

5.4 Socio-Economic Profile

5.4.1 The Socio-Economic Profile in the Study Area

The geographical area of the study area [02 km wide corridor] falls under 8 DS divisions and 45 GN divisions. The approximate extent of the study area coming under vicinity in separate DS divisions and also right of way of the identified road trace are given in Table 5.4.1(a).

Table 5.4.1 (a) General Information

	# of GN Divisions	Extent Sq.miles (2 KM corridor)	Extent under the proposed road In Ha(100M wide road trace)
Wattala	5	2.75	51
Mahara	3	5.19	22.5
Biyagama	8	8.8	74
Kaduwela	6	4.35	80.5
Maharagama	4	3.75	28.5
Panadura	2	0.98	17.5
Homagama	6	1.9	90.5
Bandaragama	11	8.0	115.5
Total	45	35.72	480

The population in the study area is comprised of multi-racial groups. The data obtained from the GNs show the pattern of population distribution among GN divisions falling under the 08 DS divisions.

Table 5.4.1(b) Population by Race

DS Division	Type of Racial groups				Total
	Sinhala	Tamil	Muslim	Other	
Wattala	14330	273	519	208	15330
Mahara	8222	161	41	9	8433
Biyagama	31995	101	209	0	32305
Kaduwela	20542	361	202	88	21193
Maharagama	10381	10	42	12	10445
Panadura	4883	7	1	0	4891
Homagama	12572	84	43	15	12714
Bandaragama	14997	3	2	14	15016

The majority of the population is Buddhists. The second category is Christians. The Muslims and Hindus are lesser in number. The distribution of the population by religions is shown in Table 5.5.11- Results of GN Surveys in Volume II.

The economic status of the people living in the study area would be significant information to the planners of the road. Information related to economic status in the GN divisions falling under the 02 km wide road corridor is shown in Table 5.4.1(c).

Table 5.4.1 (c) Population by Economic Status

DS Divisions	Income status in Rupees					Total
	Below 2500	2501 - 5000	5000 - 7500	7501 - 10000	Above 10000	
Wattala	1252	886	586	270	244	3238
Mahara	550	342	175	107	76	1250
Biyagama	1913	2198	1699	597	341	6748
Kaduwela	920	1078	1108	542	372	4020
Maharagama	583	645	430	500	205	2363
Panadura	411	243	165	134	75	1028
Homagama	1123	579	981	313	560	3556
Bandaragama	1448	1232	601	95	177	3553

Table 5.4.1 (c) shows that a substantial number of households fall under the income groups above Rs 5000.00 per month. According to the income levels, the 08 DS divisions fall under the proposed project area can be arranged in the following order as shown in Table 5.4.1 (d).

Table 5.4.1 (d) Income Levels

DS DIVISIONS	ORDER IN TERM OF INCOME LEVELS OF THE PEOPLE
Kaduwela	1 st
Maharagama	2 nd
Homagama	3 rd
Mahara	4 th
Wattala	5 th
Biyagama	6 th
Panadura	7 th
Bandaragama	8 th

The employment composition is the other information that will be useful to the project planners. Table 5.4.1 (d) provides details of employment in the vicinity of the project.

Table 5.4.1 (d) Population by Employment

DS DIVISION	TYPE OF EMPLOYMENT							
	Public	Private	Business	Laborers	Farming	Abroad	Self-employed	Total
Wattala	1451	1892	176	558	40	142	375	4634
Mahara	349	856	114	773	3	84	522	2701
Biyagama	2895	5900	895	2407	192	420	619	13328
Kaduwela	1375	4000	199	2185	193	308	515	8775
Maharagama	1405	2719	110	690	160	165	345	5594
Panadura	224	608	25	432	10	42	262	1603
Homagama	1332	1908	170	1490	394	153	622	6069
Bandaragama	789	2526	677	1062	401	197	341	5993
	9820	20409	2366	9597	1393	1511	3601	48697

The nature of impacts of development projects on urban and rural communities is different and therefore, the table differentiates urban and rural communities.

Table 5.4.1 (e) Urban and Rural Population

DS DIVISION	TYPE		
	Urban	Semi-urban	Rural
Wattala		8012	7341
Mahara	3813	140	2024
Biyagama	3000	19041	10432
Kaduwela	0	16053	6050
Wattala		8012	7341
Mahara	3813	140	2024
Biyagama	3000	19041	10432
Kaduwela	0	16053	6050

5.4.2 Socio-economic profile in the Right of Way [ROW] of the Proposed Trace

The data collected from 432 sample households in the ROW has been extrapolated for the whole trace based on data calculated by the Land Use Planner. In certain aspects where extrapolation is not possible data collected from the sample survey is provided.

Population of the sample 432 household survey and the Male and Female breakdown of the sample population and also the number of male and female populations extrapolated to the total road trace are shown in Table 5.4.2.

Table 5.4.2 (a) Population

DS	Wattala	Mahara	Biyagama	Kaduwela	Homagama	Maharagama	Bandaragama	Panadura	Total	
Age-less 5 years	F	11	8	19	20	5	12	1	7	83
	%	13.3	9.6	22.9	24.1	6.0	14.5	1.2	8.4	100.0
	M	9	11	15	24	14	10	1	9	93
	%	9.7	11.8	16.1	25.8	15.1	10.8	1.1	9.7	100.0
6-18- years	F	19	14	59	59	16	23	5	15	210
	%	9.0	6.7	28.1	28.1	7.6	11.0	2.4	7.1	100.0
	M	18	24	54	55	27	19	4	26	227
	%	7.9	10.6	23.8	24.2	11.9	8.4	1.8	11.5	100.0
19-35- years	F	36	35	68	62	38	33	9	32	313
	%	11.5	11.2	21.7	19.8	12.1	10.5	2.9	10.2	100.0
	M	36	23	60	46	47	35	7	28	282
	%	12.8	8.2	21.3	16.3	16.7	12.4	2.5	9.9	100.0
36-55 years	F	26	23	55	49	29	29	6	29	246
	%	10.6	9.3	22.4	19.9	11.8	11.8	2.4	11.8	100.0
	M	22	22	61	65	30	29	8	26	263
	%	8.4	8.4	23.2	24.7	11.4	11.0	3.0	9.9	100.0
More 55 years	F	29	5	34	26	16	15	3	9	137
	%	21.2	3.6	24.8	19.0	11.7	10.9	2.2	6.6	100.0
	M	18	9	29	28	17	9	1	11	122
	%	14.8	7.4	23.8	23.0	13.9	7.4	0.8	9.0	100.0

The ethnic composition of the sample household survey and this extrapolation to the total the trace are shown in Table below:

Table 5.4.2 (b) Ethnic Composition

ETHNIC GROUP	NUMBER OF FAMILIES		TOTAL TRACE
Sinhala	427	98.8%	1665
Tamil	0	0.0%	0
Muslim	3	0.7%	12
Burger	2	0.5%	8

The majority of the households coming under the trace are Sinhala. Although Tamil families have not been reported there can be some households occupied by Tamils, since the total number of families in the entire trace is worked out based on the sample survey.

Majority of the householders reported that they are not employed anywhere. But, it can be assumed that they are involved in various types of livelihood activities. Nearly 47% of householders come under this category. The nature of employment of the sample householders reported is shown in Table 5.4.2(c) below.

Table 5.4.2(C) Employment Category

EMPLOYMENT CATEGORY	NUMBER OF HOUSEHOLDS	%
Govt. Sector	22	5
Private sector	41	9
Business	26	6
Farming	15	3
Self employment	51	12
Retired	38	9
Daily labor	26	6
No employment	213	49

Number of persons employed in different sectors in a family is high. This becomes clear when the number employed in the sample households and in the total households in the entire road trace is analyzed. This situation can be understood from the data in Table 5.4.2. (d).

Table 5.4.2. (d) Employment

Employment	No of Female	No of Male	No-Female (Total trace)	No-male (Total trace)
Government Sector	27	74	105	289
Private Sector	61	178	238	694
Farming	1	18	4	70
Daily Labour	4	90	16	351
Business	2	25	8	98
Business (Small)	13	31	51	121
Self Employment	25	75	98	293
Foreign	13	24	51	94
Pension	12	41	47	160
Total	158	556	616	2169

Although it was difficult to obtain actual income levels of the affected households, in general it was possible to obtain the incomes per month of the 432 households surveyed and explored these figures to the total households in the entire road trace. About 31% of the households in the trace come under the Rs 2500.00 – 5000.00 per month group. The second group is those earning between Rs. 5000.00 to 7500.00 per month. There are families who earn more than Rs. 25,000 per month. The details of the monthly earning of families living in the trace are given in Table 5.4.2 (e).

Table 5.4.2 (e) Income Groups

Income Group (Unit: Families)	DS Divisions										Total trace
	Wattala	Mahara	Biyagama	Kaduwela	Homagama	Maharagama	Bandaragama	Panadura	Total trace	Total trace	
Rs less 2500	5	3	22	11	9	6	2	5	63	246	958
Rs 2500-5000	19	14	36	21	21	2	6	16	135	527	2054
Rs.5000-7500	13	5	16	27	18	13	4	10	106	413	1613
Rs.7500-10,000	5	7	13	17	4	9	0	3	58	226	882
Rs.10,000- 15,000	4	2	8	10	1	6	0	5	36	140	548
Rs.15,000- 25000	1	2	0	6	1	8	0	0	18	70	274
More Rs.25,000	0	1	2	7	1	2	0	0	13	51	198
No Income	0	0	0	0	1	0	0	0	1	4	15
No answer	1	1	0	0	0	0	0	0	2	8	30
Total	48	35	97	99	56	46	12	39	432	1685	6572

The level of education is the final socio-economic feature studied by the EIA team. The number of persons in school and the number who have completed schooling were calculated in the total trace. Those who have completed schooling are more than the number in schools. It was found that level of education in the area is higher with compared to the general situation of the country. About 3% of those having completed education are University graduates. About 2.4 % of the number in schools are university under graduates. These two figures indicate the level of education in the area. This information is very significant for the planners of the proposed road, because in the implementation stage of the road the planners and the developers of the road will have to deal with an educated population. The following Table provides the data related to level of education:

Table 5.4.2 (f) Education

	In school	Completed	In school (total trace)	School completed Total Trace
1-5	163	105	636	410
6-10	195	415	761	1619
G.C.E. (O/L)	46	513	179	2001
G.C.E. (A/L)	36	231	140	901
University	11	37	43	144
Professional/Technical	0	18	0	70
Total	451	1319	1759	5145

5.4.3 Existing Settlements in the Vicinity and the Affected Area

The area both vicinity and the trace are not popular for established human settlements. Most of the houses have come to the area as individual houses. There are two types of houses; category one includes the houses belonging to traditional people who have been there for a long time. The category two includes the houses built by the migrants to the area. Migrants have come to the area for various purposes including employment and business. The GNs in some divisions reported about several private and public settlements in the area (both vicinity and the affected areas). The private housing settlements must have built by private property developers such as John keels, The finance etc. The public housing schemes must have built under the housing development programs under the previous and present governments. Table 5.4.3 provided information on existing settlements in the vicinity and the affected areas.

