

FIG. A.4.3.4 FLOOD WATER LEVEL OF DHOBI KHOLA

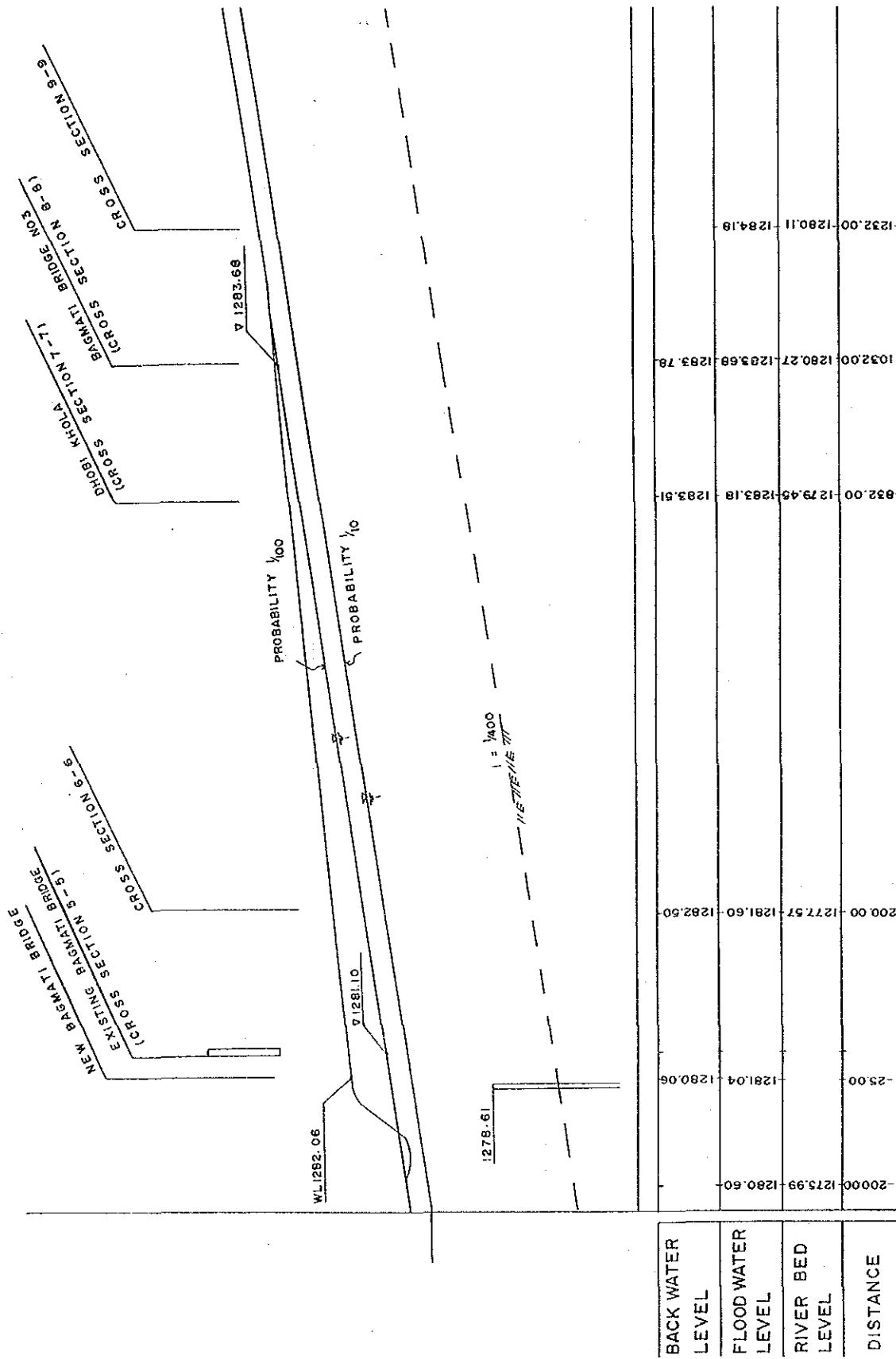


FIG. A.4.3.5 (1/2) BACK WATER BY GROUND SILL AT DOWNSTREAM OF BAGMATI BRIDGE NO. 2

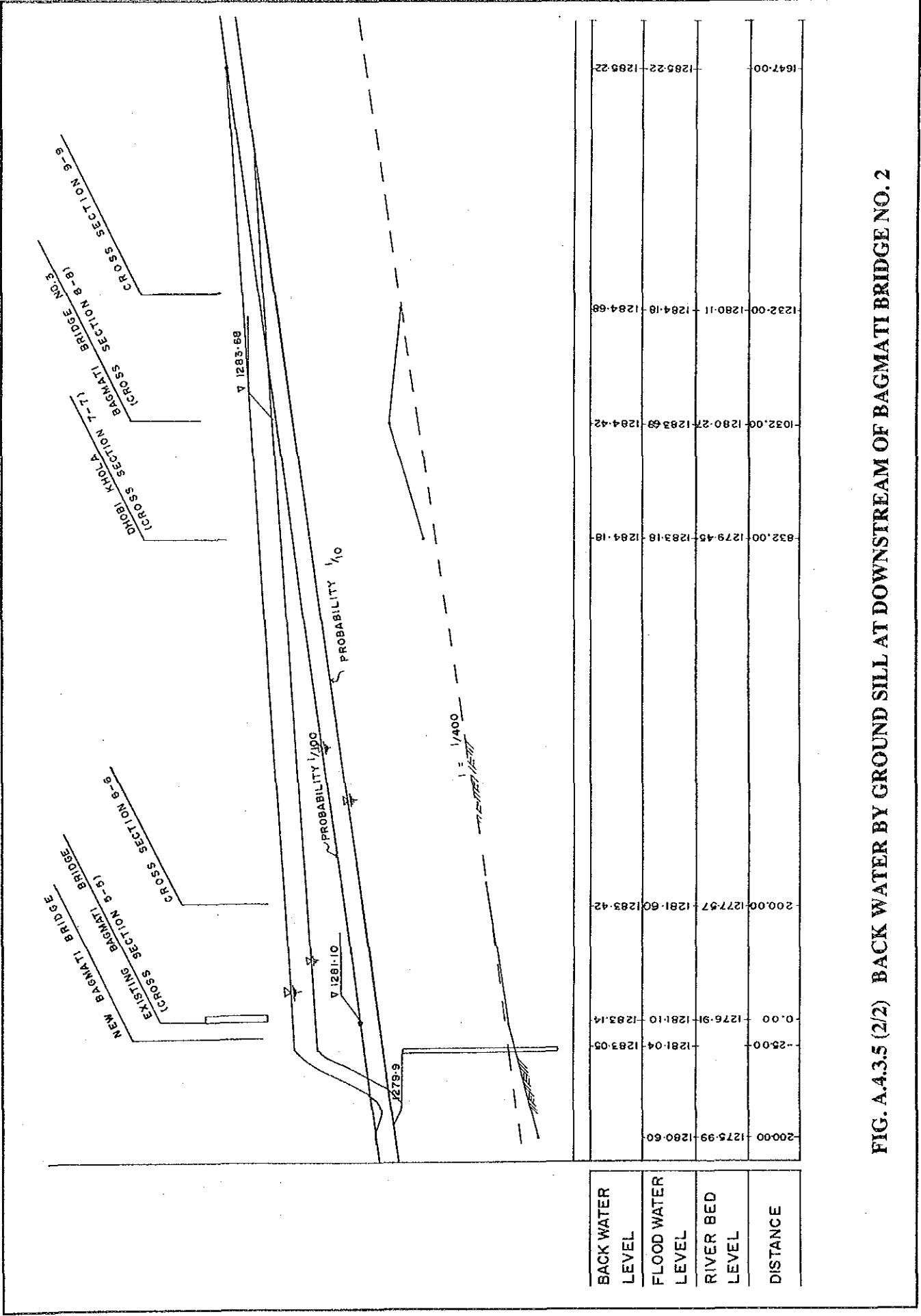


FIG. A.4.3.5 (2/2) BACK WATER BY GROUND SILL AT DOWNSTREAM OF BAGMATI BRIDGE NO. 2

Proposed Ground Sill for New Bagmati Bridge

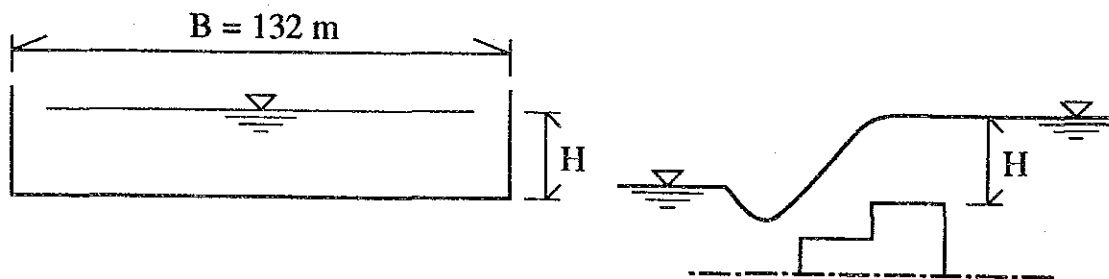
Existing ground sill is constructed to protect piers of Bagmati Bridge at Thapathali when New Bridge is constructed the ground sill should be reconstructed to maintain present condition.

In view point of hydraulics, high ground sills have disadvantages of inundation problems in upstream area. Back water calculation is performed on the following two alternative to study the effect due to change height of ground sill.

Alternative 1

Crest of proposed ground sill is 1279.9 of the same level as one of existing ground sill.

Design discharge 1,121.01 m³/s
Crest width 132.0 m



Calculation of head over crest is performed by following formula.

$$Q = 0.35 B \sqrt{2g} H^{3/2}$$

where, Q: discharge (m³/s)
B: width of crest (m)
g: acceleration due to gravity = 9.8 m/sec²
H: head over crest

given H = 3.15

$$Q = 1143.5 \text{ m}^3/\text{s} > 1121.2 \text{ m}^3/\text{s} \text{ ----- OK}$$

Water elevation at control point over crest is;

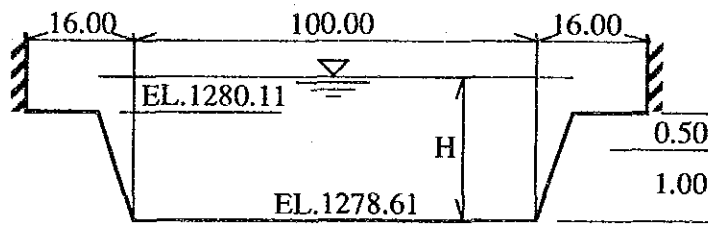
$$1279.9 + 3.15 = 1283.05$$

The result of calculation of back water is shown on Fig.A4.3.5 (1/2). In this case, innandation area due to backwater upstream is approximately 60 ha.

Alternative (2)

Crest of proposed ground sill is 1278.56 of the same level as top of footing of pier of Bagmati Bridge at Thapathali.

Design discharge	1,121.7 m ³ /s
Under Crest width	130 m
Upper Crest Width	132



given $H = 3.5$ m

$$Q = 1128.5 \text{ m}^3/\text{sec} > 1121.7 \text{ m}^3/\text{s} \quad \text{OK}$$

Water elevation at control point over crest is;

$$1278.56 + 3.50 = 1282.06 \text{ m}$$

The result of calculation of back water is shown on Fig.A4.3.5 (2/2). In this case, innandation problem due to back water upstream is almost evaded.

Therefore it is recommended that crest of proposed ground sill is lowered upto 1278.56 on the basis of view point of hydraulics.



Figure A.4.4.1 MAP OF INDIA SHOWING SEISMIC ZONES

Table A.4.4.1 SEISMIC COEFFICIENTS FOR SOME IMPORTANT TOWNS (BNCI)

Town	Zone	Horizontal Seismic Coefficient	Town	Zone	Horizontal Seismic Coefficient
Agra	III	0.0 4	Jorhat	V	0.0 8
Ahmadabad	III	0.0 4	Jabalpur	III	0.0 4
Ajmer	I	0.0 1	Kanpur	III	0.0 4
Allahabad	II	0.0 2	Kathmandu	V	0.0 8
Almora	IV	0.0 5	Kohima	V	0.0 8
Ambala	IV	0.0 5	Kurnool	I	0.0 1
Amristar	IV	0.0 5	Lucknow	III	0.0 4
Asansol	III	0.0 4	Ludhiana	IV	0.0 5
aurangabad	I	0.0 1	Madras	II	0.0 2
Bahraich	IV	0.0 5	Madurai	II	0.0 2
Bangalore	I	0.0 1	Mandi	V	0.0 8
Barauni	IV	0.0 5	Managalore	III	0.0 4
Bareilly	III	0.0 4	Monghyr	IV	0.0 5
Baroda	III	0.0 4	Moradabad	IV	0.0 5
Bhatinda	III	0.0 4	Mysore	I	0.0 1
Bhilai	I	0.0 1	Nagpur	II	0.0 2
Bhopal	II	0.0 2	Nainital	IV	0.0 5
Bhubaneswar	III	0.0 4	Nasik	III	0.0 4
Bhuj	V	0.0 8	Nellore	II	0.0 2
Bikaner	III	0.0 4	Panjim	III	0.0 4
Bokaro	III	0.0 4	Patiala	III	0.0 4
Bombay	III	0.0 4	Patna	IV	0.0 5
Burdwan	III	0.0 4	Pilibhit	IV	0.0 5
Calcutta	III	0.0 4	Pondicherry	II	0.0 2
Calicut	III	0.0 4	Pune	III	0.0 4
Chandigarh	IV	0.0 5	Rajpur	I	0.0 1
Chitradurga	I	0.0 1	Rajkot	III	0.0 4
Coimbatore	III	0.0 4	Ranchi	II	0.0 2
Cuttack	III	0.0 4	Roorkee	IV	0.0 5
Darbhanga	V	0.0 8	Raurkela	I	0.0 1
Darjiling	IV	0.0 5	Sadiya	V	0.0 8
Dehra Dun	IV	0.0 5	Simla	IV	0.0 5
Delhi	IV	0.0 5	Sironj	I	0.0 1
Durgapur	III	0.0 4	Srinagar	V	0.0 8
Gangtok	IV	0.0 5	Surat	III	0.0 4
Gauhati	V	0.0 8	Tezpur	V	0.0 8
Gaya	III	0.0 4	Thanjavur	II	0.0 2
Gorakhpur	IV	0.0 5	Tiruchchirappalli	II	0.0 2
Hyderabad	I	0.0 1	Trivandrum	III	0.0 4
Imphal	V	0.0 8	Udaipur	II	0.0 2
Jaipur	II	0.0 2	Varanasi	III	0.0 4
Jamshedpur	II	0.0 2	Vijayawada	III	0.0 4
Jhansi	I	0.0 1	Vishakhapatna	II	0.0 2
Jodhpur	I	0.0 1			

Note : The coefficients given are according to 5.2.1 and should be suitably modified for important structures according to 5.2.2 and 5.4

