CHAPTER 14

IMPLEMENTATION PLAN

CHAPTER 14 IMPLEMENTATION PLAN

14.1 General

The implementation of the OCH project has been shown to be feasible and well justified in the previous chapters of this report. It therefore will clearly provide a valuable addition to the Colombo and CMR transport infrastructure. The cost, however, could be somewhat of a strain on the finances of the Government of Sri Lanka, therefore requiring foreign financing. Two funding sources should be investigated.

① Annual budgeted expenditures
② Soft loans

Other issues, such as the availability of land, possibilities for cost reduction, and effective construction staging must be also considered. Below, those issues are estimated from the viewpoint of generating other possible solutions.

14.2 Cost Reduction Options

The options below have been identified by this Study as possible cost reduction measures. These options touch upon the roles and concept of the OCH, as well as on matters of RDA policy, and therefore require careful consideration prior to implementation. Note that the costs indicated in the tables in this section exclude Part 1(Southern Highway Project portion).

(1) Number of Lanes

The most likely scenario is the construction of a 4-lane dual carriageway with an upgrade to a 6-lane dual carriageway sometime around 2020 between Kottawa and the Colombo-Katunayake Expressway in order to satisfy future traffic demand. Two more possible options are the construction of 6 or 4 lanes from the beginning with no future upgrade. A comparison of the construction costs for these different scenarios are shown in the table below.

Tab.14.1 Comparison of Construction Costs for Different Lane Number Scenarios

	Base Case 4 Lanes Initially with Upgrade to 6 Lanes	Option Ⅰ 6 Lanes Only	Option Ⅱ 4 Lanes Only
Engineering & Construction Cost	million Rs. 9,438	million Rs. 9,903	million Rs. 8,477
Land Acquisition etc	1,162	1,162	816
Tax and Duty	2,522	2,647	2,273
Total	13,122	13,712	11,566

(2) Frontage Road

The frontage road plays two major functional roles. These are:

- To provide access to residents whose previous travel routes or properties have been severed by the proposed OCH highway.
- To provide access from proposed interchanges to residential, commercial, and industrial areas and to development areas (such as a free-trade zone or other growth center).

Minimum requirements for ensuring the functioning of the frontage road have been taken into account in this feasibility study. For comparative purposes, the option of no frontage is shown in the table below, assuming the construction of 4 lanes initially with the provision for an up grade to 6 lanes later.

Tab.14.2 Comparison of Construction Costs With and Without a Frontage Road

	Construction of Frontage Road*	No Frontage Road
Engineering & Construction Cost	million Rs. 9,438	million Rs. 9,228
Land Acquisition etc.	1,162	1,013
Tax and duty	2,522	2,462
Total	13,122	12,703

* land acquired at beginning of project

(3) At-Grade and Grade-Separated Crossings

A role of the OCH is to provide quick and easy access within Colombo. As Tab. 14.3 shows below, a partially-controlled facility with levels of service between an arterial road and an expressway would have the functions needed to provide the access required together with sufficient travel speeds for the people of the CMR. To ensure that travel speeds are maintained at acceptable levels, the OCH should have grade-separated crossings.

Tab. 14.3 The OCH Types of Urban Roads and Their Functions

Type Of Road	Access Function	Traffic Function	Spatial Function	Design Speed
Freeway (fully-controlled facility)	×	◎	○	High Speed ↓
Partially-controlled facility	○	◎	○	
Arterial	◎	◎	◎	
Collector Road	◎	◎	◎	
Local Street	◎	○	◎	Low Speed

Source: Adapted from The Planning & Design of Urban Roads, Traffic Engineering Society, Tokyo, 1988.
◎,○,× indicates the level of importance in that order.

However, at-grade crossings at existing collector roads, as an option to reduce construction cost, are also a possibility. The effect on construction costs for grade-separated and at-grade crossings are shown in Tab. 14.4, assuming the construction of 4 lanes initially with the provision for an up grade to 6 lanes later.

Tab.14.4 Comparison of Construction Costs by Type of Crossing

	Grade-Separated Crossings	At-Grade Crossings
Engineering & Construction Cost	million Rs. 9,438	million Rs. 8,003
Land Acquisition etc.	1,162	1,162
Tax and duty	2,522	2,153
Total	13,122	11,318

(4) Bridge for River Crossing and Railway Crossing

The most likely scenario is to construct the superstructure of bridges for a 4-lane carriageway and then to upgrade this around the year 2020 to 6 lanes when future traffic demand requires it for the section between Kottawa and Colombo-Katunayake Expressway. There are approximately 15 bridges in this section. However, it is possible to consider having the superstructure of the bridges built for 6 lanes from the beginning, since this would avoid the difficulties associated with the construction required for widening later on.

Tab.14.5 Comparison of Construction Cost Bridge Widening

	4 Lanes Initially with 6 Lane Upgrade	6 Lanes Only
Engineering & Construction Cost	million Rs. 9,438	million Rs. 9,226
Land Acquisition etc.	1,162	1,162
Tax and duty	2,522	2,467
Total	13,122	12,855

(5) Right–of-Way

Land acquisition and right–of–way demarcation should allow for a possible improvement to 6 lanes. The width required for this is 60-70m in general. However, another possibility is to defer the construction of traffic lanes. According to the forecast, two lanes (plus shoulders) in each direction will be sufficient in the initial stages, meaning that a right-of-way 60 meters in width would be sufficient. A comparison of construction cost as a result of the different width in right-of-way is shown in Tab. 14.6

Tab.14.6 Comparison of Construction Cost for Different Right-of-Way

	4 Lanes Initially with 6 Lane Upgrade	4 Lanes Only
Engineering & Construction Cost	million Rs. 9,438	million Rs. 8,477
Land Acquisition etc.	1,162	817
Tax and duty	2,522	2,273
Total	13,122	11,566

14.3 Staging of Implementation

(1) Financial Viability and Economic Feasibility

Staging the implementation of a project permits the financially most viable portion of the project to be built first and eliminates the need for large annual expenditures that can have an adverse impact on project finances and feasibility.

The southern portion of the OCH has already been launched and the RDA has called for tenders for the design as a part of the Southern Transport Corridor, which is to be funded by the Japan Bank for International Cooperation (JBIC). The construction of this section will commence in the middle of 2001 and will be in service by the middle of 2005.

However, as shown in the table below, the OCH project would produce the greatest returns

and have the largest net worth with the additional implementation of Part 2, which would extend from Rt. A4 to the crossing with the Colombo – Kandy Road (i.e., Rt. A1). It therefore goes without saying that the construction of the OCH should extend to Rt. A1 at a minimum and that the next appropriate staging should be the implementation of Part 2.

Tab. 14.7 Benefit/Cost Ratio and Net Present Worth for the 4 Options of the OCH

Option	Benefit/Cost Ratio	Benefits-Costs
Option 1 (Construction of Part 1 only)	2.17	Rs.4,767 million
Option 2 (Construction of Part 1 & 2)	3.23	Rs.13,869 million
Option 3 (Construction of Part 1,2,3)	1.93	Rs.8,826 million
Option 4 (Construction of entire OCH)	1.74	Rs.7,713 million

As for Part 3, its addition to Parts 1 and 2 (i.e., Option 3) would still result in a very attractive EIRR of 20.06% in comparison to the 26.35% for Option 2. In addition, from a road network viewpoint, it is crucial in the Study Team's opinion that the CKE and the Southern Highway be connected to each other via the OCH. Therefore, the portion between A1 and the proposed Colombo – Katunayake Expressway at Kerawalapitiya should be built taking into consideration the progress of the CKE Project.

As for the section between the proposed Southern Transport Corridor junction and the Colombo – Galle Road (Road A2), this would be built last. According to the sensitivity analysis in Chapter 13, the EIRR of including Part 4 drops to around 16%, which is usually the borderline for a project being desirable, with a 10% decline in benefits and a 10% increase in costs. Given this, an exmination of traffic volumes as well as a reexamination of the benefits and costs of this portion might be necessary prior to actual implementation.

The staging of implementation is shown in Fig.14.1

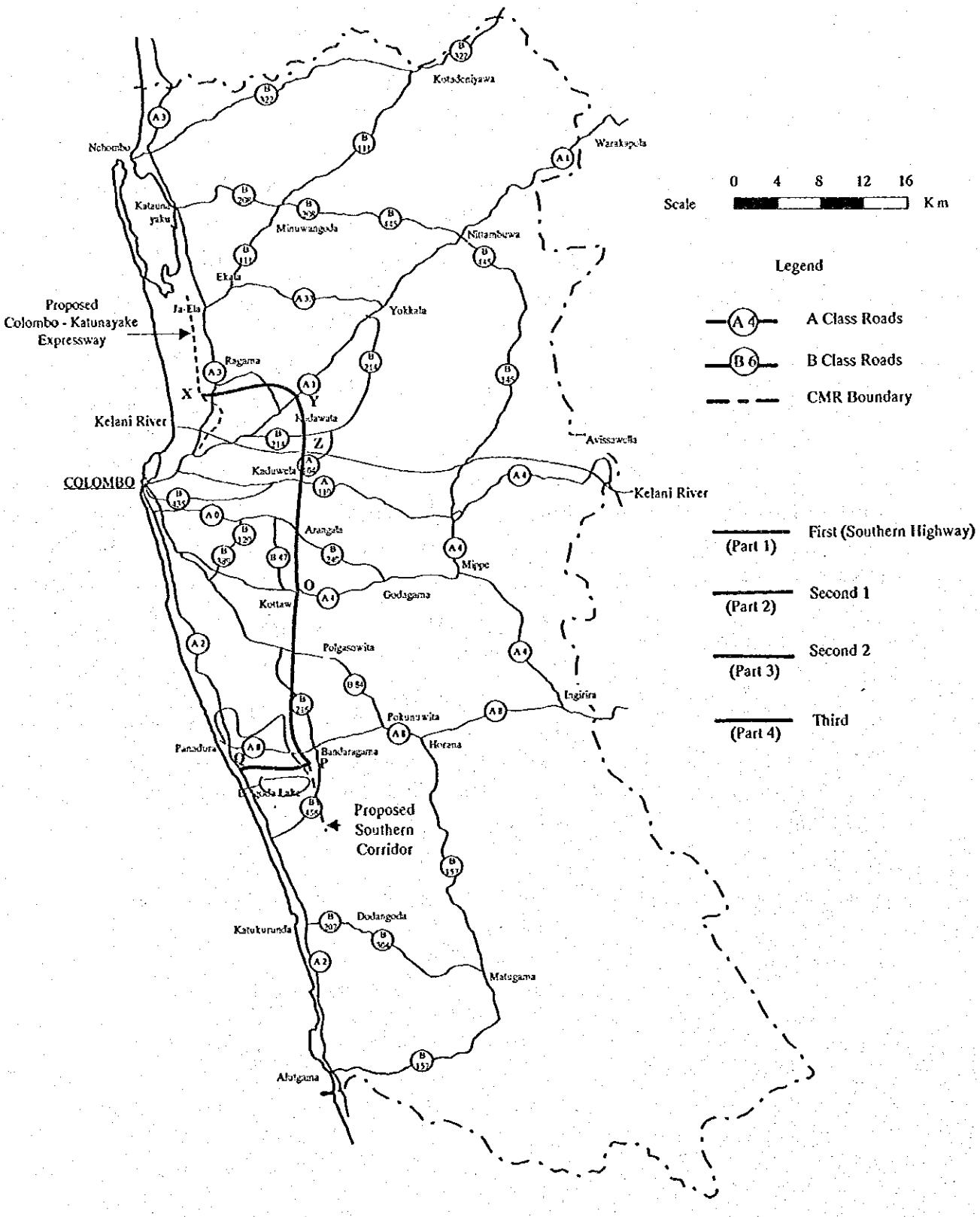


Fig 14.1 Staging of Implementation

(2) Recommendations

Having considered various factors as stated previously, the recommendations are as follows :

1. If sufficient Government funds are available, it is worthwhile to implement the entire Outer Circular Highway project immediately, with construction to begin soon after the completion of the Southern Transport Corridor. This can be carried out with existing revenue sources together with soft loans.
2. If the approach in 1 cannot be implemented, optional staging of the project should be considered. The alternative to improve financial viability is to divide the Outer Circular Highway Project into four parts as follows:

   Part 1 Bandaragama – Kottawa

   This section will be implemented as a part of the on-going Southern Transport Corridor Project and will extend to Kottawa (Rt. A4). This is to be funded by JBIC.

   Part 2 Kottawa - Kadawata

   This section extends from the north end of the Southern Transport Corridor at Kottawa to the Road A1 (Colombo – Kandy Road) should be constructed in parallel with Part 1.

   Part 3 Kadawata – CKE (Colombo – Katunayake Expressway)

   This section also should be constructed immediately after Part 1. However, the construction schedule should be determined based on the progress with the CKE Project.

   Part 4 Bandaragama - Panadura

   This section can be deferred until the economic situation of the country has improved and the Government has enough funds for construction.

Traffic forecasts indicate that by the year 2020, the most distant forecast year used in this Study, that the OCH may require three lanes per direction as shown below.