Table 5.4.3 Private and Public Settlements Located in the Vicinity and the Affected Area of the Proposed Project

DS Division	Settlement type and # families	
	Public	Private
Wattala	-	-
Mahara	-	-
Biyagama	44	27
Kaduwela	-	410
Panadura	-	-
Homagama	122 (settlements)	
Bandaragama	3 settlements	

5.4.4 Special Demographic Characteristics in the Vicinity and the Affected Area:

If we take the total belt of the proposed road project area several specific characteristic of the people can be observed. Such characteristic can be as follows:

- Both rural and urban populations reside in all the DS divisions under the project area. Table 5.4.4 (g) provides the information on Rural and urban population in the areas coming under the project in 8 DS divisions (both the vicinity and the affected areas).

Table 5.4.4 (g) Urban and Rural Population

DS Division	Type		
	Urban	Semi-urban	Rural
Wattala	-	8012	7341
Mahara	3813	140	2024
Biyagama	3000	19041	10432
Kaduwela	0	16053	6050
Maharagama	0	8145	2300
Panadura	0	0	4891
Homagama	0	0	9175
Bandaragama	0	2840	10007

- Business and other livelihood activities

In the 100 m wide road trace there are about 1345 non-business householders and about 340 business households. This indicates that business is one major feature in the demography in the affected area.

- A migrant vs. traditional people is another demographic character in the area. From our sample survey 218 out of 432 are traditional people who have been there for generations. Others (214) have come to the area for various purposes and settled there.

5.4.5 Special Social Relations of the People in the Vicinity and the Affected Area

Most of the householders except the people who have migrated to the area during the past one to three years have developed some kind of social relations with others. The degree of social relations depends on many reasons. Such reasons and their magnitude are discussed here. It needs special focus on the directly affected area, 100 m. Wide trace from which people have to be evacuated if the proposed road is constructed along this trace. Therefore, the situation in the affected area and study area is discussed separately.

Social Relations in the Study Area

In general the majority of the people in the vicinity of the proposed project have been in the area for more than 10 years and therefore, they have built various relationships among them. Table 5.4.5 (a) provides the data on settlement history of the people in the vicinity.

Table 5.4.5 (a) Settlement History

DS Division	Period (years)		
	Less than 10	More than 10	For generations
Wattala	563	1147	1506
Mahara	213	561	507
Biyagama	1382	2389	2957
Kaduwela	1012	572	1057
Maharagama	418	630	1165
Panadura	100	168	760
Homagama	691	644	1969
Bandaragama	1812	613	2243

The information in the above table indicates that about 52% in the 2 km wide road corridor have been living there for generations. Only 26% have been reported as families living there for less than 10 years. Others have been in the area for more than 10 years. Detailed analyses on different social relations of the communities living within the 100 m road trace were done. Such analyses are equally relevant to the 2 km wide road corridor because the 100 m belt is located within this 2 km corridor.

Social Relations in the 100-M Road Trace

About 50% of the householders in the affected area have been living there for generations. On the other hand only 27 % householders have been identified as the group living there for less than 10 years. One cannot argue that people who have been there for less than 10 years have no social relations with the communities. They too have developed some kind of social relations. The details of settlement history of the families in the 8 DS divisions are given in Table 5.4.5 (b).

Table 5.4.5 (b) History of Residence

DS division	By decent	More 50 years	50-20	20-10	Less 10	No answer	NA	Total
Wattala	22	1	14	3	7	1		48
Mahara	20	0	1	6	7	1		35
Biyagama	64	3	4	11	14	1		97
Kaduwela	38	0	5	11	44		1	99
Homagama	28	0	6	3	18		1	56
Maharagama	19	0	4	5	18			46
Bandaragama	3	0	0	3	6			12
Panadura	24	0	4	5	6			39
Total	218	4	38	47	120	3	2	432
Total trace	850	16	148	183	468	12	8	1685

Existence of relatives in the community is a strong indicator of social relations of a family in society. Except 19 % of the total householders all the others have some kind of social relations in the society. Out of the total who indicated that they have social relations about 75 % said that they have relatives in the society. The distributions of this type of relations are given in Table 5.4.5 (c).

Table 5.4.5 (c) Community Relations

DS division	Have relations	Have marriage relations	Have employment relations	Came from same areas	No relations
Wattala	41	7	0	0	7
Mahara	28	0	0	0	7
Biyagama	81	3	0	0	12
Kaduwela	58	0	0	0	31
Homagama	47	1	0	1	6
Maharagama	31	2	1	0	11
Bandaragama	4	2	1	1	5
Panadura	31	5	0	0	4
Total	321	20	2	2	83
Total Trace	1252	78	8	8	324

The number of relatives that one family has is another significant indicator of the social relations. About 78% of the families have at least a single relative family in the area. On the other hand about 33% families have more than 10 relative families in the area itself. The geographical spread of this information is shown in Table 5.4.5 (d).

Table 5.4.5 (d) Numbers of Relatives Living in the Area

DS division	Non	Less 5 families	5-10 families	More than 10 families	NA	Total
Wattala	4	11	14	17	2	48
Mahara	3	8	4	18	2	35
Biyagama	12	17	26	40	2	97
Kaduwela	36	18	14	26	5	99
Homagama	6	21	12	16	1	56
Maharagama	11	12	9	13	1	46
Bandaragama	6	3	1	2	0	12
Panadura	2	20	6	11	0	39
Total	80	110	86	143	13	432

The other indicator used by the consultants to assess the social relations is the people's involvement in community based organizations. About 43% of the families are members in death donation societies. Very few numbers of people have membership in all other community organizations. It was found that (from FGDs held) people are not interested to be involved in community based organizations. The major reason for this situation is poor performance of such organizations according to the people gathered at FGDs. The membership of the householders in community based organizations are shown in Table 5.4.10 (b) under the section, results of household survey in Volume II.

5.4.6 Number of Households Affected and the Socio-Economic Status

The socio-economic status of the affected families has been discussed in detail in the above sections of this report. Therefore, the number of households that will be affected is addressed. The nature of houses that will be affected in each DS divisions are given for more clarification. One should keep in mind that the numbers given here might not be exact. There can be plus or minus errors. For example the number of families living in shanties will be more than one. In such case the number of households will be more than the figures given here. But the figures given here are related to the entire trace. Table 5.4.6 shows the number of households that will be affected. There can be more than one family in one household.

Table 5.4.6 (a) Socio-Economic Status

DS division	Two stories	Single large	Single medium	Single small	Shanties	Total
Kaduwela	30	17	245	80	3	345
Biyagama	38	20	180	98	7	343
Mahara	15	7	52	22	-	96
Wattala	20	18	139	94	52	323
Panadura	4	-	52	29	-	85
Bandaragama	1	8	121	88	-	218
Maharagama	1	-	31	17	-	49
Homagama	7	3	93	93	-	196
Total	116	73	913	521	62	1685

When the planners and developers of the proposed project decide on the final trace of the road they will need to carry out the following activities:

- Number of families living in multi- storied houses
- Number of families living in shanties
- Number of families who use business places for residence as well.

5.4.7 Existing Situation with Business and Industries

Situation in the 2 km Study Area

The EIA Team faced difficulties in collecting accurate data on business places and the industries located in the study area. However the data available in some GN divisions were collected and summarized by DS divisions. Table 5.4.7(a) provides the information collected. The number of such places should be more than the reported figures. For example the land use planner estimated that the number of places located within the 100 m wide road trace is more than the numbers reported from the 2 km wide road corridor. This situation indicates that the data provided by the GNs are not accurate.

Table 5.4.7 (a) Business and Industrial Ventures

DS Division	Number of Industries/Enterprises	# of employees	Electricity		Water	
			Y	N	Y	N
Wattala	8	26*	-			
Mahara	8	291	8		8	
Biyagama	8	253	8		8	
Kaduwela	21	1126	21		21	
Maharagama	16	8067	16		16	
Panadura	3	206	3		3	
Homagama	20	1377	20		20	
Bandaragama	16	144	16		16	

Situation in the ROW

The land use planer of the consultancy team has estimated number of business places and the industrial places located in the ROW using aerial photographs and field verification visits. The number of business and industrial places identified in the entire road trace are listed in Table 5.4.7 (b).

Table 5.4.7 (b) Situation of the Affected Area [ROW]

DS division	Industries	Business	Total
Kaduwela	1 Paint (Mason) factory 1 Brass equipment manufacturing factory	15 business places	17
Biyagama	1 Metal quarry 2 Brick making factories	22 business places	25
Mahara	-	11 business places 1 service station 1 Service cum filling	13
Wattala	1 milk processing factory (Lakspray) 1 pipe manufacturing factory	14 ware houses 1 mechanical work shop 1 cold room (walls) 1 lathe machine shop 1 container yard 16 business places 1 fish stall	37
Panadura	1 BOI- garment factory	4 Business places	5
Bandaragama	-	3 business places	3
Maharagama	1 concrete product factory	1 small service station 7 Business places	9
Homagama	1 steel works factory 1 concrete products work shop	1 weaving center	3
Total	11	101	112

Many of the owners of these industrial and business places have been in the area for a long time and have built relation with the communities living in the area. For example about 340 business householders live within the trace. Out of the total, 52% are reported as householders living in the area for generations. The history of business places located along the trace and the nature of ownership to the places are explained in detail in Table 5.5.40 (e) and 5.5.40 (f) - results of household survey in Volume II. The other aspect of business ties in the area is the nature of customers of the businessmen. It was reported that about 47% of the businessmen have customers within the area or the village itself. (Some of these customers may have to be evacuated if the road runs through the temporary identified trace). The nature of customers of the businessmen who are residing within the trace are detailed in Table 5.5.45 -results of household survey in Volume II.

5.4.8 Communication Facilities in the Study Area

Situation in the Vicinity

Except for some locations in the Bandaragama DS division, most of the other GN divisions within the 2 km wide road corridor have access to communication facilities as telephones. But many households located in the area are reported as houses with no telephone facilities. This is mainly because of house holders' inability to obtain house connections. Table 5.4.6 (a) provides data on number of families within the 2 km corridor, which have telephone facilities in their households.