Table A.4.4.2 LIST OF EARTHQUAKES OF MORE THAN 5 MAGNITUDE ON RICHTER SCALE, OCCURRED WITHIN THE NEPAL REGION

Y	MD	EPCL AREA	LAT	LONG	DEPT	INT	MAG	REF
			DEG	NDEG	E	KM		
1966	12 18	WEST NEPAL	29.609	81.000			5.0	USC
1966	12 21		29.650	80.790			5.2	ISC
1967	01 05		30.000	86.000			5.2	LAO
1967	08 14		28.000	80.000			5.0	LAO
1967	12 18		29.460	81.710			5.0	ISC
1968	05 27	NEPAL	29.700	80.400			5.1	USV
1969	02 04		28.300	81.400			5.1	LAO
1969	02 11		28.100	82.700			6.2	LAO
1969	02 13		27.900	85.400			5.0	LAO
1969	02 13		28.000	81.800			5.3	LAO
1969	02 24		27.900	85.600			5.2	LAO
1969	03 03		30.040	79.840			5.0	ISC
1969	03 05		29.200	81.100			5.2	HARI
1970	02 12		29.240	81.570			5.3	ISC
1970	02 26		27.620	85.700			5.0	ISC
1971	05 03	TIBET	30.790	84.330	27		5.3	ISC
1971	12 04	NEPAL	27.930	87.950	29		5.2	ISC
1972	02 04	TIBET	30.340	84.470	18		5.1	ISC
1972	03 15	TIBET	30.425	84.502	33		5.3	NEIS
1972	04 28	TIBET	31.340	84.920	32		5.0	ISC
1973	01 02	TIBET	61.170	88.080	43		5.1	ISC
1973	04 22	TIBET	28.135	86.993	33		5.2	NEIS
1973	10 16	NEPAL	28.219	82.945	33		5.2	NEIS
1974	03 03	TIBET	30.740	86.320			5.5	ISC
1974	03 24	NEPAL	27.660	86.000			5.4	ISC
1974	09 27	NEPAL	28.590	85.510	20		5.5	ISC
1974	12 23	NEPAL	29.320	81.380	45		5.2	ISC
1975	01 31	NEPAL	28.100	84.729	33		5.4	NEIS
1975	06 19		26.740	87.560			5.1	NEIS
1975	09 06	NEPAL	29.210	81.950	33		5.1	ISC
1975	11 26	TIBET	28.150	87.800	33		5.0	ISC
1976	05 10	NEPAL	29.284	81.460	33		5.2	NEIS
1976	09 14	TIBET	29.795	89.559	82		5.5	NEIS
1976	09 29	NEPAL	29.817	81.390	33		5.0	NEIS
1976	10 23	TIBET	28.676	86.228	63		5.1	NEIS
1977	01 06	TIBET	31.048	88.058	33		5.2	NEIS
1977	03 16	TIBET	31.300	89.380	33		5.0	ISC
1977	11 18	TIBET	32.693	88.388	33		6.5	NEIS
1978	02 10	NEPAL	28.030	84.700			5.3	ISC
1978	08 08	TIBET	32.270	83.100			5.1	ISC
1978	10 04	NEPAL	27.834	85.963	33		5.2	NEIS
1979	05 20	NEPAL INDIA BORDER	30.029	80.310	33		5.9	NEIS
1979	06 19	NEPAL INDIA BORDER	26.740	87.480			5.2	ISC
1980	02 22	TIBET	30.550	88.860	14		5.7	ISC
1980	06 25	TIBET	30.130	81.760	28		5.1	ISC
1980	07 29	NEPAL	29.340	81.210	3		5.7	ISC
1980	07 29	NEPAL	29.598	81.092	18		6.1	NEIS
1980	10 08	TIBET	31.354	87.666	33		5.0	NEIS
1980	10 10	NEPAL	29.170	81.208	33		5.0	NEIS
1980	11 18	TIBET	29.550	85.180	24		5.0	ISC
1980	11 19	SIKKIM	27.400	88.800			6.0	ISC
1981	05 15		29.504	81.942			5.1	
1982	04 05		27.496	88.984			5.1	NEIS
1983	02 02	INDIA CHINA BORDER	27.032	91.870	33		5.2	NEIS
1983	03 01	INDIA CHINA BORDER	28.610	95.982	33		5.0	NEIS
1984	02 19	NEPAL INDIA BORDER	29.659	80.550	58		5.0	NEIS
1984	04 15	TIBET	31.586	82.262	33		5.0	NEIS
1984	05 18	NEPAL	29.606	81.884	33		5.6	NEIS
1984	05 21	INDIA BANGLADESH	23.663	91.519	33		5.3	NEIS
1984	12 30	INDIA BANGLADESH	24.598	92.839	33		5.6	NEIS
1985	06 15		34.630	82.990	20		5.4	ISC
1986	01 10		28.650	86.560	63		5.5	ISC
1986	02 12		34.670	82.930	33		5.0	ISC
1986	03 01		34.680	82.960	33		5.0	NEIS
1986	04 26		32.150	76.400	33		5.5	ISC
1986	06 20		31.220	86.820	33		5.9	ISC
1986	07 06		34.450	80.200	9		5.7	ISC
1986	07 16		31.050	78.000	4		5.6	ISC
1986	07 19		31.180	86.860	17		5.1	ISC
1986	09 09		31.450	85.050	7		5.4	ISC
1987	01 19		28.200	83.600	33		5.2	ISC
1987	08 09		29.470	83.740	74		5.5	ISC
1988	04 20		27.020	86.720	55		5.4	ISC
1988	08 20		26.770	86.610	71		6.4	PDE
1989	02 09		30.040	89.760	33		5.4	PDE
1989	04 03		29.120	90.020	10		5.2	PDE
1989	05 22		27.550	87.770	33		5.0	PDE
1990	02 22		29.070	89.940	33		5.0	PDE

Abbreviation

Y = year
D = day
LAT = latitude
DEPT = depth of hypocentre
Mag = Magnitude
REF = Reference Agency
ISC = International Seismological Centre, UK
NEIS = National Earthquake Information Service, USA
PDE = Preliminary Determination of epicentre

M = month
EPCL = epicentre location
LONG = longitude

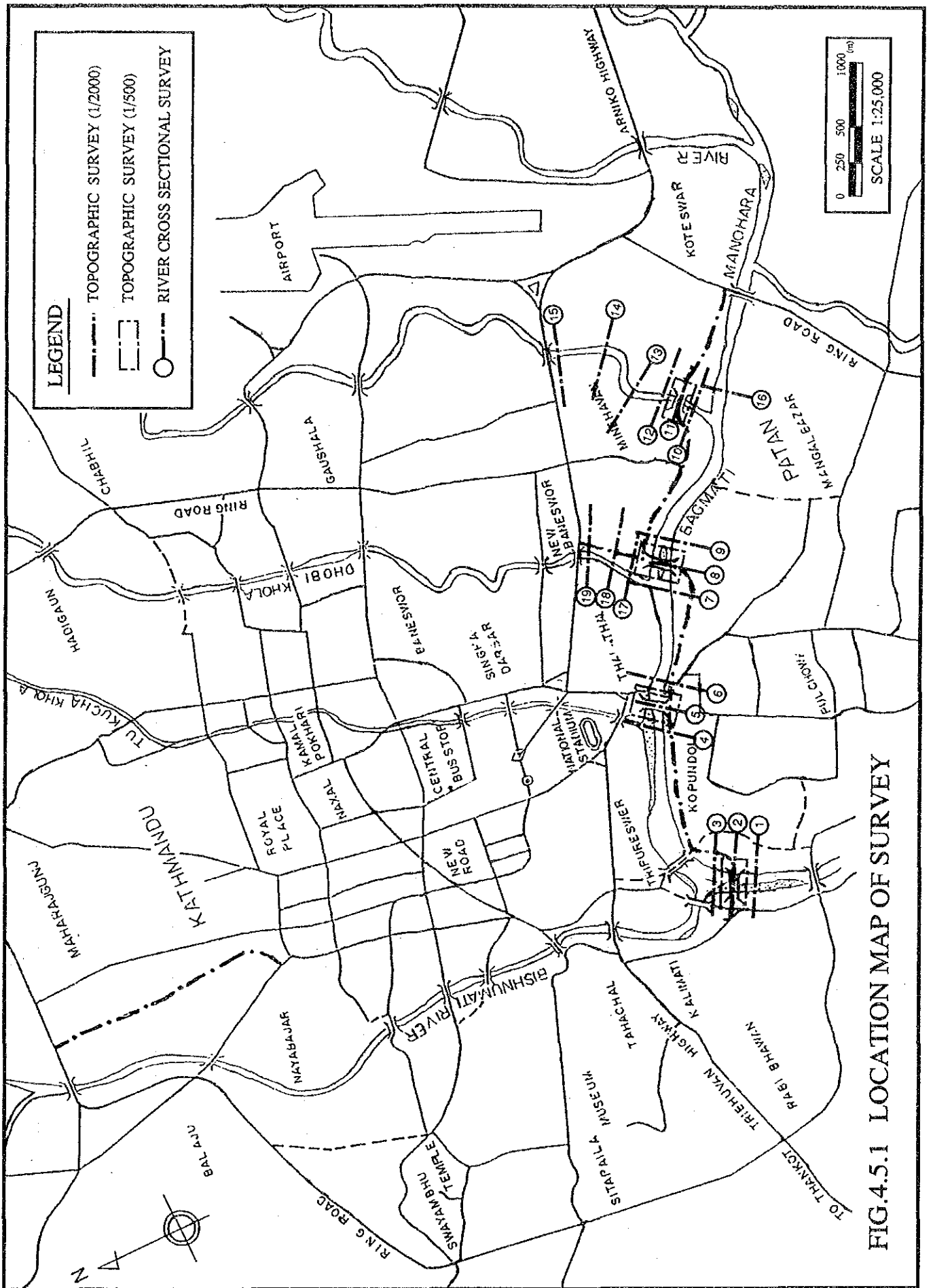
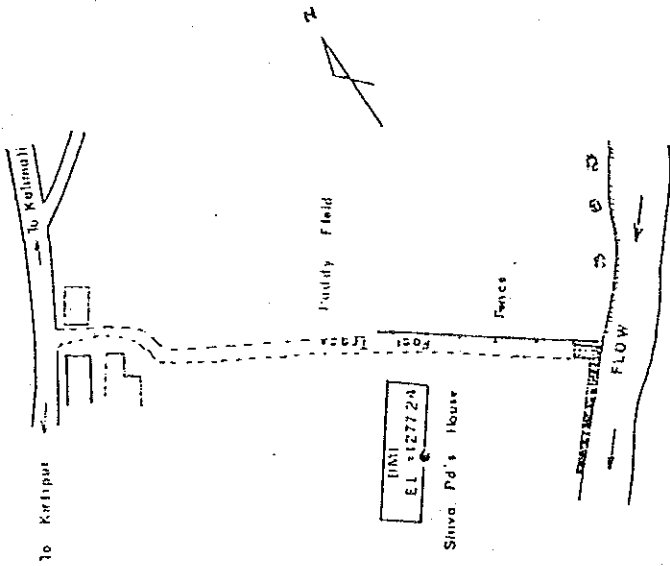


Fig. A 4.5.1 (1) LOCATION DETAIL OF BM

BRIDGE #1



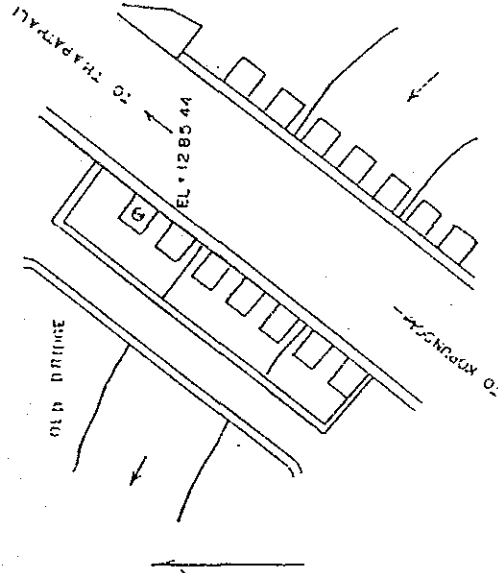
BAGMATI RIVER

NOTES:-

From Kulkshwar (in Between Kalimati & Baikhu joint) Follow the Rd 45 m in Towards Baikhu & Turn left and Follow Foot track Towards the River (Bagmati). As shown in the sketch the BM (1) is fixed at the Plinth level of Shiv Pd's House.

Fig. A 4.5.1 (2) LOCATION DETAIL OF BM

BRIDGE NO.2
(250 HO. OF GEODETIC SURVEY)

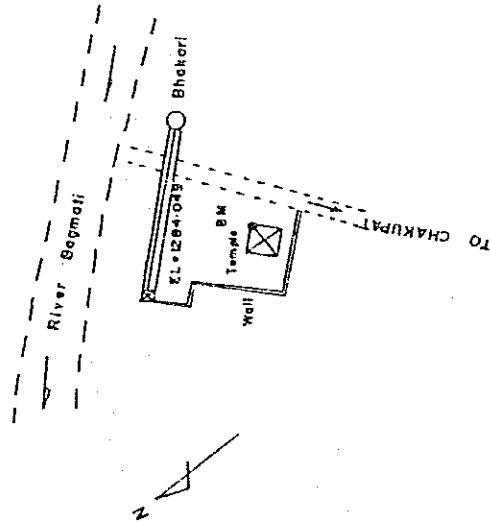


NOTES -

This BM is fixed by Geodetic Branch of department of survey of the D/S edge of Right Abutment of ThappaWali Bridge on Deck Level.

Fig. A 4.5.1 (3) LOCATION DETAIL OF BM

BRIDGE # 3

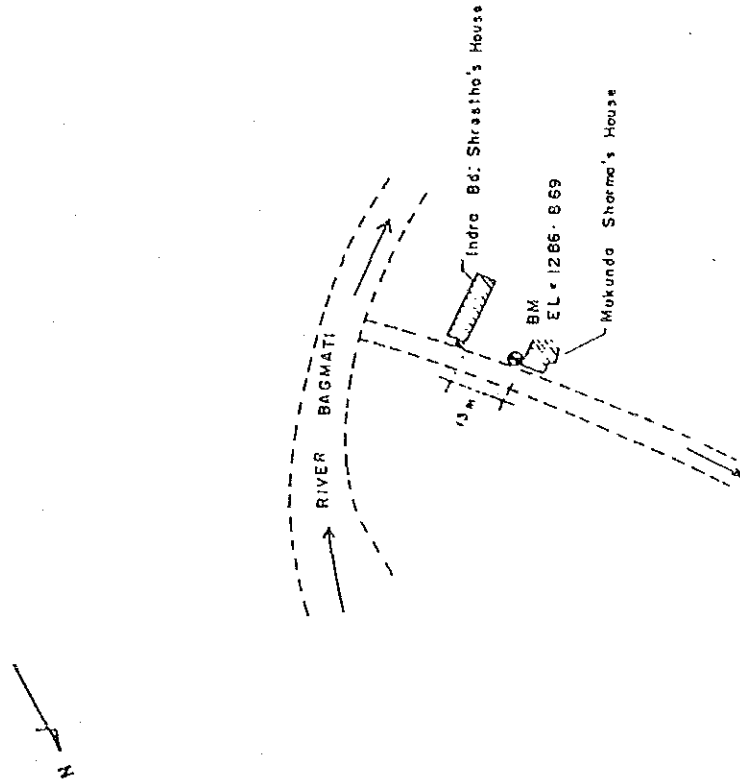


NOTES:-

This BM is Fixed at North East Corner of the Temple (South East of the Bridge Pile # 11a) on Wooden Beam at the Plinth Level.

Fig. A 4.5.1 (4) LOCATION DETAIL OF BM

BRIDGE # 4



NOTES:-

This BM is Fixed at the North West Corner of Mr. Mukundo Sharma's House (120 m West of Bridge Pile # BP2) on the Plinth Level (White Mortar)

Table A.4.5.1 (I) COORDINATES OF TRAVERSE POINT (1/2)

ATIONS	BEARING (W. C. B.)	DISTANCE (m.)	EASTING (m.)	NORTHING (m.)
TP 11974 - I1	225.34740	077.018	631,644.22	3,062,951.62
- T 1	031.80710	137.323	631,771.39	3,063,122.45
T 1 - T 2	091.92876	116.533	631,887.86	3,063,118.53
- T 3	303.05766	219.454	631,587.46	3,063,242.16
T 3 - T 4	297.34821	119.401	631,481.40	3,063,297.01
T 4 - T 5	328.80210	245.358	631,354.30	3,063,506.88
T 6 - T 7R	329.00377	223.358	631,202.57	3,063,777.72
T 5 - T 6	335.20266	087.491	631,317.60	3,063,586.31
T 7R - T 8a	165.55988	031.985	631,210.55	3,063,746.80
- T 8R	321.28710	111.825	631,132.64	3,063,865.03
- T 11a	244.06905	267.714	630,961.81	3,063,660.70
T 11a - T 8	277.16849	313.406	630,650.86	3,063,699.81
T 8a - T 9	303.06016	163.760	630,513.61	3,063,789.14
T 9 - T 10	291.86249	117.806	630,404.28	3,063,833.01
- T 11	306.32599	600.221	630,030.04	3,064,144.70
T 11 - B P1	181.49349	103.637	630,027.34	3,064,041.10
- TP 5476	013.06470	103.564	630,053.45	3,064,245.58
T 11 - T 11#	311.52043	456.803	629,688.02	3,064,447.51
T 11# - T 12	260.02793	238.446	629,453.55	3,064,407.92
T 12 - T 12	197.60738	073.556	629,431.30	3,064,337.81
- T 13	290.05905	268.616	629,201.98	3,064,400.05
T 12/1 - T 12/2	282.14182	172.915	629,262.26	3,064,374.18
T 12/2 - T 14	267.31349	247.910	629,014.61	3,064,362.56
T 14 - T 15	202.43932	075.795	628,985.68	3,064,173.33
T 15 - T 16	319.591.55	062.420	628,945.22	3,064,292.51
T 16 - T 17	210.69321	193.865	628,846.26	3,064,173.33
T 17 - T 18	217.31932	115.135	628,776.46	3,064,081.77
T 18 - T 19	254.44460	103.589	628,676.66	3,064,053.99
T 19 - T 20	235.83405	042.631	628,641.39	3,064,030.04
T 20 - BP 2	237.23294	035.010	628,611.95	3,064,011.10
T 2 - T 1	271.92877			
- BP 2 (T 21)	119.44460	137.889	632,007.94	3,063,050.74
BP 2 - BP 1 (T22)	128.45238	066.252	632,059.82	3,063,009.54
T 22 - T 23	135.33738	260.088	632,242.64	3,062,824.55
T 23 - T 24	159.84627	040.337	632,256.54	3,062,786.68
T 24 - T 25	142.18880	072.451	632,300.96	3,062,729.44
- T 26	141.37960	144.239	632,346.51	3,062,673.99
T 26 - T 27	124.51849	395.078	632,672.07	3,062,450.14
T 28 - T 29	015.74266	122.683	628,539.12	3,063,696.16
T 29 - T 30	013.40432	243.625	628,595.60	3,063,933.14
T 30 - BP 2	011.84118	079.645	628,611.95	3,064,011.10
BP 2 - BH	335.78516	021.400	628,603.17	3,064,030.61
- T 31	348.82738	043.357	628,603.54	3,064,053.63
- T20 (BP1)	057.23294	035.010	628,641.39	3,064,030.04
T 31 - E	273.89960	086.261	628,517.48	3,064,059.50
E - D	297.18849	069.711	628,455.47	3,064,091.35
D - T 32	316.01349	094.240	628,390.02	3,064,159.15
T 32 - T 33	342.36405	194.810	628,330.97	3,064,344.91
- A	149.44127	009.560	628,394.88	3,064,150.92
8 (R) - 34	246.61543	034.230	631,101.22	3,063,851.44
- 35	047.38960	060.520	631,177.18	3,063,906.00
- 36	024.55960	242.440	631,233.41	3,064,085.84
- 37	016.67850	386.641	631,243.61	3,064,235.41
T 37 - T 38	182.61322	084.721	631,239.75	3,064,150.78
- T 38A	119.10072	062.282	631,298.03	3,064,205.12