Tab.14.8 Number of Lanes

Part	Lanes/Direction Year 2010	Lanes/Direction Year 2020
Part 1 Bandaragama – Kottawa	2	3
Part 2 Kottawa – Kadawata	2	3
Part 3 Kadawata-CKE (Colombo– Katunayake Expressway)	2	3
Part 4 Bandaragama – Panadura	2	2

On the other hand, as shown in Tab. 14.8, three lanes (per direction) are not required throughout the length of the OCH. It is recommended to build a four-lane dual carriageway initially and then to widen this to six lanes when circumstances require it.

Initial construction is to consist of a 4-lane dual carriageway with grade-separated interchanges, with provision for subsequent widening to 6 lanes. The widening should be constructed when traffic volumes reach critical thresholds. It is anticipated that traffic volumes of the OCH will reach 55,000 PCU by about 2020 (i.e.10 years after opening) , indicating that widening at this time would be warranted.

It is also recommended that Part 1 and Part 4, which the Southern Transport Corridor Project has already committed to be separated from the OCH project cost. That is, it should be treated as a sunk cost not subject to financing.

14.4 Implementation Schedule

A project implementation schedule should be consistent with the technical realities of a project and should ensure the proper sequencing of activities, taking into account institutional capabilities and the availability of resources for construction. The suggested project implementation is shown in the bar chart in Fig.14.2.

It should also be noted that project construction should be divided into work packages that would be attractive to and manageable by international contractors, but not so large as to limit the numbers likely to bid. Each of these packages will be scheduled for completion in a period of about 2.0-3.0 years.

It is suggested that the commencement of construction would begin at the end of the rainy season. The construction of first stage should commence around the end of 2003 and be completed by the middle of 2006.

The schedule is subjected to a number of events occurring, including the following:

Loan Processing

A request by the Sri Lankan Government by September 2000 for a project loan. Nine months is required for the processing of the loan.

Engineering Services

The final alignment based on the trace of the feasibility study should be established at the preliminary design stage prior to the detailed design. Eighteen months is required for the preliminary and detailed design.

Right-of-way Acquisition and Resettlement

The legal process and resettlement actions required should be undertaken in parallel with the detailed design, All land should have been acquired and cleared prior to the award of the construction contracts.

Utility Relocation

Utilities, such as high-voltage lines, local electricity distribution facilities, water mains, telephone lines, etc., must be identified at the early stage of the detailed engineering and be relocated. The relocations should be undertaken in parallel with the detailed design.

Access Limitation Legislation

The project requires that the constructed facility be access controlled. There is therefore a need to strengthen legal powers to restrict access and evict those found to be trespassing. Legislation should be in place prior to the award of the construction contracts.

Pre-construction and Supervision Consultant Selection

The consultant for pre-construction services and supervision services should be selected prior to the pre-qualification of the contractor.

Contractor Selection

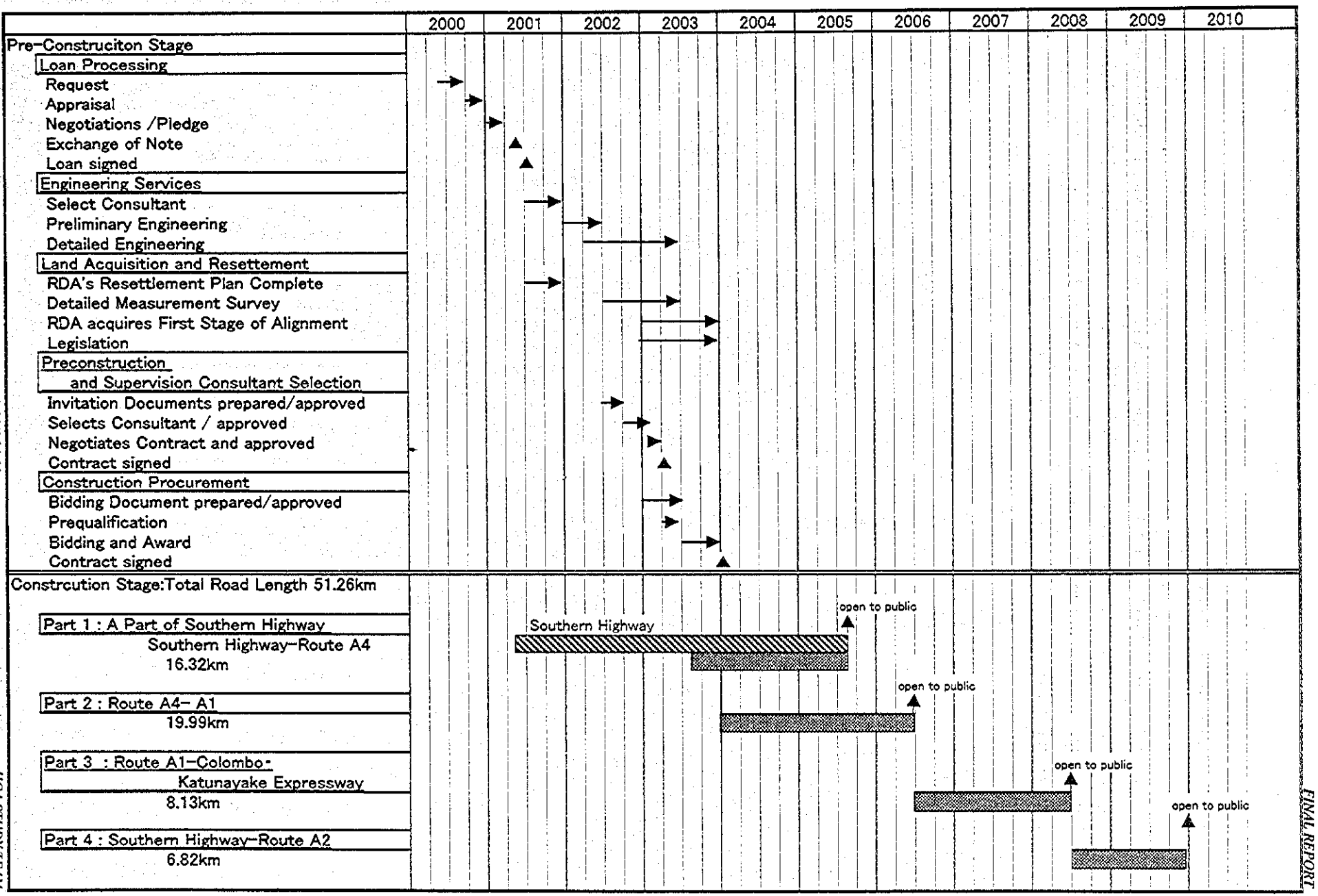
Nine months is required prior to the commencement of construction for contractor pre-qualification, tendering, and the evaluation and award of the contract.

Construction Specification

The initial construction should be carried out as a 4-lane dual carriageway with grade-separated interchanges, with the provision for subsequent widening to 6 lanes. Widening

should be carried out around 2020. The construction should be divided into 4 parts and implemented as mentioned in Chapter 11.5.

Fig. 14.2 PROJECT IMPLEMENTATION SCHEDULE



14.5 Disbursement Schedule

Based on the above-mentioned implementation schedule, the disbursement program for 30years after the completion of the project is established in Tab.14.8 and Tab.14.9 below. Initial construction cost, subsequent widening construction cost, maintenance and operation cost are summarized.

Tab.14.8 Disbursement Schedule of Project Cost In 1999 Prices (Part2～Part4) (million Rs.)

Operated Part	Year	Construction Cost (including Contingency)		TAX & IMPORT DUTY of Construction Cost (including Contingency)		E/S & BID Assit. (inclu.Contingency)		TAX & IMPORT DUTY of E/S & BID Assit.(inclu.contingency)		Land Acquisition & Resettlement	Operation & Maintenance Cost
		F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C		
	2000										
	1										
	2									580.9	
	3									580.9	
Part2	4	884.0	795.7	314.2	150.4	88.4	79.6	25.0	9.9		
Part2	5	884.0	795.7	314.2	150.4	88.4	79.6	25.0	9.9		
Part2&3	6	702.5	672.2	249.7	127.0	70.3	67.2	19.8	8.4		10.0
Part3	7	781.4	823.1	277.8	155.6	78.1	82.3	22.1	10.3		16.5
Part3&4	8	595.9	621.8	211.8	117.5	59.6	62.2	16.8	7.8		18.5
Part4	9	503.2	521.1	178.9	98.5	50.3	52.1	14.2	6.5		22.1
	2010										27.3
	11										27.3
	12										27.3
	13										27.3
	14										27.3
	15										409.0
	16										27.3
	17										27.3
Upgrade for	18	108.3	102.4	38.5	19.4	10.8	10.2	3.1	1.3		27.3
6 lanes	19	108.3	102.4	38.5	19.4	10.8	10.2	3.1	1.3		27.3
	2020										36.8
	21										36.8
	22										36.8
	23										36.8
	24										36.8
	25										503.1
	26										36.8
	27										36.8
	28										36.8
	29										36.8
	2030										36.8
	31										36.8
	32										36.8
	33										36.8
	34										36.8
	35										503.9
	36										36.2
	37										36.2
	38										36.2
	2039										36.2
TOTAL		4,567.6	4,434.4	1,623.6	838.1	456.8	443.4	129.0	55.4	1,161.8	2,388.8
		9,002.0		2,461.7		900.2		184.5			
		11,463.7				1,084.7					
		13,710.2									

Tab.14.9 Disbursement Schedule of Project Cost in 1999 Prices (Part1~Part4) (million Rs.)

Operated Part	Year	Construction Cost (including Contingency)		TAX & IMPORT DUTY of Construction Cost (including Contingency)		E/S & BID Assit. (inclu.Contingency)		TAX & IMPORT DUTY of E/S & BID Assit.(inclu.contingency)		Land Acquisition & Resettlement	Operation & Maintenance Cost
		F/C	L/C	F/C	L/C	F/C	L/C	F/C	L/C		
	2000										
	1									572.0	
Part1	2	800.5	725.2	284.5	137.1	80.1	72.5	22.6	9.1	580.9	
Part1	3	600.4	543.9	213.4	102.8	60.0	54.4	17.0	6.8	580.9	
Part1&2	4	1,484.4	1,339.6	527.6	253.2	148.4	134.0	41.9	16.7		
Part2	5	884.0	795.7	314.2	150.4	88.4	79.6	25.0	9.9		15.0
Part2&3	6	702.5	672.2	249.7	127.0	70.3	67.2	19.8	8.4		25.0
Part3	7	781.4	823.1	277.8	155.6	78.1	82.3	22.1	10.3		30.0
Part3&4	8	595.9	621.8	211.8	117.5	59.6	62.2	16.8	7.8		32.0
Part4	9	503.2	521.1	178.9	98.5	50.3	52.1	14.2	6.5		35.0
	2010										40.0
	11										40.0
	12										40.0
	13										40.0
	14										40.0
	15										600.0
	16										40.0
	17										40.0
Upgrade for	18	171.4	162.2	60.9	30.7	17.1	16.2	4.8	2.0		40.0
6 lanes	19	171.4	162.2	60.9	30.7	17.1	16.2	4.8	2.0		40.0
	2020										55.0
	21										55.0
	22										55.0
	23										55.0
	24										55.0
	25										750.0
	26										55.0
	27										55.0
	28										55.0
	29										55.0
	2030										55.0
	31										55.0
	32										55.0
	33										55.0
	34										55.0
	35										750.0
	36										55.0
	37										55.0
	38										55.0
	2039										55.0
TOTAL		6,695.1	6,367.0	2,379.8	1,203.4	669.5	636.7	189.1	79.6	1,733.8	3,587.0
		13,062.1		3,583.2		1,306.2		268.7			
		16,645.3				1,574.9					
		19,954.0									

CHAPTER 15

MAINTENANCE AND OPERATION PLAN

CHAPTER 15 MAINTENANCE AND OPERATION PLAN

15.1 Maintenance

A 20 year design life shall be considered for the pavement of the proposed OCH. The maintenance for highway is basically programmed in three different categories.

(1) Routine

This is required to maintain the entire facility annually.

- repairs to road surface – crack sealing and pothole patching
- cleaning of drainage ditches culverts –desilting
- repairs to road facilities – repainting signs, repairing guardrail and fencing etc.
- repairs to bridge – painting of metal ,cleaning of expansion joints and repairing concrete parapets etc.
- general upkeep in the right of way – weeding, clearing and cleaning etc.

The costs is estimated on a per-kilometre basis as Rs.0.6 million per-kilometre for 4 lanes which is extracted from the RDA's past record for the expenditure.

(2) Periodic

This is required to maintain the road at some interval.

- pavement overlay – the work consists of restriping
  – timing should be based on traffic volume
  – the timing is estimated as a five year interval
- pavement marking – it should be replaced when it wears off the pavement
  – the timing is estimated as a five year interval

Each overlay is estimated to be 50mm thick and the cost is Rs8.28 million per kilometre for 4 lanes which is extracted from the RDA's past record for the expenditure.

(3) Emergency

This is an indeterminable nature and scope and therefore not quantifiable and estimated.

- accident damage to roads and structures
- flood damage

15.2 Operation

Generally in Sri Lanka, the traffic management measures shall be adopted to improve traffic flow including the designation of bus stops off the main carriageway, restriction of on – street parking, control of frontage activity and encroachment, and provision of facilities for pedestrians (e.g. footways, footbridges and designated crossing points).

Legislation is required to define and enforce the necessary restriction on vehicles allowed to use the OCH and frontage road from adjacent land.