Table 5.4.8 Situation in the Study Area

DS Division	Communication	
	Total no of houses	With telephones
Wattala	3238	399
Mahara	1250	230
Biyagama	6748	1129
Kaduwela	4020	730
Maharagama	2363	585
Panadura	1028	71
Homagama	3556	648
Bandaragama	3553	163

Situation in the ROW

In the household survey it was observed that the data available in the GN's offices are not accurate on availability of telephones. Out of 432 families interviewed 414 have obtained telephone facilities. On this basis about 1615 families out of 1685 should have telephone facilities in the total trace. The details on the availability of telephone facilities in the households located in the trace are given in results of household survey in Volume II.

5.4.9 Water Supply and Sanitation Sources in the Vicinity and the Affected Area

Availability of domestic water supply in the vicinity of the proposed project was assessed through the data obtained from the GN offices located in the vicinity. The data available in the GN offices on these aspects are not accurate. Most of the data are recalled data of the GNs. However, the sources for domestic water in the vicinity are shown in Table 5.4.9 [a].

Table 5.4.9 [a] Sources of Domestic Water

DS Divisions	Number of families using different water Sources				
	Private wells	Pipe borne	Tube wells	Common wells	Total
Wattala	2526	185	82	-	2793
Mahara	1031	327	73	3	1434
Biyagama	5438	925	0	0	6363
Kaduwela	3208	820	5	0	4033
Maharagama	1708	672	0	5	2385
Panadura	930	70	26	0	1026
Homagama	3020	0	0	10	3030
Bandaragama	2925	62	52	45	3084
Total	20786	3061	238	63	24148

The situation of the domestic water facility was assessed through the sample household survey. It indicates the accurate situation in the ROW (100 m wide trace). About 93% of the householders have access to domestic water facilities. On the other hand nearly 70 % of householders are satisfied with the service available. (See Table 5.5.48 [a] - under results of household survey in Volume II for more details).

5.4.10 Agriculture in the Vicinity and the ROW

Situation in the Study Area

Agriculture is not the dominating land use feature in the 2 km wide road corridor. But the EIA Team attempted to measure the degree of agriculture in the area. One indicator of agriculture in the area is availability of irrigation canals. Except Mahara and Panadura, irrigation canals are located within the study area (see Table 5.5.7 in results of GN survey in Volume II.)

A considerable number of farmers are living within the 2 km corridor according to the data available in GN offices. Compared to other employment categories the number and percentage of employees involved in agriculture are shown in the Table 5.4.10.

Table 5.4.10 Farmers in 2 km Wide Corridor

	Public	Private	Business	Laborers	Farming	Abroad	Self-employed	Total	% of farmers of total
Wattala	1451	1892	176	558	40	142	375	4634	.86
Mahara	349	856	114	773	3	84	522	2701	.1
Biyagama	2895	5900	895	2407	192	420	619	13328	1.4
Kaduwela	1375	4000	199	2185	193	308	515	8775	2.1
Maharagama	1405	2719	110	690	160	165	345	5594	2.8
Panadura	224	608	25	432	10	42	262	1603	.62
Homagama	1332	1908	170	1490	394	153	622	6069	6.4
Bandaragama	789	2526	677	1062	401	197	341	5993	6.6
Total	9820	20409	2366	9597	1393	1511	3601	48697	2.8

5.4.11 Possible Relocation Sites Available in the Study Area

The GNs in 8 DS divisions falling under the proposed project were queried about the availability of suitable land for relocation of people who will have to be evacuated from the affected area. From the local knowledge of the GNs they provided some information about such lands. The information provided by the GNs is summarized in Table 5.4.11.

Table 5.4.11 Places for Resettlement Identified by GNs from their Limited Local Knowledge

DS Division	Land type		Facilities available				Suitability for Resettlement
	Govt.	Private	Water	Latrines	Electricity		
Wattala	No	10 acres, abandoned paddy lands	No	No	No	This is a muddy land. Construction of houses in this land is expensive.	
Mahara	Land belonging to State Timber Corporation. Extent not known	Coconut land Belonging to Pushpa Weerasekara.	Yes	No	Yes	This area has all the necessary conditions for resettlement of people.	
Biyagama	Land belonging to National Youth Service Council - 22 acres mixed crop cultivation	83 acres coconut lands belonging to 8 individuals and 2.5 acres of paddy land held by one individual	Yes	No	Yes	This area has all the necessary conditions for resettlement of people. Paddy lands suitable for settlement after earth filling of paddy lands	
Kaduwela	450 acres, Gem Corporation and Housing Development Authority land with coconut cultivation	35 acres of land with coconut and rubber and 21 acres of rubber lands, 22 acres of barren lands	Yes	No	Yes	This area has all the necessary conditions for resettlement of people	
Maharagama		64.5 acres, rubber and coconut lands	Yes	No	Yes	This area has all the necessary conditions for resettlement of people	
Panadura		90 acres paddy lands and 5 acres coconut lands	No	No	No	Paddy lands have to be filled up for construction of houses	
Homagama	Diyagama Radio Ceylon, 148 acres, 8 acres in Magamma with coconut and uncultivated	12 acres coconut and rubber lands	Yes	Yes	Yes	This area has all the necessary conditions for resettlement of people	
Bandaragama		187.5 acres of rubber, coconut and cinnamon lands	Yes	Yes	Yes	As above	

During the detailed phase of the proposed project the project developers should further investigate the suitability of these land for resettlement. A. Separate comprehensive resettlement plan should be drawn including details of the definite resettlement sites. Information in Table 5.4.11 would be supportive for the resettlement planners.

The consultants also inquired about the availability of land for resettlement from householders interviewed. About 135 of 432 householders provided some information on the availability of suitable lands for resettlement. The information provided by individuals living in the 100 m wide road trace are summarized into following categories for future use by the RDA.

- [a] Serial number given for each questionnaire by the consultant. (Therefore, in future the RDA can find the householders including their names and addresses, who provided the information about the potential land for resettlement)
- [b] Location of the first land
- [c] Extent of the first land
- [d] Ownership of the first land
- [e] Location of the second land
- [f] Extent of the second land
- [g] Ownership of the second land

All the details mentioned above are given in Table 5.5.50 of the section- results of household survey in Volume II.

5.4.12 Important Sites in the Affected Area

There are no significant sites in the affected area of the proposed road. The important sites located in each DS area under the proposed project are as follows:

- Wattala DS division- Cemetery about 50% of the cemetery falls under the affected area
- Panadura- Cemetery
- Bandaragama- Bolgoda Ganga

5.4.13 Places of Worship and other Culturally Important Sites

A few places of worship are located within the affected area. Such places are located in the following DS divisions under the affected area:

- Wattala DS division- 1 temple with 5 buildings, 1 Church with 2 buildings
- Bandaragama – 1 temple with 4 buildings, another temple with 3 buildings.
- Homagama – About 15% of a temple with part of two buildings and the bodiya (Bo Tree).

5.4.14 Existing Infrastructure Facilities in the Study Area

The infrastructure facilities in the 2-km wide corridor are explained in this section. There were some limitations with regard to information available on infrastructure facilities in the 2 km road corridor. However, information on existing infrastructure facilities in the vicinity was collected through GNs and other grassroots level agency officials such as Samurdhi Niyamakas

The availability of infrastructure for basic needs was examined. The basic infrastructure facilities studied include:

- Access roads and transport
- Education
- Health and hospitals
- Market
- Institutional facilities such as Post office, DS office, banks, police station, townships, work place etc

The spatial distribution of these services along the identified road trace was studied. The data collected on the distribution is given in Volume II of this study.

Access Road and Transport

Except 9 householders from the 432 households that were interviewed all the others maintained that they had access facilities. In the total trace about 1650 out of 1685 families have access facilities. When it comes to their level of satisfaction with these facilities low levels were recorded. Only 302-householders in the sample and 1178 in the total trace mentioned that they were satisfied. It implies that about 30% of the total affected population are not satisfied with the existing facilities of access roads. The level of dissatisfaction with existing transport facilities is more pronounced than the dissatisfaction with access facilities. About 36% of the total population in the road trace indicated that they are dissatisfied with the existing transport facilities.

This indication could be considered as a factor for the justification of OCH, which will be instrumental in improving the transport facilities from these areas to Colombo and other distant places in the country.

The number of main roads across or parallel to the 02 km wide corridor is given in Table 5.4.14(a).

Table 5.4.14(a) Roads in 2 km Corridor

DS division	Number of main Roads-A and B	Number of sub-roads (C and D)	Proposed road improvement by the Govt.
Wattala	3	12	-
Mahara	2	13	-
Biyagama	13	23	Widening of Samurdhi Mawatha
Kaduwela	4	22	Athurugiriya-Borella road improvement
Maharagama	9	20	Widening of 2 roads
Panadura	2	12	-
Homagama	6	8	-
Bandaragama	11	38	-

A substantial number of main roads and sub-roads cut across or run parallel to the proposed OCH as described in Section 5.3.4.

Irrigation Canals

No major irrigation canals cut across the proposed road trace or the 2 km wide corridor but about 11 man-made minor irrigation canals are located in the study area. Of these Homagama and Bandaragama contain 3 canals each, Wattala 1 canal and Biyagama, Kaduwela and Maharagama also have one canal each. Mahara and Panadura do not have any canals located in the 2 km road corridor (see Table 5.5.7: Results of GN Survey in Volume II).

Drinking Water

Information on the number of families using different sources of drinking water is shown in the Table 5.5.8 in Volume II. These families reside in the 2 km wide corridor. The situation with regard to sources of domestic water in the entire 2 km belt is shown below:

- Private wells - 20786 families
- Pipe borne - 3061 families
- Tube wells - 238 families

- Common wells - 63 families
- Total no of families - 24148.

Some of the infrastructure facilities of the above sources are located within the road trace (100 m wide belt).

Electricity and Telephone facilities

The information on number of families living in the 2 km road corridor who have electricity and telephone facilities are shown in the Table 5.5.23 – Results of GN Survey in Volume II. The situation with regard to the entire 2 km corridor is shown below:

- Number of families who have electricity connections to their houses- 20439
- Number of families who have telephone connections to their houses-3955

In general, electricity and telephone facilities are available in the entire area. Some families have not yet obtained house connections of such services.

This situation indicates that electricity and telephone distribution lines and other infrastructure facilities are located within the 100 m wide road trace.

Education

A total of 10 families out of the 432 interviewed mentioned that they send their children to the schools located within the road trace. Others send their children to schools located in nearby towns and Colombo. This indicates that about 39 families altogether send their children to the schools in the affected area. There are 4 schools located within the road trace, the details of which are given below:

- The first school is located in the Kaduwela DS division. About 60% of the school premises falls within the road trace. About five school buildings will be affected.
- The second school is located in Mahara DS division. About 9 buildings of this school will be affected.
- The third school is located in Wattala (Karunaratna College). About 10 buildings and a playground will be affected.
- The fourth school is located in the Bandaragama DS division. About 4 buildings and about 80% of the school playground will be affected.
- Children within and outside the trace attend these schools.

