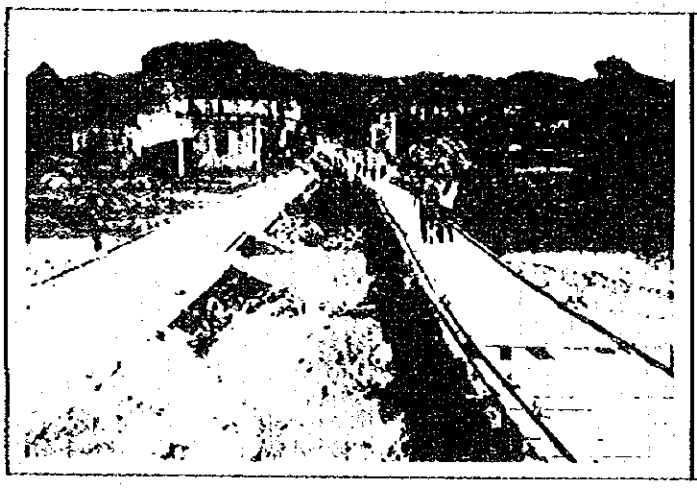
P: Yen Bai D: Van Yen C: Mau Dong

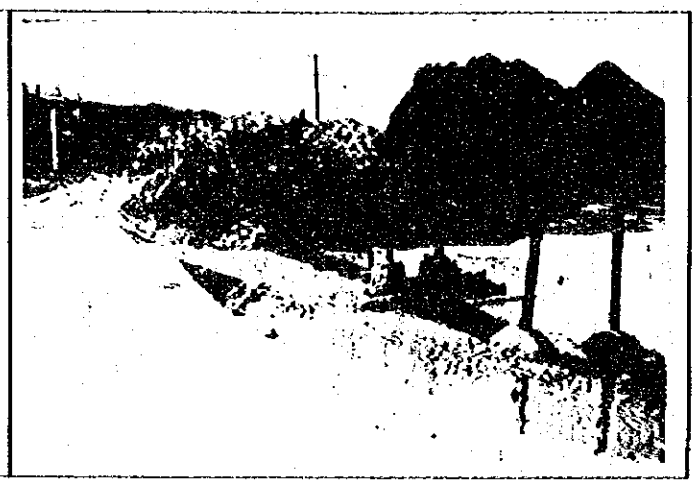
Super Structure	: -
Sub Structure	: -
Bridge Length	: -
Width of Bridge	: -
Main Traffic	: Pedestrians, Bicycle, Motorbike
Access Road	: Dirt Road (W = 3.5 m)

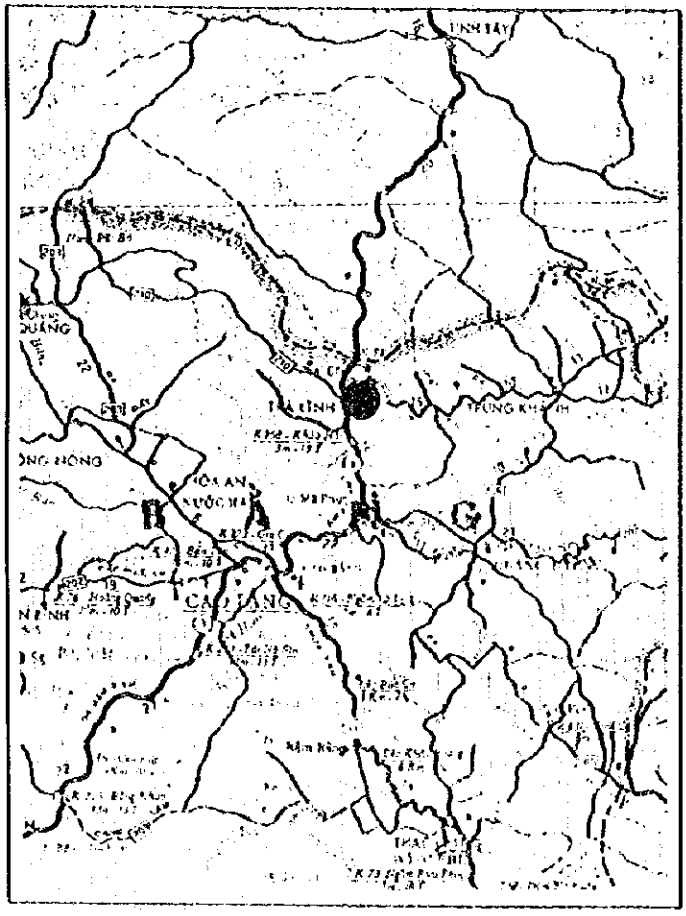
Other Information

- Access road from Yen Bai to the site is narrow and in bad condition, in particular, after rain fall.
- Distance from Yen Bai to the site is 47 km.
- Subsoil is supposedly sand with boulders.
- When the water level is not high, pedestrians and vehicles cross the river on e river bed.
- Flood level rises 3 m from teh present river stage.