Access to the OCH should be limited to designated points and certain classed of road user, e.g. cyclist, pedestrians, animal drawn vehicles, motor cycles and three-wheelers are prohibited. The right-of–way should be fenced throughout to inhibit illegal access and to prevent unauthorized access to and from adjacent properties.

The expenditure covering the personnel expenses, electric charges, etc., is required to operate the OCH keeping a partially-controlled facility with levels of the service.

Legislation of Highway

It is recommended that new highway be designated as an 'expressway'. The term 'expressway' should also be given a specific legal definition and clauses introduced into the new 'National Highways Act' to specify:

① special procedure for developing an expressway, e.g. land acquisition and resettlement :

② limitation on the use of the expressway by specified users, e.g. cyclist, pedestrians, animal drawn vehicles, motor cycles and three-wheelers: and

③ controls on the rights of access from adjacent land-owners and occupiers.

Such legislation should be in place prior to the construction of the highway.

Bus Bays

Sri Lankan driver behavior at the present time is very much different to that of other developed countries. The operating speed of vehicles is obliged to be significantly low, mainly because of the interruptions made by public and private bus drivers. Although bus bays are provided in the city, buses stop at any location to load passenger without giving any regards to other vehicles.

Therefore, it is suggested that no busses or coaches should be allowed to stop within the OCH except the designated bus stops those are established at certain interval on the OCH and the interchanges outside the main highway.

APPENDIX A1

CONSTRUCTION QUANTITY SHEETS

APPENDIX A1 CONSTRUCTION QUANTITY SHEETS

1.1 Summary of Quantity Sheets

1.1.1 Main Part

Tab.A.1.1 and Tab.A.1.2 show the summary of quantity lists for main part at initial and final stages. The lists show the Southern Highway(SH) portion and the Outer Circular Highway(OCH) Project Portion.

1.1.2 Interchange (IC) and Junction (JCT)

Tab.A.1.3 shows the summary of quantity list for interchange and junction. The list shows the SH portion, the OCH portion and the Colombo Katunayake Expressway (CKE) portion.

1.2 Detail of Quantity Sheets

1.2.1 Detail of Quantity for Main Part

Detail of quantities are shown in Tab.A.1.4.1 ～ Tab.A.1.11 .

List

Tab.A.1. 4.1～4 : PAVEMENT & KERB (INITIAL STAGE)
Tab.A.1. 5.1～3 : PAVEMENT & KERB (FINAL STAGE)
Tab.A.1. 6.1～7 : FRONTAGE ROAD
Tab.A.1. 7.1～2 : BRIDGE & VIADUCT(INITIAL & FINAL STAGE)
Tab.A.1. 8.1～3 : OVERPASS
Tab.A.1. 9.1～4 : BOX CULVERT
Tab.A.1.10.1～4 : PIPE CULVERT
Tab.A.1.11 : SHIFTED CHANNEL

1.2.2 Detail of Quantity for Interchange (IC) and Junction (JCT)

Detail of quantities are shown in Tab.A.1.12.1 ～ Tab.A.1.19. Regarding CKE junction, construction portion is divided, as follows.

CKE Junction ⇒ CKE1(CKE Portion) and CKE2(Part3 in OCH)

List

Tab.A.1.12.1～ 2 : TOTAL LENGTH
Tab.A.1.13.1～10 : EARTH WORKS
Tab.A.1.14.1～ 3 : SLOPE PROTECTION
Tab.A.1.15 : RETAINING WALL
Tab.A.1.16.1～ 6 : PAVEMENT
Tab.A.1.17. : BRIDGE & VIADUCT
Tab.A.1.18 : BOX CULVERT
Tab.A.1.19 : INTERCHANGE AT ROAD A2

Tab.A.1.1 SUMMARY OF QUANTITY (INITIAL STAGE)

ITEM	UNIT	SOUTHERN HIGHWAY	OUTER CIRCULAR HIGHWAY				REMARKS
		PART 1 (4LANES)	PART 2 (4LANES)	PART 3 (4LANES)	PART 4 (4LANES)	TOTAL	
TOTAL LENGTH	km	16.32	19.99	8.13	6.82	34.93	
(i)EARTH WORKS							
CUTTING	m3	634,615.0	1,122,772.0	814,576.0	12,320.0	1,949,668.0	Excavation,Loading
EMBANKMENT-1	m3	66,165.0	73,038.0	20,088.0	11,112.0	104,238.0	Excavation,Loading,Spreading, Compaction
EMBANKMENT-2	m3	312,855.0	0.0	0.0	669,089.0	669,089.0	Borrow,Excavation,Loading,Spreading ,Compaction
EMBANKMENT-3	m3	634,615.0	991,133.0	584,535.0	12,320.0	1,587,988.0	Spreading,Compaction
FOUNDATION STABILIZER	m2	0.0	0.0	50,000.0	0.0	50,000.0	Sand Blanket (t=1.0m),Sta.17~27
SLOPE PROTECTION	m2	235,664.0	377,190.0	187,095.0	81,443.0	645,728.0	Turfing
RETAINING WALL	m	0.0	0.0	6,529.0	0.0	6,529.0	Mansonry type along milk factory, in Part-3.
(ii)ROAD WORKS							
WEARING COURSE(t=40mm)	m2	302,435.1	368,820.1	148,734.2	115,566.2	633,120.5	
BINDER COURSE(t=60mm)	m2	388,152.0	473,352.0	190,888.8	150,907.8	815,148.6	
BASE COURSE(t=200mm)	m2	401,090.4	489,130.4	197,251.8	155,186.2	841,568.4	See Tab.A.1.4.1~A.1.4.4
SUBBASE COURSE(t=200mm)	m2	414,732.6	504,888.4	203,897.6	166,579.4	875,365.4	
CENTER MEDIAN	m	0.0	0.0	0.0	6,720.0	6,720.0	
KERB	m	64,692.0	78,892.0	31,814.8	13,440.0	124,146.8	
FRONTAGE ROAD	m2	114,605.0	202,667.0	53,965.0	19,162.0	275,794.0	See Tab.A.1.6.1~A.1.6.7
(iii)BRIDGE & VIADUCT							
(a)BRIDGE							
LENGTH>50m	no	0.0	0.0	0.0	0.0	0.0	
LENGTH<50m	no	1.0	0.0	0.0	0.0	0.0	See Tab.A.1.7.1
KELANI GANGA CROSSING	no	0.0	1.0	0.0	0.0	1.0	
BOLGODA GANGA CROSSING	no	0.0	0.0	0.0	1.0	1.0	
(b)VIADUCT							
LENGTH>50m	no	0.0	0.0	1.0	0.0	1.0	See Tab.A.1.7.1
LENGTH<50m	no	5.0	3.0	3.0	0.0	6.0	
(c)OVERPASS							
LENGTH>50m	no	3.0	0.0	1.0	0.0	1.0	See Tab.A.1.8.1~A.1.8.3
LENGTH<50m	no	14.0	0.0	6.0	4.0	10.0	
(iv)UNDERPASS							
BOX CULVERT	m	355.0	551.0	230.0	84.0	865.0	See Tab.A.1.9.1~A.1.9.4
(v)INTERCHANGE & JUNCTION							
INTERCHANGE	no	2.0	4.0	1.0	1.0	6.0	See Tab.A.1.3
JUNCTION	no	0.0	0.0	1.0	1.0	2.0	
(vi)DRAINAGE WORKS							
PIPE CULVERT(Φ1,500mm)	m	1,059.0	1,209.0	183.0	155.0	1,547.0	See Tab.A.1.10.1~A.1.10.4
BOX CULVERT	m	116.0	118.0	0.0	191.0	309.0	See Tab.A.1.9.1~A.1.9.4
ROAD SURFACE DRAINAGE	m	16,173.0	19,723.0	7,953.7	6,720.0	34,396.7	(Total Length) - (Bridge Length)
(vii)SHIFTED CHANNEL							
BOX CULVERT	m	63.0	0.0	0.0	0.0	0.0	See Tab.A.1.11
U DITCH	m	750.0	0.0	240.0	0.0	240.0	
(viii)MISCELLANEOUS							
TEMPORARY ROAD	Ls.	1.0	1.0	1.0	1.0	3.0	(CUTTING + EMBANKMENT-1,2,3 + BRIDGE&VIADUCT WORKS) × 3.0%
TEMPORARY CONSTRUCTION FACILITY	Ls.	1.0	1.0	1.0	1.0	3.0	(CUTTING + EMBANKMENT-1,2,3 + BRIDGE&VIADUCT WORKS) × 1.0%
TRAFFIC SIGN BOARD & SAFETY CONTROL FACILITY	m	16,173.0	19,723.0	7,953.7	6,720.0	34,396.7	(Total Length) - (Bridge Length)
TRAFFIC ILLUMINATION	no	392.0	478.0	196.0	166.0	840.0	Found at Intervals of 84.0m(Both sides)
ACCESS CONTROL FACILITY(GUARD RAIL)	m	55,000.0	65,000.0	27,000.0	13,000.0	105,000.0	((Total Length)-(Ramp's Length))×4
LANE MARKING	m	97,038.0	118,338.0	47,722.2	40,320.0	206,380.2	((Total Length) - (Bridge Length))×6
FENCING & km POST	m	32,346.0	39,446.0	15,907.4	13,440.0	68,793.4	((Total Length) - (Bridge Length))×2
TRAFFIC SIGNAL	no	0.0	0.0	0.0	0.0	0.0	
ROADSIDE PLANTING	m	16,173.0	19,723.0	7,953.7	6,720.0	34,396.7	(Total Length) - (Bridge Length)
PIPE WORKS FOR COMMUNICATION CABLE	m	16,173.0	19,723.0	7,953.7	6,720.0	34,396.7	(Total Length) - (Bridge Length)

Tab.A.1.2 SUMMARY OF QUANTITY (FINAL STAGE)

ITEM	UNIT	SOUTHERN HIGHWAY	OUTER CIRCULAR HIGHWAY				REMARKS
		PART 1 (6LANES)	PART 2 (6LANES)	PART 3 (6LANES)	PART 4 (4LANES)	TOTAL	
TOTAL LENGTH	km	16.32	19.99	8.13	6.82	34.94	
(i)EARTH WORKS							
CUTTING	m3	634,615.0	1,122,772.0	814,576.0	12,320.0	1,949,668.0	Excavation,Loading
EMBANKMENT-1	m3	66,165.0	73,038.0	20,088.0	11,112.0	104,238.0	Excavation,Loading,Spreading, Compaction
EMBANKMENT-2	m3	312,855.0	0.0	0.0	669,089.0	669,089.0	Borrow,Excavation,Loading,Spreading
EMBANKMENT-3	m3	634,615.0	991,133.0	584,535.0	12,320.0	1,587,988.0	Spreading,Compaction
FOUNDATION STABILIZER	m2	0.0	0.0	50,000.0	0.0	50,000.0	Sand Blanket (t=1.0m),Sta.17~27
SLOPE PROTECTION	m2	235,664.0	377,190.0	187,095.0	81,443.0	645,728.0	Turfing
RETAINING WALL	m	0.0	0.0	6,529.0	0.0	6,529.0	Mansonry type along milk factory, in Part-3,
(ii)ROAD WORKS							
WEARING COURSE(t=40mm)	m2	391,386.6	477,253.4	192,443.7	115,566.2	785,263.3	See Tab.A.1.5.1~A.1.5.3
BINDER COURSE(t=60mm)	m2	476,650.3	581,179.7	234,313.9	150,907.8	966,401.4	
BASE COURSE(t=200mm)	m2	487,775.9	594,535.7	239,538.9	155,186.2	989,260.8	
SUBBASE COURSE(t=200mm)	m2	510,812.2	622,558.6	251,355.1	166,579.4	1,040,493.1	
CENTER MEDIAN	m	16,173.0	19,723.0	7,954.7	6,720.0	34,397.7	
KERB	m	32,346.0	39,446.0	15,907.4	13,440.0	68,793.4	
FRONTAGE ROAD	m	114,605.0	202,667.0	53,965.0	19,162.0	275,794.0	See Tab.A.1.6.1~A.1.6.7
(iii)BRIDGE & VIADUCT							
(a)BRIDGE							
LENGTH>50m	no	0.0	0.0	0.0	0.0	0.0	See Tab.A.1.7.2
LENGTH<50m	no	1.0	0.0	0.0	0.0	0.0	
KELANI GANGA CROSSING	no	0.0	1.0	0.0	0.0	1.0	
BOLGODA GANGA CROSSING	no	0.0	0.0	0.0	1.0	1.0	
(b)VIADUCT							
LENGTH>50m	no	0.0	0.0	1.0	0.0	1.0	See Tab.A.1.7.2
LENGTH<50m	no	5.0	3.0	3.0	0.0	6.0	
(c)OVERPASS							
LENGTH>50m	no	3.0	0.0	1.0	0.0	1.0	See Tab.A.1.8.1~A.1.8.3
LENGTH<50m	no	14.0	0.0	6.0	4.0	10.0	
(iv)UNDERPASS							
BOX CULVERT	m	355.0	551.0	230.0	84.0	865.0	See Tab.A.1.9.1~A.1.9.4
(v)INTERCHANGE & JUNCTION							
INTERCHANGE	no	2.0	4.0	1.0	1.0	6.0	See Tab.A.1.3
JUNCTION	no	0.0	0.0	1.0	1.0	2.0	
(vi)DRAINAGE WORKS							
PIPE CULVERT(Φ1,500mm)	m	1,059.0	1,209.0	183.0	155.0	1,547.0	See Tab.A.1.10.1~A.1.10.4
BOX CULVERT	m	116.0	118.0	0.0	191.0	309.0	See Tab.A.1.9.1~A.1.9.4
ROAD SURFACE DRAINAGE	m	16,173.0	19,723.0	7,953.7	6,720.0	34,396.7	(Total Length) - (Bridge Length)
(vii)SHIFTED CHANNEL							
BOX CULVERT	m	63.0	0.0	0.0	0.0	0.0	See Tab.A.1.11
U DITCH	m	750.0	0.0	240.0	0.0	240.0	
(viii)MISCELLANEOUS							
TEMPORARY ROAD	Ls.	1.0	1.0	1.0	1.0	3.0	(CUTTING + EMBANKMENT-1,2,3 + BRIDGE&VIADUCT WORKS) × 3.0%
TEMPORARY CONSTRUCTION FACILITY	Ls.	1.0	1.0	1.0	1.0	3.0	(CUTTING + EMBANKMENT-1,2,3 + BRIDGE&VIADUCT WORKS) × 1.0%
TRAFFIC SIGN BOARD & SAFETY CONTROL FACILITY	m	16,173.0	19,723.0	7,953.7	6,720.0	34,396.7	(Total Length) - (Bridge Length)
TRAFFIC ILLUMINATION	no	392.0	478.0	196.0	166.0	840.0	Found at Intervals of 42.0m
ACCESS CONTROL FACILITY(GUARD RAIL)	m	23,000.0	27,000.0	11,000.0	13,000.0	51,000.0	((Total Length)-(Ramp's Length))×2
LANE MARKING	m	129,384.0	157,784.0	63,629.6	40,320.0	261,733.6	((Total Length) - (Bridge Length))×6
FENCING & km POST	m	32,346.0	39,446.0	15,907.4	13,440.0	68,793.4	((Total Length) - (Bridge Length))×2
TRAFFIC SIGNAL	no	0.0	0.0	0.0	0.0	0.0	
ROADSIDE PLANTING	m	16,173.0	19,723.0	7,953.7	6,720.0	34,396.7	(Total Length) - (Bridge Length)
PIPE WORKS FOR COMMUNICATION CABLE	m	16,173.0	19,723.0	7,953.7	6,720.0	34,396.7	(Total Length) - (Bridge Length)