Hospitals and Health Facilities

About 98% of the householders in the total trace indicated that they have access to health facilities and about 87% of the total population mentioned that they are satisfied with the services available. The communities have to travel different distances for different institutes, which provide health facilities, as shown below:

Table 5.4.14[b] Distance to Medical Centers

Institute	Less than 500 m	500-1 km	1 km- 5 km	5km – 10 km	More than 10 km	Not replied
Health centers	488	488	519	16	4	172
Rural Hospitals	nil	20	55	12	1599	nil
Govt. Dispensary	133	230	433	31	nil	846
Govt. Hospitals	16	82	1045	449	35	59
Private medical centers	339	511	683	86	12	55
Services of Specialists	51	129	788	402	254	62

The above table indicates the number of households, which responded to queries on the access to various health facilities. These figures are worked out based on the 432 sample households interviewed by the consultants. Though these figures may not be the exact number of households falling under the trace, they indicate the following issues:

- A substantial number of householders mentioned that they have access to various medical facilities in the area within a 10 km radius.
- Many householders mentioned that such services are available within the 500 m radius.
- These places may be located either along the trace, parallel to the trace or within the trace.
- The places located within the trace will be affected.

Market Facilities

Day-to-day marketing facilities are considered under the market facilities. The householder's responses were obtained in 8 DS divisions through a sample survey with 432 families and based on figures of the sample survey, the figures for the whole trace was estimated. Table 5.4.14[c] shows the results of the sample survey and the situation in the total trace.

Table 5.4.14(c) Marketing Facilities Available

DS Division	Market					
	Availability			Satisfaction		
	Yes	No	NA	Yes	No	NA
Wattala	48	0	0	47	1	
Mahara	35	0	0	35	0	
Biyagama	97	0	0	90	7	
Kaduwela	97		2	85	12	2
Homagama	54	1	1	51	4	1
Maharagama	46			44	2	
Bandaragama	8	4		7	5	
Panadura	39			38	1	
Total	424	5	3	397	32	3
Total Trace	1654	20	12	1548	125	12

The data in the above table indicate that more than 98% of the householders have easy access to the markets located in the area itself. On other hand more than 90% of the householders are satisfied with these market facilities.

Other Institutional Facilities in the Study Area

The people in the affected area have access to various services provided by different institutions. These institutions include the Post Office, DS Office, Banks, Police Station, townships and work places. The distribution of these services among the 8 DS Divisions through which the proposed road trace run across is shown with detail in 7 Tables - result of household survey in Volume II. The distance to these six services as expressed by the householders is shown in Table 5.4.14[d] below:

Table 5.4.14[d] Institutional Facilities

Institution	Distance 1 KM	2 KM	3KM	4KM	5KM	7KM	Not replied
Post office	382	569	612	82	0	0	39
DS office	8	90	1077	378	90	4	39
Bank	226	332	948	144	0	0	35
Police station	74	222	956	332	51	4	4
Near by town	105	242	1096	152	23	4	51
Work place	168	86	211	176	265	12	12

The above data estimated for the total trace, based on the sample survey, indicate that most of the people have almost all the basic institutional services required within a distance of less than 7 km. Irrespective of the affect of the OCH on these institutions, the services available to the people will be affected when they are displaced due to the proposed road.

5.5 Relocation Sites

The following relocation areas have been identified through photo interpretation and field verifications and demarcated on the relocation area map (see map 5-4-1 Volume II, Identified Relocation Sites within the study area of proposed OCH to the City of Colombo).

These relocation areas occur within the 2 km wide study area of the road trace of the OCH.

Wattala DS Division-Within the proposed 0-5 km length

Marshes	230	hectares
Highlands with scrubs	9	hectares
Coconut lands	<u>8</u>	hectares
Total	<u>247</u>	hectares

Mahara DS Division-Within the 5 to 7.5 km length

Coconut lands	40	hectares
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Biyagama DS Division-Within the 7.5 to 15.1 km length

Coconut lands	70	hectares
Rubber lands	13	hectares
Total	<u>83</u>	hectares

Kaduwela DS Division-Within the 15.2 to 23.3 km length

Coconut lands	36	hectares
Rubber lands	102	hectares
Highlands with scrubs	<u>6</u>	hectares
Total	<u>144</u>	hectares

Maharagama DS Division-Within 23.3 to 26.2 km length

Coconut lands	20	hectares
Rubber lands	17	hectares
Total	<u>37</u>	hectares

Homagama DS Division-Within the 26.2 to 35.1 km length

Coconut lands	38	hectares
Rubber lands	156	hectares
* Highlands with scrubs	<u>35</u>	hectares
Total	<u>229</u>	hectares

* State owned SLBC lands at Diyagama

Bandaragama DS Division-Within 35.1 to 46.8 km length

Coconut lands	55	hectares
Rubber lands	<u>195</u>	hectares
Total	<u>250</u>	hectares

Panadura DS Division-Within 46.8 to 48.4 km length

Coconut lands	12	hectares
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6. ANTICIPATED ENVIRONMENTAL IMPACTS

6.1 Surface Run-off and Future Flood Water Levels

The construction of an embankment for the roadway when it crosses marshes, paddy tracts and river valleys causes a restriction in the available area of flow of storm water. All sheet flow will cease and storm waters will necessarily be drained, through openings provided at different locations of the roadway, from the upstream side to the downstream. A study of Figure 5.1.1(O) in Volume II, reveals that this flow will be generally north to south in the case of the alignment from Mattumagala to Kadawatha and from Bandaragama to Pinwatte except at Bolgoda Ganga. Similarly the storm flow will be generally from East to West along the alignment from Kadawatha to Bandaragama. As a result the flood levels experienced on the upstream side of the roadway will be higher than before construction of roadway.

6.2 Irrigation and Flood Protection Works

Irrigation systems are designed so that water can be diverted at a known location and made to irrigate a known tract of paddy. If a roadway embankment crosses this paddy tract and irrigation canal [which cannot be avoided], then the irrigation system on the downstream side of the roadway will be completely cut off and no irrigation water can be supplied to these tracts during times of water stress. Similarly, these paddy tracts and other built up or developed areas have to be drained efficiently during storm rainfall. Hence, if any such drainage canal is also obstructed, it will create unnecessary heading up of water levels on the upstream side of the new roadway.

In para 5.1.4 all such affected irrigation canals and drainage canals, in each sub catchment, have been identified.

6.3 Inundation Levels in Flood Plains

It can be said that the entire A5 trace traverses through the flood plains of the Kelani Ganga Basin [including the Kalu Ela] and the Bolgoda Ganga Basin. These flood plains serve as flood detention basins and contribute towards mitigatory flood levels, which could be excessive in the absence of such flood plains. The construction of a road embankment over a reach of a flood plain will reduce effective detention capacity and correspondingly increase flood levels on the upstream.

6.4 Future Urbanization of the Sub-Catchments

Considering the proximity of the OCH to the City of Colombo and the current population density of the areas within and close to the city, there is bound to be a surge of development activity along the OCH with the completion of the roadway.

6.5 Impact On Water Quality

The impact of pollutants from vehicle exhaust gases adversely affecting the quality of surface water bodies, in the immediate vicinity, is minimal. Air movements will not only carry away the pollutants but also lessen the pollution load by dispersion and dilution. However, minute amounts exhaust emissions may get into the water bodies through surface runoff assisted by precipitation and settling. These may pollute the existing water bodies may adversely effect aquatic habitats and fauna and flora. And if the contamination is severe, with time, it may reach ground water, too. Of the pollutants coming into the water lead could have a significant adverse impact even in minute concentrations. However, it is expected that the use of leaded gasoline will be phased out.

On the other hand the urban and sub urban growth and regional economic development spurred by the OCH as industrial expansion and associated infrastructure development can have significant indirect impacts on water quality. These developments would demand more water and generate additional wastewater. Further, these activities may affect run-off, too. Given below are some of the causal factors associated with development activities, which could contribute to the pollution of water bodies

The easy access through the OCH may promote agricultural activities in addition to development of commercial and industrial activity. Hence, pollution of surface water bodies and in the long term the ground water, by industrial waste which could contain arsenic, cadmium an mercury and agricultural run-off containing pesticides and trace elements may be indirect impacts of the OCH .

Domestic wastewater and municipal solid waste and hazardous waste are a direct result of urbanization, which could be spurred on by the OCH. The effluent from wastewater and leachates of solid waste dumps and disposal sites may contaminate surface as well as ground water. Further, eutrophication in water bodies may result if wastewater disposal is not managed properly.

The spillage of oil, grease and petroleum compounds may contribute hydrocarbons, oils and grease and trace materials as lead zinc and calcium to run-off resulting in pollution of water bodies. The pollution of water bodies with these substances and also by air emissions will have to be monitored by a well-planned monitoring programme.

6.6 Impact On Noise and Vibration Levels

Noise levels are expected to increase during the operations phase of the proposed project, affecting residents living in close proximity to the project site. During the operations phase the main sources of transport related noise are engine exhaust systems, tyre-road interaction, use of horns and vibrations generated by the running of vehicles. Noise from road transport activity can cause hearing loss, annoyance, disturbance of sleep, disruption of educational and other activities.

One way of valuing the increased levels of noise pollution is the property value approach. Evidence of studies carried out in other countries indicate that noise from road transport activities have a negative impact on property values. However, the

socio-economic survey carried out for this study reveals that the respondents are of the view that the development of the road may have a positive impact on property values of the project area. That is the marginal benefits of the road development may be greater than the marginal cost of increased noise pollution from transport activities.

Various preventive measures can reduce the amount of noise that reaches a site. Noise will be significantly reduced if houses are constructed a reasonable distance from roads. For example, doubling the distance from roads can reduce the average noise levels by 3-4 dB[A]. The type of road surface will also affect noise levels. Sound barriers, natural vegetation and mounds may also be used to mitigate any increase in noise levels.

Therefore, in order to quantify the effects of noise pollution, the preventive expenditure approach is used. The mitigation measures such as the type of road surfacing and sound barriers will give a minimum estimate of the value people place on tranquility. The design and construction costs of the project will include some of the mitigatory costs related to noise pollution. Mitigation costs not included in the construction costs of the project will be costed once the noise studies are completed.