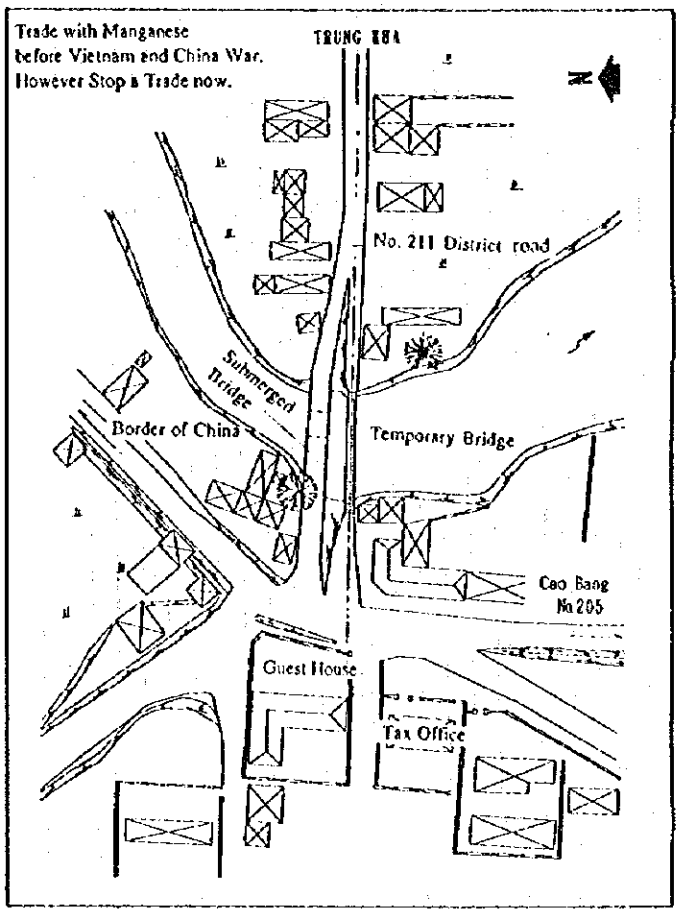
NO. 27 PHO TRA LINH BRIDGE







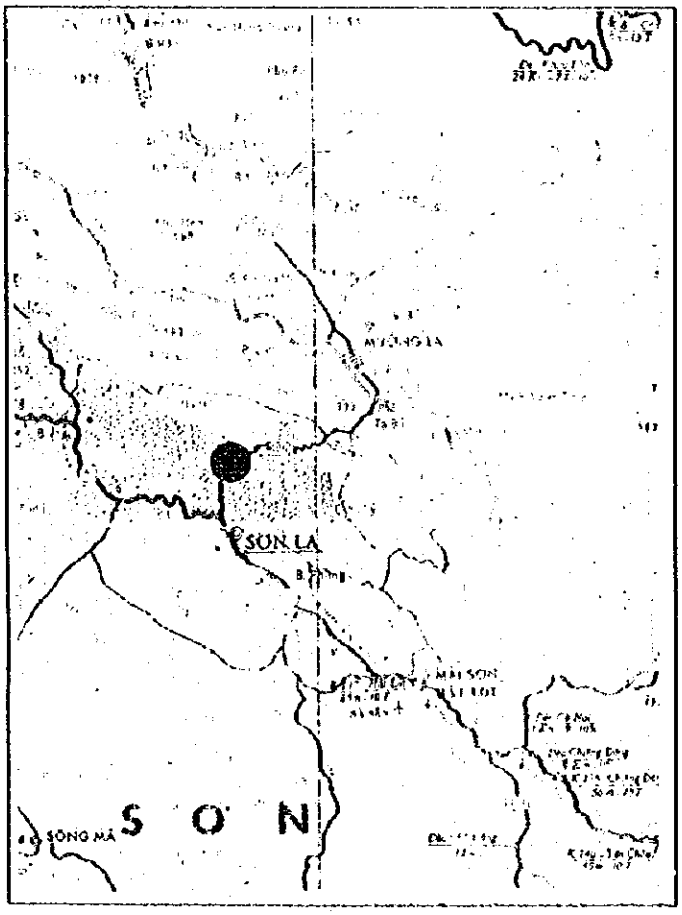
LOCATION MAP



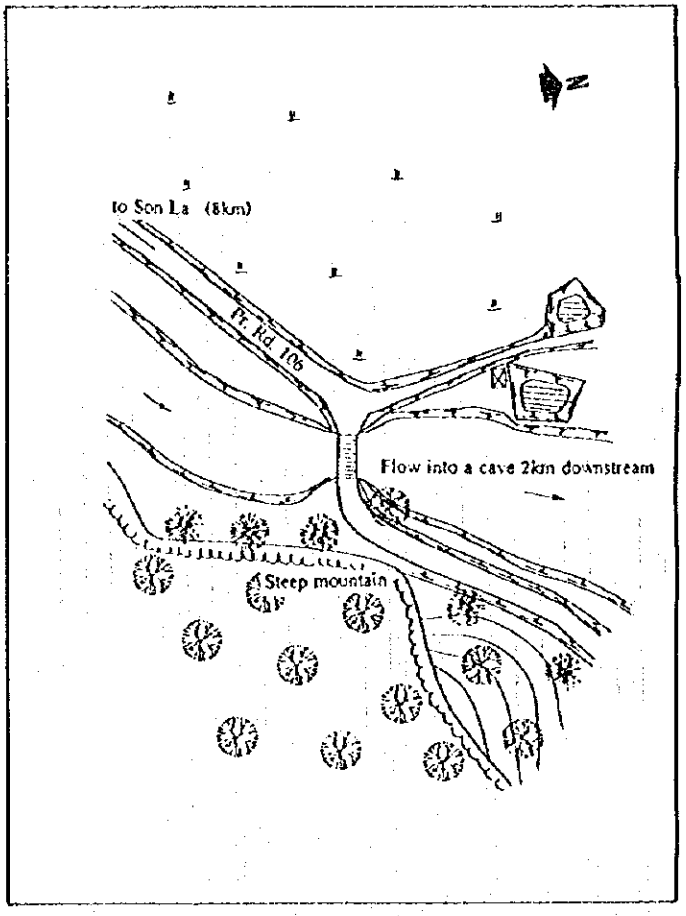
BRIDGE SITE MAP

Present Bridge Condition	Other Information
Cao Bang Province, Tra Linh District, Hung Quoc Village Super Structure : Wooden Bridge and Submerged Bridge Sub Structure : Stone Masonry Bridge Length : 29.7 m Width of Bridge : 1.5 m Main Traffic : Pedestrians, Bicycle, Motorbike Access Road : Gravel Road	• From Cao Bang city to the site in Tra Linh it takes about one hour and a half by car. • Site is located in the town. • Border of China is located about 3 km from the town. • Vehicles can submerged bridge except during flood season. • Pedestrians and motor-cycle cross use temporary bridge in all seasons. • Old bridge was destroyed in 1979 during the war. • Lowest temperature is around 4 °C during winter season.