Tab.A.1.3 SUMMARY OF QUANTITY (INTERCHANGE & JUNCTION)

ITEM	UNIT	CKE	PART1(SOUTHERN HIGHWAY)			OUTER CIRCULAR HIGHWAY								REMARKS
						PART2				PART3		PART4	TOTAL	
			B84 IC	A8 IC	TOTAL	A1 IC	B214 IC	A110 IC	A4 IC	CKE2	A3 IC	SH JCT	A2 IC	
TOTAL LENGTH	m	1,166.0	999.0	965.0		1,356.0	287.0	403.0	1,095.0	1,222.0	782.0	2,198.0		
(I)EARTH WORKS														
CUTTING	m3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
EMBANKMENT-1	m3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
EMBANKMENT-2	m3	143,163.0	45,173.0	54,766.0	99,939.0	96,185.0	23,372.0	16,024.0	206,675.0	276,450.0	58,364.0	129,063.0	0.0	806,133.0 See Tab.A.1.13.1~A.1.13.11
EMBANKMENT-3	m3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FOUNDATION STABILIZER	m2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SLOPE PROTECTION	m2	36,619.0	0.0	0.0	0.0	0.0	0.0	0.0	15,321.0	23,254.0	6,877.0	29,952.0	0.0	75,404.0 See Tab.A.1.14.1~A.1.14.3
RETAINING WALL	m	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	540.0	60.0	0.0	600.0 See Tab.A.1.15
(II)ROAD WORKS														
WEARING COURSE(t=40mm)	m2	19,937.0	10,068.0	9,830.0	19,898.0	12,567.0	3,547.0	4,359.0	13,478.0	14,697.0	7,688.0	18,995.0	24,200.0	99,531.0
BINDER COURSE(t=60mm)	m2	19,937.0	10,068.0	9,830.0	19,898.0	12,567.0	3,547.0	4,359.0	13,478.0	14,697.0	7,688.0	18,995.0	24,200.0	99,531.0
BASE COURSE(t=200mm)	m2	19,937.0	10,068.0	9,830.0	19,898.0	12,567.0	3,547.0	4,359.0	13,478.0	14,697.0	7,688.0	18,995.0	24,200.0	99,531.0 See Tab.A.1.16.1~A.1.16.7
SUBBASE COURSE(t=200mm)	m2	19,937.0	10,068.0	9,830.0	19,898.0	12,567.0	3,547.0	4,359.0	13,478.0	14,697.0	7,688.0	18,995.0	24,200.0	99,531.0
CENTER MEDIAN	m	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
KERB	m	1,166.0	999.0	965.0	1,964.0	1,356.0	287.0	403.0	1,050.0	1,182.0	782.0	2,061.0	0.0	7,121.0 (Total Length) - (Bridge Length)
FRONTAGE ROAD	m	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
(III)BRIDGE & VIADUCT														
(a)BRIDGE														
LENGTH>50m	no	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	2.0 See Tab.A.1.17
LENGTH<50m	no	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	1.0
(b)VIADUCT														
LENGTH>50m	no	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0 See Tab.A.1.17
LENGTH<50m	no	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	2.0
(IV)UNDERPASS														
BOX CULVERT	m	35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.0	0.0	0.0	0.0	30.0 See Tab.A.1.18
(VI)DRAINAGE WORKS														
PIPE CULVERT(Φ1,500mm)	m	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ROAD SURFACE DRAINAGE	m	1,166.0	999.0	965.0	1,964.0	1,356.0	287.0	403.0	1,050.0	1,182.0	782.0	2,061.0	0.0	7,121.0 (Total Length) - (Bridge Length)
(VII)MISCELLANEOUS														
TEMPORARY ROAD	Ls.	1.0	1.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	8.0 (CUTTING + EMBANKMENT-1,2,3 + BRIDGE&VIADUCT WORKS) x 3.0%
TEMPORARY CONSTRUCTION	Ls.	1.0	1.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	8.0 (CUTTING + EMBANKMENT-1,2,3 + BRIDGE&VIADUCT WORKS) x 1.0%
TRAFFIC SIGN BOARD	m	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRAFFIC ILLUMINATION	no	15.0	13.0	13.0	26.0	18.0	5.0	6.0	15.0	16.0	11.0	28.0	0.0	99.0 Found at intervals of 42.0m
ACCESS CONTROL FACILITY(GUARD R/	m	2,365.0	1,998.0	1,930.0	3,928.0	2,712.0	574.0	806.0	2,100.0	2,331.0	1,564.0	4,122.0	0.0	14,209.0 ((Total Length) - (Bridge Length))×2
LANE MARKING	m	2,365.0	1,998.0	1,930.0	3,928.0	2,712.0	574.0	806.0	2,100.0	2,331.0	1,564.0	4,122.0	0.0	14,209.0 ((Total Length) - (Bridge Length))×2
FENCING & km POST	m	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRAFFIC SIGNAL	no	0.0	2.0	2.0	4.0	2.0	2.0	2.0	0.0	0.0	0.0	0.0	1.0	7.0 Found at Diamond Type.
ROADSIDE PLANTING	m	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PIPE WORKS FOR COMMUNICATION CA	m	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1.2.1

Detail of Quantity for Main Part

Tab.A.1.4.1 QUANTITIES OF PAVEMENT & KERB(INITIAL STAGE)

PAVEMENT WORKS

PART 1(SOUTHERN HIGHWAY)

	CUT			EMBANKMENT			CUT/EMBANKMENT			SUB TOTAL-1	REMARKS
	WIDTH (m)	LENGTH (m)	AREA (m²)	WIDTH (m)	LENGTH (m)	AREA (m²)	WIDTH (m)	LENGTH (m)	AREA (m²)	(m²)	
WEARING COURSE	18.700	3,994.000	74,687.80	18.700	11,205.000	209,533.50	18.700	974.000	18,213.80	302,435.10	asphalt con. 40mm including tack coat
BINDER COURSE	24.000	3,994.000	95,856.00	24.000	11,205.000	268,920.00	24.000	974.000	23,376.00	388,152.00	asphalt con. 60mm including prime coat
BASE COURSE	24.800	3,994.000	99,051.20	24.800	11,205.000	277,884.00	24.800	974.000	24,155.20	401,090.40	t=200mm
SUBBASE COURSE	24.796	3,994.000	99,035.22	25.960	11,205.000	290,881.80	25.478	974.000	24,815.57	414,732.60	t=200mm

	CENTER MEDIAN (STRAIGHT LINE)			CENTER MEDIAN (CURVE LINE)			SUB TOTAL-2			TOTAL	REMARKS
	WIDTH (m)	LENGTH (m)	AREA (m²)	WIDTH (m)	LENGTH (m)	AREA (m²)	(m²)			(m²)	
WEARING COURSE	0.200	0.000	0.00	0.200	0.000	0.00	0.00			302,435.10	
BINDER COURSE	0.300	0.000	0.00	0.250	0.000	0.00	0.00			388,152.00	
BASE COURSE	0.700	0.000	0.00	0.450	0.000	0.00	0.00			401,090.40	
SUBBASE COURSE	1.280	0.000	0.00	1.740	0.000	0.00	0.00			414,732.60	

KERB WORKS

	CUT			EMBANKMENT			CUT/EMBANKMENT			TOTAL	REMARKS
	UNIT LENGTH (m)	ROAD LENGTH (m)	KERB LENGTH (m)	UNIT LENGTH (m)	ROAD LENGTH (m)	KERB LENGTH (m)	UNIT LENGTH (m)	ROAD LENGTH (m)	KERB LENGTH (m)	(m)	
ASPHALT KERB	4.000	3,994.000	15,976.000	4.000	11,205.000	44,820.000	4.000	974.000	3,896.000	64,692.000	
CONCRETE KERB											

Tab.A.1.4.2 QUANTITIES OF PAVEMENT & KERB(INITIAL STAGE)

PAVEMENT WORKS

PART 2(OUTER CIRCULAR HIGHWAY)

	CUT			EMBANKMENT			CUT/EMBANKMENT			SUB TOTAL-1	REMARKS
	WIDTH (m)	LENGTH (m)	AREA (m²)	WIDTH (m)	LENGTH (m)	AREA (m²)	WIDTH (m)	LENGTH (m)	AREA (m²)	(m²)	
WEARING COURSE	18.700	5,370.000	100,419.00	18.700	12,548.000	234,647.60	18.700	1,805.000	33,753.50	368,820.10	asphalt con. 40mm including tack coat
BINDER COURSE	24.000	5,370.000	128,880.00	24.000	12,548.000	301,152.00	24.000	1,805.000	43,320.00	473,352.00	asphalt con. 60mm including prime coat
BASE COURSE	24.800	5,370.000	133,176.00	24.800	12,548.000	311,190.40	24.800	1,805.000	44,764.00	489,130.40	t=200mm
SUBBASE COURSE	24.796	5,370.000	133,154.52	25.960	12,548.000	325,746.08	25.478	1,805.000	45,987.79	504,888.39	t=200mm

	CENTER MEDIAN (STRAIGHT LINE)			CENTER MEDIAN (CURVE LINE)			SUB TOTAL-2			TOTAL	REMARKS
	WIDTH (m)	LENGTH (m)	AREA (m²)	WIDTH (m)	LENGTH (m)	AREA (m²)	(m²)			(m²)	
WEARING COURSE	0.200	0.000	0.00	0.200	0.000	0.00	0.00			368,820.10	
BINDER COURSE	0.300	0.000	0.00	0.250	0.000	0.00	0.00			473,352.00	
BASE COURSE	0.700	0.000	0.00	0.450	0.000	0.00	0.00			489,130.40	
SUBBASE COURSE	1.280	0.000	0.00	1.740	0.000	0.00	0.00			504,888.39	

KERB WORKS

	CUT			EMBANKMENT			CUT/EMBANKMENT			TOTAL	REMARKS
	UNIT LENGTH (m)	ROAD LENGTH (m)	KERB LENGTH (m)	UNIT LENGTH (m)	ROAD LENGTH (m)	KERB LENGTH (m)	UNIT LENGTH (m)	ROAD LENGTH (m)	KERB LENGTH (m)	(m)	
ASPHALT KERB	4.000	5,370.000	21,480.000	4.000	12,548.000	50,192.000	4.000	1,805.000	7,220.000	78,892.000	
CONCRETE KERB											

Tab.A.1.4.3 QUANTITIES OF PAVEMENT & KERB(INITIAL STAGE)

PAVEMENT WORKS

PART 3(OUTER CIRCULAR HIGHWAY)