During the operational phase of the OCH the traffic generated by and diverted to the OCH will cause a significant increase in the background noise and vibration levels. If the noise levels are higher than the stipulated levels and if these higher levels are continuous it may have adverse effects on people in particular and fauna. However, the higher levels recorded at peak locations as busy roadsides in commercial and industrial areas are in the range 68-79 dB(A) and the highest recorded at Colombo-Negombo road near the Lakspray Milk Food Factory at Welisara is 81 dB(A)

The noise level increase due to traffic in the OCH is not expected to increase more than 5 dB (A) during day time and 3 dB (A) during the night. Further, it can be expected that noise levels in the other roads will decrease as a result of the decrease in traffic. However, it may be pertinent to advocate measures to mitigate high noise level that could arise from unexpected rise in vehicular traffic in the OCH.

6.7 Impact On Air Quality

Vehicles on the move, irrespective of the fact whether it contains internal spark ignition engines or compression ignition engines, will discharge air pollutants as Carbon Monoxides, Sulphur Dioxides, Oxides of Nitrogen, Suspended Particulate Matter and Hydrocarbons or Volatile Organic Compounds incorporated in the exhaust gases. Lead from gasoline driven vehicles is also a pollutant at present. In addition to these there may be derived secondary pollutants produced by chemical reactions in the atmosphere.

The proposed OCH is expected to carry vehicular traffic at comparatively higher speeds and it is envisaged that the vehicular emissions will be comparatively low.

According to the Interim Report of the Feasibility Study on the OCH the traffic volume is estimated to be 62,425 vehicles/day.

Considering the above traffic volume air pollution simulation was carried out employing the Atmospheric Diffusion Model [Gaussian]. Air quality was predicted at ground level and at an elevation of 1.5 m. The results are:

Nitrogen Dioxide [NO ₂]	0.065 ppm
Carbon Monoxide [CO]	0.220 ppm

The environmental standard in Sri Lanka is:

Thus the predicted levels are lower than the Sri Lanka standards. Hence the impact on air quality is not adverse but could be beneficial.

6.8 Impacts on Ecology

6.8.1 Loss of Mineral Resources

The project will require a significant amount of sand, metal and general fill material for the construction of the road. The environmental cost of blasting quarry and dredging riverbeds is high, as the process is irreversible. However, this cost can be minimized considerably if the project uses the earthfill and metal that will either be excavated from the project site or from already operating quarries, rather than depleting an unutilized natural resources and creating a void space. This will also reduce the economic cost of obtaining metal, as it will minimize the transportation and administration costs.

The externality effects and irreversible effects of increased demand for mineral resources has not been quantified, although the impact on current and future generations is expected to be high if new sites are exploited.

6.8.2 Loss of Habitats

No development project could be carried out without any ecological impacts. This project will also result in loss of some areas of existing habitats. The proposed highway does not pass through any unique habitat. In the ecological viewpoint the most sensitive areas that are lost are the marshes. Some regions of these marshes will be destroyed due to filling. In relation to the amount of marshlands available in the coastal areas of the western region of Sri Lanka, the marshy area that will be lost due to construction of the highway is very small.

By signing the RAMSAR convention Sri Lanka is committed to preserve the ecological values and functions in the country's wetlands. By demarcation of a conservation zone in the Muthurajawela marsh this objective is fulfilled to some extent. The proposed highway joins the proposed Colombo-Katunayake expressway in the mixed urban zone identified in the Muthurajawela Marsh - Negombo lagoon conservation management plan. Therefore, the construction of the proposed highway will not have significant

adverse impacts on any of the faunal and floral species and also the ecological values and functions of Muthurajawela wetland.

The effect on research, education and eco-tourism due to loss of marshy habitats will also be insignificant because the conservation zone of the Muthurajawela marsh is not affected by the project.

6.8.3 Fauna and Flora

Most of the vertebrate fauna and active terrestrial invertebrates that inhabit the project route will move to adjacent safe areas when construction work begins. However, the sluggish terrestrial invertebrates, plants and the fauna in the isolated pockets of water that will be reclaimed will perish.

Construction of highway will result in fragmentation of populations other than those of avifauna. If the population sizes are reduced beyond the minimum viable size, those populations will also perish in the long run. However, it is very unlikely that the size of any population is reduced to a level below the minimum viable size due to the construction of this highway.

The highway will obstruct the free movement of some animals such as small mammals, lizards and amphibians. They will be in danger of being run over by vehicles.

During night, bright lights of the highway will attract many insects such as moths and may result in an increased mortality of such animals. The lights will also disturb the birds that roost close to the highway.

Two species of animals that inhabit the project area, namely *Crocodylus palustris* (Marsh crocodile) and *Pelicanus philippensis* (Spot billed pelican), are included in the species red list of IUCN as vulnerable species and four more species namely *Belontia signata* (Comb-tail), *Python morulus* (Python), *Threskiornis melanocephalus* (White ibis) and *Anastomus oscitans* (Open-bill stork) have been identified in the red list of IUCN as lower risk species. In addition, few more species have been identified to be threatened in the local context. All these threatened and vulnerable animal species are not confined to the project area and its vicinity within 1 km range on either side of the proposed highway route and are distributed either in other regions of the low country wet zone, dry zone or throughout the country. Further all these threatened and vulnerable species except *Belontia signata* are also found in the Muthurajawela marsh where a conservation zone is demarcated (Samarakoon and van Zon 1991). The endemic species recorded during the present survey are also not confined to the project area and are found in most other regions of the country including the protected areas and therefore construction of highway will not have significant adverse impacts on

these species too. Critically endangered or endangered species confined to the habitats that will be lost, however, were not recorded during the present survey. Therefore, it is very unlikely that the construction of the highway will result in the extinction of any faunal or floral species.

Due to loss of habitats, the breeding and feeding grounds of some animals will be lost. However, no unique breeding or feeding grounds was identified along the project route. Therefore, the animals will move to adjacent areas of similar habitat conditions for breeding and feeding.

Noise levels

During the construction period and also during the operation, the noise level in the project area and also in the vicinity of metal quarries would be higher than the existing level. This will deter some of the bird and mammal species in the area. They will take refuge in areas slightly away from the project route and metal quarries where the noise levels are tolerable. Some of these animals may eventually get adapted to these high noise levels.

Siltation and salination in the aquatic environment

Two main rivers flow across the project area and dredging of these riverbeds for the construction of bridges will increase the turbidity of water at the construction sites. The fish at these sites will move to adjacent areas to take refuge during this period. Therefore, the adverse impacts on these animals due to increased amounts of suspended matter in the water as a result of construction of bridges would be insignificant. It should also be noted that after heavy rains, the water in these rivers especially in the Kelani river frequently becomes heavily silted due to erosion of marginal lands in the upstream regions.

Due to erosion of the embankments and cut and filled areas too the adjacent aquatic habitats may be silted. If siltation of isolated pockets of water in the marshy areas occur, the aquatic fauna in these habitats will be adversely affected. Due to suspended particles, the amount of light penetrated into water will be reduced resulting in a decrease in primary productivity. Suspended particles will mechanically injure the delicate body parts of aquatic animals and also will clog the gills of fish. This will ultimately result in an increase in mortality of aquatic animals especially in isolated pockets of water in marshy areas.

If sea sand is used as a construction material, salination of adjacent terrestrial and aquatic habitats will take place. In the terrestrial habitats, this will adversely affect mainly the flora. The existing species may be destroyed due to increased salinity.

Salination will have severe adverse impacts on aquatic fauna and flora. Most of the species in the rivers, Bolgoda lake and isolated pockets of water in the marshes are primarily freshwater species and cannot tolerate an increase in salinity. Therefore, such individuals in these habitats will perish due to increased salinity.

Pollution due to construction material and application of weedicides:

Weedicides used for site clearing may leach into adjacent water bodies thus causing chemical pollution. These chemicals will cause mortality of aquatic organisms and if organo-chlorines are used they may get accumulated along the food chains. It may also make the fish that inhabit these water bodies unsuitable for human consumption.

Poor management of construction machinery and construction material will lead to pollution of waterways and marshes in the project area by oily refuse, solid debris such as plastic and polythene containers, polypropylene bags thrown away by the work force and toxic wastes such as lead from the batteries and burning fuel. This will adversely affect the fauna and flora inhabiting these habitats and may also influence the human use of these water bodies. These substances will cause pollution during the operation period too.

Organic pollution

If proper sanitary facilities are not provided for the labour force and resettlers, organic pollution of both the terrestrial and aquatic habitats may occur. Organic pollution of non flowing waters such as small pockets of water in marshy areas and Bolgoda lake will lead to eutrophication sometimes resulting in heavy algae growth and fish kills.

Pollution during Operation Stage

Pollutants generally associated with motor traffic e.g.: lead, copper, cadmium, petroleum hydrocarbons, will enter the neighbouring ecosystems, both aquatic and terrestrial, due to surface run-off. Some of these substance especially heavy metals will accumulate along the food chains and adversely affect the fauna in the long run. This will be particularly important in aquatic habitats. Such pollution will render the water bodies unsuitable for human use. Accumulation of heavy metals along the food chain will make the top carnivorous fish such as snakeheads unsuitable for human consumption.

6.8.4 Impairment of Fisheries and other Water Uses:

Pollution due to surface run-off and increased salination if sea sand is used will result in an impairment of fisheries and other uses in the water bodies of the project area. However, no large-scale commercial fishery exists in the waterbodies in the project area i.e., in Kelani river, Bolgoda River and Bolgoda Lake. Increase in salinity if sea sand is used will destroy the phytoplankton and aquatic macrophytes especially in the northern region of the Bolgoda lake. This will result in a decrease in the primary productivity of the entire lake. Further, large number of zooplankton will also be destroyed due to increased salinity. Thus, there will be a reduction in the productivity of the entire ecosystem resulting in a decrease in the fish production too. Further, heavy eutrophication also results in fish kills, which will adversely affect the fish production. As state earlier pollution due to heavy metals and organochlorines may also render the fish unsuitable for human consumption. Pollution of the aquatic habitats will render the water in these water bodies, especially in the Bolgoda lake and isolated pockets of water in the marshes unsuitable for human usage such as washing, watering etc.

Air quality

During the construction phase, the air quality in the project area and along the access routes that are used to transport construction material, especially earth used to fill low lying areas, will deteriorate due to dust. This may cause respiratory problems in the people that live in these areas.

During the operational phase, since traffic move rapidly along this highway, the congestion in the city will be reduced and therefore the amount of time of burning fuel will also be reduced. This may result in an overall decrease in the amount of carbon dioxide and noxious gases emitted from motor vehicles. Thus the contribution to global warming will also be reduced in the long run.

Impact of metal quarries, burrow pits and sand mining, etc.