NO. 29 BAN AI BRIDGE



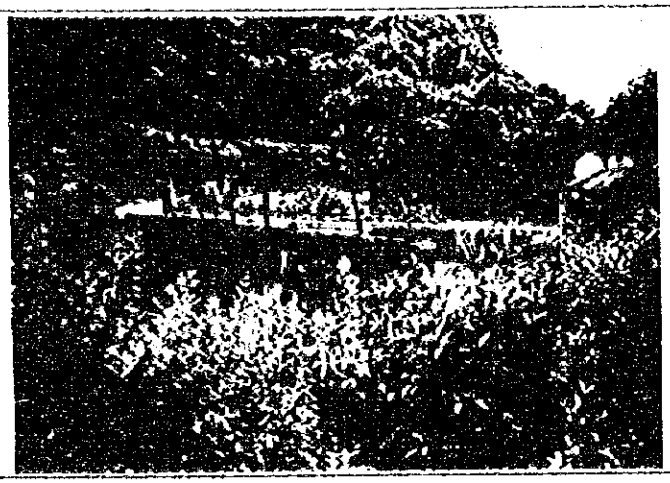
LOCATION MAP

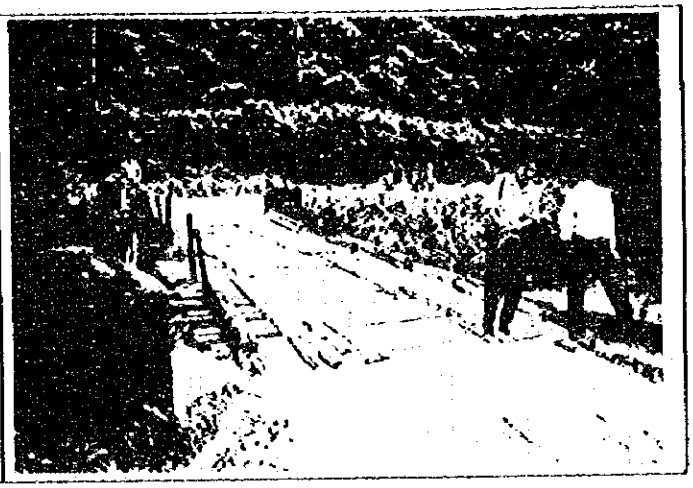


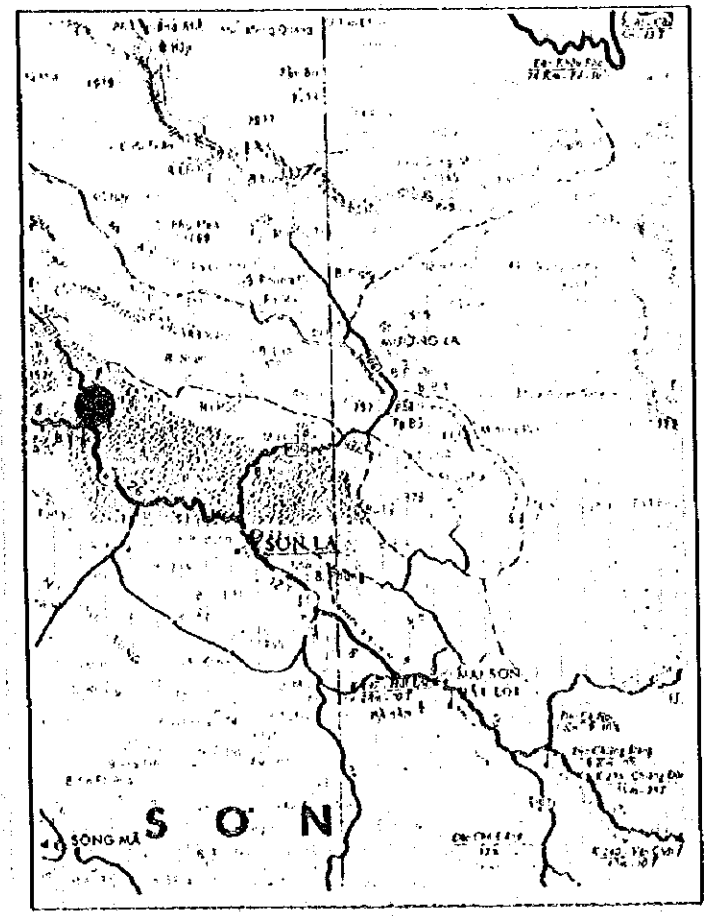
BRIDGE SITE MAP

Present Bridge Condition	Other Information
P: Son La D: Son La C: Chieng Xom Super Structure : H-Beam, Wooden Deck Sub Structure : Stone Masonry Bridge Length : 10.5 m Width of Bridge : 4.0 m Main Traffic : form Pedestrians to Heavy Vehicle Access Road : Gravel Road (W = 5 m)	• Bridge site is 8 km distant from Son La through Rt. 106. • Flood level rises up to the surface of bridge. • Load limit for Rt. 106 is 8 tons. • Existing abutment is in good condition and can support new giders.

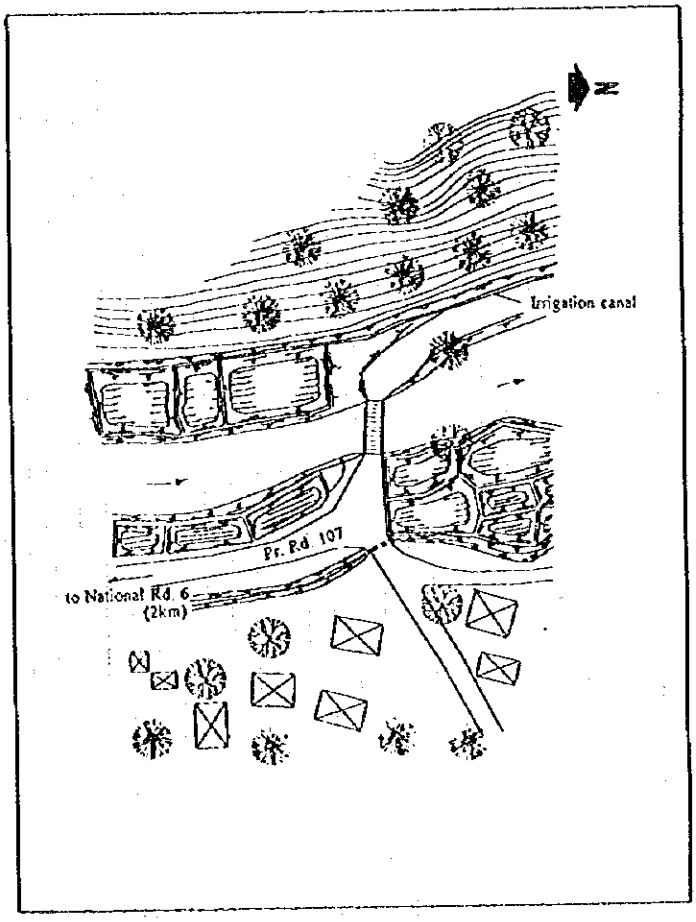
NO. 30 BAN HINH BRIDGE







LOCATION MAP



BRIDGE SITE MAP

Present Bridge Condition

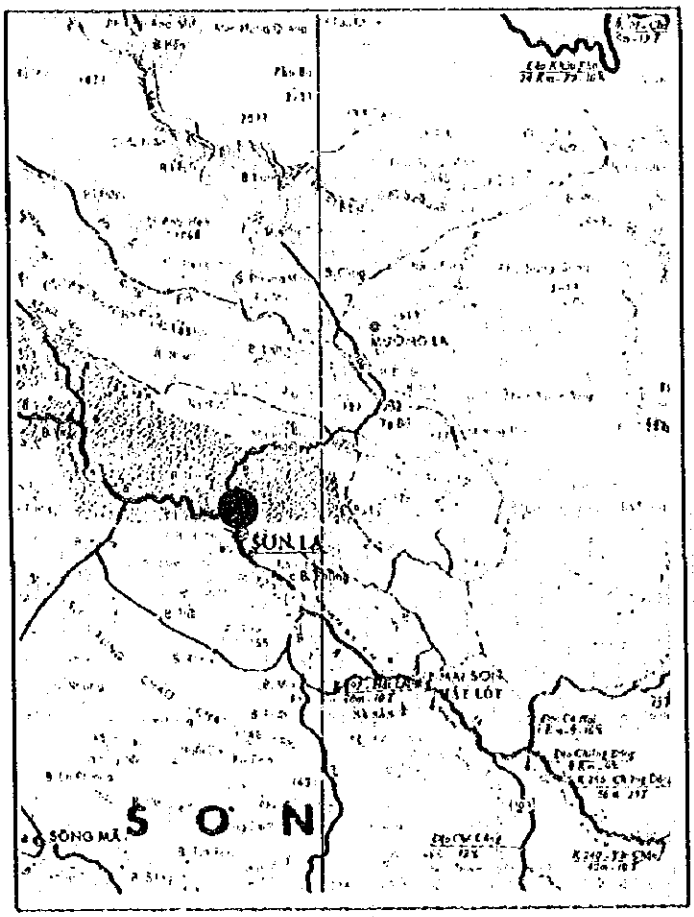
P: Son La D: Thuang Chau C:

Super Structure	:	H-Beam, Wooden Deck
Sub Structure	:	Stone Masonry
Bridge Length	:	13.2 m
Width of Bridge	:	2.9 m
Main Traffic	:	form Pedestrians to Heavy Vehicle
Access Road	:	Gravel Road (W = 5 m)

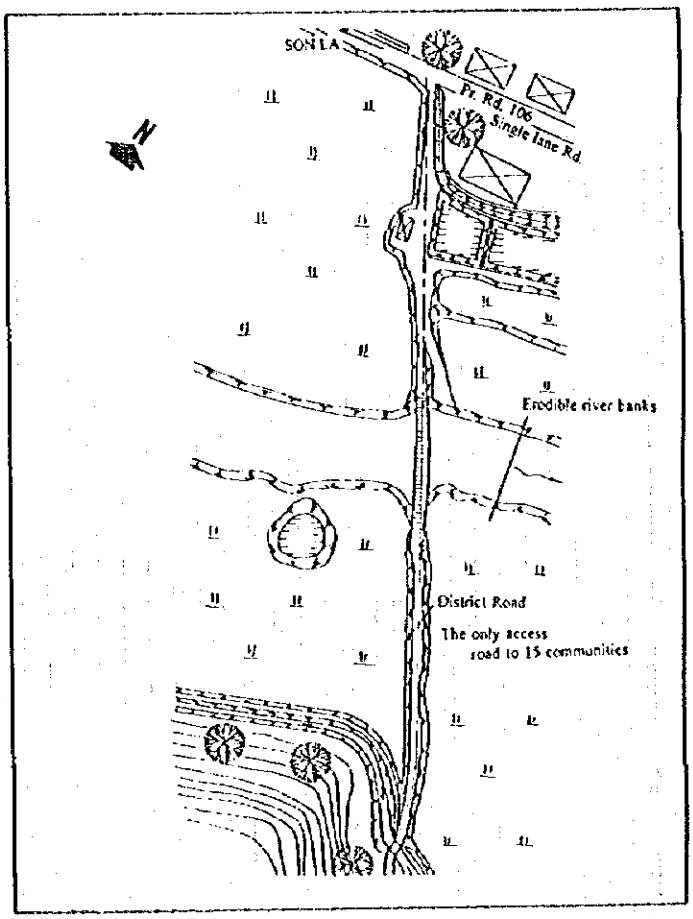
Other Information

- Bridge site is 2 km distant from the junction with Ntional Rd. 6.
- Site is located among mountains.
- Rocks are exposed on the river bed and spread foundation is likely to be applicable.
- Existing abutments can be reused after renovation.
- Surface condition of access road is fair.

NO. 31 TONG PANH BRIDGE



LOCATION MAP



BRIDGE SITE MAP

Present Bridge Condition

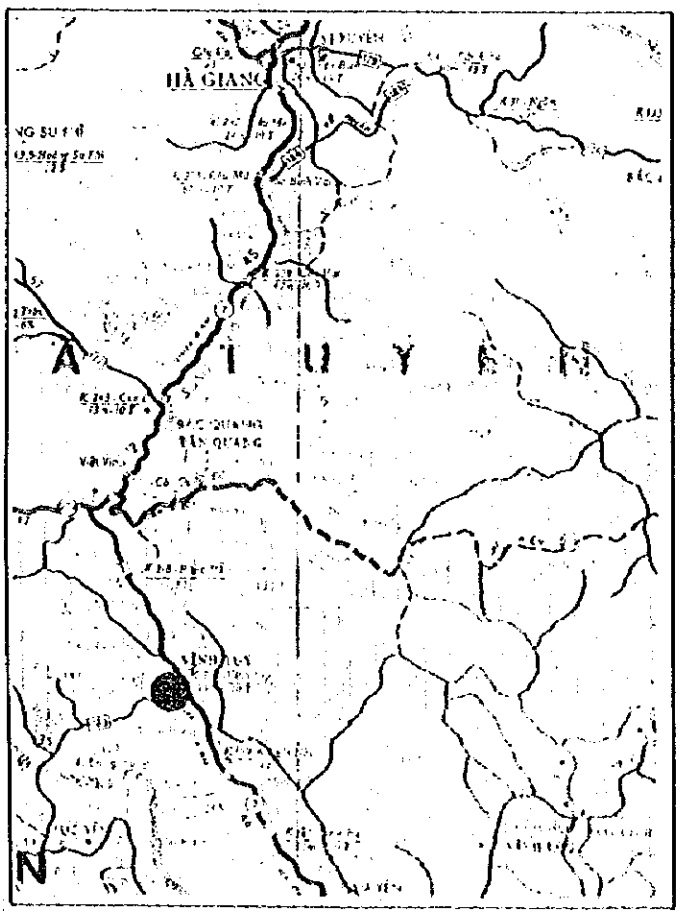
P: Son La D: Son La C: Chieng An

Super Structure	: H-Beam
Sub Structure	: Concrete
Bridge Length	: 23.8 m
Width of Bridge	: 3.7 m
Main Traffic	: Pedestrians, Bicycle
Access Road	: Soil Road (W = 5 m)

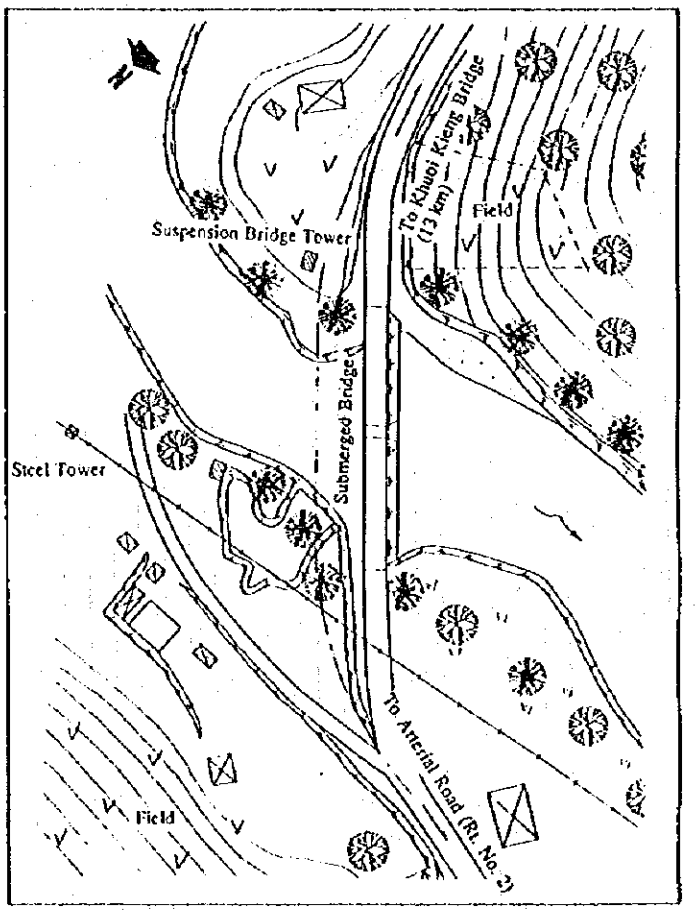
Other Information

- The bridge collapsed due to a flood in 1991 which scoured abutment backfill.
- This route is the only access road to 6 communities.
- In new bridge construction, abutment and pier need to be carefully protected from flood flow.