	CUT			EMBANKMENT			CUT/EMBANKMENT			SUB TOTAL-1	REMARKS
	WIDTH (m)	LENGTH (m)	AREA (m')	WIDTH (m)	LENGTH (m)	AREA (m')	WIDTH (m)	LENGTH (m)	AREA (m')	(m')	
WEARING COURSE	18.700	1,985.000	37,119.50	18.700	5,408.700	101,142.69	18.700	560.000	10,472.00	148,734.19	asphalt con. 40mm including tack coat
BINDER COURSE	24.000	1,985.000	47,640.00	24.000	5,408.700	129,808.80	24.000	560.000	13,440.00	190,888.80	asphalt con. 60mm including prime coat
BASE COURSE	24.800	1,985.000	49,228.00	24.800	5,408.700	134,135.76	24.800	560.000	13,888.00	197,251.76	t=200mm
SUBBASE COURSE	24.796	1,985.000	49,220.06	25.960	5,408.700	140,409.85	25.478	560.000	14,267.68	203,897.59	t=200mm

	CENTER MEDIAN (STRAIGHT LINE)			CENTER MEDIAN (CURVE LINE)			SUB TOTAL-2 (m')			TOTAL (m')	REMARKS
	WIDTH (m)	LENGTH (m)	AREA (m')	WIDTH (m)	LENGTH (m)	AREA (m')					
WEARING COURSE	0.200	0.000	0.00	0.200	0.000	0.00	0.00			148,734.19	
BINDER COURSE	0.300	0.000	0.00	0.250	0.000	0.00	0.00			190,888.80	
BASE COURSE	0.700	0.000	0.00	0.450	0.000	0.00	0.00			197,251.76	
SUBBASE COURSE	1.280	0.000	0.00	1.740	0.000	0.00	0.00			203,897.59	

KERB WORKS

	CUT			EMBANKMENT			CUT/EMBANKMENT			TOTAL (m)	REMARKS
	UNIT LENGTH (m)	ROAD LENGTH (m)	KERB LENGTH (m)	UNIT LENGTH (m)	ROAD LENGTH (m)	KERB LENGTH (m)	UNIT LENGTH (m)	ROAD LENGTH (m)	KERB LENGTH (m)		
ASPHALT KERB	4.000	1,985.000	7,940.000	4.000	5,408.700	21,634.800	4.000	560.000	2,240.000	31,814.800	
CONCRETE KERB											

Tab.A.1.4.4 QUANTITIES OF PAVEMENT & KERB(INITIAL STAGE)

PAVEMENT WORKS

PART 4(OUTER CIRCULAR HIGHWAY)

	CUT			EMBANKMENT			CUT/EMBANKMENT			SUB TOTAL-1	REMARKS
	WIDTH (m)	LENGTH (m)	AREA (m²)	WIDTH (m)	LENGTH (m)	AREA (m²)	WIDTH (m)	LENGTH (m)	AREA (m²)	(m²)	
WEARING COURSE	17.000	210.000	3,570.00	17.000	6,430.000	109,310.00	17.000	80.000	1,360.00	114,240.00	asphalt con. 40mm including tack coat
BINDER COURSE	22.200	210.000	4,662.00	22.200	6,430.000	142,746.00	22.200	80.000	1,776.00	149,184.00	asphalt con. 60mm including prime coat
BASE COURSE	22.600	210.000	4,746.00	22.600	6,430.000	145,318.00	22.600	80.000	1,808.00	151,872.00	t=200mm
SUBBASE COURSE	22.698	210.000	4,766.58	23.180	6,430.000	149,047.40	22.939	80.000	1,835.12	155,649.10	t=200mm

	CENTER MEDIAN (STRAIGHT LINE)			CENTER MEDIAN (CURVE LINE)						TOTAL	REMARKS
	WIDTH (m)	LENGTH (m)	AREA (m²)	WIDTH (m)	LENGTH (m)	AREA (m²)	SUB TOTAL-2 (m²)			(m²)	
WEARING COURSE	0.200	1,321.000	264.20	0.200	5,310.000	1,062.00	1,326.20			115,566.20	
BINDER COURSE	0.300	1,321.000	396.30	0.250	5,310.000	1,327.50	1,723.80			150,907.80	
BASE COURSE	0.700	1,321.000	924.70	0.450	5,310.000	2,389.50	3,314.20			155,186.20	
SUBBASE COURSE	1.280	1,321.000	1,690.88	1.740	5,310.000	9,239.40	10,930.28			166,579.38	

KERB WORKS

	CUT			EMBANKMENT			CUT/EMBANKMENT			TOTAL	REMARKS
	UNIT LENGTH (m)	ROAD LENGTH (m)	KERB LENGTH (m)	UNIT LENGTH (m)	ROAD LENGTH (m)	KERB LENGTH (m)	UNIT LENGTH (m)	ROAD LENGTH (m)	KERB LENGTH (m)	(m)	
ASPHALT KERB	2.000	210.000	420.000	2.000	6,430.000	12,860.000	2.000	80.000	160.000	13,440.000	
CONCRETE KERB											

Tab.A.1.5.1 QUANTITIES OF PAVEMENT & KERB(FINAL STAGE)

PAVEMENT WORKS

PART 1(SOUTHERN HIGHWAY)

	CUT			EMBANKMENT			CUT/EMBANKMENT			SUB TOTAL-1	REMARKS
	WIDTH (m)	LENGTH (m)	AREA (m²)	WIDTH (m)	LENGTH (m)	AREA (m²)	WIDTH (m)	LENGTH (m)	AREA (m²)	(m²)	
WEARING COURSE	24.000	3,994.000	95,856.00	24.000	11,205.000	268,920.00	24.000	974.000	23,376.00	388,152.00	asphalt con. 40mm including tack coat
BINDER COURSE	29.200	3,994.000	116,624.80	29.200	11,205.000	327,186.00	29.200	974.000	28,440.80	472,251.60	asphalt con. 60mm including prime coat
BASE COURSE	29.600	3,994.000	118,222.40	29.600	11,205.000	331,668.00	29.600	974.000	28,830.40	478,720.80	t=200mm
SUBBASE COURSE	29.698	3,994.000	118,613.81	30.180	11,205.000	338,166.90	29.939	974.000	29,160.59	485,941.30	t=200mm

	CENTER MEDIAN (STRAIGHT LINE)			CENTER MEDIAN (CURVE LINE)						TOTAL	REMARKS
	WIDTH (m)	LENGTH (m)	AREA (m²)	WIDTH (m)	LENGTH (m)	AREA (m²)	SUB TOTAL-2 (m²)			(m²)	
WEARING COURSE	0.200	7,109.000	1,421.80	0.200	9,064.000	1,812.80	3,234.60			391,386.60	
BINDER COURSE	0.300	7,109.000	2,132.70	0.250	9,064.000	2,266.00	4,398.70			476,650.30	
BASE COURSE	0.700	7,109.000	4,976.30	0.450	9,064.000	4,078.80	9,055.10			487,775.90	
SUBBASE COURSE	1.280	7,109.000	9,099.52	1.740	9,064.000	15,771.36	24,870.88			510,812.18	

KERB WORKS

	CUT			EMBANKMENT			CUT/EMBANKMENT			TOTAL	REMARKS
	UNIT LENGTH (m)	ROAD LENGTH (m)	KERB LENGTH (m)	UNIT LENGTH (m)	ROAD LENGTH (m)	KERB LENGTH (m)	UNIT LENGTH (m)	ROAD LENGTH (m)	KERB LENGTH (m)	(m)	
ASPHALT KERB	2.000	3,994.000	7,988.00	2.000	11,205.000	22,410.00	2.000	974.000	1,948.000	32,346.000	
CONCRETE KERB											

Tab.A.1.5.2 QUANTITIES OF PAVEMENT & KERB(FINAL STAGE)

PAVEMENT WORKS

PART 2(OUTER CIRCULAR HIGHWAY)

	CUT			EMBANKMENT			CUT/EMBANKMENT			SUB TOTAL-1	REMARKS
	WIDTH (m)	LENGTH (m)	AREA (m²)	WIDTH (m)	LENGTH (m)	AREA (m²)	WIDTH (m)	LENGTH (m)	AREA (m²)	(m²)	
WEARING COURSE	24.000	5,370.000	128,880.00	24.000	12,548.000	301,152.00	24.000	1,805.000	43,320.00	473,352.00	asphalt con. 40mm including tack coat
BINDER COURSE	29.200	5,370.000	156,804.00	29.200	12,548.000	366,401.60	29.200	1,805.000	52,706.00	575,911.60	asphalt con. 60mm including prime coat
BASE COURSE	29.600	5,370.000	158,952.00	29.600	12,548.000	371,420.80	29.600	1,805.000	53,428.00	583,800.80	t=200mm
SUBBASE COURSE	29.698	5,370.000	159,478.26	30.180	12,548.000	378,698.64	29.939	1,805.000	54,039.90	592,216.80	t=200mm

	CENTER MEDIAN (STRAIGHT LINE)			CENTER MEDIAN (CURVE LINE)			SUB TOTAL-2 (m²)			TOTAL (m²)	REMARKS
	WIDTH (m)	LENGTH (m)	AREA (m²)	WIDTH (m)	LENGTH (m)	AREA (m²)					
WEARING COURSE	0.200	7,827.000	1,565.40	0.200	11,680.000	2,336.00	3,901.40			477,253.40	
BINDER COURSE	0.300	7,827.000	2,348.10	0.250	11,680.000	2,920.00	5,268.10			581,179.70	
BASE COURSE	0.700	7,827.000	5,478.90	0.450	11,680.000	5,256.00	10,734.90			594,535.70	
SUBBASE COURSE	1.280	7,827.000	10,018.56	1.740	11,680.000	20,323.20	30,341.76			622,558.56	

KERB WORKS

	CUT			EMBANKMENT			CUT/EMBANKMENT			TOTAL	REMARKS
	UNIT LENGTH (m)	ROAD LENGTH (m)	KERB LENGTH (m)	UNIT LENGTH (m)	ROAD LENGTH (m)	KERB LENGTH (m)	UNIT LENGTH (m)	ROAD LENGTH (m)	KERB LENGTH (m)	(m)	
ASPHALT KERB	2.000	5,370.000	10,740.000	2.000	12,548.000	25,096.000	2.000	1,805.000	3,610.000	39,446.000	
CONCRETE KERB											

Tab.A.1.5.3 QUANTITIES OF PAVEMENT & KERB(FINAL STAGE)

PAVEMENT WORKS

PART 3(OUTER CIRCULAR HIGHWAY)

	CUT			EMBANKMENT			CUT/EMBANKMENT			SUB TOTAL-1	REMARKS
	WIDTH (m)	LENGTH (m)	AREA (m²)	WIDTH (m)	LENGTH (m)	AREA (m²)	WIDTH (m)	LENGTH (m)	AREA (m²)	(m²)	
WEARING COURSE	24.000	1,985.000	47,640.00	24.000	5,408.700	129,808.80	24.000	560.000	13,440.00	190,888.80	asphalt con. 40mm including tack coat
BINDER COURSE	29.200	1,985.000	57,962.00	29.200	5,408.700	157,934.04	29.200	560.000	16,352.00	232,248.04	asphalt con. 60mm including prime coat
BASE COURSE	29.600	1,985.000	58,756.00	29.600	5,408.700	160,097.52	29.600	560.000	16,576.00	235,429.52	t=200mm
SUBBASE COURSE	29.698	1,985.000	58,950:53	30.180	5,408.700	163,234.57	29.939	560.000	16,765.84	238,950.94	t=200mm

	CENTER MEDIAN (STRAIGHT LINE)			CENTER MEDIAN (CURVE LINE)			SUB TOTAL-2 (m²)			TOTAL (m²)	REMARKS
	WIDTH (m)	LENGTH (m)	AREA (m²)	WIDTH (m)	LENGTH (m)	AREA (m²)					
WEARING COURSE	0.200	2,443.000	488.60	0.200	5,331.700	1,066.34	1,554.94			192,443.74	
BINDER COURSE	0.300	2,443.000	732.90	0.250	5,331.700	1,332.93	2,065.83			234,313.87	
BASE COURSE	0.700	2,443.000	1,710.10	0.450	5,331.700	2,399.27	4,109.37			239,538.89	
SUBBASE COURSE	1.280	2,443.000	3,127.04	1.740	5,331.700	9,277.16	12,404.20			251,355.13	

KERB WORKS

	CUT			EMBANKMENT			CUT/EMBANKMENT			TOTAL (m)	REMARKS
	UNIT LENGTH (m)	ROAD LENGTH (m)	KERB LENGTH (m)	UNIT LENGTH (m)	ROAD LENGTH (m)	KERB LENGTH (m)	UNIT LENGTH (m)	ROAD LENGTH (m)	KERB LENGTH (m)		
ASPHALT KERB	2.000	1,985.000	3,970.000	2.000	5,408.700	10,817.400	2.000	560.000	1,120.000	15,907.400	
CONCRETE KERB											

Tab. A.1.6.1 QUANTITIES FOR FRONTAGE ROAD

PART 1(SOUTHERN HIGHWAY) (1/2)