Table A.4.5.1 (2) COORDINATES OF TRAVERSE POINT (2/2)

ATIONS	BEARING (W. C. B.)	DISTANCE (m.)	EASTING (m.)	NORTHING (m.)
T 39 - T 40	180.75794	414.706	629,493.53	3,068,710.04
T 40 - T 41	185.97182	249.697	629,467.55	3,068,461.69
T 40 - T 42	349.24294	057.774	629,482.75	3,068,766.80
T 41 - T 43	193.39682	185.028	629,424.68	3,068,281.70
T 43 - T 44	109.55738	065.885	629,486.73	3,068,259.53
T 44 - T 45	175.48682	223.188	629,503.87	3,068,037.00
T 45 - T 46	129.22294	015.390	629,515.77	3,068,027.24
T 45 - T 47	175.41627	095.934	629,511.36	3,067,941.36
T 47 - T 48	071.27821	024.920	629,534.97	3,067,949.34
T 47 - T 49	157.89182	199.769	629,586.20	3,067,756.14
T 49 - T 50	174.78766	117.147	629,596.63	3,067,639.46
T 50 - T 51	280.06349	009.810	629,586.98	3,067,641.19
T 50 - T 52	188.07321	068.273	629,586.92	3,067,571.88
T 52 - T 53	193.58483	080.276	629,568.07	3,067,493.85
T 53 - T 54	194.28066	059.162	629,553.48	3,067,436.51
T 54 - T 55	217.00150	074.725	629,508.51	3,067,376.84
T 55 - T 56	220.80872	056.783	629,530.52	3,067,429.18
T 55 - T 57	260.72566	099.511	629,410.30	3,067,360.80
T 57 - T 58	046.05400	035.000	629,435.50	3,067,385.09
T 57 - T 59	258.57566	054.832	629,356.55	3,067,349.94
T 59 - T 60	15.61066	027.763	629,363.75	3,067,375.72

Appendix 5.3.1 Alternative Study on Protection Works of Existing Bagmati Bridge

The existing 2-lane Bagmati Bridge at Thapathali was constructed in 1968, about 25 years back. During the flood in September 1991, one of its pier suffered settlement and rotation. It was demolished and a new pier was constructed with a gabion check-dam against the lowering of river bed to open the traffic in early 1992. These protection works however are

The existing bridge is supposed to be utilized for another 10 years from now on, so that appropriate protection work should be provided on the piers of existing bridge.

The following four (4) alternative plans are studied as shown in Fig. A 5.1 on the protection work of existing bridge.

- A - Plan : Construction of a new 2-lane bridge on d/s side and protection of the existing piers
- B - Plan : This plan is same as A-Plan. The only difference is that instead of permanent ground sill, gabion ground sill will be provided.
- C - Plan : Construction of a new 2-lane bridge on d/s side and reconstruction of the existing piers.
- D - Plan : Construction of a new 4-lane bridge.

The detail of each alternatives are explained below:

A - Plan and B- Plan: Construction of a new 2-lane bridge on d/s side and protection of the existing piers

A check-dam (ground sill) should be provided on downstream to raise the river bed level and prevent it's further erosion. The materials of check-dam should be either reinforced concrete or gabion. The check-dam made of reinforced concrete is used as the permanent structure while gabion check-dam temporary stricture. Selection of materials depends on availability of funds.

In addition to the check-dam, the scour protection around the existing piers should also be constructed. The elevation of this protection will be the same as that for the ground sill. From hydrological considerations, the top of ground sill should be 1.5 m below the top of existing pier footing.

C - Plan : Construction of a new 2-lane bridge on d/s side and reconstruction of the existing piers.

After the construction of the new bridge, the traffic is diverted to the new bridge and the superstructure of the existing bridge is dismantled temporarily for the foundation works and sheet pile works. The existing piers are then demolished and new piers with pile foundations are constructed. After this, the superstructure is again placed on the new piers. In this plan there is no necessity of constructing the ground sill and scour protection. The difficult works associated with this plan are that the superstructure should be repaired and adjusted for new type of rivet connections, camber, etc. For this it has to be carried to a factory. In this way the cost for rehabilitation is sometime more than the cost for new construction. The construction period required for this plan will be longer, and temporary gabion has to be provided for the protection of existing bridge during new bridge construction.

D - Plan : Construction of a new dual 2-lane bridge.

This plan is total replacement of the existing 2 lane bridge to the new bridge with dual 2 lane. A first, a new 2-lane bridge is constructed on d/s side and the traffic is diverted through this new bridge. Then the existing bridge is completely demolished. The next is the construction of another new 2-lane bridge on the u/s side and their connection with each other. This plan has three disadvantages. One is its very high construction cost, second is the longer construction period and the third is the need for providing temporary gabion structure for the protection of the existing bridge during the construction of the first 2-lane bridge on d/s side.

On comparison of the above 4 plans, A-plan seems to be the most favorable and recommended to be implemented.

Appendix 5.3.2 Inspection of Existing Bridges and Topo. Conditions

For the planning and design of the bridges the existing bridges across Bagmati, Bishnumati, Dhobi Khola and Manohara rivers have been visually inspected. Also, some planned bridges and bridges under construction have been referred to. These bridges have been indicated in Fig. A 5.2 (1) and sketches of these bridges are shown in Fig. A 5.2 (2). These data have been used to fix the bridge length, the minimum span, span arrangement, the lowering of river bed, the girder bottom elevation, etc.

In addition to this, the aerial photo of 1987 and survey map of around 1974 has been referred to for estimation of the natural course change. The enlarged bridge site plans which resulted from the combination of the aerial photo and survey map are shown in the Fig. A 5.2 (3) and Fig. A 5.2 (4). The indicated new river line in the plans has been scaled up from the aerial photos.

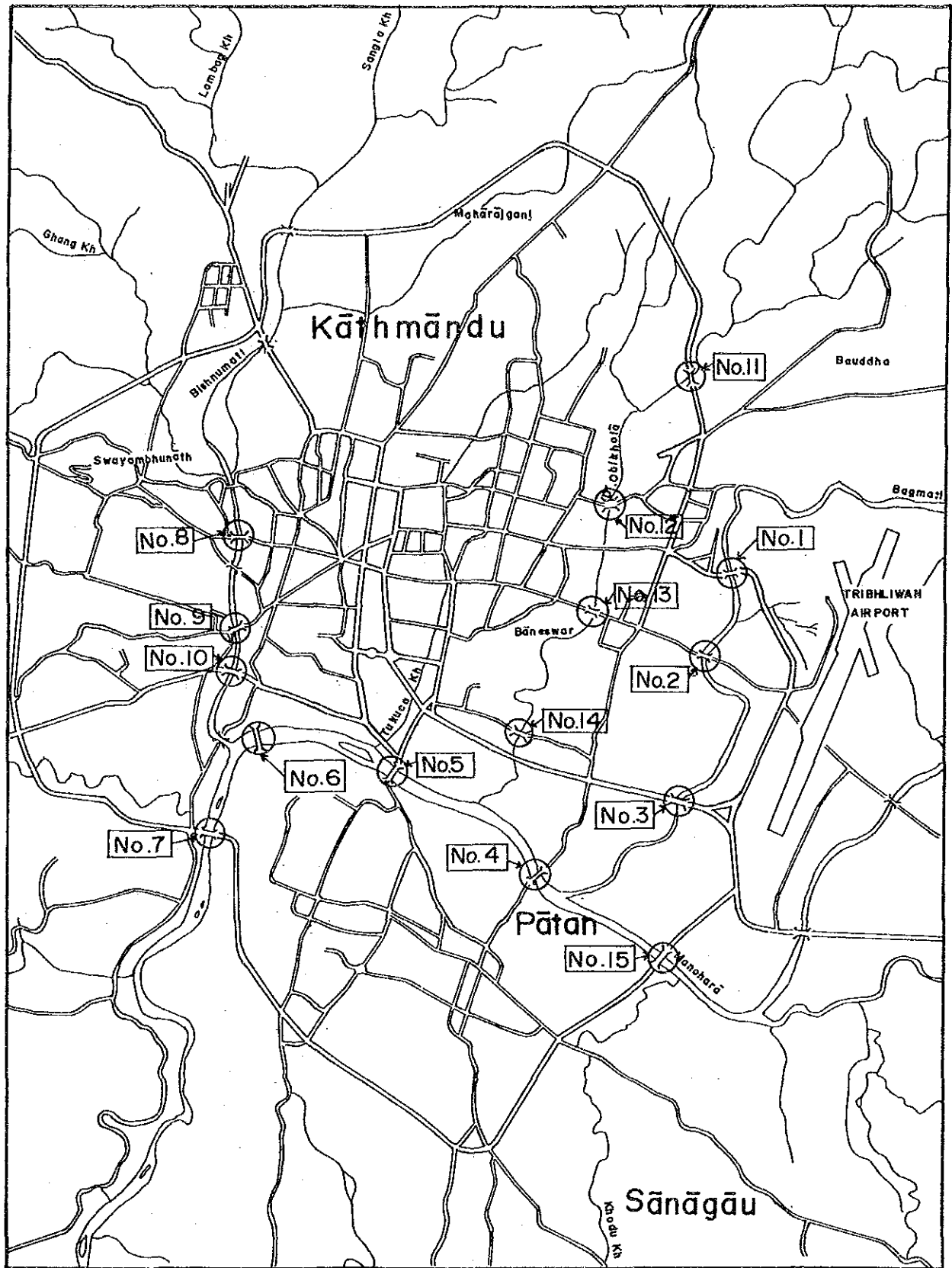


Figure A 5.2.1 LOCATION MAP OF EXISTING AND PLANNING BRIDGE

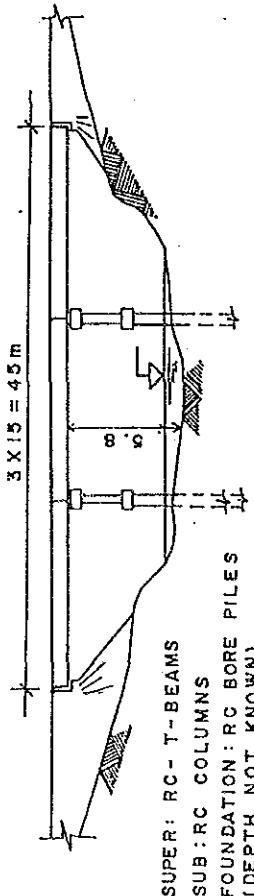
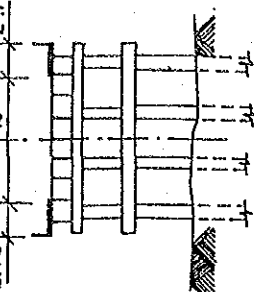
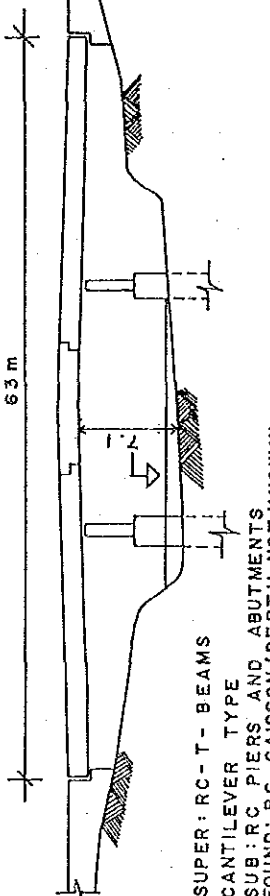
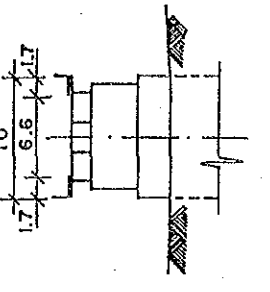
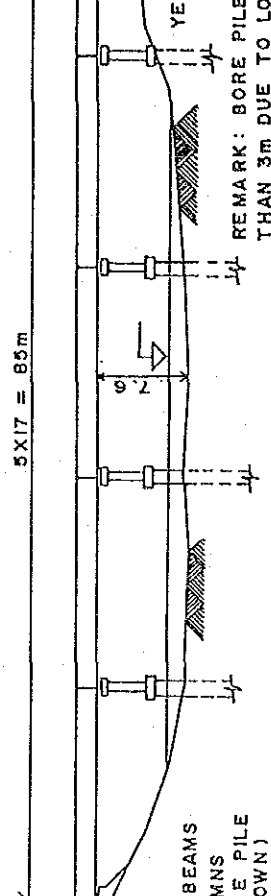
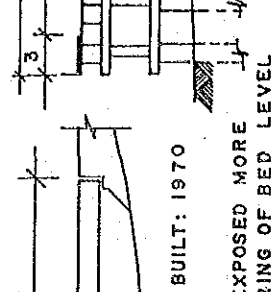
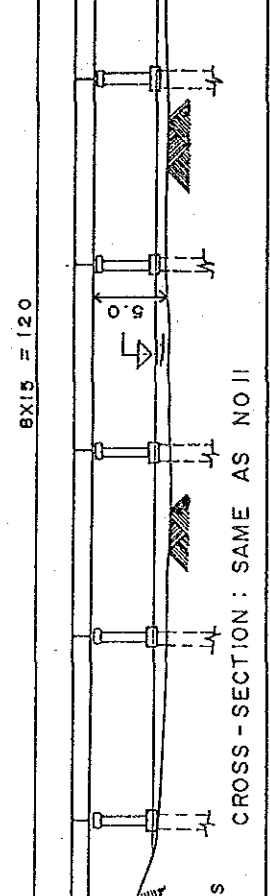
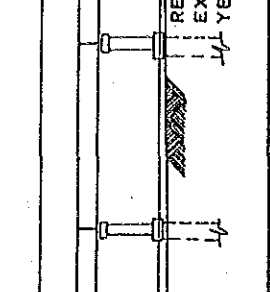
NO	BRIDGE NAME	ELEVATION	CROSS-SECTION	REMARKS
1	BAGMATI BRIDGE LOCATION: PASHUPATI (RING ROAD)	 <p>3 X 15 = 45 m</p> <p>SUPER: RC-T-BEAMS SUB: RC COLUMNS FOUNDATION: RC BORE PILES (DEPTH NOT KNOWN)</p>	 <p>2.75</p> <p>1.0</p> <p>2.75</p>	BUILT IN 1974 BORE PILES EXPOSED UPTO 3m DUE TO LOWERING OF BED LEVEL
2	BAGMATI BRIDGE ON OLD ROAD TO AIRPORT	 <p>63 m</p> <p>SUPER: RC-T-BEAMS CANTILEVER TYPE SUB: RC PIERS AND ABUTMENTS FOUND: RC CAISSON (DEPTH NOT KNOWN)</p>	 <p>1.7</p> <p>1.0</p> <p>6.6</p>	BUILT IN 1967 CAISSON EXP- POSED 3m DUE TO LOWERING OF BED LEVEL
3	BAGMETI BRIDGE KOTESWAR	 <p>5 X 17 = 85 m</p> <p>SUPER: RC-T-BEAMS SUB: RC COLUMNS FOUND: RC BORE PILE (DEPTH NOT KNOWN)</p> <p>YEAR BUILT: 1970</p> <p>REMARK: BORE PILES EXPOSED MORE THAN 3m DUE TO LOWERING OF BED LEVEL</p>	 <p>2.0</p> <p>1.4</p> <p>3</p>	
7	BAGMATI BRIDGE BALKHU (RING ROAD)	 <p>8 X 15 = 120</p> <p>SUPER: RC-T-BEAMS SUB: RC COLUMNS FOUND: RC BORE PILES</p> <p>CROSS-SECTION: SAME AS NO II</p>	 <p>2.0</p>	REMARKS: BORE PILES EXPOSED FOR 2-30cm YEAR BUILT 1974