NO. 33 KHUOI NIENG BRIDGE



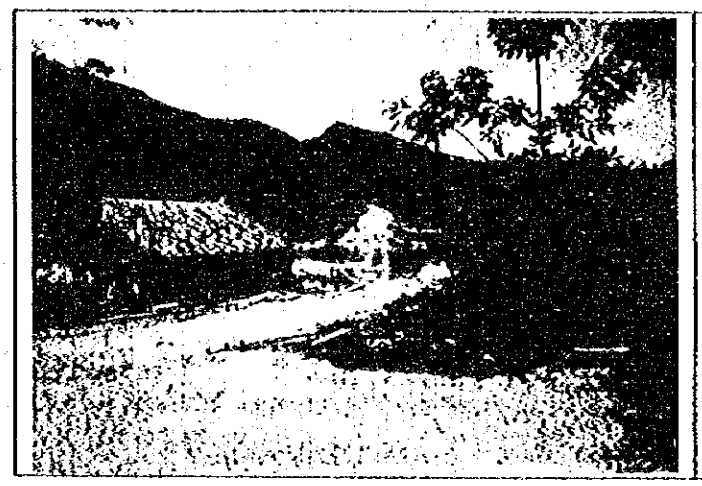
LOCATION MAP

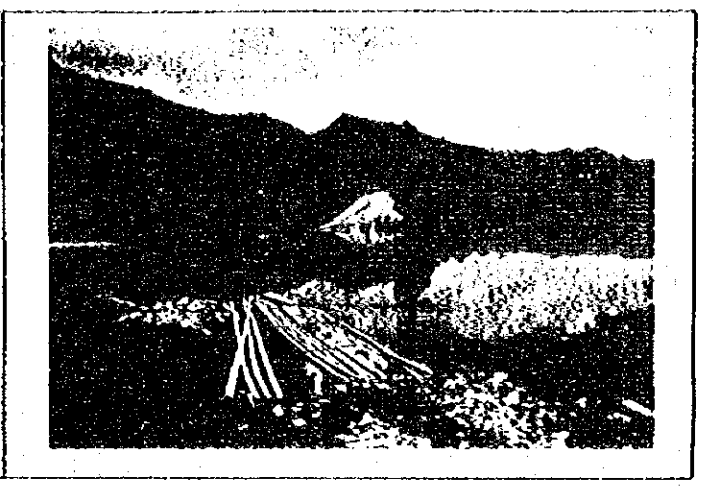


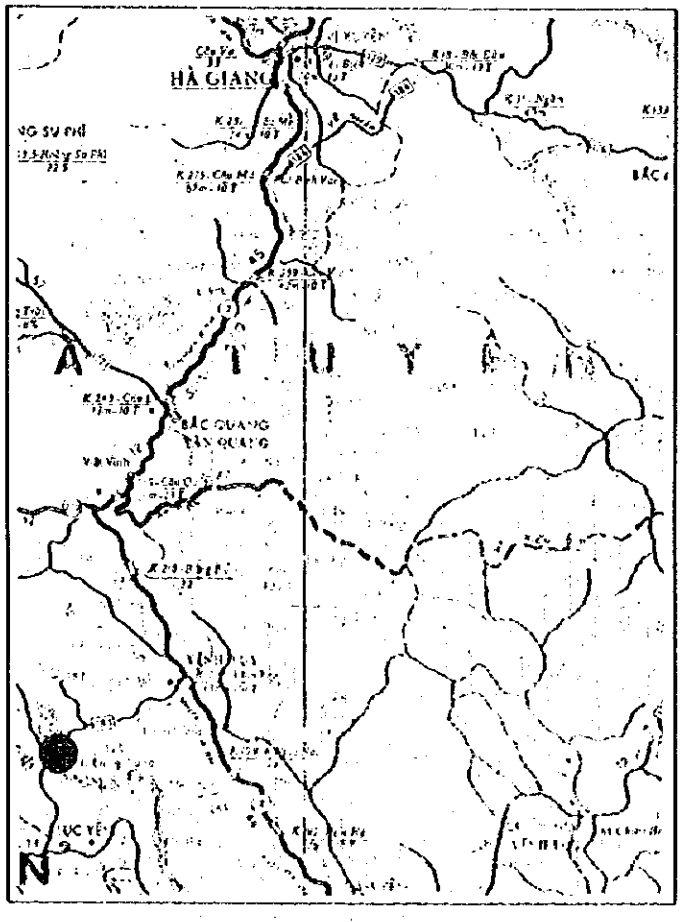
BRIDGE SITE MAP

Present Bridge Condition	Other Information
Ha Giang Province Bac Quang District Vinh Bao County Super Structure : Submerged Bridge Sub Structure : - Bridge Length : 43.0 m Width of Bridge : 4.5 m Main Traffic : Pedestrians, Bicycle, Motorbike, Light Vehicle Access Road : Good (No Pavement)	• 13 km from Khuoi Kieng via National Road No. 2 to the site. 10 minutes by car. • Access road is in good condition. • Presently a submerged bridge but up until 5 years ago a suspension bridge was used. • Rocks are exposed in surrounding area. • Rocks are not exposed in river bed. However, spread foundation is likely to be applicable because deposit soil is thin. • No problem for temporary yard.