The noise of metal quarries as stated earlier will have some adverse impacts on fauna. Further, these may lead to increased erosion causing siltation of nearby water bodies. Burrowing of soil will also cause degradation of land and destruction of natural habitats. Sand mining will deeper the river beds and may result in intrusion of salt water thus adversely affecting the riverine habitats and the fauna and flora inhabiting these. Further, if sea sand is to be used, removal of sand from the beach will result in coastal erosion and degradation of coastal habitats. If sand is to be mined from the sea bottom as done for the landfill at Muthurajawela marsh, the benthic habitat in the sea will be

destroyed. This will result in increased turbidity in the marine waters resulting in a reduction in the penetration of light thus reducing the primary productivity. Sand mining in the sea bottom will also destroy the breeding sites of some fish that lay eggs on the bottom. However, when compared with the vast area of sea bottom in the coastal area, the area disturbed due to sand mining will be very small. Suspended particles will also clog the gills of sessile animals such as mussels and oysters resulting in an increase in their mortality. However, the highly movable animals such as fish, cephalopods, sea mammals, prawns and other crustaceans, will move away from the disturbed area.

Flooding due to embankments

Embankments in the marshy areas will result in inundation of low-lying areas in the project area and its vicinity due to floods and storm water. This will adversely affect the terrestrial fauna and flora in these areas. Further, due to embankments storm water may be retained for a longer time than at present. This will result in longer period of inundation of plants. These plants will then die and decompose. Then the dissolved oxygen content will decrease due to high biochemical oxygen demand. This will lead to killing of fish thus affecting the fish production. The heavy nutrient loading due to all these may increase the eutrophication in the Bolgoda lake. This may lead to heavy growth of cyanobacteria resulting in blooms. This will reduce the aesthetic value of the Bolgoda lake.

6.9 Social Impacts

6.9.1 Community Severance

Community severance's can take place in the following aspects:

- Long term community relationships will be lost. (Relations, friends, and other social relationships will be negatively affected.)
- Community based organizations will be affected.
- Employment relations will be affected (agriculture business etc)
- Sentimental attachment of certain people(attachment to the house, attachment to relatives, attachment to friends, attachment to home and garden and general attachment to the area)

Factors affecting social severance in rural and urban areas will be different. The rural people will have strong employment relations (farmers) and also strong relations with relatives. In urban areas relationship with friends and sentimental attachments to the house and home garden will be significant. However, it should be mentioned that social severance would be one of the significant aspects that will be affected negatively due to

the proposed project. The number of people who will be affected are also large and therefore, community severance will be very much significant.

6.9.2 Generation of New Development

With regard to generation of new development two types of impacts are expected:

In the short term people in the area and also the investors of the outside area will not decide to invest for new development in the affected area and also in the vicinity due to uncertainty of the right of way of the proposed OCH. This will be a very significant short term impact until the RDA demarcate the final right of way of the proposed road.

In the long term very significant positive impacts could be expected in many areas of new development. The areas of new development envisaged are:

- New settlement will start positively with the migration of people from Colombo and also people who are working but residing outside Colombo.
- New business places will open up along the OCH.
- Land prices will go up and therefore, rural people will also start selling their lands to outsiders for settlements, industries and business.

6.9.3 Changes in Property Values and Nature of Compensation where Values Decrease

Impact on Property Values in the Vicinity

There are around 1,700 properties located along the 100-meter corridor of the proposed OCH. At present property and land values vary considerably along the road trace. Initially, during the construction phase, there may be a negative impact on the property and land values, due to the impacts of noise and air pollution from construction activities. However, the decline will be temporary. Once the road is open for operation, it is anticipated that the proposed development will have a beneficial impact on the land value of local properties, particularly those in residential area located close to commercial centres. It is assumed that the OCH will have spin off effects on development activities as well as the increased provision of electricity, telecommunication and pipe-borne water to the community, which will create a demand for land in the project area. The rate of increase in property values will largely depend on the rate of increase in urbanization and development of the project area.

Overall the impact of the OCH on the value of the existing and proposed local property in the vicinity of the project areas is likely to be neutral or positive. However, careful planning, public relations work and professional implementation of the project, which takes into account the needs and concerns of local people will mitigate any negative impacts on property values.

In the short term the land and house value in the affected area and the vicinity may go down significantly due to uncertainty of the right of way of the proposed OCH.

In the long term this situation may change significantly. The land and house values may go up significantly. People from Colombo may attempt to settle down in the vicinity of OCH. The farmers who own paddy and other crops such as rubber may attempt to

convert their land into human settlements to obtain higher values for the land. This may be an opportunity for middle and poor income level farmers who own large plots of lands.

6.9.4 Changes in Accessibility to Land and Demand for Land, Schools, Religious Institutions Businesses etc.

Accessibility

The proposed OCH project is expected to provide linkage between the rural areas and the Colombo City area. It will also reduce traffic congestion on existing road networks, thereby reducing travel distance and travel time. The socio-economic survey reveals that approximately 48% of the population interviewed in the project area live within 05 km from their workplace, whilst more than 95% of the residents live within 05 km of banks, police stations and government hospitals are located within 05 km of the more than 65% of the residents interviewed whereas rural hospitals are located more than 10 km for a large majority of the residents interviewed whereas rural hospitals are located more than 10 km for a large majority of the community. The main mode of transportation is by bus. Less than 10% of the population interviewed use their own vehicle as a mode of transportation. The proposed project will increase the mobility of the community and provide them with easier access to other areas for employment, educational, health care and other facilities.

At present the project areas are primarily rural based with limited service facilities such as banking, industrial and private sector development. As the OCH will provide a link to the rural areas, the saving in travel time and accessibility will also create opportunities for development and growth in the project areas in terms of industrial development, and setting up of banking, restaurants, motels, service stations and other commercial establishments. Hence, not only the people of the project area will benefit from improved mobility but also others who seek to branch out and develop the rural sector.

In addition, the OCH will also impact positively on the mobility of the community living outside the project areas who travel through Colombo City to get to the southern or northern part of Colombo. The reduced travel time and distance can have an effect on the workforce who will be able to use the saving in travel time more productively at work.

Impact on Accessibility

Land allotments such as paddy, rubber, vegetable and homesteads, which are located across the proposed OCH, will be fragmented. The proposed road may separate parts of the lands. In such cases access to these separated lands would be a serious problem.

Accessibility and demand for Schools

The impact on schools will be more serious than other land. Whatever the trace selected for the OCH there would be several schools located in the right of way. In such a situation several or all of the school will be affected. Even if several buildings are affected the entire school may have to be relocated with the children. This will be a

serious issue as far as numbers of affected human beings are considered. There are four schools within the currently identified trace. The students of these schools are psychologically attached to the schools (some children if not all). On the other hand the distance to these schools from present residences are manageable for both children and the parents. If their present schools were to be moved out it would be a serious problem for parties, children as well as parents.

Accessibility to Religious Institutions

Five religious institutions including Buddhist temples and catholic churches are located inside the present right of way of OCH. In some places several buildings including very sensitive properties such as Bo trees are affected. On the other hand locating a religious place by the side of a highway also will not be appropriate.

Accessibility to Business Places

About 112 business and industrial places may be affected. Locating a business or an industry by the side of the road will not be a serious problem unless it comes within the right of way. Thus, the number of business that has to be relocated may be less than expected. However, if the access to the business or industry is affected then relocation may have to be considered. Negative impacts can also be expected on business like small tea boutiques and retail businesses. If the clientele of these businesses have access difficulties it will cause problems for both the customer and owner.

6.9.5 Effects on other Modes of Transportation and Transportation Facilities

Some of the existing roads in the area cut across the proposed road trace and some others run parallel to the trace. The roads that cut across will be severely affected. The people who used these roads will face serious difficulties. The farmers in the area transport agriculture equipment such as tractors to their paddy fields. If the roads they use are fragmented due to proposed OCH it will cause difficulties to the farmers. Whichever trace is selected such problems are unavoidable. Fragmentation of existing local roads will be a problem for other users such as school children, employees etc.

6.9.6 Effects on Social Groups as Elderly, Handicapped and Economically Disadvantaged.

The above social groups will be affected in the following manner:

Elderly and Handicapped

Most of them are dependents of their children or other relatives. When they become aware of the fact that the house they are living would be affected it may cause psychological effect. They will worry about their abode until their children or relatives rebuild a house in a different location. Further they would not like to part with the place that had been the residence for generations.

Economically Disadvantaged Group

As most of the middle and low income earners have built their houses undergoing many difficulties they will be severely affected if they have to rebuild their houses on given land. Most of them believe that Government authorities would take a long time to pay compensation although they have to demolish their present houses, immediately. They also fear of losing their present livelihood system, which is established in the present area.

6.9.7 Relocation Impacts

Number of Households to be Relocated, Socio-Economic Profiles and Ownership of Properties

Except for information on ownership of properties, other information on houses to be relocated if the present road trace is selected, are given in section 5.5.

Mainly three types of properties are owned by the people in this area. The three types include houses, homesteads, and other lands. The details of the houses have already been given in section 5.5. Information related to impacts on other properties is given below.

Types of ownership of the homesteads are given in Table 6.9.7(a).

Table 6.9.7(a) Type of Ownership

DS division	Permanent Deeds	Registered Deeds	Permits	Ande *	Annual Permits	Encroach.	No Owner	Lease	NA	Total
Wattala	27	12	0	0	1	0	4	0	4	48
Mahara	30	0	0	0	0	1	3	0	1	35
Biyagama	68	22	0	2	0	0	4	0	1	97
Kaduwela	92	0	0	0	0	0	2	0	5	99
Homagama	48	1	4	0	0	0	0	0	3	56
Maharagama	42	0	0	0	0	0	0	2	2	46
Bandaragama	9	0	0	0	0	1	1	0	1	12
Panadura	35	0	0	0	0	1	3	0	0	39
Total	351	35	4	2	1	3	17	2	17	432
Total trace	1369	137	16	8	4	12	66	8	66	1685

* Ande [Local Term] refers to type of land tenure existing in agricultural lands. Owners give their land to others for cultivation on certain conditions i.e. money or harvest.

The data in the above table indicates the degree of significance with regard to land ownership in the affected area. About 81% of the homesteads have freehold deeds (permanent deeds).

The homestead is the main property that will have greater negative impact due to relocation. Houses are the most valuable properties in a homestead. The values of the houses that will be affected according to the estimates of the affected people are as shown in the table 6.8.7 (b).

Table 6.9.7 (b) -The community estimates of their own houses [Unit Rs.]

DS division	less 50000	50000-100000	100000-200000	200000-500000	500000-1000000	Over 1000000	N/A	Total
Wattala	2	9	4	11	11	11		48
Mahara		3	2	5	7	18		35
Biyagama	4	7	14	19	30	22	1	97
Kaduwela	4	3	11	23	31	25	2	99
Homagama	5	5	7	19	15	3	2	56
Maharagama	2	7	5	15	5	12		46
Bandaragama	6		1	3	1	1		12
Panadura	7	3	2	19	6	2		39
Total	30	37	46	114	106	94	5	432
Total Trace	117	144	179	445	413	367	20	1685

Very few householders have more than one house. For example about 12% of the householder surveyed had 2 houses and about 3% had three houses. The impact on these people will be serious in terms of financial resources involved.