STAGE	L-R	WIDTH (m)	LENGTH (m)	AREA (m²)	RATE (Rs.)	COST (x10³sRs.)
274 +70 ~ 277 +80	L	5.5	310.0	1,705.0	571.83	974.97
279 +10 ~ 293 +60	R	5.5	1,450.0	7,975.0	571.83	4,560.34
279 +80 ~ 305 +60	L	5.5	2,580.0	14,190.0	571.83	8,114.27
305 +60 ~ 326 +10	L	5.5	2,050.0	11,275.0	571.83	6,447.38
308 +24	L	4.0	130.0	520.0	571.83	297.35
308 +24	R	4.0	75.0	300.0	571.83	171.55
315 +55	R	4.0	20.0	80.0	571.83	45.75
323 +05 ~ 336 +75	R	5.5	1,370.0	7,535.0	571.83	4,308.74
338 +80 ~ 360 +50	L	5.5	2,170.0	11,935.0	571.83	6,824.79
338 +80 ~ 355 +50	R	5.5	1,670.0	9,185.0	571.83	5,252.26
355 +70	L	4.0	50.0	200.0	571.83	114.37
355 +70	R	4.0	100.0	400.0	571.83	228.73
355 +70 ~ 356 +10	R	5.5	110.0	605.0	571.83	345.96
360 +70	L	4.0	70.0	280.0	571.83	160.11
360 +70	R	4.0	90.0	360.0	571.83	205.86
370 +20 ~ 371 +10	R	4.0	125.0	500.0	571.83	285.92
371 +10 ~ 372 +30	L	4.0	140.0	560.0	571.83	320.22
380 +60 ~ 405 +90	L	5.5	2,530.0	13,915.0	571.83	7,957.01
380 +00 ~ 405 +90	R	5.5	2,590.0	14,245.0	571.83	8,145.72
SUB TOTAL-1			17,630.0	95,765.0		54,761.30

Tab. A.1.6.2 QUANTITIES FOR FRONTAGE ROAD

PART 1(SOUTHERN HIGHWAY) (2/2)

STAGE	L-R	WIDTH (m)	LENGTH (m)	AREA (m²)	RATE (Rs.)	COST (x10⁶sRs.)
405 +90 ~ 428 +80	L	5.5	2,290.0	12,595.0	571.83	7,202.20
405 +90 ~ 410 +60	R	5.5	450.0	2,475.0	571.83	1,415.28
410 +40 ~	R	4.0	70.0	280.0	571.83	160.11
410 +40 ~	R	4.0	80.0	320.0	571.83	182.99
423 +90 427 +10	L	5.5	370.0	2,035.0	571.83	1,163.67
414 +60 416 +30	R	5.5	170.0	935.0	571.83	534.66
428 +40	R	4.0	50.0	200.0	571.83	114.37
SUB TOTAL-2			3,480.0	18,840.0		10,773.28
SUB TOTAL-1			17,630.0	95,765.0		54,761.30
TOTAL			21,110.0	114,605.0		65,534.58

Tab. A.1.6.3 QUANTITIES FOR FRONTAGE ROAD

PART 2(OUTER CIRCULAR HIGHWAY)(1/3)

STAGE	L-R	WIDTH (m)	LENGTH (m)	AREA (m²)	RATE (Rs.)	COST (x10³sRs.)
74 +80 ~ 81 +30	L	5.5	700.0	3,850.0	571.83	2,201.55
74 +80 ~ 81 +30	R	5.5	620.0	3,410.0	571.83	1,949.94
89 +60 ~ 87 +60	L	5.5	620.0	3,410.0	571.83	1,949.94
81 +60 ~ 87 +30	R	5.5	560.0	3,080.0	571.83	1,761.24
90 +20 ~ 92 +20	L	5.5	200.0	1,100.0	571.83	629.01
87 +60 ~ 92 +30	R	5.5	470.0	2,585.0	571.83	1,478.18
95 +10 ~ 101 +40	L	5.5	630.0	3,465.0	571.83	1,981.39
101 +50 ~ 111 +60	L	5.5	1,010.0	5,555.0	571.83	3,176.52
111 +70 ~ 124 +20	L	5.5	1,250.0	6,875.0	571.83	3,931.33
124 +30 ~ 131 +80	L	5.5	880.0	4,840.0	571.83	2,767.66
95 +00 ~ 100 +80	R	5.5	570.0	3,135.0	571.83	1,792.69
100 +90 ~ 111 +40	R	5.5	1,050.0	5,775.0	571.83	3,302.32
111 +50 ~ 115 +30	R	5.5	380.0	2,090.0	571.83	1,195.12
124 +20 ~ 132 +00	R	5.5	780.0	4,290.0	571.83	2,453.15
132 +00	L	4.0	120.0	480.0	571.83	274.48
132 +00	R	4.0	80.0	320.0	571.83	182.99
132 +40 ~ 159 +80	L	5.5	2,740.0	15,070.0	571.83	8,617.48
132 +15 ~ 159 +80	R	5.5	2,765.0	15,207.5	571.83	8,696.10
163 +00 ~ 175 +20	L	5.5	1,220.0	6,710.0	571.83	3,836.98
SUB TOTAL-1			16,645.0	91,247.5		52,178.06

Tab. A.1.6.4 QUANTITIES FOR FRONTAGE ROAD

PART 2(OUTER CIRCULAR HIGHWAY)(2/3)

STAGE				L-R	WIDTH (m)	LENGTH (m)	AREA (m²)	RATE (Rs.)	COST (x10³sRs.)
163	+00 ~	175	+00	R	5.5	1,200.0	6,600.0	571.83	3,774.08
175	+30 ~	194	+60	L	5.5	1,930.0	10,615.0	571.83	6,069.98
175	+10 ~	194	+60	R	5.5	1,950.0	10,725.0	571.83	6,132.88
194	+70 ~	201	+30	L	5.5	660.0	3,630.0	571.83	2,075.74
194	+70 ~	201	+90	R	5.5	720.0	3,960.0	571.83	2,264.45
201	+40 ~	206	+10	L	5.5	470.0	2,585.0	571.83	1,478.18
202	+00 ~	206	+10	R	5.5	410.0	2,255.0	571.83	1,289.48
206	+20 ~	224	+60	L	5.5	1,840.0	10,120.0	571.83	5,786.92
206	+30 ~	224	+70	R	5.5	1,840.0	10,120.0	571.83	5,786.92
224	+70 ~	245	+00	L	5.5	2,030.0	11,165.0	571.83	6,384.48
224	+80 ~	247	+40	R	5.5	2,260.0	12,430.0	571.83	7,107.85
246	+50 ~	247	+40	L	5.5	90.0	495.0	571.83	283.06
247	+50 ~	260	+05	L	5.5	1,255.0	6,902.5	571.83	3,947.06
247	+50 ~	258	+00	R	5.5	1,120.0	6,160.0	571.83	3,522.47
260	+15 ~	264	+00	L	5.5	485.0	2,667.5	571.83	1,525.36
260	+30 ~	264	+10	R	5.5	380.0	2,090.0	571.83	1,195.12
264	+00 ~	268	+00	L	5.5	400.0	2,200.0	571.83	1,258.03
264	+20 ~	267	+90	R	5.5	370.0	2,035.0	571.83	1,163.67
264	+15			L	4.0	110.0	440.0	571.83	251.61
SUB TOTAL-2						19,520.0	107,195.0		57,523.24

Tab. A.1.6.5 QUANTITIES FOR FRONTAGE ROAD

PART 2(OUTER CIRCULAR HIGHWAY)(3/3)

STAGE	L-R	WIDTH (m)	LENGTH (m)	AREA (m²)	RATE (Rs.)	COST (x10³sRs.)
268 +10 ~ 270 +30	L	5.5	310.0	1,705.0	571.83	974.97
254 +50 255 +15	L	4.0	440.0	1,760.0	571.83	1,006.42
255 +15	R	4.0	110.0	440.0	571.83	251.61
260 +15	L	4.0	80.0	320.0	571.83	182.99
SUB TOTAL-3			940.0	4,225.0		2,415.98
SUB TOTAL-1			16,645.0	91,247.5		52,178.06
SUB TOTAL-2			19,520.0	107,195.0		57,523.24
TOTAL			37,105.0	202,667.5		112,117.28

Tab. A.1.6.6 QUANTITIES FOR FRONTAGE ROAD

PART 3(OUTER CIRCULAR HIGHWAY)

STAGE	L-R	WIDTH (m)	LENGTH (m)	AREA (m²)	RATE (Rs.)	COST (x10^3Rs.)
9 +40 ~ 14 +50	L	5.5	510.0	2,805.0	571.83	1,603.98
9 +40 ~ 14 +50	R	5.5	510.0	2,805.0	571.83	1,603.98
28 +80 ~ 44 +80	L	5.5	1,600.0	8,800.0	571.83	5,032.10
28 +60 ~ 57 +30	R	5.5	2,870.0	15,785.0	571.83	9,026.34
45 +80 ~ 57 +30	L	5.5	1,150.0	6,325.0	571.83	3,616.82
57 +50 ~ 63 +60	L	5.5	610.0	3,355.0	571.83	1,918.49
37 +10 ~	L	4.0	70.0	280.0	571.83	160.11
37 +10 ~	R	4.0	100.0	400.0	571.83	228.73
36 +80 ~	L	4.0	60.0	240.0	571.83	137.24
37 +20 ~	L	4.0	60.0	240.0	571.83	137.24
37 +00 ~	R	4.0	110.0	440.0	571.83	251.61
37 +30 ~	R	4.0	110.0	440.0	571.83	251.61
57 +30 ~	L	10.0	50.0	500.0	571.83	285.92
57 +30 ~	R	10.0	110.0	1,100.0	571.83	629.01
57 +30 ~ 74 +80	R	5.5	1,750.0	9,625.0	571.83	5,503.86
73 +30 ~ 74 +80	L	5.5	150.0	825.0	571.83	471.76
TOTAL			9,820.0	53,965.0		30,858.81

Tab. A.1.6.7 QUANTITIES FOR FRONTAGE ROAD

PART 4(OUTER CIRCULAR HIGHWAY)

STAGE	L-R	WIDTH (m)	LENGTH (m)	AREA (m²)	RATE (Rs.)	COST (x10³sRs.)
458 +45 ~	L	5.5	90.0	495.0	571.83	283.06
458 +45 ~	R	5.5	60.0	330.0	571.83	188.70
471 +40 ~ 472 +90	L	5.5	150.0	825.0	571.83	471.76
471 +60 ~ 473 +00	R	5.5	150.0	825.0	571.83	471.76
481 +10 ~ 486 +50	L	5.5	540.0	2,970.0	571.83	1,698.34
486 +50 ~	R	5.5	150.0	825.0	571.83	471.76
492 +90 ~ 501 +90	L	5.5	940.0	5,170.0	571.83	2,956.36
492 +80 ~ 506 +14	R	5.5	1,404.0	7,722.0	571.83	4,415.67
TOTAL			3,484.0	19,162.0		10,957.41

Tab.A.1.7.1 QUANTITIES OF BRIDGE&VIADUCT (MAIN PART)
(INITIAL STAGE)

PART 1-4

PART	CROSS SECTION	STATION	TYPE	WIDTH(m) / LENGTH(m)	AREA (m²)	NO.OF SPAN	SUPERSTRUCTURE			SUBSTRUCTURE								TOTAL COST		UNIT COST (/m^2)
							TYPE	UNIT COST Rs./m²	COST x10^3Rs.	ABUTMENT			PIER			CONCRETE BLOCK PITCHING (x10^3Rs.)	TOTAL x10^3Rs.	ACTUAL x10^3Rs.	INCLU. OVERHEAD x10^3Rs.	Rs./m²
										BODY (x10^3Rs.)	FOUNDATION TYPE	FOUNDATION COST	TOTAL (x10^3Rs.)	BODY (x10^3Rs.)	FOUNDATION TYPE	FOUNDATION COST	TOTAL (x10^3Rs.)				
3	CKE2	0 +61.000 0 +22.000	VIADUCT	25.0 / 83.0	2,075.0	4	PC	33,276	69,048	10,470	Pile Φ1000	31,564	42,034	10,656	Pile Φ1000	21,424	32,080	710	74,824	143,872	165,452	79,736
3	CKE2	2 +89.000 3 +11.000	VIADUCT	25.0 / 22.0	550.0	1	PC	33,276	18,302	10,470	Pile Φ1000	31,564	42,034	0		0	0	710	42,744	61,046	70,203	127,641
3	A3	9 +12.000 9 +52.000	VIADUCT	25.0 / 40.0	1,000.0	1	PC	53,242	53,242	10,470	Pile Φ1000	31,564	42,034	0		0	0	710	42,744	95,986	110,384	110,384
3	RA11	28 +27.000 28 +57.000	VIADUCT	25.0 / 30.0	750.0	1	PC	39,932	29,949	10,470	Pile Φ1000	31,564	42,034	0		0	0	710	42,744	72,693	83,597	111,463
2	A1	81 +32.000 81 +62.000	VIADUCT	25.0 / 30.0	750.0	1	PC	39,932	29,949	11,519	SPREAD	0	11,519	0		0	0	710	12,229	42,178	48,505	64,673
2	KEIAN	159 +82.000 161 +79.000	BRIDGE	25.0 / 197.0	4,925.0	8	PC	33,276	163,884	10,470	Pile Φ1000	31,564	42,034	24,103	Caisson	29,763	53,866	710	96,610	260,494	299,568	60,826
2	A110	162 +89.000 163 +11.000	VIADUCT	25.0 / 22.0	550.0	1	PC	33,276	18,302	10,470	Pile Φ1000	31,564	42,034	0		0	0	710	42,744	61,046	70,203	127,641
2	RA11	270 +19.000 270 +37.000	VIADUCT	25.0 / 18.0	450.0	1	PC	16,472	7,412	10,470	Pile Φ1000	31,564	42,034	0		0	0	710	42,744	50,156	57,680	128,177
1	A4	276 +5.000 276 +50.000	VIADUCT	25.0 / 45.0	1,125.0	1	PC	59,897	67,384	10,470	Pile Φ1000	31,564	42,034	0		0	0	710	42,744	110,128	126,647	112,575
1	A4	276 +15.000 276 +63.000	VIADUCT	25.0 / 48.0	1,200.0	1	PC	63,890	76,668	10,470	Pile Φ1000	31,564	42,034	0		0	0	710	42,744	119,412	137,324	114,437
1	MINOR	322 +75.000 323 +0.000	VIADUCT	25.0 / 25.0	625.0	1	PC	33,276	20,798	10,470	Pile Φ1000	31,564	42,034	0		0	0	710	42,744	63,542	73,073	116,916
1	B84	337 +82.000 338 +12.000	VIADUCT	25.0 / 30.0	750.0	1	PC	39,932	29,949	10,470	Pile Φ1000	31,564	42,034	0		0	0	710	42,744	72,693	83,597	111,463
1	MINOR	366 +94.000 367 +16.000	BRIDGE	25.0 / 22.0	550.0	1	PC	33,276	18,302	10,470	Pile Φ1000	31,564	42,034	0		0	0	710	42,744	61,046	70,203	127,641
1	A8	423 +57.000 423 +79.000	VIADUCT	25.0 / 22.0	550.0	1	PC	33,276	18,302	10,470	Pile Φ1000	31,564	42,034	0		0	0	710	42,744	61,046	70,203	127,641
4	KEIAN	442 +70.000 443 +72.000	BRIDGE	25.0 / 102.0	2,550.0	6	PC	16,472	42,004	10,470	Pile Φ1000	31,564	42,034	3,500	Pile Φ1000	37,180	40,680	710	83,424	125,428	144,242	56,565
PART1(SOUTHERN HIGHWAY) NO. OF BRIDGE : 1 NO. OF VIADUCT: 5							PART2-4(OUTER CIRCULAR HIGHWAY) NO. OF BRIDGE : 2 NO. OF VIADUCT: 7														
TOTAL																				1,400,765	1,610,880	