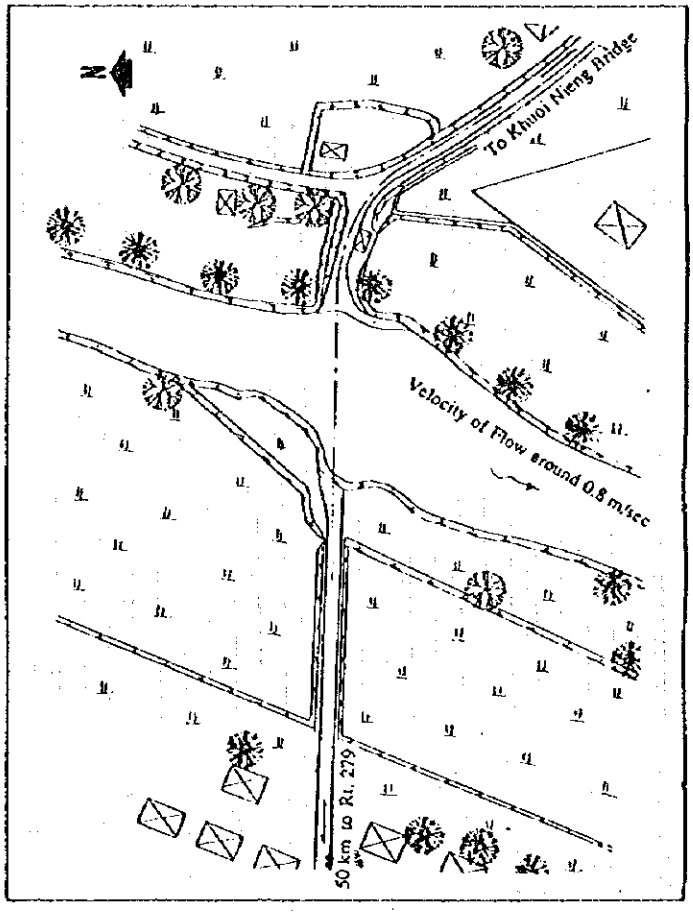
NO. 34 KHUOI KIENG BRIDGE







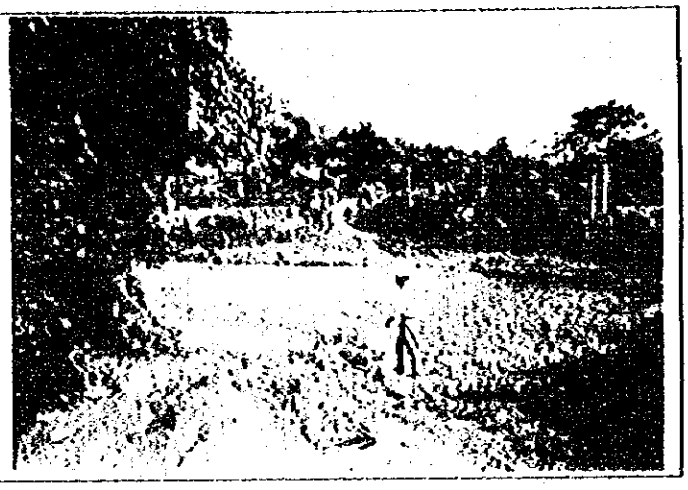
LOCATION MAP

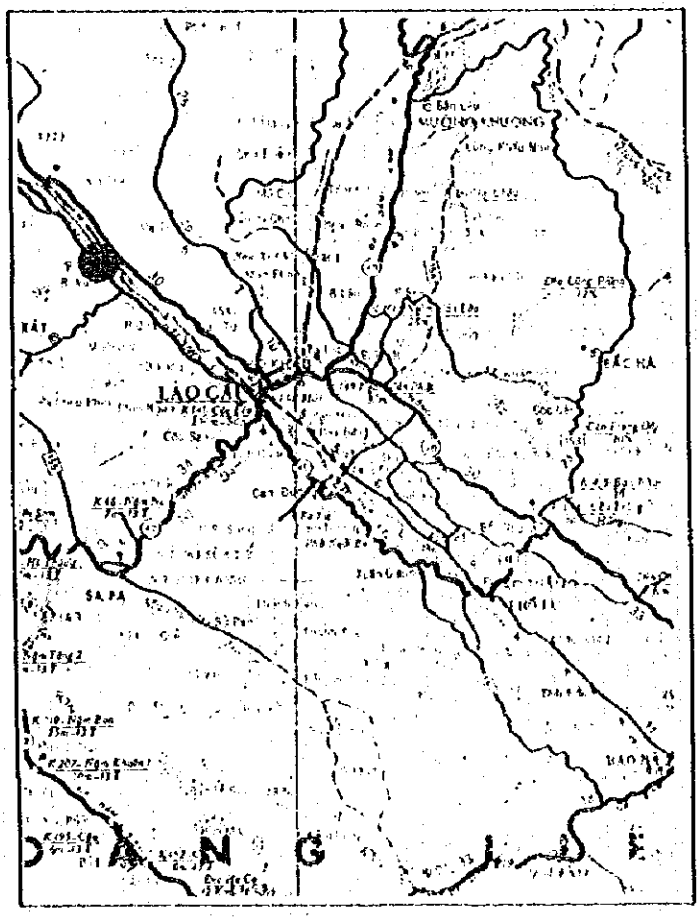


BRIDGE SITE MAP

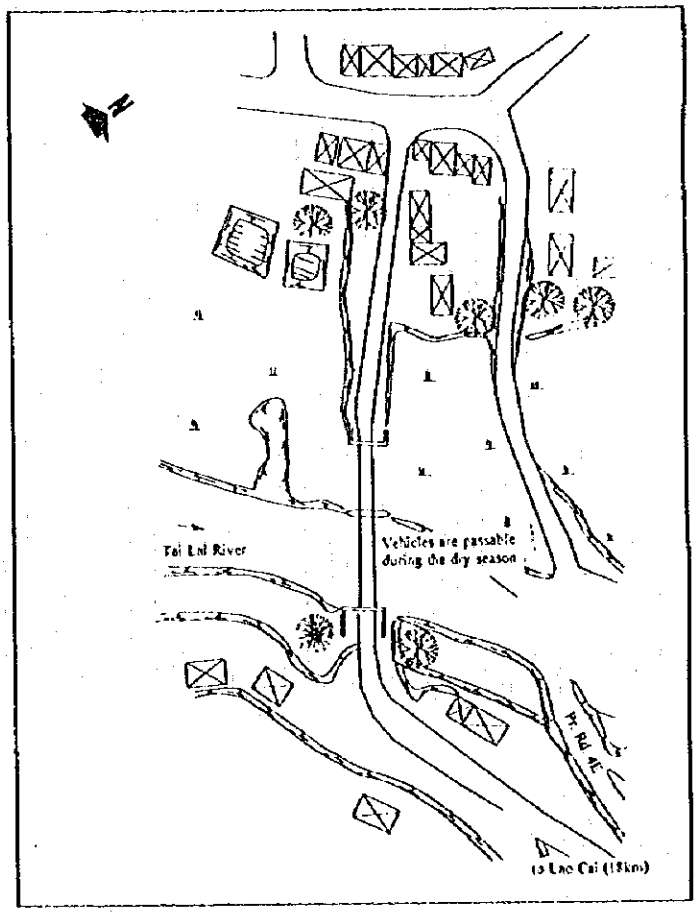
Present Bridge Condition		Other Information
Ha Giang Province Bac Quang District Dong Yen County		• One hour by car from Khuoi Nieng bridge to the bridge site.
Super Structure	: Bamboo Raft	• On the way five mountain streams are crossed.
Sub Structure	: -	• Trucks cannot pass the access road.
Bridge Length	: 36.0 m	• Vehicles can cross the river only during dry season.
Width of Bridge	: -	• Pedestrians, bicycle and motorbike use bamboo raft during rainy season.
Main Traffic	: Pedestrians, Bicycle, Motorbike, Light Vehicle	• Water level is 2.5 m up during flood season and reaches road level of left river bank.
Access Road	: Bad (No Pavement)	• The nature of the soil is terrace deposit and hard layer is presumed in shallow layer.