The other properties, which will be affected, is other land owned by the people in the affected area. About 180 families along the trace have land in addition to their homestead. These additional land ranges from 5 acres to $\frac{1}{4}$ acre. About 80% of these lands are freehold lands. These lands are cultivated with coconut, rubber, paddy, vegetable etc. (see tables 5.5.50, 5.5.51, and 5.5.52 in the section on results of household survey in volume II for details on these lands). Only about 56 out of 1685 householders in the trace have more than one land. Out of the 56 nearly 43 are free hold lands. This information indicates that a significant number of people will have adverse impacts on their other lands, too. These lands generate income for them. Only 14 of 432 of the people interviewed mentioned the income they obtained annually from the lands. It ranges from RS. 10,000 to over 25,000. The land value ranges from 50,000 to over 200000 per acre from the point of view of the owners. Value of home gardens ranges from Rs. 2500 to over 100000 per perch. (Specific details of the lands and home gardens are given in table 5.5.50 to 5.5.58 under results of household survey in Volume II).

6.9.8 Availability of Acceptable and Affordable Housing for the Displaced

At present no alternative houses have been identified for the affected people to move into. Alternative lands have been identified in each DS division by the consultants [See Map 5-4-1]. The availability of all these lands are doubtful because some of the lands identified are private properties and owners may not be willing to sell. The availability has to be verified during the detailed design stage of the project.

Availability of alternative lands for resettlement has been discussed in section 5.4. Prices of such lands are the same as the prices of lands affected by the project. It ranges from Rs 50,000 to 200000 per acre along the trace. The land prices in the Wattala, Mahara, Biyagama, Kaduwela and Mahara are higher than Bandaragama, Homagama

and Panadura. If the lands indicated by the GNs and individuals during the household survey would be selected for resettlement the accessibility and distance to present houses will not cause problems because the lands identified are spread over all the 8-DS divisions along the trace.

6.9.9 Businesses and Industries to be Displaced

The nature of business and industries located in the affected areas has been given under section 5.3.6 in this report. The size of the business places and the industries range from small to large scale. These business places provide services in the following nature:

- Large places provide services for the locals as well as outsiders
- Employment opportunities have been provided for the locals as well as outsiders
- Medium and small-scale places are providing services specifically for the local communities in the areas and also employees in such places are locals.

The businessmen, due to social unrest prevailing among communities were reluctant to provide information regarding revenues and sales. Once the specific road trace is finalized such details should be collected to calculate the compensations for the specific business and industries.

The impact on some business and industries will be as follows:

- If these places are located within the affected area they all have to be shifted.
- The long-term business relations will be seriously affected.
- There will be negative effects on the sales and revenues
- Finding suitable places for business would be difficult.
- It will take a long time to rebuilt the business relations in the new places
- The customers who received services from these businessmen will also be negatively affected.

6.9.10 Availability of Relocation Sites for Displaced Businesses and the Cost-Benefit of Relocation

At this stage of the project no specific sites for business and industries have been identified for relocation. There is land available for relocation of displaced people. Out of such land suitable sites for relocation of business and industries should be selected. The nature of the land and the environment required for relocating businesses and industries are different from human settlements. The following criteria are suggested for selecting land for businesses and industries:

Criteria for selecting lands for business establishments

- There must be sufficient clientele living in the vicinity for the specific business venture;
- There must be ways for the businessmen to purchase their goods;
- The environment in the vicinity should be conducive for the specific business.

Criteria for selecting land for Industries:

- The environment in the vicinity should be suitable for locating the specific industry
- The owners of the industries should be able to find other requirements such as labor, raw material etc.
- Same extent of land or little more should be provided to them for operation in the new place.

Salient Features of Cost and Benefit of Relocations

COST	BENEFIT
<ul style="list-style-type: none"> • Loss of houses, business places and industries • Loss of some agricultural lands and also fragmentation of lands • Access difficulties to fragmented agricultural lands • Loss of various social relations • Loss of business relations • Problems for children's schooling • Loss of religious relations 	<ul style="list-style-type: none"> • The significance of the benefits would be dependent on the design and implementation strategies of the proposed project. Likely benefits would be as follows: <ul style="list-style-type: none"> - Improved transportation between Colombo and project area and also between Colombo and other areas such as North Central and Central Province - Shift of population from Colombo to project area - Increase of land values in the project area

6.9.11 Acquisition of Property and Relocation and Adherence to Respective Legislation and Regulations

As a Government Institution involved in infrastructure development in the country RDA has legal power under its land acquisition act of 1956 and amended in 1982 to acquire lands needed for road development in the country. Apart from this legal act special compensation for properties and communities affected by road development were approved (RDA July 1999). These two legal documents cover all the aspects of land acquisition and compensation for affected properties in road development projects.

Irrespective of legal aspects of land acquisition and compensation the RDA is obliged to abide by certain policies of the donor agencies for road development projects. For example the RDA has to follow the ADB policies on involuntary resettlement of affected households under Southern Highway development project. Based on ADB policy on compensation RDA has worked out details on type of losses due to the Southern Highway project and the type of compensation. For the OCH also a similar program should be worked out and the affected parties should be informed. (See table 9 in RDA: July 1999 document)

Nature of compensation to be paid and also the strategies to be adopted in implementation of compensation programmes are clearly shown in this document prepared by RDA for Southern Highway.

6.9.12 Availability of Relocation Resources to Residential and Commercial Displacement

This is an area where the communities are much concerned. In the Focus Group Discussion [FGD] sessions conducted in the Biyagama area, the community members were critical of the RDA for not effecting relocation compensation in time to the affected parties. The OCH will need effective relocation resources including financial, human resources (expertise). The following aspects will have to be considered with regard to relocation resources:

- Availability of comprehensive relocation plan (once the final right of way is identified and decided at the detailed designs stage, this should be one of the significant task to be carried out)
- Availability of adequate expertise to work with affected communities.
- Availability of sufficient financial resources for payment of compensation timely.
- Effective implementation program for relocation.

Other Incentives:

- to implement the relocation programme effectively additional resources are needed to provide incentives for officials of the government agencies working in the project area. The government officials attached to divisional secretaries offices such as Divisional Secretaries, Assistant Directors of Planning, some clerical staff members and Grama Niladhari will have to work with the project implementers to carry out activities related to relocation of affected communities. On the other hand the additional incentives will have to be paid for some staff members attached to Pradeshiya Sabhas. the assistance of these persons will be needed to implement relocation of business places.

6.9.13 Impacts On Land Use

Fragmentation of Agricultural Lands

Valleys cultivated with paddy will be the most affected by the construction of the OCH. Proper drainage outlets have to be constructed to drain out the water and also to avoid the inundation of the upper part of the valleys crossed by the OCH.

The proposed road will cut across a few estates and that will affect the access and movement of resources required by the estates.

Wattala DS Division

The road trace cuts across a Medium paddy field at the proposed 5th km post.

Biyagama DS Division

The OCH road trace road cut across two wide paddy valleys at the 8th and 14th km lengths, two tiny paddy valleys at the 9th and 9.75 km lengths, three medium size paddy valleys at 11.5, 12.0 and 12.5 km lengths and one narrow paddy valley at 9.25 km length.

Kaduwela DS Division

The OCH road trace road cuts across a broader paddy valley within the 24th to 26th km lengths, a medium paddy valley cuts across at 16th km length, and a small paddy valley at 17.25 km length.

Maharagama DS Division

The OCH road trace cuts across, five medium size paddy valleys within 24th to 26th km lengths.

Homagama DS Division

Three wide valleys, four medium valleys and three tiny valleys cut across within 26.2 to 35.1 km lengths by the OCH road trace.

Bandaragama DS Division

The OCH road trace cuts across two wide valleys and one medium valley within 35.1 to 46.8 km lengths. It all cuts across a rubber estate at Aluthgama near 37.4 km length of the road trace and a coconut estate (Limpasswatte) at Pamunugama, near 44.8 km length of the road trace.

6.9.14 Impacts on Encroachment on Historical and Cultural Sites and Monuments

The impact of proposed project on these aspects is not very significant. There are no archeologically and historically significant locations within the current right of way of the road. But several religious places will be affected. The two parties who will be affected are leaders of these places and the communities who visit these places for religious activities.

6.10 Economic Impacts

6.10.1 Public Expenditure and Infrastructure Development

The Road Development Authority (RDA), the implementing agency for the OCH project, is responsible for the development of the road network of the country. RDA is also responsible for the maintenance of around 10,000 km of road network whilst the balance 90,000 km are maintained by the Provincial Councils and Local Authorities. In 1998, RDA's expenditure on the development and maintenance of roads was Rs. 5,783 million and in 1999 around Rs. 6,688 million was allocated for this purpose. The two main line items in RDA's budget involve expenditure for: (i) widening

improvement and new construction of roads and bridges and (ii) rehabilitation and improvement of roads and bridges. Around 38 percent of the expenditure on roads in 1998 was for construction additions and improvements of roads whilst a larger proportion, 57 percent was towards rehabilitation and improvement of roads, bridges and culverts. With the increase in traffic level and resulting development of new road networks, the allocation of RDA's budget is shifting its emphasis on maintenance to construction of new roads. A significant proportion of the government's expenditure on rehabilitation and construction of new roads is financed by concessionary loans and grants obtained from international donor agencies.

The OCH project investment costs correspond to the RDA's budgetary item for widening improvement and construction of roads and bridges. The central government has given preliminary approval for the OCH project, thereby implying that some provision for the OCH project cost will be met by the national budget. However, it will not be possible for the central government to bear the full cost of the OCH project as other development and infrastructure needs of the country would also have to be met by the central government's budget on public investment programmes. Public investment, mainly on infrastructure development, is currently around 8 percent of GDP. The delay in implementation of some infrastructure projects in the roads, ports and telecommunication sector in the past is expected to be restored in the coming years and will therefore, have a greater impact on lending.

The OCH project will be constructed over an eight-year period from 2002 to 2009. The disbursement of the construction costs are given below:

Table 6.10.1[a] OCH Project Costs at Current Prices

Year	At current prices (Rs. Million)		
	Foreign	Local	Totals
2002	90.2	1,159.2	1,249.4
2003	94.3	1,275.2	1,369.5
2004	1,488.6	1,924.2	3,412.8
2005	1,607.1	2,200.2	3,807.3
2006	1,325.6	2,218.2	3,543.8
2007	1,467.1	3,225.5	4,692.6
2008	1,217.4	2,622.8	3,840.2
2009	1,107.2	2,376.3	3,483.5
<i>Total</i>	<i>8,397.5</i>	<i>17,001.6</i>	<i>25,399.1</i>

Annual increase in prices: foreign component – 4.5%, local component – 10%. Base year is 1999.