Figure A 5.2.2 SKETCHES OF EXISTING AND PLANNING BRIDGE 1/4

ELEVATION AND CROSS SECTION

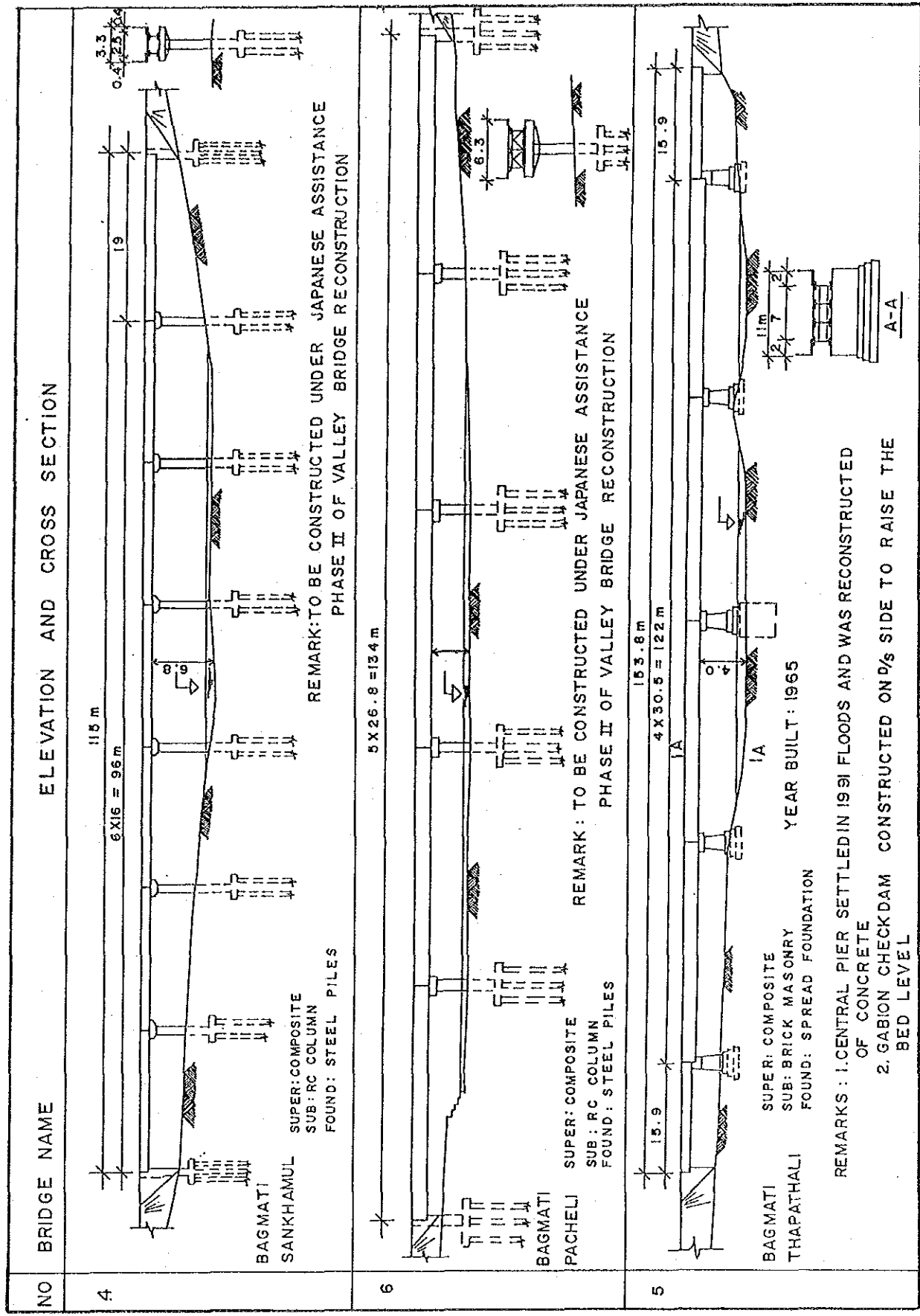


Figure A 5.2.2 SKETCHES OF EXISTING AND PLANNING BRIDGE 2/4

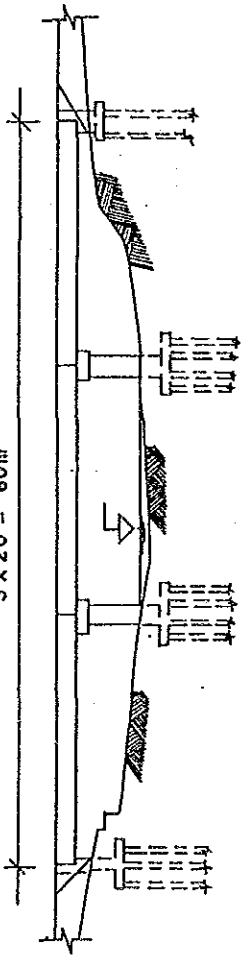
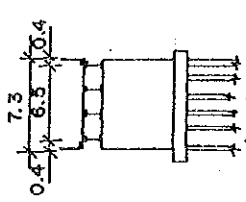
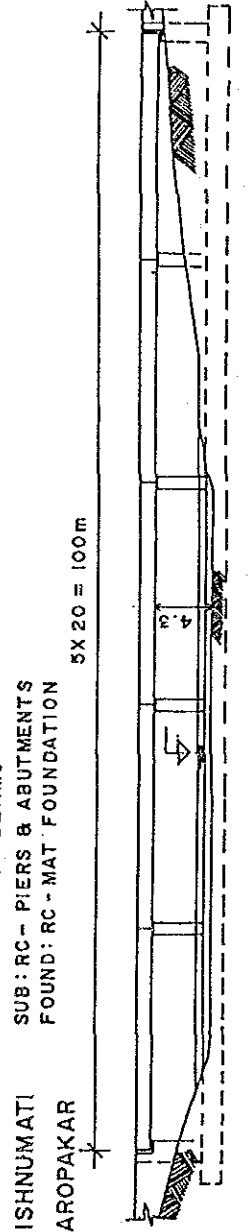
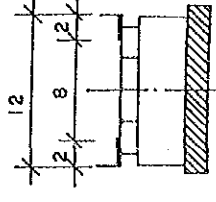
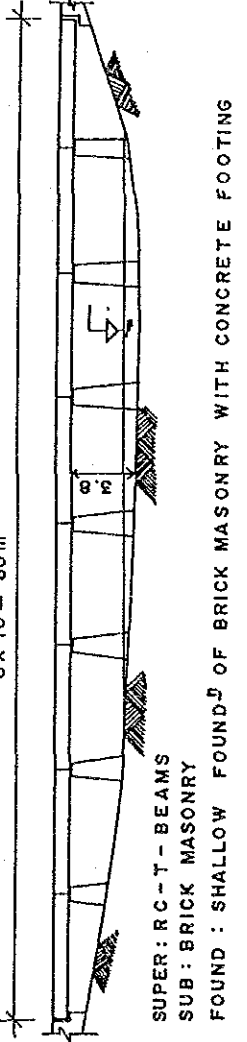
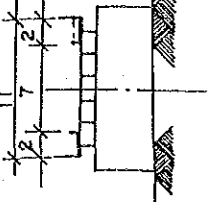
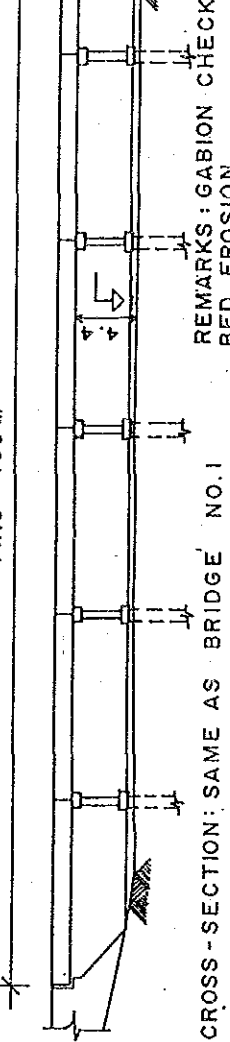
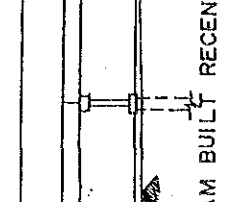
NO	BRIDGE NAME	ELEVATION	CROSS SECTION	REMARKS
8	BISHNUMATI DALLU	 <p>3 X 20 = 60m</p>	 <p>7.3 6.5 0.4 A-A</p>	NEW BRIDGE CONSTRUCTED UNDER JAPAN- ESE ASSISTANCE
9	BISHNUMATI PAROPAKAR	 <p>5 X 20 = 100m</p> <p>SUPER: RC-T-BEAMS SUB: RC-PIERS & ABUTMENTS FOUND: RC-MAT FOUNDATION</p>	 <p>12 8 2</p>	BUILT: 1984 GABION CHECK DAM BUILT RECENTLY TO PREVENT EROSION OF BED LEVEL
10	BISHNUMATI TEKU	 <p>8 X 10 = 80m</p> <p>SUPER: RC-T-BEAMS SUB: BRICK MASONRY FOUND: SHALLOW FOUNDATION OF BRICK MASONRY WITH CONCRETE FOOTING</p>	 <p>11 7 2</p>	BUILT: 1967 GABION CHECK DAM BUILT RECENTLY TO PREVENT EROSION OF BED LEVEL
15	MANOHARA RING ROAD BUILT: 1974	 <p>7 X 15 = 105 m</p> <p>CROSS-SECTION: SAME AS BRIDGE NO.1</p> <p>REMARKS: GABION CHECKDAM BUILT RECENTLY TO PREVENT BED EROSION</p>	 <p>11 7 2</p>	REMARKS: GABION CHECKDAM BUILT RECENTLY TO PREVENT BED EROSION

Figure A 5.2.2 SKETCHES OF EXISTING AND PLANNING BRIDGE 3/4

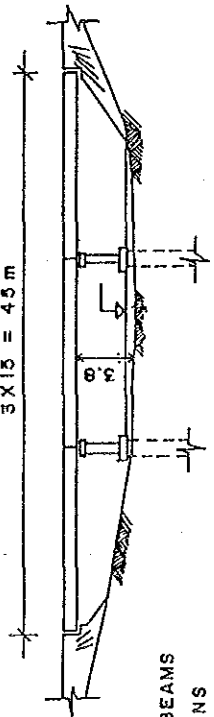
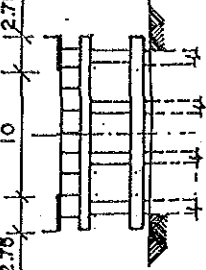
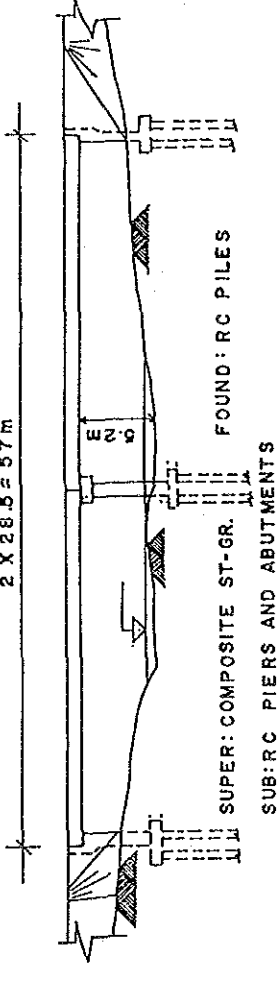
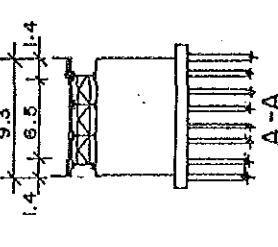
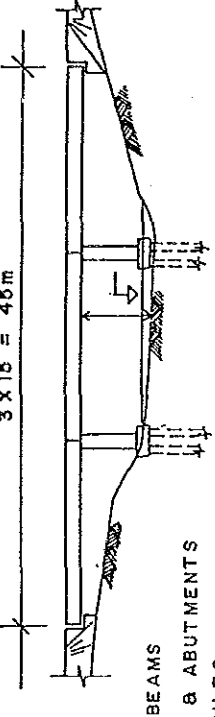
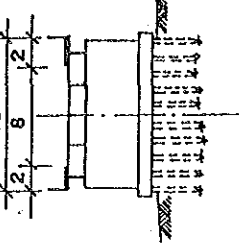
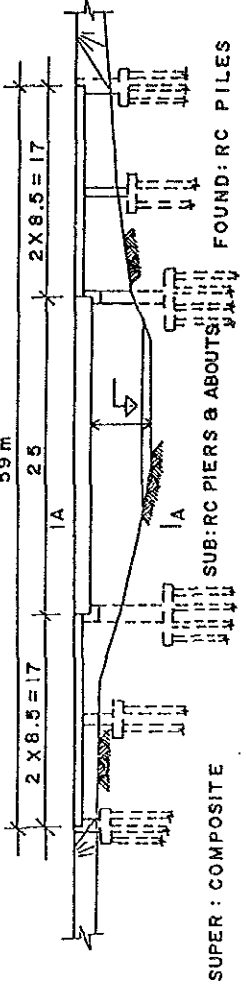
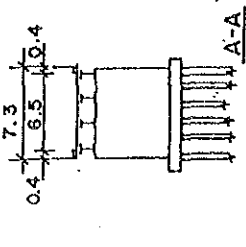
NO	BRIDGE NAME	ELEVATION	CROSS - SECTION	REMARKS
11	DHOBI KHOLA CHABAHIL (RING ROAD)	 <p>3 X 15 = 45 m</p> <p>SUPER : RC - T - BEAMS SUB : RC - COLUMNS FOUND : RC - BORE PILES</p>	 <p>10 2.75 12.75</p>	BUILT 1974 BORE PILES EXPOSED ABOUT 30cm
12	DHOBIKHOLA SIPHAL (KALO PUL)	 <p>2 X 28.5 = 57 m</p> <p>SUPER : COMPOSITE ST-GR. SUB : RC PIERS AND ABUTMENTS FOUND : RC PILES</p>	 <p>9.3 1.4 6.5 1.4</p> <p>A-A</p>	NEW BRIDGE CONSTRUCTED UNDER JAPAN ASSISTANCE BUILT : 1992
13	DHOBIKHOLA MAITIDEVI	 <p>3 X 15 = 45 m</p> <p>SUPER : RC - T - BEAMS SUB : RC - PIERS & ABUTMENTS FOUND : RC - PILES</p>	 <p>12 2 2</p>	BUILT : 1975 RC PILES EXPOSED ABOUT 50cm
14	DHOBIKHOLA BABAR MAHAL BACK LANE	 <p>59 m</p> <p>2 X 28.5 = 57</p> <p>25 17 17</p> <p>SUPER : COMPOSITE SUB : RC PIERS & ABUTMENTS FOUND : RC PILES</p>	 <p>7.3 0.4 6.5 0.4</p> <p>A-A</p>	NEW BRIDGE CONSTRUCTED UNDER JAPA- NESE ASSIS- TANCE BUILT : 1992