NO. 35 BAN VUOC BRIDGE





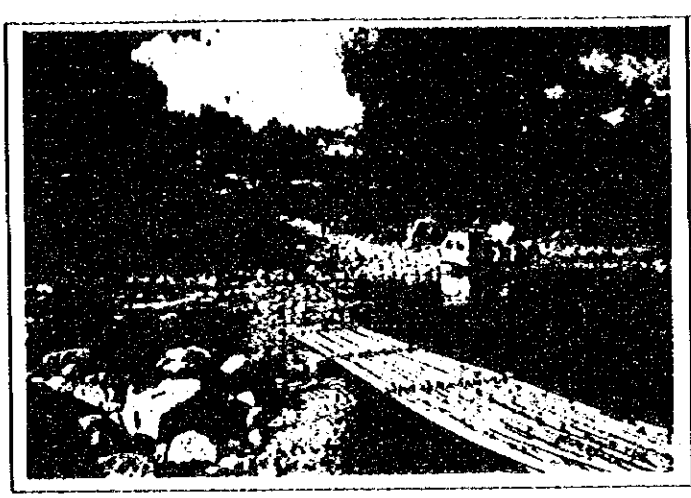
LOCATION MAP

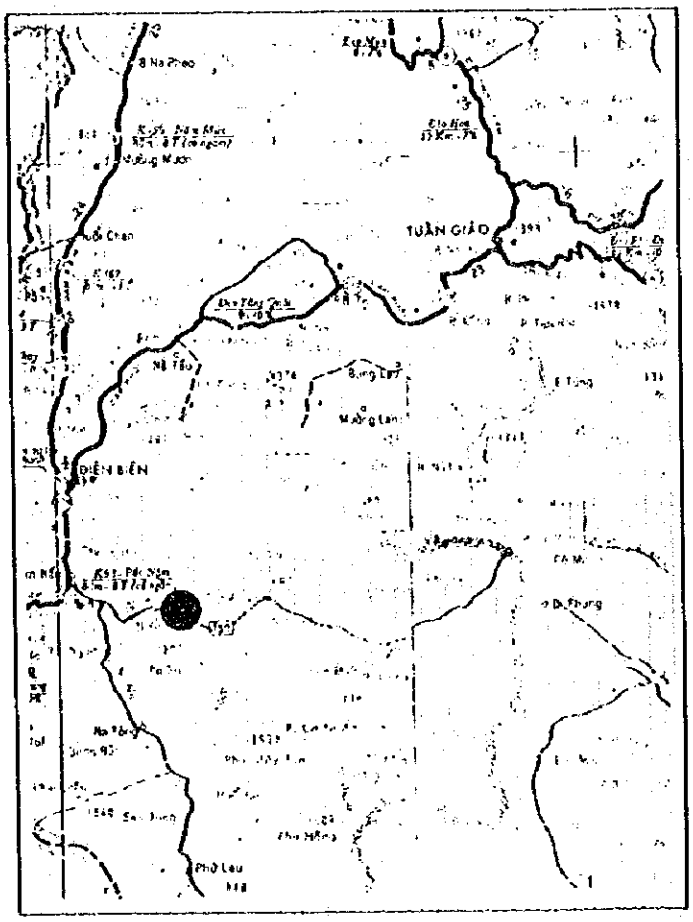


BRIDGE SITE MAP

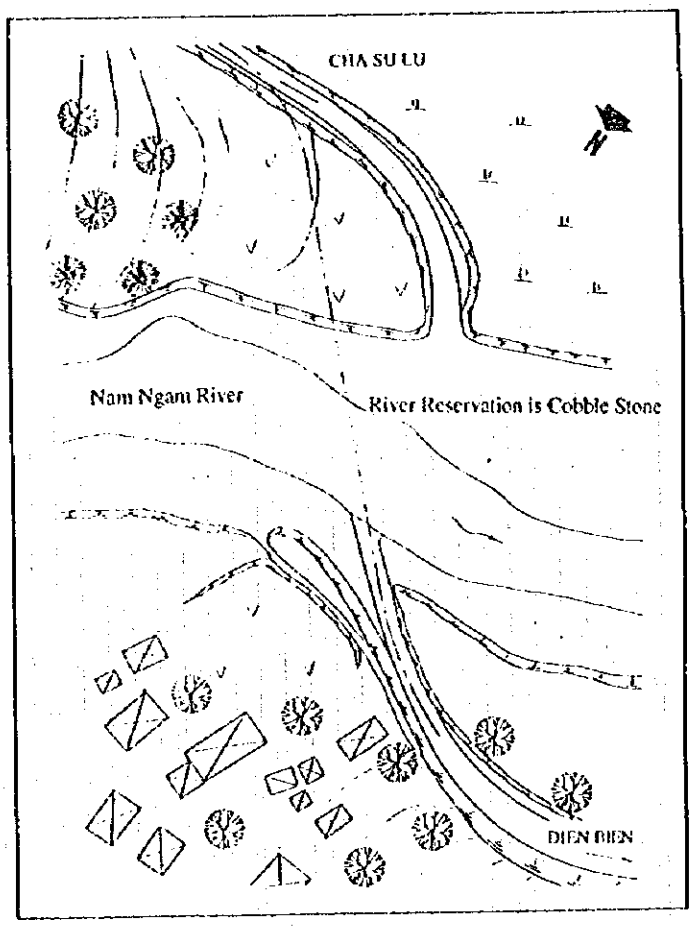
Present Bridge Condition	Other Information
P: Lao Cai D: Bat Xat, C: Coc My Super Structure : Suspension Bridge Sub Structure : Stone Masonry Bridge Length : 42 m Width of Bridge : 2.2 m Main Traffic : Pedestrians, Bicycle, Motorbike Access Road : Paved with Macadam (W = 6 m)	• The distance from Lao Cai to bridge site is around 18 km. • No problem in transportation of equipment and materials. • Former bridge was damaged during the war between Vietnam and China. • Existing abutments and pier are likely to be reusable after some repair work. • Aggregate and sand for concrete can be procured in the vicinity.

No. 37' NA SANG-2 BRIDGE





LOCATION MAP



BRIDGE SITE MAP

Present Bridge Condition	Other Information
Lai Chau Province, Dien Bien District, Nua Ngan Village Super Structure : No Bridge Sub Structure : Bridge Length : Width of Bridge : River Width is about 60 m Main Traffic : Pedestrians, Bicycle, Truck Access Road : Earth Road	• From Dien Bien City to the site it takes one hour by jeep. • Old bridge was washed away in 1993. • Condition of access road is very poor, especially in rainy season. • Improvement of the road will be completed by 1998. • Vehicles can pass the river in dry season only. • Alignment of new bridge crossing is limited by the topographic conditions.