Tab.A.1.7.2 QUANTITIES OF BRIDGE&VIADUCT (MAIN PART)
(FINAL STAGE)

PART 1-4

PART	CROSS SECTION	STATION	TYPE	WIDTH(m) / LENGTH(m)	AREA (m²)	NO.OF SPAN	SUPERSTRUCTURE			SUBSTRUCTURE									TOTAL COST		UNIT COST (/m^2)
							TYPE	UNIT COST Rs./m²	COST x10^3Rs.	ABUTMENT				PIER			CONCRETE BLOCK PITCHING (x10^3Rs.)	TOTAL x10^3Rs.	ACTUAL x10^3Rs.	INCLU. OVERHEAD x10^3Rs.	Rs/m²
										BODY (x10^3Rs.)	FOUNDATION TYPE	FOUNDATION COST	TOTAL (x10^3Rs.)	BODY (x10^3Rs.)	FOUNDATION TYPE	FOUNDATION COST	TOTAL (x10^3Rs.)				
3	CKE2	0 -61.000 0 +22.000	VIADUCT	31.5 / 83.0	2,614.5	4	PC	33,276	87,000	10,470	Pile Φ1000	31,564	42,034	10,656	Pile Φ1000	21,424	32,080	710	74,824	161,824	186,098	61,895
3	CKE2	2 +89.000 3 +11.000	VIADUCT	31.5 / 22.0	693.0	1	PC	33,276	23,060	10,470	Pile Φ1000	31,564	42,034	0		0	0	710	42,744	65,804	75,675	94,956
3	A3	9 +12.000 9 +52.000	VIADUCT	31.5 / 40.0	1,260.0	1	PC	53,242	67,085	10,470	Pile Φ1000	31,564	42,034	0		0	0	710	42,744	109,829	126,303	87,166
3	RAIL	28 +27.000 28 +57.000	VIADUCT	31.5 / 30.0	945.0	1	PC	39,932	37,736	10,470	Pile Φ1000	31,564	42,034	0		0	0	710	42,744	80,480	92,552	85,164
2	A1	81 +32.000 81 +62.000	VIADUCT	31.5 / 30.0	945.0	1	PC	39,932	37,736	11,519	SPREAD	0	11,519	0		0	0	710	12,229	49,965	57,459	52,873
2	EXPAN	159 +82.000 161 +79.000	BRIDGE	31.5 / 197.0	6,205.5	8	PC	33,276	206,494	10,470	Pile Φ1000	31,564	42,034	24,103	Caisson	29,763	53,866	710	96,610	303,104	348,570	48,844
2	A110	162 +89.000 163 +11.000	VIADUCT	31.5 / 22.0	693.0	1	PC	33,276	23,060	10,470	Pile Φ1000	31,564	42,034	0		0	0	710	42,744	65,804	75,675	94,956
2	RAIL	270 +19.000 270 +37.000	VIADUCT	31.5 / 18.0	567.0	1	PC	16,472	9,340	10,470	Pile Φ1000	31,564	42,034	0		0	0	710	42,744	52,084	59,896	91,858
1	A4	276 +5.000 276 +50.000	VIADUCT	31.5 / 45.0	1,417.5	1	PC	59,897	84,904	10,470	Pile Φ1000	31,564	42,034	0		0	0	710	42,744	127,648	146,795	90,051
1	A4	276 +15.000 276 +63.000	VIADUCT	31.5 / 48.0	1,512.0	1	PC	63,890	96,602	10,470	Pile Φ1000	31,564	42,034	0		0	0	710	42,744	139,346	160,248	92,160
1	MINOR	322 +75.000 323 +0.000	VIADUCT	31.5 / 25.0	787.5	1	PC	33,276	26,205	10,470	Pile Φ1000	31,564	42,034	0		0	0	710	42,744	68,949	79,291	87,554
1	B84	337 +82.000 338 +12.000	VIADUCT	31.5 / 30.0	945.0	1	PC	39,932	37,736	10,470	Pile Φ1000	31,564	42,034	0		0	0	710	42,744	80,480	92,552	85,164
1	MINOR	366 +94.000 367 +16.000	BRIDGE	31.5 / 22.0	693.0	1	PC	33,276	23,060	10,470	Pile Φ1000	31,564	42,034	0		0	0	710	42,744	65,804	75,675	94,956
1	A8	423 +57.000 423 +79.000	VIADUCT	31.5 / 22.0	693.0	1	PC	33,276	23,060	10,470	Pile Φ1000	31,564	42,034	0		0	0	710	42,744	65,804	75,675	94,956
4	RAILWAY	442 +70.000 443 +72.000	BRIDGE	25.0 / 102.0	2,550.0	6	PC	16,472	42,004	10,470	Pile Φ1000	31,564	42,034	3,500	Pile Φ1000	37,180	40,680	710	83,424	125,428	144,242	49,187
PART1(SOUTHERN HIGHWAY) NO. OF BRIDGE : 1 NO. OF VIADUCT: 5							PART2-4(OUTER CIRCULAR HIGHWAY) NO. OF BRIDGE : 2 NO. OF VIADUCT: 7															
TOTAL																			1,562,352	1,796,705	

Tab.A.1.8.1 QUANTITIES OF OVERPASS

PART 1(SOUTHERN HIGHWAY)

NO.	STATION.	WIDTH(m) / LENGTH(m)			AREA (m²)	NO.OF SPAN	SUPERSTRUCTURE			SUBSTRUCTURE									TOTAL COST		UNIT COST (/m^2)
							TYPE	UNIT COST Rs./m²	COST x10^3Rs.	ABUTMENT			PIER			CONCRETE BLOCK PITCHING (x10^3Rs.)	TOTAL x10^3Rs.	ACTUAL x10^3Rs.	INCLU. OVERHEAD x10^3Rs.	
										BODY (x10^3Rs.)	FOUNDATION TYPE	FOUNDATION COST	TOTAL (x10^3Rs.)	BODY (x10^3Rs.)	FOUNDATION TYPE	FOUNDATION COST	TOTAL (x10^3Rs.)				
1	282 +50.000	5.5	/	35.5	195.3	2	PC	16,445	3,211	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	12,133	13,953	62,140
2	292 +46.000	5.5	/	35.5	195.3	2	PC	16,445	3,211	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	12,133	13,953	62,140
3	308 +23.000	5.5	/	35.5	195.3	2	PC	16,445	3,211	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	12,133	13,953	62,140
4	315 +54.000	5.5	/	35.5	195.3	2	PC	16,445	3,211	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	12,133	13,953	62,140
5	350 +0.000	5.5	/	35.5	195.3	2	PC	16,445	3,211	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	12,133	13,953	62,140
6	355 +73.000	5.5	/	43.9	241.5	2	PC	33,276	8,034	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	16,956	19,500	70,228
7	360 +66.000	5.5	/	35.5	195.3	2	PC	16,445	3,211	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	12,133	13,953	62,140
8	371 +10.000	5.5	/	35.5	195.3	2	PC	16,445	3,211	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	12,133	13,953	62,140
9	384 +14.000	5.5	/	50.0	275.0	2	PC	33,276	9,151	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	18,073	20,784	65,720
10	391 +0.000	5.5	/	35.5	195.3	2	PC	16,445	3,211	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	12,133	13,953	62,140
11	395 +51.000	5.5	/	35.5	195.3	2	PC	16,445	3,211	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	12,133	13,953	62,140
12	403 +0.000	5.5	/	35.5	195.3	2	PC	16,445	3,211	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	12,133	13,953	62,140
13	410 +40.000	5.5	/	35.5	195.3	2	PC	16,445	3,211	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	12,133	13,953	62,140
14	428 +37.000	5.5	/	35.5	195.3	2	PC	16,445	3,211	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	12,133	13,953	62,140
15	378 +50.000	5.5	/	70.0	385.0	4	PC	16,445	6,331	1,292	Pile Φ600	4,180	5,472	1,620	Pile Φ600	5,700	7,320	1,010	13,802	20,133	23,153	52,294
16	380 +15.000	15.0	/	55.0	825.0	3	PC	16,445	13,567	3,874	Pile Φ600	12,540	16,414	3,240	Pile Φ600	11,400	14,640	3,030	34,084	47,651	54,799	57,759
17	436 +65.000	5.5	/	44.0	242.0	2	PC	33,276	8,053	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	16,975	19,521	70,144
TOTAL																				265,383	305,191	

Tab.A.1.8.2 QUANTITIES OF OVERPASS

PART 3(OUTER CIRCULAR HIGHWAY)

NO.	STATION	WIDTH(m) / LENGTH(m)	AREA (m²)	NO.OF SPAN	SUPERSTRUCTURE			SUBSTRUCTURE									TOTAL COST		UNIT COST (/m^2)
								ABUTMENT				PIER			CONCRETE BLOCK PITCHING	TOTAL	ACTUAL	INCLU. OVERHEAD	
					TYPE	UNIT COST Rs./m²	COST x10^3Rs.	BODY (x10^3Rs.)	FOUNDATION TYPE	FOUNDATION COST	TOTAL (x10^3Rs.)	BODY (x10^3Rs.)	FOUNDATION TYPE	FOUNDATION COST	TOTAL (x10^3Rs.)	(x10^3Rs.)	x10^3Rs.	x10^3Rs.	Rs/m²
1	37 +10.000	5.5 / 53.0	291.5	3	PC	16,445	4,794	1,292	Pile Φ600	4,180	5,472	1,080	Pile Φ600	3,800	4,880	1,010	11,362	16,156	18,579	55,423
2	44 +70.000	5.5 / 35.5	195.3	2	PC	16,445	3,211	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	12,133	13,953	62,140
3	47 +15.000	5.5 / 45.0	247.5	2	PC	33,276	8,236	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	17,158	19,731	69,324
4	50 +80.000	8.0 / 40.0	320.0	2	PC	33,276	10,648	1,880	Pile Φ600	6,080	7,960	786	Pile Φ600	2,764	3,550	1,470	12,980	23,628	27,173	73,839
5	57 +30.000	5.5 / 35.5	195.3	2	PC	16,445	3,211	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	12,133	13,953	62,140
6	66 +55.000	5.5 / 35.5	195.3	2	PC	16,445	3,211	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	12,133	13,953	62,140
7	73 +40.000	10.0 / 45.0	450.0	2	PC	33,276	14,974	2,584	Pile Φ600	8,360	10,944	1,080	Pile Φ600	3,800	4,880	2,020	17,844	32,818	37,741	72,929
	TOTAL																126,159	145,083		

Tab.A.1.8.3 QUANTITIES OF OVERPASS

PART 4(OUTER CIRCULAR HIGHWAY)