Figure A 5.2.2 SKETCHES OF EXISTING AND PLANNING BRIDGE 4/4

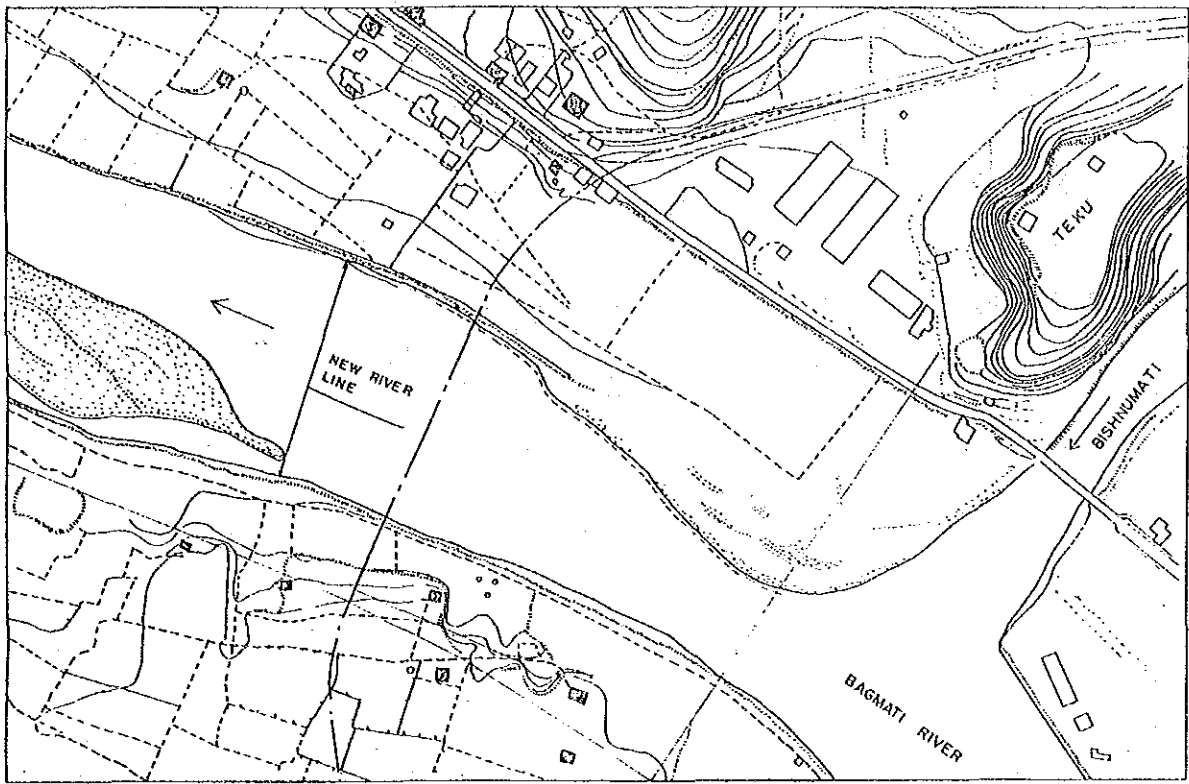


Figure A 5.2.3 (1) BAGMATI BRIDGE No.1 MAP

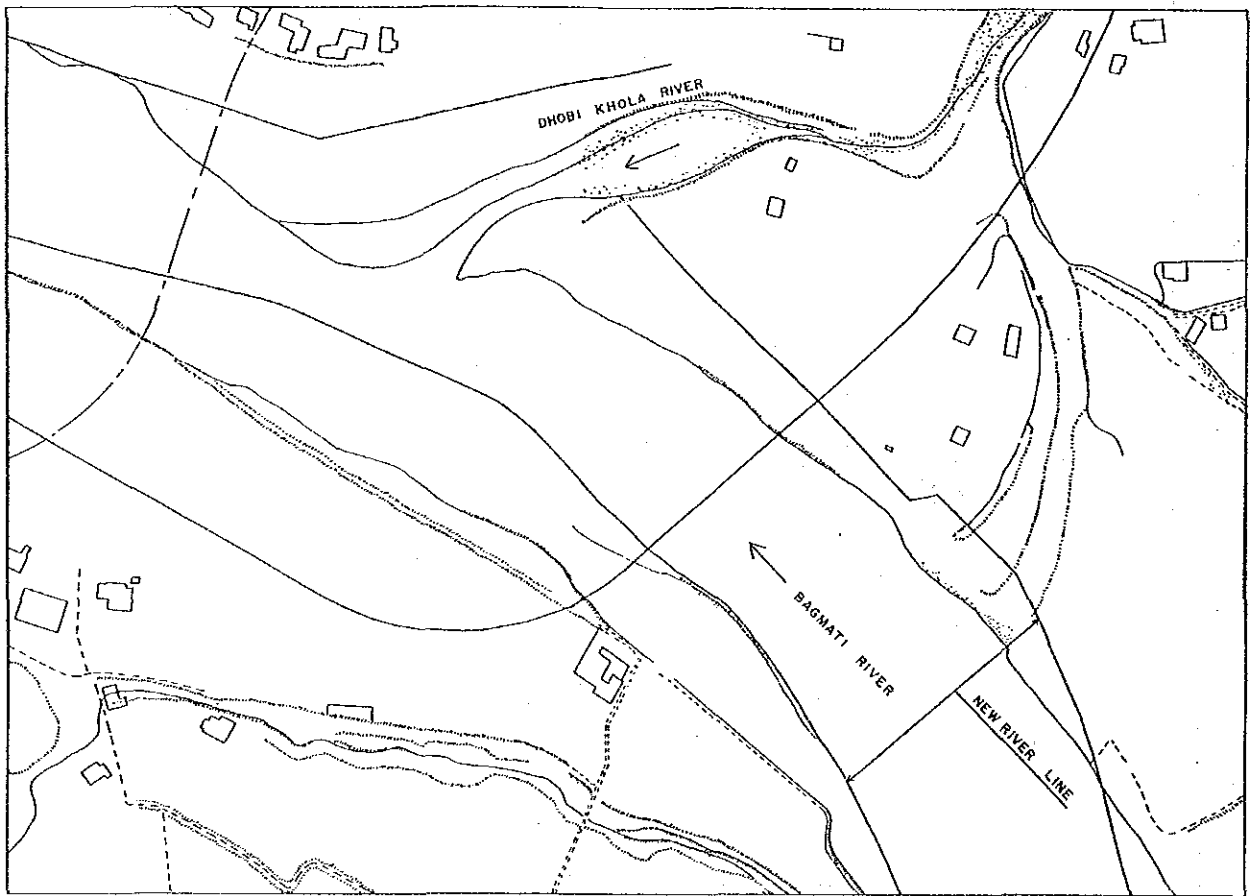


Figure A 5.2.3 (2) BAGMATI BRIDGE No.3 MAP

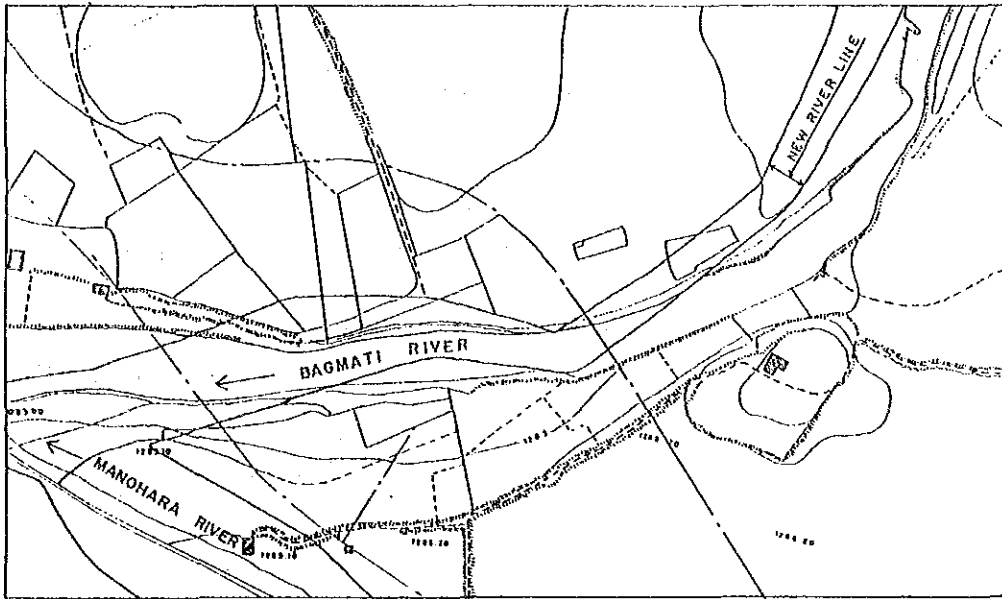


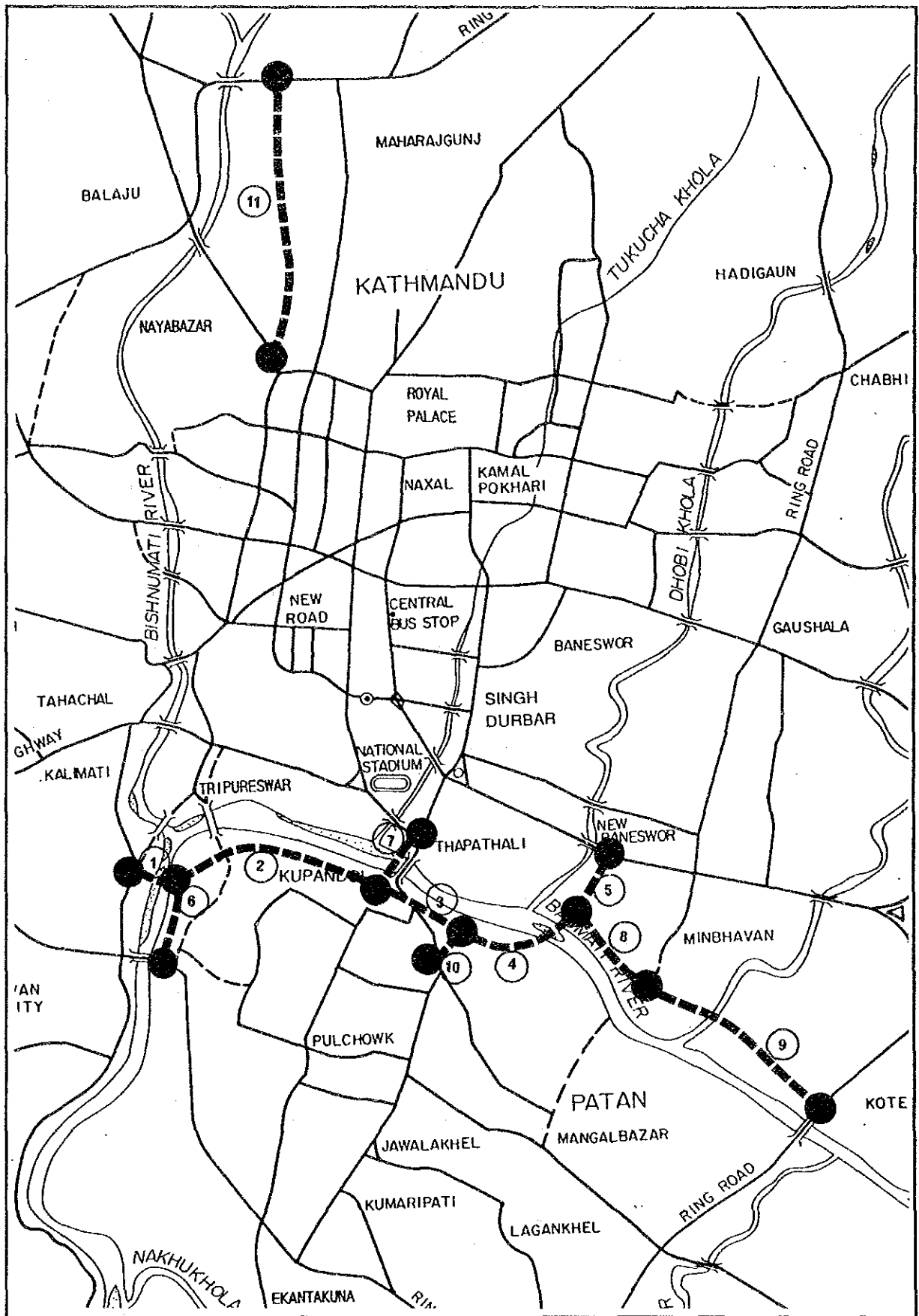
Figure A 5.2.3 (3) BAGMATI BRIDGE No.4 MAP

Appendix 5.5.2 Traffic Volume on the Project Roads

TRAFFIC VOLUME ON THE SECTIONS OF THE PROJECT ROADS

Section	Traffic Volume - 1997 (100Vehicles/day)						
	M/C	Taxi	Bus	P/C	Truck	Total	HV*
1	17	19	3	13	5	57	8
2	38	35	7	29	11	120	18
3	19	9	3	13	8	52	11
4	46	23	8	32	11	120	19
5	38	17	6	29	5	95	11
6	28	26	7	21	8	90	15
7	135	100	20	87	19	361	39
8	39	15	6	28	8	96	14
9	34	8	4	20	7	73	11
10	28	14	5	18	3	68	8
11	20	56	8	20	3	107	11

Section	Traffic Volume - 2002 (100Vehicles/day)						
	M/C	Taxi	Bus	P/C	Truck	Total	HV*
1	20	19	3	17	7	67	10
2	46	35	8	39	15	143	23
3	23	9	3	17	11	64	15
4	55	23	9	43	15	146	24
5	46	17	7	39	7	116	14
6	34	26	8	28	11	107	19
7	163	100	23	117	26	429	49
8	47	15	7	38	11	118	18
9	41	8	5	27	10	90	14
10	34	14	6	24	4	82	10
11	24	56	9	27	4	120	13
Growth Rate (% per annum)	3.8	0.0	2.6	6.1	6.8		
Expansion Factor (2002/1997)	1.20	1.00	1.14	1.34	1.39		



Location Map

Appendix 6.5.1 Detailed Work Quantities

(1/2)

Description	Unit	South link of inner ring road	Sanepa access	Patan access	Koteswor access	Central bus terminal access	New bagnmati bridge Thaphatali side intersection with signal	New bagnmati bridge Patan side intersection
Clear site and stripping	m2	76,464	8,830	3,556	45,000	38,012		
Removal of existing pavement material	m3						100	100
Removal of existing bridge at Thaphatali	L.S							
Removal of existing structures	m3						100	100
Fill in soft material	m3	120,713	9,582	2,511	68,173	41,384	1,300	862
Spoil in soft material	m3	5,162	1,373	275	11,004	196	130	493
Sodding	m2	25,648	2,414	1,086	15,599	10,856		
Plant selected trees	no.	744						
Gabion	m3						50	500
Stone Masonry	m2	4,880		490			250	
Excavation in soft material for structures	m3					120		
Backfilling with selected materials for structures	m3					40		
Side block	m	2,840						
Kerb stone (A)	m	2,521	990	400	4,064	3,730		
Kerb stone (B)	m	1,345			150		400	450
Kerb stone for bridge	m							
Pipe culvert D300	m	1,155	188	80	1,600	750		
Pipe culvert D600	m	1,720	240	200	1,060	760	100	50
Pipe culvert D1000	m	205	74		81	133	80	
U shaped drain ditch (0.3 x 0.3m)	m		940	365				
U shaped drain ditch (0.5 x 0.5m)	m	3,167			3,615	3,572		
U shaped drain ditch (1.0 x 1.0m)	m	300				132		
Side drain with stone pitching	m	1,934						
Catch pit	no.	135	47	20	206	187	20	23
Manhole	no.	96	102	4	114	90	4	
Subbase course	m3	12,831	638	423	2,894	4,875	290	197
Base course	m3	11,134	552	368	2,504	4,219	310	164
Prime coat, 1.0 litre/m2	m2	34,400	4,880	1,600	22,140	18,650	4,185	2,408
Tack coat, 0.4litre/m2	m2	68,880	4,880	1,600	22,140	18,650	4,185	2,408
Asphalt concrete binder course t=6cm	m2		4,880	1,600	22,140	18,650	2,910	1,750
Asphalt concrete binder course t=10cm	m2	34,440					1,280	660
Asphalt concrete surfase course t=4cm	m2		4,880	1,600	22,140	18,650	2,910	1,750
Asphalt concrete surfase course t=5cm	m2	34,440					1,280	660
Side walk t=13cm	m2	17,220	2,440	1,600	11,070	9,325	1,076	750
Road lighting	no.	32					18	10
Traffic signal	portion	4	1	1	1	2	1	
Lane marking 15cm	m	11,721	1,575	690	6,681	5,775	1,120	700
Information sign	no.	19	3	3	3	6	4	
Steel pile D800	m							
Steel pile D500	m							
Concrete class-A, 240kg	m3					73		
Concrete class-C, 180kg	m3					8		
Formwork for superstructures	m2							
Formwork for all structures other than superstructure	m2					245		
Reinforcement	ton					8		
Prate girder (material,assemble,transportation,electi	ton							
Bridge railing	m							
Excavation for diversion of the river	m3							
Construction and removal of temporary road	m3							
Temporary bridge	m							
Steel sheet pile	m							

Bagmati bridge No.1	Bagmati bridge No.2	Bagmati bridge No.3	Bagmati bridge No.4	Pedestrian bridge at Thaphatali	Pedestrian bridge at Patan with signal	Check dam at Bagmati bridge No.2	Demolishing of existing old truss bridge	TOTAL
								171,862
								200
							1	1
								200
								244,525
								18,633
								55,603
								744
950	1,060	2,010	620			2,100		7,290
66		190	250			1,000		7,126
5,480	4,980	3,110	2,630	630	800	9,000		26,750
4,290	3,300	2,410	2,020	160	200	7,000		19,420
								2,840
								11,705
								2,345
306	276	240	120					942
								3,773
								4,130
								573
								1,305
								10,354
								432
								1,934
								638
								410
								22,148
								19,251
1,200	1,380	960	480					92,283
								122,743
								51,930
								36,380
1,200	1,380	960	480	410	570			56,930
								36,380
765	414	600	300					45,560
	4							64
							1	11
153	138	120	60					28,733
								38
3,060	1,680	1,414	1,530					7,684
				1,640	1,840			3,480
2,050	1,840	1,470	970	330	450			7,183
55	850	35	30	23	30	2,263		3,294
2,280	2,170	1,820	910					7,180
1,580	1,940	1,300	880	300	410	6,466		13,121
250	230	195	112	20	27			842
292	268	234	117	137	152			1,200
306	276	240	120					942
2,680								2,680
3,750		4,540	1,670					9,960
12	70							82
	3,960					4,300		8,260

Appendix 6.6.1

(1) Cost of Inner Ring Road including Checkdam

Unit : NRs.