8. Basic Design Criteria

Basic Design Study
On
The Project for Reconstruction of Bridges in the Northern District
In
The Socialist Republic of Viet Nam

DESIGN CRITERIA
(DRAFT)

AUGUST 1995

13-9-1995.

Based on Design Criteria of Highway TCVN 4054-85
Vietnamese Bridge Design Code 22 TCN 018-79
Ministry of Transport and Communication No2057QD/KT4 1979

1. Typical Cross Section

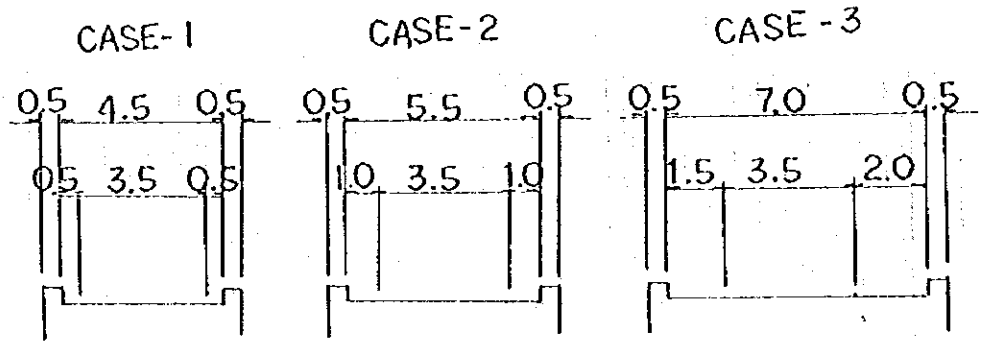
1-1. Bridge

a. Classification of the Road

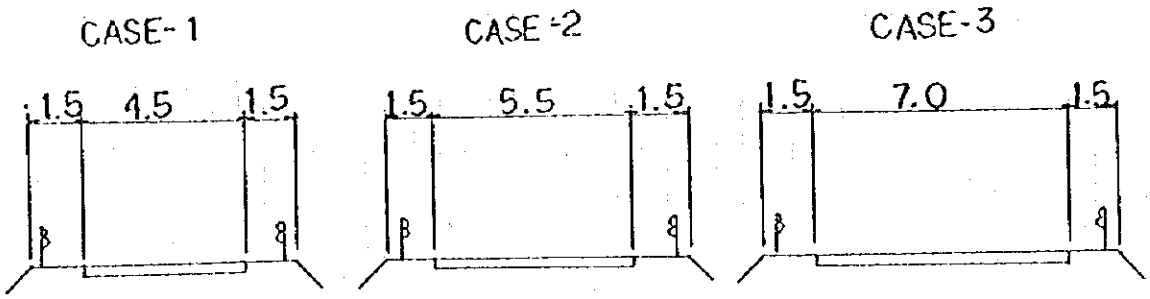
Class	Design Traffic Volume(Veh./day)
IV	300 ~ 1000
V	50 ~ 300
VI	Less than 50

b. Recommended Width for Each Bridge

Case	Clear Width	Bri. Construction	Girder Supply	Total
1	4.5m	No. 9 11 13 15 17 18 24 31 33 34	No. 10 25	12
2	5.5m	No. 3 5 6 8 16 23	No. 4 7 21 26 28 29 30 35 36	15
3	7.0m	No. 1 12 20 22 27	No. 19	6
	Total	21 Bri.	12 Bri.	33 Bri.



1-2. Approach Road



2. Live Load

Vietnamese standard H 13 -X60

3. Coefficient of Earthquake

Kh(Horizontal Acceleration Ratio)= 0.05

(by Seismic Intensity Scale 1992)

4. Clearance

-Road Clearance for the Bridge H= 4.50m

-Flood Clearance for the Bridge H= 0.50m

-Navigation Clearance for the Bridge

Ship	Horizontal		Vertical
	River	Channel	
300tons	40m	25m	6m
100tons	25m	20m	3.5m
40tons	15m	10m	2.5m

5. Standard Span Length (3.0m Interval)

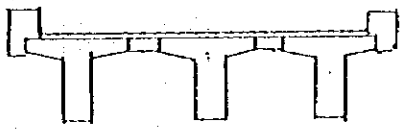
-1. 15m
-2. 21m
-3. 24m
-4. 30m
-5. Specified length

6. Structural Type of Bridge

6-1. Super Structure

-1. Bridge Construction

Post Tentioned・Prestressed Concrete T Beam (Case-1)

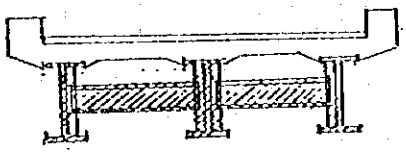


CASE-1

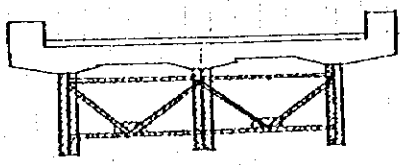
-2. Girder Supply

Composite H-beam Girder (Case-2)

Composite Built-up Steel Girder (Case-3)



CASE-2



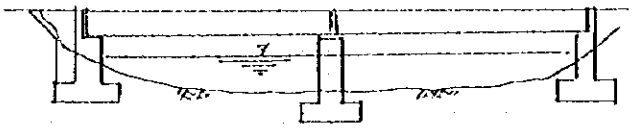
CASE-3

6-2. Sub Structure

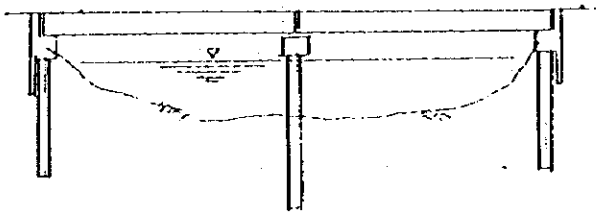
-1. Spread Foundation Type (Case-1)

-2. Pile Foundation Type (Case-2)

CASE - 1



CASE - 2



7. Geometrical Design Standard

Item	Unit	Design Standard		
Design Speed	km/h	60	40	25
HORIZONTAL ALIGNMENT				
Min. radius	m	130	60	25
Min. curve length	m	100*	70*	45*
Min. transition curve length	m	50*	35*	25*
Superelevation runoff		1/125*	1/100*	1/65*
Min. stopping sight distance	m	150	80	40
VERTICAL ALIGNMENT				
Max. gradient	%	7	8	9
Min. vertical curve length				
Crest	m	2500(1400*)	1000(450*)	600(175*)
Sag	m	1500(1000*)	1000(450*)	250(175*)
Min. vertical curve length	m	50*	30*	25*
CROSS SECTION				
Cross fall	%	3	3	3
Max superelevation	%	10*	10*	10*

Notes: * Based on Japanese Code
Applied 40, 25km/h Design Speed