NO.	STATION	WIDTH(m) / LENGTH(m)	AREA (m²)	NO.OF SPAN	SUPERSTRUCTURE			SUBSTRUCTURE									TOTAL COST		UNIT COST (/m^2)
					TYPE	UNIT COST Rs./m²	COST x10^3Rs.	ABUTMENT			PIER			CONCRETE BLOCK PITCHING (x10^3Rs.)	TOTAL x10^3Rs.	ACTUAL x10^3Rs.	INCLU. OVERHEAD x10^3Rs.	Rs/m²
								BODY (x10^3Rs.)	FOUNDATION TYPE	FOUNDATION COST	TOTAL (x10^3Rs.)	BODY (x10^3Rs.)	FOUNDATION TYPE	FOUNDATION COST	TOTAL (x10^3Rs.)				
1	458 +40.000	5.5 / 30.0	165.0	2	PC	16,445	2,713	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	11,635	13,381	70,518
2	486 +50.000	5.5 / 28.5	156.8	2	PC	16,445	2,578	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	11,500	13,225	73,364
3	493 +90.000	5.5 / 28.5	156.8	2	PC	16,445	2,578	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	11,500	13,225	73,364
4	500 +80.000	5.5 / 28.5	156.8	2	PC	16,445	2,578	1,292	Pile Φ600	4,180	5,472	540	Pile Φ600	1,900	2,440	1,010	8,922	11,500	13,225	73,364
	TOTAL																	46,135	53,055	

Tab. A.1.9.1 QUANTITIES FOR BOX CULVERT

PART 1(SOUTHERN HIGHWAY)

STATION	SHAPE		LENGTH(m)	WHOLE SECTION (m^2)	SECTION OF CONCRETE (m^2)	QUANTITY OF CONCRETE (m^3)	RATE(Rs.)	COST (x10^3Rs.)	REMARKS
	W(m)* H(m)	INNER SECTION (m^2)							
278 +90.000	8.00 * 6.00	48.00	41.00	63.00	15.00	1230.00	30,000	59,040	UNDERPASS
300 +50.000	5.00 * 5.00	25.00	33.00	36.00	11.00	363.00	30,000	24,750	UNDERPASS
334 +50.000	6.00 * 6.00	36.00	76.00	49.00	13.00	988.00	30,000	82,080	UNDERPASS
340 +80.000	6.00 * 5.00	30.00	15.00	42.00	12.00	180.00	30,000	13,500	UNDERPASS
343 +30.000	6.00 * 4.00	24.00	66.00	35.00	11.00	726.00	34,500	54,648	DRAINAGE
411 +73.000	3.00 * 2.00	6.00	50.00	12.00	6.00	300.00	34,500	10,350	DRAINAGE
416 +30.000	5.00 * 5.00	25.00	33.00	36.00	11.00	363.00	30,000	24,750	UNDERPASS
419 +22.000	5.00 * 5.00	25.00	6.00	36.00	11.00	66.00	30,000	4,500	UNDERPASS
420 +00.000	6.00 * 5.00	30.00	59.00	42.00	12.00	708.00	30,000	53,100	UNDERPASS
431 +42.000	4.00 * 2.00	8.00	92.00	15.00	7.00	644.00	30,000	22,080	UNDERPASS
TOTAL		UNDERPASS	355.00					283,800	
		DRAINAGE	116.00					64,998	

Tab. A.1.9.2 QUANTITIES FOR BOX CULVERT

PART 2(OUTER CIRCULAR HIGHWAY)

STATION	SHAPE		LENGTH(m)	WHOLE SECTION (m^2)	SECTION OF CONCRETE (m^2)	QUANTITY OF CONCRETE (m^3)	RATE(Rs.)	COST (x10^3Rs.)	REMARKS
	W(m)* H(m)	INNER SECTION (m^2)							
77 +00.000	6.00 * 5.00	30.00	74.00	42.00	12.00	888.00	30,000	66,600	UNDERPASS
87 +45.000	6.00 * 0.50	3.00	35.00	10.50	7.50	262.50	30,000	3,150	UNDERPASS
104 +30.000	5.00 * 5.00	25.00	33.00	36.00	11.00	363.00	30,000	24,750	UNDERPASS
107 +55.000	5.00 * 5.00	25.00	33.00	36.00	11.00	363.00	30,000	24,750	UNDERPASS
138 +55.000	5.00 * 5.00	25.00	33.00	36.00	11.00	363.00	30,000	24,750	UNDERPASS
156 +00.000	6.00 * 5.00	30.00	37.00	42.00	12.00	444.00	30,000	33,300	UNDERPASS
157 +20.000	7.00 * 3.00	21.00	118.00	32.00	11.00	1298.00	34,500	85,491	DRAINAGE
167 +00.000	6.00 * 5.00	30.00	40.00	42.00	12.00	480.00	30,000	36,000	UNDERPASS
189 +50.000	5.00 * 5.00	25.00	33.00	36.00	11.00	363.00	30,000	24,750	UNDERPASS
211 +30.000	5.00 * 5.00	25.00	33.00	36.00	11.00	363.00	30,000	24,750	UNDERPASS
220 +00.000	5.00 * 5.00	25.00	33.00	36.00	11.00	1230.00	30,000	24,750	UNDERPASS
224 +75.000	8.00 * 6.00	48.00	35.00	63.00	15.00	525.00	30,000	50,400	UNDERPASS
233 +80.000	5.00 * 5.00	25.00	33.00	36.00	11.00	363.00	30,000	24,750	UNDERPASS
236 +50.000	5.00 * 5.00	25.00	33.00	36.00	11.00	363.00	30,000	24,750	UNDERPASS
244 +40.000	5.00 * 5.00	25.00	33.00	36.00	11.00	363.00	30,000	24,750	UNDERPASS
268 +00.000	6.00 * 6.00	36.00	33.00	49.00	13.00	429.00	30,000	35,640	UNDERPASS
TOTAL		UNDREPASS	551.00					447,840	
		DRAINAGE	118.00					85,491	

Tab. A.1.9.3 QUANTITIES FOR BOX CULVERT

PART 3(OUTER CIRCULAR HIGHWAY)

STATION	SHAPE		LENGTH(m)	WHOLE SECTION (m^2)	SECTION OF CONCRETE (m^2)	QUANTITY OF CONCRETE (m^3)	RATE(Rs.)	COST (x10^3Rs.)	REMARKS
	W(m)* H(m)	INNER SECTION (m^2)							
0 +90.000	6.00 * 5.00	30.00	79.00	42.00	12.00	948.00	30,000	71,100	UNDERPASS
13 +85.000	6.00 * 5.00	30.00	64.00	42.00	12.00	768.00	30,000	57,600	UNDERPASS
16 +52.000	8.00 * 6.00	48.00	37.00	63.00	15.00	555.00	30,000	53,280	UNDERPASS
33 +60.000	6.00 * 3.00	18.00	50.00	28.00	10.00	500.00	30,000	27,000	UNDERPASS
TOTAL		UNDERPASS	230.00					208,980	
		DRAINAGE	0.00					0.00	

Tab. A.1.9.4 QUANTITIES FOR BOX CULVERT

PART 4(OUTER CIRCULAR HIGHWAY)

STATION	SHAPE		LENGTH(m)	WHOLE SECTION (m^2)	SECTION OF CONCRETE (m^2)	QUANTITY OF CONCRETE (m^3)	RATE(Rs.)	COST (x10^3Rs.)	REMARKS
	W(m)* H(m)	INNER SECTION (m^2)							
438 +53.000	4.00 * 2.00	8.00	60.00	15.00	7.00	420.00	34,500	16,560	DRAINAGE
440 +80.000	4.00 * 2.00	8.00	78.00	15.00	7.00	546.00	34,500	21,528	DRAINAGE
450 +85.000	6.00 * 6.00	36.00	30.00	49.00	13.00	390.00	30,000	32,400	UNDERPASS
463 +85.000	5.00 * 3.00	15.00	26.00	24.00	9.00	234.00	30,000	11,700	UNDERPASS
471 +45.000	5.00 * 5.00	25.00	28.00	36.00	11.00	308.00	30,000	21,000	UNDERPASS
480 +40.000	10.00 * 4.00	40.00	26.00	55.00	15.00	390.00	34,500	35,880	DRAINAGE
489 +50.000	5.00 * 3.00	15.00	27.00	24.00	9.00	243.00	34,500	13,973	DRAINAGE
TOTAL		UNDERPASS	84.00					65,100	
		DRAINAGE	191.00					87,941	

Tab.A.1.10.1 QUANTITIES OF PIPE CULVERT

PART 1(SOUTHERN HIGHWAY)

STATION	DIAMETER (m)	LENGTH (m)	RATE (Rs.)	COST (x10^3Rs.)	REMARKS
277 +80.000	ϕ1.5	80.00	37,500	3,000	
285 +64.000	ϕ1.5	50.00	37,500	1,875	
291 +20.000	ϕ1.5	55.00	37,500	2,063	
294 +53.000	ϕ1.5	45.00	37,500	1,688	
309 +05.000	ϕ1.5	50.00	37,500	1,875	
312 +75.000	ϕ1.5	50.00	37,500	1,875	
327 +95.000	ϕ1.5	80.00	37,500	3,000	
348 +82.000	ϕ1.5	66.00	37,500	2,475	
352 +25.000	ϕ1.5	60.00	37,500	2,250	
356 +48.000	ϕ1.5	50.00	37,500	1,875	
371 +75.000	ϕ1.5	53.00	37,500	1,988	
387 +85.000	ϕ1.5	55.00	37,500	2,063	
400 +26.000	ϕ1.5	48.00	37,500	1,800	
407 +25.000	ϕ1.5	60.00	37,500	2,250	
413 +05.000	ϕ1.5	60.00	37,500	2,250	
416 +60.000	ϕ1.5	65.00	37,500	2,438	
419 +20.000	ϕ1.5	70.00	37,500	2,625	
426 +27.000	ϕ1.5	62.00	37,500	2,625	
TOTAL		1059.00		40,013	

Tab.A.1.10.2 QUANTITIES OF PIPE CULVERT

PART 2(OUTER CIRCULAR HIGHWAY)

STATION	DIAMETER (m)	LENGTH (m)	RATE (Rs.)	COST (x10^3Rs.)	REMARKS
88 +50.000	ϕ1.5	100.00	37,500	3,750	
96 +25.000	ϕ1.5	80.00	37,500	3,000	
119 +20.000	ϕ1.5	50.00	37,500	1,875	
122 +65.000	ϕ1.5	50.00	37,500	1,875	
130 +40.000	ϕ1.5	60.00	37,500	2,250	
134 +50.000	ϕ1.5	58.00	37,500	2,175	
148 +50.000	ϕ1.5	70.00	37,500	2,625	
178 +20.000	ϕ1.5	50.00	37,500	1,875	
180 +10.000	ϕ1.5	65.00	37,500	2,438	
198 +37.000	ϕ1.5	66.00	37,500	2,475	
207 +60.000	ϕ1.5	55.00	37,500	2,063	
213 +40.000	ϕ1.5	66.00	37,500	2,475	
223 +60.000	ϕ1.5	80.00	37,500	3,000	
225 +77.000	ϕ1.5	77.00	37,500	2,888	
241 +93.000	ϕ1.5	60.00	37,500	2,250	
257 +90.000	ϕ1.5	50.00	37,500	1,875	
261 +85.000	ϕ1.5	52.00	37,500	1,950	
265 +30.000	ϕ1.5	55.00	37,500	2,063	
331 +25.000	ϕ1.5	65.00	37,500	2,438	
TOTAL		1209.00		45,338	

Tab.A.1.10.3 QUANTITIES OF PIPE CULVERT

PART 3(OUTER CIRCULAR HIGHWAY)

STATION	DIAMETER (m)	LENGTH (m)	RATE (Rs.)	COST (x10^3Rs.)	REMARKS
49 +45.000	ϕ1.5	60.00	37,500	2,250	
53 +60.000	ϕ1.5	60.00	37,500	2,250	
58 +10.000	ϕ1.5	63.00	37,500	2,363	
TOTAL		183.00		6,863	

Tab.A.1.10.4 QUANTITIES OF PIPE CULVERT

PART 4(OUTER CIRCULAR HIGHWAY)

STATION	DIAMETER (m)	LENGTH (m)	RATE (Rs.)	COST (x10^3Rs.)	REMARKS
455 +40.000	ϕ 1.5	40.00	37,500	1,500	
467 +77.000	ϕ 1.5	65.00	37,500	2,438	
498 +50.000	ϕ 1.5	50.00	37,500	1,875	
TOTAL		155.00		5,813	

Tab.A.1.11 QUANTITIES FOR SHIFTED CHANNEL

PART1-4

PART		STATION	L-R	TYPE	LENGTH (m)	WIDTH (m)	HEIGHT (m)	VOLUME (m^3)	RATE (Rs./m^3)	COST (x10^3Rs.)	REMARKS
SOUTHERN HIGHWAY	1	274 +70.000 ~ 276 +30.000	L	U	160.0	2.00	1.00	320.00	34,500.00	5,520.00	
	1	276 +30.000 ~ 276 +93.000	L	box	63.0	5.00	3.00	945.00	276,000.00	17,388.00	
	1	279 +80.000 ~ 281 +50.000	L	U	170.0	2.00	1.00	340.00	34,500.00	5,865.00	
	1	339 +20.000 ~ 343 +40.000	L	U	420.0	2.00	1.00	840.00	34,500.00	14,490.00	
OCH	3	31 +50.000 ~ 33 +60.000	R	U	240.0	6.00	4.00	5760.00	603,750.00	144,900.00	
TOTAL		SH	BOX CULVERT		63.0					17,388	
			U DITCH		750.0					25,875	
		OCH	BOX CULVERT		0.0					0	
			U DITCH		240.0					144,900	