Description	Unit	Quantity	Unit Cost		Amount		
			Foreign	Local	Foreign	Local	Total
			Portion	Portion	Portion	Portion	
Clear site and stripping	m2	76,464	16	4	1,223,424	305,856	1529280
Removal of existing pavement material	m3		308	77	0	0	0
Removal of existing bridge at Thaphatali	L.S		4,802,398	1,200,600	0	0	0
Removal of existing structures	m3		1,566	392	0	0	0
Fill in soft material	m3	120,713	335	84	40,462,998	10,115,749	50578747
Spoil in soft material	m3	5,162	241	60	1,243,010	310,752	1553762
Sodding	m2	25,648	156	39	4,001,088	1,000,272	5001360
Plant selected trees	no.	744	1,292	0	961,248	0	961248
Gabion	m3		1,957	345	0	0	0
Stone Masonry	m2	4,880	4,885	1,221	23,837,824	5,959,456	29797280
Excavation in soft material for structures	m3		40	10	0	0	0
Backfilling with selected materials for structures	m3		36	9	0	0	0
Side block	m	2,840	558	239	1,584,436	679,044	2263480
Kerb stone (A)	m	2,521	1,352	580	3,409,400	1,461,172	4870572
Kerb stone (B)	m	1,345	2,668	1,143	3,588,057	1,537,739	5125795
Kerb stone for bridge	m		570	244	0	0	0
Pipe culvert D300	m	1,155	2,110	904	2,436,819	1,044,351	3481170
Pipe culvert D600	m	1,720	3,720	1,594	6,398,056	2,742,024	9140080
Pipe culvert D1000	m	205	7,445	3,191	1,526,123	654,053	2180175
U shaped drain ditch (0.3 x 0.3m)	m		1,384	593	0	0	0
U shaped drain ditch (0.5 x 0.5m)	m	3,167	1,912	820	6,056,571	2,595,673	8652244
U shaped drain ditch (1.0 x 1.0m)	m	300	4,624	1,982	1,387,260	594,540	1981800
Side drain with stone pitching	m	1,934	1,373	343	2,654,995	663,749	3318744
Catch pit	no.	135	6,811	2,919	919,485	394,065	1313550
Manhole	no.	96	11,379	4,877	1,092,403	468,173	1560576
Subbase course	m3	12,831	648	162	8,314,488	2,078,622	10393110
Base course	m3	11,134	1,173	293	13,057,955	3,264,489	16322444
Prime coat, 1.0 litre/m2	m2	34,400	33	1	1,134,512	35,088	1169600
Tack coat, 0.4litre/m2	m2	68,880	11	0	734,950	22,730	757680
Asphalt concrete binder course t=6cm	m2		577	86	0	0	0
Asphalt concrete binder course t=10cm	m2	34,440	968	145	33,348,596	4,983,124	38331720
Asphalt concrete surface course t=4cm	m2		415	62	0	0	0
Asphalt concrete surface course t=5cm	m2	34,440	512	77	17,648,089	2,637,071	20285160
Side walk t=13cm	m2	17,220	402	60	6,921,407	1,034,233	7955640
Road lighting	no.	32	269,413	5,498	8,621,209	175,943	8797152
Traffic signal	portion	4	4,598,410	93,845	18,393,640	375,380	18769020
Lane marking 15cm	m	11,721	54	1	631,762	12,893	644655
Information sign	no.	19	222,546	4,542	4,228,379	86,293	4314672
Steel pile D800	m		22,121	451	0	0	0
Steel pile D500			11,060	226	0	0	0
Concrete class-A, 240kg	m3		4,598	94	0	0	0
Concrete class-C, 180kg	m3		3,627	74	0	0	0
Formwork for superstructures	m2		632	271	0	0	0
Formwork for all structures other than superstructure	m2		408	175	0	0	0
Reinforcement	ton		37,914	774	0	0	0
Prate girder (material,assemble,transportation,electi	ton		488,414	25,706	0	0	0
Bridge railing	m		21,742	1,144	0	0	0
Excavation for diversion of the river	m3		40	10	0	0	0
Construction and removal of temporary road	m3		335	84	0	0	0
Temporary bridge	m		52,156	2,745	0	0	0
Steel sheet pile	m		2,673	141	0	0	0
TOTAL					215,818,182	45,232,534	261,050,716

Construction Cost of Check Dam at No. 2 Bridge

Unit : NRs.

Description	Unit	Quantity	Unit Cost		Amount		Total
			Foreign	Local	Foreign	Local	
			Portion	Portion	Portion	Portion	
Clear site and stripping	m2		16	4	0	0	0
Removal of existing pavement material	m3		308	77	0	0	0
Removal of existing bridge at Thaphatali	L.S		4,802,398	1,200,600	0	0	0
Removal of existing structures	m3		1,566	392	0	0	0
Fill in soft material	m3		335	84	0	0	0
Spoil in soft material	m3		241	60	0	0	0
Sodding	m2		156	39	0	0	0
Plant selected trees	no.		1,292	0	0	0	0
Gabion	m3	2,100	1,957	345	4,109,070	725,130	4,834,200
Stone Masonry	m2	1,000	4,885	1,221	4,884,800	1,221,200	6,106,000
Excavation in soft material for structures	m3	9,000	40	10	360,000	90,000	450,000
Backfilling with selected materials for structures	m3	7,000	36	9	252,000	63,000	315,000
Side block	m		558	239	0	0	0
Kerb stone (A)	m		1,352	580	0	0	0
Kerb stone (B)	m		2,668	1,143	0	0	0
Kerb stone for bridge	m		570	244	0	0	0
Pipe culvert D300	m		2,110	904	0	0	0
Pipe culvert D600	m		3,720	1,594	0	0	0
Pipe culvert D1000	m		7,445	3,191	0	0	0
U shaped drain ditch (0.3 x 0.3m)	m		1,384	593	0	0	0
U shaped drain ditch (0.5 x 0.5m)	m		1,912	820	0	0	0
U shaped drain ditch (1.0 x 1.0m)	m		4,624	1,982	0	0	0
Side drain with stone pitching	m		1,373	343	0	0	0
Catch pit	no.		6,811	2,919	0	0	0
Manhole	no.		11,379	4,877	0	0	0
Subbase course	m3		648	162	0	0	0
Base course	m3		1,173	293	0	0	0
Prime coat, 1.0 litre/m2	m2		33	1	0	0	0
Tack coat, 0.4litre/m2	m2		11	0	0	0	0
Asphalt concrete binder course t=6cm	m2		577	86	0	0	0
Asphalt concrete binder course t=10cm	m2		968	145	0	0	0
Asphalt concrete surfase course t=4cm	m2		415	62	0	0	0
Asphalt concrete surfase course t=5cm	m2		512	77	0	0	0
Side walk t=13cm	m2		402	60	0	0	0
Road lighting	no.		269,413	5,498	0	0	0
Traffic signal	portion		4,598,410	93,845	0	0	0
Lane marking 15cm	m		54	1	0	0	0
Information sign	no.		222,546	4,542	0	0	0
Steel pile D800	m		22,121	451	0	0	0
Steel pile D500	m		11,060	226	0	0	0
Concrete class-A, 240kg	m3		4,598	94	0	0	0
Concrete class-C, 180kg	m3	2,263	3,627	74	8,207,856	167,507	8,375,363
Formwork for superstructures	m2		632	271	0	0	0
Formwork for all structures other than superstructur	m2	6,466	408	175	2,638,775	1,130,903	3,769,678
Reinforcement	ton		37,914	774	0	0	0
Prate girder (material,assemble,transportation,electi	ton		488,414	25,706	0	0	0
Bridge railing	m		21,742	1,144	0	0	0
Excavation for diversion of the river	m3		40	10	0	0	0
Construction and removal of temporary road	m3		335	84	0	0	0
Temporary bridge	m		52,156	2,745	0	0	0
Steel sheet pile	m	4,300	2,673	141	11,495,190	605,010	12,100,200
TOTAL					31,947,690	4,002,751	35,950,441

Appendix 6.6.1 (2) Cost of Access (Sanepa, Koteswor, Patan Core and New Bus Terminal Access)

Description	Unit	Quantity	Unit Cost		Amount		Total
			Foreign	Local	Foreign	Local	
			Portion	Portion	Portion	Portion	
Clear site and stripping	m2	8,830	16	4	141,280	35,320	176600
Removal of existing pavement material	m3		308	77	0	0	0
Removal of existing bridge at Thaphatali	L.S		4,802,398	1,200,600	0	0	0
Removal of existing structures	m3		1,566	392	0	0	0
Fill in soft material	m3	9,582	335	84	3,211,886	802,972	4014858
Spoil in soft material	m3	1,373	241	60	330,618	82,655	413273
Sodding	m2	2,414	156	39	376,584	94,146	470730
Plant selected trees	no.		1,292	0	0	0	0
Gabion	m3		1,957	345	0	0	0
Stone Masonry	m2		4,885	1,221	0	0	0
Excavation in soft material for structures	m3		40	10	0	0	0
Backfilling with selected materials for structures	m3		36	9	0	0	0
Side block	m		558	239	0	0	0
Kerb stone (A)	m	990	1,352	580	1,338,876	573,804	1912680
Kerb stone (B)	m		2,668	1,143	0	0	0
Kerb stone for bridge	m		570	244	0	0	0
Pipe culvert D300	m	188	2,110	904	396,642	169,990	566632
Pipe culvert D600	m	240	3,720	1,594	892,752	382,608	1275360
Pipe culvert D1000	m	74	7,445	3,191	550,893	236,097	786990
U shaped drain ditch (0.3 x 0.3m)	m	940	1,384	593	1,300,866	557,514	1858380
U shaped drain ditch (0.5 x 0.5m)	m		1,912	820	0	0	0
U shaped drain ditch (1.0 x 1.0m)	m		4,624	1,982	0	0	0
Side drain with stone pitching	m		1,373	343	0	0	0
Catch pit	no.	47	6,811	2,919	320,117	137,193	457310
Manhole	no.	102	11,379	4,877	1,160,678	497,434	1658112
Subbase course	m3	638	648	162	413,424	103,356	516780
Base course	m3	552	1,173	293	647,386	161,846	809232
Prime coat, 1.0 litre/m2	m2	4,880	33	1	160,942	4,978	165920
Tack coat, 0.4litre/m2	m2	4,880	11	0	52,070	1,610	53680
Asphalt concrete binder course t=6cm	m2	4,880	577	86	2,814,833	420,607	3235440
Asphalt concrete binder course t=10cm	m2		968	145	0	0	0
Asphalt concrete surfase course t=4cm	m2	4,880	415	62	2,025,151	302,609	2327760
Asphalt concrete surfase course t=5cm	m2		512	77	0	0	0
Side walk t=13cm	m2	2,440	402	60	980,734	146,546	1127280
Road lighting	no.		269,413	5,498	0	0	0
Traffic signal	portion	1	4,598,410	93,845	4,598,410	93,845	4692255
Lane marking 15cm	m	1,575	54	1	84,893	1,733	86625
Information sign	no.	3	222,546	4,542	667,639	13,625	681264
Steel pile D800	m		22,121	451	0	0	0
Steel pile D500			11,060	226	0	0	0
Concrete class-A, 240kg	m3		4,598	94	0	0	0
Concrete class-C, 180kg	m3		3,627	74	0	0	0
Formwork for superstructures	m2		632	271	0	0	0
Formwork for all structures other than superstructure	m2		408	175	0	0	0
Reinforcement	ton		37,914	774	0	0	0
Prate girder (material,assemble,transportation,electi	ton		488,414	25,706	0	0	0
Bridge railing	m		21,742	1,144	0	0	0
Excavation for diversion of the river	m3		40	10	0	0	0
Construction and removal of temporary road	m3		335	84	0	0	0
Temporary bridge	m		52,156	2,745	0	0	0
Steel sheet pile	m		2,673	141	0	0	0
TOTAL					22,466,674	4,820,487	27,287,161

Construction Cost of Koteswor Access

Unit : NRs.

Description	Unit	Quantity	Unit Cost		Amount		Total
			Foreign	Local	Foreign	Local	
			Portion	Portion	Portion	Portion	
Clear site and stripping	m2	45,000	16	4	720,000	180,000	900000
Removal of existing pavement material	m3		308	77	0	0	0
Removal of existing bridge at Thaphatali	L.S		4,802,398	1,200,600	0	0	0
Removal of existing structures	m3		1,566	392	0	0	0
Fill in soft material	m3	68,173	335	84	22,851,590	5,712,897	28564487
Spoil in soft material	m3	11,004	241	60	2,649,763	662,441	3312204
Sodding	m2	15,599	156	39	2,433,444	608,361	3041805
Plant selected trees	no.		1,292	0	0	0	0
Gabion	m3		1,957	345	0	0	0
Stone Masonry	m2		4,885	1,221	0	0	0
Excavation in soft material for structures	m3		40	10	0	0	0
Backfilling with selected materials for structures	m3		36	9	0	0	0
Side block	m		558	239	0	0	0
Kerb stone (A)	m	4,064	1,352	580	5,496,154	2,355,494	7851648
Kerb stone (B)	m	150	2,668	1,143	400,155	171,495	571650
Kerb stone for bridge	m		570	244	0	0	0
Pipe culvert D300	m	1,600	2,110	904	3,375,680	1,446,720	4822400
Pipe culvert D600	m	1,060	3,720	1,594	3,942,988	1,689,852	5632840
Pipe culvert D1000	m	81	7,445	3,191	603,005	258,431	861435
U shaped drain ditch (0.3 x 0.3m)	m		1,384	593	0	0	0
U shaped drain ditch (0.5 x 0.5m)	m	3,615	1,912	820	6,913,326	2,962,854	9876180
U shaped drain ditch (1.0 x 1.0m)	m		4,624	1,982	0	0	0
Side drain with stone pitching	m		1,373	343	0	0	0
Catch pit	no.	206	6,811	2,919	1,403,066	601,314	2004380
Manhole	no.	114	11,379	4,877	1,297,229	555,955	1853184
Subbase course	m3	2,894	648	162	1,875,312	468,828	2344140
Base course	m3	2,504	1,173	293	2,936,691	734,173	3670864
Prime coat, 1.0 litre/m2	m2	22,140	33	1	730,177	22,583	752760
Tack coat, 0.4litre/m2	m2	22,140	11	0	236,234	7,306	243540
Asphalt concrete binder course t=6cm	m2	22,140	577	86	12,770,573	1,908,247	14678820
Asphalt concrete binder course t=10cm	m2		968	145	0	0	0
Asphalt concrete surfase course t=4cm	m2	22,140	415	62	9,187,879	1,372,901	10560780
Asphalt concrete surfase course t=5cm	m2		512	77	0	0	0
Side walk t=13cm	m2	11,070	402	60	4,449,476	664,864	5114340
Road lighting	no.		269,413	5,498	0	0	0
Traffic signal	portion	1	4,598,410	93,845	4,598,410	93,845	4692255
Lane marking 15cm	m	6,681	54	1	360,106	7,349	367455
Information sign	no.	3	222,546	4,542	667,639	13,625	681264
Steel pile D800	m		22,121	451	0	0	0
Steel pile D500			11,060	226	0	0	0
Concrete class-A, 240kg	m3		4,598	94	0	0	0
Concrete class-C, 180kg	m3		3,627	74	0	0	0
Formwork for superstructures	m2		632	271	0	0	0
Formwork for all structures other than superstructure	m2		408	175	0	0	0
Reinforcement	ton		37,914	774	0	0	0
Prate girder (material, assemble, transportation, electi	ton		488,414	25,706	0	0	0
Bridge railing	m		21,742	1,144	0	0	0
Excavation for diversion of the river	m3		40	10	0	0	0
Construction and removal of temporary road	m3		335	84	0	0	0
Temporary bridge	m		52,156	2,745	0	0	0
Steel sheet pile	m		2,673	141	0	0	0
TOTAL					89,898,895	22,499,536	112,398,431

Construction Cost of Patan Access

Unit : NRs.

Description	Unit	Quantity	Unit Cost		Amount		Total
			Foreign	Local	Foreign	Local	
			Portion	Portion	Portion	Portion	
Clear site and stripping	m2	3,556	16	4	56,896	14,224	71120
Removal of existing pavement material	m3		308	77	0	0	0
Removal of existing bridge at Thaphatali	L.S		4,802,398	1,200,600	0	0	0
Removal of existing structures	m3		1,566	392	0	0	0
Fill in soft material	m3	2,511	335	84	841,687	210,422	1052109
Spoil in soft material	m3	275	241	60	66,220	16,555	82775
Sodding	m2	1,086	156	39	169,416	42,354	211770
Plant selected trees	no.		1,292	0	0	0	0
Gabion	m3		1,957	345	0	0	0
Stone Masonry	m2	490	4,885	1,221	2,393,552	598,388	2991940
Excavation in soft material for structures	m3		40	10	0	0	0
Backfilling with selected materials for structures	m3		36	9	0	0	0
Side block	m		558	239	0	0	0
Kerb stone (A)	m	400	1,352	580	540,960	231,840	772800
Kerb stone (B)	m		2,668	1,143	0	0	0
Kerb stone for bridge	m		570	244	0	0	0
Pipe culvert D300	m	80	2,110	904	168,784	72,336	241120
Pipe culvert D600	m	200	3,720	1,594	743,960	318,840	1062800
Pipe culvert D1000	m		7,445	3,191	0	0	0
U shaped drain ditch (0.3 x 0.3m)	m	365	1,384	593	505,124	216,482	721605
U shaped drain ditch (0.5 x 0.5m)	m		1,912	820	0	0	0
U shaped drain ditch (1.0 x 1.0m)	m		4,624	1,982	0	0	0
Side drain with stone pitching	m		1,373	343	0	0	0
Catch pit	no.	20	6,811	2,919	136,220	58,380	194600
Manhole	no.	4	11,379	4,877	45,517	19,507	65024
Subbase course	m3	423	648	162	274,104	68,526	342630
Base course	m3	368	1,173	293	431,590	107,898	539488
Prime coat, 1.0 litre/m2	m2	1,600	33	1	52,768	1,632	54400
Tack coat, 0.4litre/m2	m2	1,600	11	0	17,072	528	17600
Asphalt concrete binder course t=6cm	m2	1,600	577	86	922,896	137,904	1060800
Asphalt concrete binder course t=10cm	m2		968	145	0	0	0
Asphalt concrete surfase course t=4cm	m2	1,600	415	62	663,984	99,216	763200
Asphalt concrete surfase course t=5cm	m2		512	77	0	0	0
Side walk t=13cm	m2	1,600	402	60	643,104	96,096	739200
Road lighting	no.		269,413	5,498	0	0	0
Traffic signal	portion	1	4,598,410	93,845	4,598,410	93,845	4692255
Lane marking 15cm	m	690	54	1	37,191	759	37950
Information sign	no.	3	222,546	4,542	667,639	13,625	681264
Steel pile D800	m		22,121	451	0	0	0
Steel pile D500			11,060	226	0	0	0
Concrete class-A, 240kg	m3		4,598	94	0	0	0
Concrete class-C, 180kg	m3		3,627	74	0	0	0
Formwork for superstructures	m2		632	271	0	0	0
Formwork for all structures other than superstructur	m2		408	175	0	0	0
Reinforcement	ton		37,914	774	0	0	0
Prate girder (material,assemble,transportation,electi	ton		488,414	25,706	0	0	0
Bridge railing	m		21,742	1,144	0	0	0
Excavation for diversion of the river	m3		40	10	0	0	0
Construction and removal of temporary road	m3		335	84	0	0	0
Temporary bridge	m		52,156	2,745	0	0	0
Steel sheet pile	m		2,673	141	0	0	0
TOTAL					13,977,094	2,419,356	16,396,450

Construction Cost of Central Bus Terminal Access

Unit : NRs.

Description	Unit	Quantity	Unit Cost		Amount		Total
			Foreign	Local	Foreign	Local	
			Portion	Portion	Portion	Portion	
Clear site and stripping	m2	38,012	16	4	608,192	152,048	760240
Removal of existing pavement material	m3		308	77	0	0	0
Removal of existing bridge at Thaphatali	L.S		4,802,398	1,200,600	0	0	0
Removal of existing structures	m3		1,566	392	0	0	0
Fill in soft material	m3	41,384	335	84	13,871,917	3,467,979	17339896
Spoil in soft material	m3	196	241	60	47,197	11,799	58996
Sodding	m2	10,856	156	39	1,693,536	423,384	2116920
Plant selected trees	no.		1,292	0	0	0	0
Gabion	m3		1,957	345	0	0	0
Stone Masonry	m2		4,885	1,221	0	0	0
Excavation in soft material for structures	m3	120	40	10	4,800	1,200	6000
Backfilling with selected materials for structures	m3	40	36	9	1,440	360	1800
Side block	m		558	239	0	0	0
Kerb stone (A)	m	3,730	1,352	580	5,044,452	2,161,908	7206360
Kerb stone (B)	m		2,668	1,143	0	0	0
Kerb stone for bridge	m		570	244	0	0	0
Pipe culvert D300	m	750	2,110	904	1,582,350	678,150	2260500
Pipe culvert D600	m	760	3,720	1,594	2,827,048	1,211,592	4038640
Pipe culvert D1000	m	133	7,445	3,191	990,119	424,337	1414455
U shaped drain ditch (0.3 x 0.3m)	m		1,384	593	0	0	0
U shaped drain ditch (0.5 x 0.5m)	m	3,572	1,912	820	6,831,093	2,927,611	9758704
U shaped drain ditch (1.0 x 1.0m)	m	132	4,624	1,982	610,394	261,598	871992
Side drain with stone pitching	m		1,373	343	0	0	0
Catch pit	no.	187	6,811	2,919	1,273,657	545,853	1819510
Manhole	no.	90	11,379	4,877	1,024,128	438,912	1463040
Subbase course	m3	4,875	648	162	3,159,000	789,750	3948750
Base course	m3	4,219	1,173	293	4,948,043	1,237,011	6185054
Prime coat, 1.0 litre/m2	m2	18,650	33	1	615,077	19,023	634100
Tack coat, 0.4litre/m2	m2	18,650	11	0	198,996	6,155	205150
Asphalt concrete binder course t=6cm	m2	18,650	577	86	10,757,507	1,607,444	12364950
Asphalt concrete binder course t=10cm	m2		968	145	0	0	0
Asphalt concrete surfase course t=4cm	m2	18,650	415	62	7,739,564	1,156,487	8896050
Asphalt concrete surfase course t=5cm	m2		512	77	0	0	0
Side walk t=13cm	m2	9,325	402	60	3,748,091	560,060	4308150
Road lighting	no.		269,413	5,498	0	0	0
Traffic signal	portion	2	4,598,410	93,845	9,196,820	187,690	9384510
Lane marking 15cm	m	5,775	54	1	311,273	6,353	317625
Information sign	no.	6	222,546	4,542	1,335,277	27,251	1362528
Steel pile D800	m		22,121	451	0	0	0
Steel pile D500			11,060	226	0	0	0
Concrete class-A, 240kg	m3	73	4,598	94	335,666	6,850	342516
Concrete class-C, 180kg	m3	8	3,627	74	29,016	592	29608
Formwork for superstructures	m2		632	271	0	0	0
Formwork for all structures other than superstructure	m2	245	408	175	99,985	42,851	142835
Reinforcement	ton	8	37,914	774	303,314	6,190	309504
Prate girder (material,assemble,transportation,electi	ton		488,414	25,706	0	0	0
Bridge railing	m		21,742	1,144	0	0	0
Excavation for diversion of the river	m3		40	10	0	0	0
Construction and removal of temporary road	m3		335	84	0	0	0
Temporary bridge	m		52,156	2,745	0	0	0
Steel sheet pile	m		2,673	141	0	0	0
TOTAL					79,187,948	18,360,435	97,548,383

Appendix 6.6.1 (3) Cost of Bridges and Pedestrian Bridges
Construction Cost of Bagmati Bridge No.1

Description	Unit : NRs.			
	Local		Amount	
	Portion	Foreign Portion	Local Portion	Total
Clear site and stripping	4	0	0	0
Removal of existing pave	77	0	0	0
Removal of existing bridg	1,200,600	0	0	0
Removal of existing struc	392	0	0	0
Fill in soft material	84	0	0	0
Spoil in soft material	60	0	0	0
Sodding	39	0	0	0
Plant selected trees	0	0	0	0
Gabion	345	1,858,865	328,035	2186900
Stone Masonry	1,221	322,397	80,599	402996
Excavation in soft materi	10	219,200	54,800	274000
Backfilling with selectdr	9	154,440	38,610	193050
Side block	239	0	0	0
Kerb stone (A)	580	0	0	0
Kerb stone (B)	1,143	0	0	0
Kerb stone for bridge	244	174,359	74,725	249084
Pipe culvert D300	904	0	0	0
Pipe culvert D600	1,594	0	0	0
Pipe culvert D1000	3,191	0	0	0
U shaped drain ditch (0.3	593	0	0	0
U shaped drain ditch (0.5	820	0	0	0
U shaped drain ditch (1.0	1,982	0	0	0
Side drain with stone pitel	343	0	0	0
Catch pit	2,919	0	0	0
Manhole	4,877	0	0	0
Subbase course	162	0	0	0
Base course	293	0	0	0
Prime coat, 1.0 litre/m2	1	39,576	1,224	40800
Tack coat, 0.4litre/m2	0	0	0	0
Asphalt concrete binder c	86	0	0	0
Asphalt concrete binder c	145	0	0	0
Asphalt concrete surfase c	62	497,988	74,412	572400
Asphalt concrete surfase c	77	0	0	0
Side walk t=13cm	60	307,484	45,946	353430
Road lighting	5,498	0	0	0
Traffic signal	93,845	0	0	0
Lane marking 15cm	1	8,247	168	8415
Information sign	4,542	0	0	0
Steel pile D800	451	67,688,914	1,381,406	69070320
Steel pile D500	226	0	0	0
Concrete class-A, 240kg	94	9,426,228	192,372	9618600
Concrete class-C, 180kg	74	199,484	4,071	203555
Formwork for superstruct	271	1,441,188	617,652	2058840
Formwork for all structur	175	644,798	276,342	921140
Reinforcement	774	9,478,560	193,440	9672000
Prate girder (material,asse	25,706	142,616,888	7,506,152	150123040
Bridge railing	1,144	6,652,960	350,156	7003116
Excavation for diversion t	10	107,200	26,800	134000
Construction and removal	84	1,257,000	314,250	1571250
Temporary bridge	2,745	625,871	32,941	658812
Steel sheet pile	141	0	0	0
TOTAL		243,721,647	11,594,102	255,315,748

Construction Cost of Bagmati Bridge No.2

Unit : NRs.

Description	Unit	Quantity	Unit Cost		Amount		Total
			Foreign	Local	Foreign	Local	
			Portion	Portion	Portion	Portion	
Clear site and stripping	m2		16	4	0	0	0
Removal of existing pavement material	m3		308	77	0	0	0
Removal of existing bridge at Thaphatali	L.S		4,802,398	1,200,600	0	0	0
Removal of existing structures	m3		1,566	392	0	0	0
Fill in soft material	m3		335	84	0	0	0
Spoil in soft material	m3		241	60	0	0	0
Sodding	m2		156	39	0	0	0
Plant selected trees	no.		1,292	0	0	0	0
Gabion	m3	1,060	1,957	345	2,074,102	366,018	2,440,120
Stone Masonry	m2		4,885	1,221	0	0	0
Excavation in soft material for structures	m3	4,980	40	10	199,200	49,800	249,000
Backfilling with selected materials for structures	m3	3,300	36	9	118,800	29,700	148,500
Side block	m		558	239	0	0	0
Kerb stone (A)	m		1,352	580	0	0	0
Kerb stone (B)	m		2,668	1,143	0	0	0
Kerb stone for bridge	m	276	570	244	157,265	67,399	224,664
Pipe culvert D300	m		2,110	904	0	0	0
Pipe culvert D600	m		3,720	1,594	0	0	0
Pipe culvert D1000	m		7,445	3,191	0	0	0
U shaped drain ditch (0.3 x 0.3m)	m		1,384	593	0	0	0
U shaped drain ditch (0.5 x 0.5m)	m		1,912	820	0	0	0
U shaped drain ditch (1.0 x 1.0m)	m		4,624	1,982	0	0	0
Side drain with stone pitching	m		1,373	343	0	0	0
Catch pit	no.		6,811	2,919	0	0	0
Manhole	no.		11,379	4,877	0	0	0
Subbase course	m3		648	162	0	0	0
Base course	m3		1,173	293	0	0	0
Prime coat, 1.0 litre/m2	m2	1,380	33	1	45,512	1,408	46,920
Tack coat, 0.4litre/m2	m2		11	0	0	0	0
Asphalt concrete binder course t=6cm	m2		577	86	0	0	0
Asphalt concrete binder course t=10cm	m2		968	145	0	0	0
Asphalt concrete surfase course t=4cm	m2	1,380	415	62	572,686	85,574	658,260
Asphalt concrete surfase course t=5cm	m2		512	77	0	0	0
Side walk t=13cm	m2	414	402	60	166,403	24,865	191,268
Road lighting	no.	4	269,413	5,498	1,077,651	21,993	1,099,644
Traffic signal	portion		4,598,410	93,845	0	0	0
Lane marking 15cm	m	138	54	1	7,438	152	7,590
Information sign	no.		222,546	4,542	0	0	0
Steel pile D800	m	1,680	22,121	451	37,162,541	758,419	37,920,960
Steel pile D500			11,060	226	0	0	0
Concrete class-A, 240kg	m3	1,840	4,598	94	8,460,614	172,666	8,633,280
Concrete class-C, 180kg	m3	850	3,627	74	3,082,933	62,917	3,145,850
Formwork for superstructures	m2	2,170	632	271	1,371,657	587,853	1,959,510
Formwork for all structures other than superstructur	m2	1,940	408	175	791,714	339,306	1,131,020
Reinforcement	ton	230	37,914	774	8,720,275	177,965	8,898,240
Prate girder (material,assemble,transportation,electi	ton	268	488,414	25,706	130,894,952	6,889,208	137,784,160
Bridge railing	m	276	21,742	1,144	6,000,709	315,827	6,316,536
Excavation for diversion of the river	m3		40	10	0	0	0
Construction and removal of temporary road	m3		335	84	0	0	0
Temporary bridge	m	70	52,156	2,745	3,650,917	192,154	3,843,070
Steel sheet pile	m	3,960	2,673	141	10,586,268	557,172	11,143,440
TOTAL					215,141,638	10,700,394	225,842,032

Construction Cost of Bagmati Bridge No.3

Unit : NRs.

Description	Unit	Quantity	Unit Cost		Amount		Total
			Foreign	Local	Foreign	Local	
			Portion	Portion	Portion	Portion	
Clear site and stripping	m2		16	4	0	0	0
Removal of existing pavement material	m3		308	77	0	0	0
Removal of existing bridge at Thaphatali	L.S		4,802,398	1,200,600	0	0	0
Removal of existing structures	m3		1,566	392	0	0	0
Fill in soft material	m3		335	84	0	0	0
Spoil in soft material	m3		241	60	0	0	0
Sodding	m2		156	39	0	0	0
Plant selected trees	no.		1,292	0	0	0	0
Gabion	m3	2,010	1,957	345	3,932,967	694,053	4,627,020
Stone Masonry	m2	190	4,885	1,221	928,112	232,028	1,160,140
Excavation in soft material for structures	m3	3,110	40	10	124,400	31,100	155,500
Backfilling with selected materials for structures	m3	2,410	36	9	86,760	21,690	108,450
Side block	m		558	239	0	0	0
Kerb stone (A)	m		1,352	580	0	0	0
Kerb stone (B)	m		2,668	1,143	0	0	0
Kerb stone for bridge	m	240	570	244	136,752	58,608	195,360
Pipe culvert D300	m		2,110	904	0	0	0
Pipe culvert D600	m		3,720	1,594	0	0	0
Pipe culvert D1000	m		7,445	3,191	0	0	0
U shaped drain ditch (0.3 x 0.3m)	m		1,384	593	0	0	0
U shaped drain ditch (0.5 x 0.5m)	m		1,912	820	0	0	0
U shaped drain ditch (1.0 x 1.0m)	m		4,624	1,982	0	0	0
Side drain with stone pitching	m		1,373	343	0	0	0
Catch pit	no.		6,811	2,919	0	0	0
Manhole	no.		11,379	4,877	0	0	0
Subbase course	m3		648	162	0	0	0
Base course	m3		1,173	293	0	0	0
Prime coat, 1.0 litre/m2	m2	960	33	1	31,661	979	32,640
Tack coat, 0.4litre/m2	m2		11	0	0	0	0
Asphalt concrete binder course t=6cm	m2		577	86	0	0	0
Asphalt concrete binder course t=10cm	m2		968	145	0	0	0
Asphalt concrete surfase course t=4cm	m2	960	415	62	398,390	59,530	457,920
Asphalt concrete surfase course t=5cm	m2		512	77	0	0	0
Side walk t=13cm	m2	600	402	60	241,164	36,036	277,200
Road lighting	no.		269,413	5,498	0	0	0
Traffic signal	portion		4,598,410	93,845	0	0	0
Lane marking 15cm	m	120	54	1	6,468	132	6,600
Information sign	no.		222,546	4,542	0	0	0
Steel pile D800	m	1,414	22,121	451	31,278,472	638,336	31,916,808
Steel pile D500	m		11,060	226	0	0	0
Concrete class-A, 240kg	m3	1,470	4,598	94	6,759,295	137,945	6,897,240
Concrete class-C, 180kg	m3	35	3,627	74	126,944	2,591	129,535
Formwork for superstructures	m2	1,820	632	271	1,150,422	493,038	1,643,460
Formwork for all structures other than superstructure	m2	1,300	408	175	530,530	227,370	757,900
Reinforcement	ton	195	37,914	774	7,393,277	150,883	7,544,160
Prate girder (material,assemble,transportation,electi	ton	234	488,414	25,706	114,288,876	6,015,204	120,304,080
Bridge railing	m	240	21,742	1,144	5,218,008	274,632	5,492,640
Excavation for diversion of the river	m3		40	10	0	0	0
Construction and removal of temporary road	m3	4,540	335	84	1,521,808	380,452	1,902,260
Temporary bridge	m		52,156	2,745	0	0	0
Steel sheet pile	m		2,673	141	0	0	0
TOTAL					174,154,306	9,454,607	183,608,913

Construction Cost of Bagmati Bridge No.4

Unit : NRs.

Description	Unit	Quantity	Unit Cost		Amount		Total
			Foreign	Local	Foreign	Local	
			Portion	Portion	Portion	Portion	
Clear site and stripping	m2		16	4	0	0	0
Removal of existing pavement material	m3		308	77	0	0	0
Removal of existing bridge at Thaphatali	L.S		4,802,398	1,200,600	0	0	0
Removal of existing structures	m3		1,566	392	0	0	0
Fill in soft material	m3		335	84	0	0	0
Spoil in soft material	m3		241	60	0	0	0
Sodding	m2		156	39	0	0	0
Plant selected trees	no.		1,292	0	0	0	0
Gabion	m3	620	1,957	345	1,213,154	214,086	1,427,240
Stone Masonry	m2	250	4,885	1,221	1,221,200	305,300	1,526,500
Excavation in soft material for structures	m3	2,630	40	10	105,200	26,300	131,500
Backfilling with selected materials for structures	m3	2,020	36	9	72,720	18,180	90,900
Side block	m		558	239	0	0	0
Kerb stone (A)	m		1,352	580	0	0	0
Kerb stone (B)	m		2,668	1,143	0	0	0
Kerb stone for bridge	m	120	570	244	68,376	29,304	97,680
Pipe culvert D300	m		2,110	904	0	0	0
Pipe culvert D600	m		3,720	1,594	0	0	0
Pipe culvert D1000	m		7,445	3,191	0	0	0
U shaped drain ditch (0.3 x 0.3m)	m		1,384	593	0	0	0
U shaped drain ditch (0.5 x 0.5m)	m		1,912	820	0	0	0
U shaped drain ditch (1.0 x 1.0m)	m		4,624	1,982	0	0	0
Side drain with stone pitching	m		1,373	343	0	0	0
Catch pit	no.		6,811	2,919	0	0	0
Manhole	no.		11,379	4,877	0	0	0
Subbase course	m3		648	162	0	0	0
Base course	m3		1,173	293	0	0	0
Prime coat, 1.0 litre/m2	m2	480	33	1	15,830	490	16,320
Tack coat, 0.4litre/m2	m2		11	0	0	0	0
Asphalt concrete binder course t=6cm	m2		577	86	0	0	0
Asphalt concrete binder course t=10cm	m2		968	145	0	0	0
Asphalt concrete surfase course t=4cm	m2	480	415	62	199,195	29,765	228,960
Asphalt concrete surfase course t=5cm	m2		512	77	0	0	0
Side walk t=13cm	m2	300	402	60	120,582	18,018	138,600
Road lighting	no.		269,413	5,498	0	0	0
Traffic signal	portion		4,598,410	93,845	0	0	0
Lane marking 15cm	m	60	54	1	3,234	66	3,300
Information sign	no.		222,546	4,542	0	0	0
Steel pile D800	m	1,530	22,121	451	33,844,457	690,703	34,535,160
Steel pile D500			11,060	226	0	0	0
Concrete class-A, 240kg	m3	970	4,598	94	4,460,215	91,025	4,551,240
Concrete class-C, 180kg	m3	30	3,627	74	108,809	2,221	111,030
Formwork for superstructures	m2	910	632	271	575,211	246,519	821,730
Formwork for all structures other than superstructure	m2	880	408	175	359,128	153,912	513,040
Reinforcement	ton	112	37,914	774	4,246,395	86,661	4,333,056
Prate girder (material,assemble,transportation,electi	ton	117	488,414	25,706	57,144,438	3,007,602	60,152,040
Bridge railing	m	120	21,742	1,144	2,609,004	137,316	2,746,320
Excavation for diversion of the river	m3		40	10	0	0	0
Construction and removal of temporary road	m3	1,670	335	84	559,784	139,946	699,730
Temporary bridge	m		52,156	2,745	0	0	0
Steel sheet pile	m		2,673	141	0	0	0
TOTAL					106,926,933	5,197,413	112,124,346

Construction Cost of Pedestrian Bridge at Thaphatali

Unit : NRs.

Description	Unit	Quantity	Unit Cost		Amount		Total
			Foreign	Local	Foreign	Local	
			Portion	Portion	Portion	Portion	
Clear site and stripping	m2		16	4	0	0	0
Removal of existing pavement material	m3		308	77	0	0	0
Removal of existing bridge at Thaphatali	L.S		4,802,398	1,200,600	0	0	0
Removal of existing structures	m3		1,566	392	0	0	0
Fill in soft material	m3		335	84	0	0	0
Spoil in soft material	m3		241	60	0	0	0
Sodding	m2		156	39	0	0	0
Plant selected trees	no.		1,292	0	0	0	0
Gabion	m3		1,957	345	0	0	0
Stone Masonry	m2		4,885	1,221	0	0	0
Excavation in soft material for structures	m3	630	40	10	25,200	6,300	31,500
Backfilling with selected materials for structures	m3	160	36	9	5,760	1,440	7,200
Side block	m		558	239	0	0	0
Kerb stone (A)	m		1,352	580	0	0	0
Kerb stone (B)	m		2,668	1,143	0	0	0
Kerb stone for bridge	m		570	244	0	0	0
Pipe culvert D300	m		2,110	904	0	0	0
Pipe culvert D600	m		3,720	1,594	0	0	0
Pipe culvert D1000	m		7,445	3,191	0	0	0
U shaped drain ditch (0.3 x 0.3m)	m		1,384	593	0	0	0
U shaped drain ditch (0.5 x 0.5m)	m		1,912	820	0	0	0
U shaped drain ditch (1.0 x 1.0m)	m		4,624	1,982	0	0	0
Side drain with stone pitching	m		1,373	343	0	0	0
Catch pit	no.		6,811	2,919	0	0	0
Manhole	no.		11,379	4,877	0	0	0
Subbase course	m3		648	162	0	0	0
Base course	m3		1,173	293	0	0	0
Prime coat, 1.0 litre/m2	m2		33	1	0	0	0
Tack coat, 0.4litre/m2	m2		11	0	0	0	0
Asphalt concrete binder course t=6cm	m2		577	86	0	0	0
Asphalt concrete binder course t=10cm	m2		968	145	0	0	0
Asphalt concrete surface course t=4cm	m2	410	415	62	170,146	25,424	195,570
Asphalt concrete surface course t=5cm	m2		512	77	0	0	0
Side walk t=13cm	m2		402	60	0	0	0
Road lighting	no.		269,413	5,498	0	0	0
Traffic signal	portion		4,598,410	93,845	0	0	0
Lane marking 15cm	m		54	1	0	0	0
Information sign	no.		222,546	4,542	0	0	0
Steel pile D800	m		22,121	451	0	0	0
Steel pile D500		1,640	11,060	226	18,138,859	370,181	18,509,040
Concrete class-A, 240kg	m3	330	4,598	94	1,517,393	30,967	1,548,360
Concrete class-C, 180kg	m3	23	3,627	74	83,421	1,702	85,123
Formwork for superstructures	m2		632	271	0	0	0
Formwork for all structures other than superstructure	m2	300	408	175	122,430	52,470	174,900
Reinforcement	ton	20	37,914	774	758,285	15,475	773,760
Prate girder (material, assemble, transportation, electi	ton	137	488,414	25,706	66,912,718	3,521,722	70,434,440
Bridge railing	m		21,742	1,144	0	0	0
Excavation for diversion of the river	m3		40	10	0	0	0
Construction and removal of temporary road	m3		335	84	0	0	0
Temporary bridge	m		52,156	2,745	0	0	0
Steel sheet pile	m		2,673	141	0	0	0
TOTAL					87,734,211	4,025,682	91,759,893

Construction Cost of Pedestrian Bridge at Patan

Unit : NRs.

Description	Unit	Quantity	Unit Cost		Amount		Total
			Foreign	Local	Foreign	Local	
			Portion	Portion	Portion	Portion	
Clear site and stripping	m2		16	4	0	0	0
Removal of existing pavement material	m3		308	77	0	0	0
Removal of existing bridge at Thaphatali	L.S		4,802,398	1,200,600	0	0	0
Removal of existing structures	m3		1,566	392	0	0	0
Fill in soft material	m3		335	84	0	0	0
Spoil in soft material	m3		241	60	0	0	0
Sodding	m2		156	39	0	0	0
Plant selected trees	no.		1,292	0	0	0	0
Gabion	m3		1,957	345	0	0	0
Stone Masonry	m2		4,885	1,221	0	0	0
Excavation in soft material for structures	m3	800	40	10	32,000	8,000	40,000
Backfilling with selected materials for structures	m3	200	36	9	7,200	1,800	9,000
Side block	m		558	239	0	0	0
Kerb stone (A)	m		1,352	580	0	0	0
Kerb stone (B)	m		2,668	1,143	0	0	0
Kerb stone for bridge	m		570	244	0	0	0
Pipe culvert D300	m		2,110	904	0	0	0
Pipe culvert D600	m		3,720	1,594	0	0	0
Pipe culvert D1000	m		7,445	3,191	0	0	0
U shaped drain ditch (0.3 x 0.3m)	m		1,384	593	0	0	0
U shaped drain ditch (0.5 x 0.5m)	m		1,912	820	0	0	0
U shaped drain ditch (1.0 x 1.0m)	m		4,624	1,982	0	0	0
Side drain with stone pitching	m		1,373	343	0	0	0
Catch pit	no.		6,811	2,919	0	0	0
Manhole	no.		11,379	4,877	0	0	0
Subbase course	m3		648	162	0	0	0
Base course	m3		1,173	293	0	0	0
Prime coat, 1.0 litre/m2	m2		33	1	0	0	0
Tack coat, 0.4litre/m2	m2		11	0	0	0	0
Asphalt concrete binder course t=6cm	m2		577	86	0	0	0
Asphalt concrete binder course t=10cm	m2		968	145	0	0	0
Asphalt concrete surface course t=4cm	m2	570	415	62	236,544	35,346	271,890
Asphalt concrete surface course t=5cm	m2		512	77	0	0	0
Side walk t=13cm	m2		402	60	0	0	0
Road lighting	no.		269,413	5,498	0	0	0
Traffic signal	portion	1	4,598,410	93,845	4,598,410	93,845	4,692,255
Lane marking 15cm	m		54	1	0	0	0
Information sign	no.		222,546	4,542	0	0	0
Steel pile D800	m		22,121	451	0	0	0
Steel pile D500		1,840	11,060	226	20,350,915	415,325	20,766,240
Concrete class-A, 240kg	m3	450	4,598	94	2,069,172	42,228	2,111,400
Concrete class-C, 180kg	m3	30	3,627	74	108,809	2,221	111,030
Formwork for superstructures	m2		632	271	0	0	0
Formwork for all structures other than superstructure	m2	410	408	175	167,321	71,709	239,030
Reinforcement	ton	27	37,914	774	1,023,684	20,892	1,044,576
Prate girder (material, assemble, transportation, electi	ton	152	488,414	25,706	74,238,928	3,907,312	78,146,240
Bridge railing	m		21,742	1,144	0	0	0
Excavation for diversion of the river	m3		40	10	0	0	0
Construction and removal of temporary road	m3		335	84	0	0	0
Temporary bridge	m		52,156	2,745	0	0	0
Steel sheet pile	m		2,673	141	0	0	0
TOTAL					102,832,984	4,598,677	107,431,661

Appendix 6.6.1 (4) Cost of Intersections at Patan and Thapathali

Construction Cost of Patan Side Intersection

Description	Unit	Quantity	Unit Cost		Amount		Unit : NRs.
			Foreign	Local	Foreign	Local	Total
			Portion	Portion	Portion	Portion	
Clear site and stripping	m2		16	4	0	0	0
Removal of existing pavement material	m3	100	308	77	30,800	7,700	38500
Removal of existing bridge at Thaphatali	L.S		4,802,398	1,200,600	0	0	0
Removal of existing structures	m3	100	1,566	392	156,640	39,160	195800
Fill in soft material	m3	862	335	84	288,942	72,236	361178
Spoil in soft material	m3	493	241	60	118,714	29,679	148393
Sodding	m2		156	39	0	0	0
Plant selected trees	no.		1,292	0	0	0	0
Gabion	m3	500	1,957	345	978,350	172,650	1151000
Stone Masonry	m2		4,885	1,221	0	0	0
Excavation in soft material for structures	m3		40	10	0	0	0
Backfilling with selected materials for structures	m3		36	9	0	0	0
Side block	m		558	239	0	0	0
Kerb stone (A)	m		1,352	580	0	0	0
Kerb stone (B)	m	450	2,668	1,143	1,200,465	514,485	1714950
Kerb stone for bridge	m		570	244	0	0	0
Pipe culvert D300	m		2,110	904	0	0	0
Pipe culvert D600	m	50	3,720	1,594	185,990	79,710	265700
Pipe culvert D1000	m		7,445	3,191	0	0	0
U shaped drain ditch (0.3 x 0.3m)	m		1,384	593	0	0	0
U shaped drain ditch (0.5 x 0.5m)	m		1,912	820	0	0	0
U shaped drain ditch (1.0 x 1.0m)	m		4,624	1,982	0	0	0
Side drain with stone pitching	m		1,373	343	0	0	0
Catch pit	no.	23	6,811	2,919	156,653	67,137	223790
Manhole	no.		11,379	4,877	0	0	0
Subbase course	m3	197	648	162	127,656	31,914	159570
Base course	m3	164	1,173	293	192,339	48,085	240424
Prime coat, 1.0 litre/m2	m2	2,408	33	1	79,416	2,456	81872
Tack coat, 0.4litre/m2	m2	2,408	11	0	25,693	795	26488
Asphalt concrete binder course t=6cm	m2	1,750	577	86	1,009,418	150,833	1160250
Asphalt concrete binder course t=10cm	m2	660	968	145	639,085	95,495	734580
Asphalt concrete surfase course t=4cm	m2	1,750	415	62	726,233	108,518	834750
Asphalt concrete surfase course t=5cm	m2	660	512	77	338,204	50,536	388740
Side walk t=13cm	m2	750	402	60	301,455	45,045	346500
Road lighting	no.	10	269,413	5,498	2,694,128	54,982	2749110
Traffic signal	portion		4,598,410	93,845	0	0	0
Lane marking 15cm	m	700	54	1	37,730	770	38500
Information sign	no.		222,546	4,542	0	0	0
Steel pile D800	m		22,121	451	0	0	0
Steel pile D500	m		11,060	226	0	0	0
Concrete class-A, 240kg	m3		4,598	94	0	0	0
Concrete class-C, 180kg	m3		3,627	74	0	0	0
Formwork for superstructures	m2		632	271	0	0	0
Formwork for all structures other than superstructure	m2		408	175	0	0	0
Reinforcement	ton		37,914	774	0	0	0
Prate girder (material, assemble, transportation, electi	ton		488,414	25,706	0	0	0
Bridge railing	m		21,742	1,144	0	0	0
Excavation for diversion of the river	m3		40	10	0	0	0
Construction and removal of temporary road	m3		335	84	0	0	0
Temporary bridge	m		52,156	2,745	0	0	0
Steel sheet pile	m		2,673	141	0	0	0
TOTAL					9,287,910	1,572,185	10,860,095

Construction Cost of Thaphatali side Intersection

Unit : NRs.

Description	Unit	Quantity	Unit Cost		Amount		Total
			Foreign	Local	Foreign	Local	
			Portion	Portion	Portion	Portion	
Clear site and stripping	m2		16	4	0	0	0
Removal of existing pavement material	m3	100	308	77	30,800	7,700	38500
Removal of existing bridge at Thaphatali	L.S		4,802,398	1,200,600	0	0	0
Removal of existing structures	m3	100	1,566	392	156,640	39,160	195800
Fill in soft material	m3	1,300	335	84	435,760	108,940	544700
Spoil in soft material	m3	130	241	60	31,304	7,826	39130
Sodding	m2		156	39	0	0	0
Plant selected trees	no.		1,292	0	0	0	0
Gabion	m3	50	1,957	345	97,835	17,265	115100
Stone Masonry	m2	250	4,885	1,221	1,221,200	305,300	1526500
Excavation in soft material for structures	m3		40	10	0	0	0
Backfilling with selected materials for structures	m3		36	9	0	0	0
Side block	m		558	239	0	0	0
Kerb stone (A)	m		1,352	580	0	0	0
Kerb stone (B)	m	400	2,668	1,143	1,067,080	457,320	1524400
Kerb stone for bridge	m		570	244	0	0	0
Pipe culvert D300	m		2,110	904	0	0	0
Pipe culvert D600	m	100	3,720	1,594	371,980	159,420	531400
Pipe culvert D1000	m	80	7,445	3,191	595,560	255,240	850800
U shaped drain ditch (0.3 x 0.3m)	m		1,384	593	0	0	0
U shaped drain ditch (0.5 x 0.5m)	m		1,912	820	0	0	0
U shaped drain ditch (1.0 x 1.0m)	m		4,624	1,982	0	0	0
Side drain with stone pitching	m		1,373	343	0	0	0
Catch pit	no.	20	6,811	2,919	136,220	58,380	194600
Manhole	no.	4	11,379	4,877	45,517	19,507	65024
Subbase course	m3	290	648	162	187,920	46,980	234900
Base course	m3	310	1,173	293	363,568	90,892	454460
Prime coat, 1.0 litre/m2	m2	4,185	33	1	138,021	4,269	142290
Tack coat, 0.4litre/m2	m2	4,185	11	0	44,654	1,381	46035
Asphalt concrete binder course t=6cm	m2	2,910	577	86	1,678,517	250,813	1929330
Asphalt concrete binder course t=10cm	m2	1,280	968	145	1,239,437	185,203	1424640
Asphalt concrete surfase course t=4cm	m2	2,910	415	62	1,207,621	180,449	1388070
Asphalt concrete surfase course t=5cm	m2	1,280	512	77	655,910	98,010	753920
Side walk t=13cm	m2	1,076	402	60	432,487	64,625	497112
Road lighting	no.	18	269,413	5,498	4,849,430	98,968	4948398
Traffic signal	portion	1	4,598,410	93,845	4,598,410	93,845	4692255
Lane marking 15cm	m	1,120	54	1	60,368	1,232	61600
Information sign	no.	4	222,546	4,542	890,185	18,167	908352
Steel pile D800	m		22,121	451	0	0	0
Steel pile D500			11,060	226	0	0	0
Concrete class-A, 240kg	m3		4,598	94	0	0	0
Concrete class-C, 180kg	m3		3,627	74	0	0	0
Formwork for superstructures	m2		632	271	0	0	0
Formwork for all structures other than superstructure	m2		408	175	0	0	0
Reinforcement	ton		37,914	774	0	0	0
Prate girder (material,assemble,transportation,electi	ton		488,414	25,706	0	0	0
Bridge railing	m		21,742	1,144	0	0	0
Excavation for diversion of the river	m3		40	10	0	0	0
Construction and removal of temporary road	m3		335	84	0	0	0
Temporary bridge	m		52,156	2,745	0	0	0
Steel sheet pile	m		2,673	141	0	0	0
TOTAL					20,536,425	2,570,891	23,107,316

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