The OCH project will largely be financed by JBIC (Japan Bank for International Cooperation) funds. However, of the total project costs, taxes, land acquisition, compensation and resettlement costs amounting to around Rs. 6,268 million (at current prices) should be financed domestically by the central government. The burden on the central government will be higher in the initial years of the project and is estimated to range between 7 and 20 percent of the current RDA budget. The central government may have difficulty in meeting these additional costs and may have to raise the shortfall

in funds from either domestic or international financial markets. The table below gives the disbursement of the project costs to be borne by the central government.

Table 6.10.1(b) Component of Project Costs to be Financed by Central Government
in Rs. Million at current prices

Year	Taxes	Land Acquisition and Compensation	Total
2002	219.4	1,080.6	1,300.1
2003	240.5	1,188.6	1,429.1
2004	535.9	-	535.9
2005	592.3	-	592.3
2006	549.4	-	549.4
2007	730.4	-	730.4
2008	594.2	-	594.2
2009	536.5	-	536.5
<i>Total</i>	<i>3,998.6</i>	<i>2,269.2</i>	<i>6,267.9</i>

In practice, the central government generally finances the operation and maintenance costs of any road development project. Therefore, the total operation and maintenance costs associated with the OCH project is expected to be fully financed by the central government. The operation and maintenance costs will be effective from 2006 and the project will be fully operational by 2010. The estimated operation and maintenance costs for 2010 is Rs. 77 million (in current prices) which could be met by the central government's budget.

6.10.2 Impact on Regional and Local Economies

The project area is located in the Colombo Metropolitan Region [CMR], which plays a vital role in the economic development of the country. In 1998, the Colombo region contributed significantly to the Gross Domestic Product.

CMR is the industrial centre of the country accounting for almost 80 percent of industrial establishments. The infrastructure facilities are better developed than the rest of the country and as a result, it has attracted a large proportion of the foreign investment to the country. In 1996, around 75 percent of BOI approved projects were located in the CMR. The two largest investment promotion zones are located in Biyagama and Katunayake. The manufacturing sector and tourist industry in the Colombo region also contributes significantly to the growth of the national economy.

The main industrial areas of the study area are Biyagama, Kaduwela and Homagama. The industrial areas in these towns have mainly developed in locations where suitable infrastructure facilities are available. This includes access to main roads, which is a large contributing factor to the siting of these industries.

With the development of the OCH it is expected that the project will have wider economic benefits to the regional economy in terms of increased industrial and manufacturing activities. As in any urbanized area, commercial and industrial development tend to concentrate in areas that are located close to or along main arterial

roads. The improved road network and reduced travel time on road will also make Sri Lanka more attractive to foreign investors. The multiplier effect on investment activities will have a positive impact on both social and economic aspects. Although, it is not easy to assess the multiplier effect of industrial and investment activities that will be brought about by the proposed project, it is expected to be high.

In addition to the benefits of increased investment and industrial activity to the regional economy, the project will have positive impacts on the local economy. During the construction phase, there will be significant potential for increased economic activity in the project area in terms of the development of eating houses and restaurants, shops, banking facilities, rental opportunities for lodging quarters and other service related activities to service the local and foreign workforce on the project. Once the road is open for operation, these development activities along with other service activities such as property development, guesthouses, petrol stations and car maintenance garages will increase significantly along the road trace. Opportunities will also exist for Local Authorities to increase their revenue by the collection of additional property taxes, business and trade taxes. The spin off effects from the development of the OCH will be highly beneficial to the welfare and quality of life of the people of the area.

The agricultural sector contributed Rs. 153,335 Mn (21.3%) to the country's gross national product (GNP) in 1998 at current factor cost prices. The total extent of agricultural land to be acquired for the construction of the proposed road is around 306 ha. Assuming productive lands with good output, the estimated loss of agricultural production is in the order of Rs. 2.78 Mn. In relation to the total output of all goods and services provided in the agricultural sector, the loss in agricultural production as a result of the proposed project will be negligible amounting to 0.002 percent of the agricultural contribution to GNP.

6.10.3 Impact on Employment

The construction of the road project will displace around 1,684 families due to land acquisition for the project. The relocation may bring about a negative impact on the employment of some of the displaced community, particularly the agricultural workforce and self employed. At the same time it may provide new employment opportunities for others. The results from the socio-economic survey indicate that almost one third of the employed persons within a 100 m corridor are employed in private sector jobs. The next largest employment category is daily labour, which accounts for around 16 percent of the total employed persons. Approximately 27 percent of the workforce are self employed or working in the government sector.

6.10.4 Loss of Employment in the Agricultural Sector

The acquisition of agricultural lands due to the construction of the proposed road will also have an impact on the employment of farmers and other agricultural workers. Based on the number of man working days required per hectare for a specific agricultural activity the total number of persons employed in agricultural activities was calculated. It is assumed that the number of hours worked per month per worker is 160, thereby giving 240 working days per year. Table 6.15.1 gives the figures relating to the number of persons who will be unemployed due to the acquisition of agricultural land for the OCH project. In the case of rubber cultivation, the average annual labour input

is 258 man labour days per hectare per year, based on figures obtained from the rubber Research Institute. Hence, at the rate of 258 man labour days per hectare per year and assuming 240 working days per year, the estimated labour requirement per hectare per annum is 1.075 persons. The rubber land to be acquired by the project is approximately 39.65 ha. thereby, displacing around 43 labourers. Similarly, the labour requirement for cultivation of one hectare of coconut land is 121 man labour days per hectare per year whilst for paddy it is around 197 man labour days per year. Therefore, for a coconut land area of 22.35 ha. around 11 persons will lose their employment and for a paddy land area of 95.25 ha. approximately 78 persons will be unemployed as a result of the proposed project.

It should be noted that the labour requirements are for productive agricultural lands with high yields. In the case of lands that are not performing well, the man labour day requirement will be less, thus giving a lower number of persons to be displaced from agriculture. However, for the basis of this calculation it is assumed that all agricultural lands have a reasonably good crop output.

Table 6.10.4[a] Estimated Loss in Employment from the Agricultural Sector

CROP TYPE	AREA	NO. OF MAN LABOUR DAYS PER HA.	TOTAL NO. EMPLOYED PER YEAR	%
Rubber	39.65	258	43	32.3
Coconut	22.35	121	11	08.5
Paddy	95.25	197	78	59.2
Total			132	100.0

It is estimated that approximately 132 persons will lose their source of employment due to the acquisition of agricultural lands. Around 60% of the agricultural workforce population who will lose their employment will be from the paddy sector whilst around 32% will be from the rubber sector.

Table 6.10.4[b] Estimated Loss in Foregone Earnings from Loss in Employment in Agricultural Sector

CROP TYPE	TOTAL NO. EMPLOYED PER YEAR	TOTAL NO. OF DAYS WORKED PER YEAR	AVERAGE WAGE RATE PER DAY [RS]	ANNUAL LOSS OF FOREGONE EARNINGS [AT MARKET PRICES] [RS]	LOSS OF FOREGONE EARNING [AT ECONOMIC PRICES] [RS]
Rubber	43	10,230	125.00	1,278,713	963,510
Coconut	11	2,704	125.00	338,044	254,716
Paddy	78	18,764	125.00	2,345,531	1,767,358
Total		31,698		3,962,288	2,985,584

The total value of the loss in employment from the agricultural sector was calculated using the loss in foregone earnings from the persons expected to lose their employment. Assuming an average daily wage rate of Rs. 125.00 in the rubber, coconut and paddy sectors, the loss in foregone earnings for each crop type was calculated. In order to convert the market value of labour into the true price of labour the average conversion factor for surplus labour and scarce labour of 0.7535 was used. Therefore, the

economic value of the loss of employment from the agricultural sector is estimated to be almost Rs. 3 million per annum.

However, it should also be noted that in addition to the economic loss of foregone earnings, there is an additional social cost in terms of loss of livelihood, particularly for the farmers who depend solely on farming as a way of their livelihood. Farming is a livelihood that is passed on to future generation. The culture and social behaviour of the farming community revolve around the farmer's daily activities and will be disrupted if all or a large proportion of their paddy land is acquired. The farmers will find it difficult to find alternative sources of employment as their skills are restricted. Therefore, to minimize any disruption to the harmony of the farming community and other agricultural community such as rubber tappers, appropriate mitigation measures should be implemented to reduce the additional social costs.

6.10.5 Loss of Employment from Non-Agricultural Sector

The construction of the road will have a very low to negligible impact on almost 45 percent of the workforce in the area who are primarily employed in the private or government sectors. The displaced community who are either daily labourers or self employed may encounter difficulties in accessing new markets and clients if they are relocated some distance away from their home town. The daily labourers and self employed persons may have already established working relationships with clients and customers of the area and if relocated to an area far from their village, they may not find it easy to maintain the business relationships and contacts. This can have adverse social and economic consequences to the affected population. It is difficult to quantify the impact on employment on the affected population but the impact can be minimized considerably if appropriate measures are taken to resettle the population in areas close to their village or workplace and accessible by transport facilities.

6.10.6 Loss of Employment in the Agricultural Sector

The acquisition of agricultural lands due to the construction of the proposed road will also have an impact on the employment of farmers and other agricultural workers. Based on the number of man working days required per hectare for a specific agricultural activity the total number of persons employed in agricultural activities was calculated. It is assumed that the number of hours worked per month per worker is 160, thereby giving 240 working days per year. Table 6.15.4 gives the figures relating to the number of persons who will be unemployed due to the proposed project. The number of man labour days required per hectare for rubber cultivation was obtained from the Rubber Research Institute. The labour requirements are for productive agricultural lands with high yields. In the case of lands that are not performing well, the man Labour Day requirement will be less, thus giving a lower number of persons to be displaced from agriculture. However, for the basis of this calculation it is assumed that all agricultural lands have a reasonably good crop output.

Table 6.10.6 [a] Loss in Employment from the Agricultural Sector

	Area	No. of man labor days per ha	Total no. employed per year	Percentage
Rubber	39.65	258	43	32.3%
Coconut	22.35	121	11	8.5%
Paddy	95.25	197	78	59.2%
Total			132	100%

It is estimated that approximately 132 persons will lose their source of employment due to the acquisition of agricultural lands. Around 60 percent of the agricultural workforce population who will lose their employment will be from the paddy sector whilst around 32 percent will be from the rubber sector. That is, around 78 workers in the paddy sector and 43 workers in the rubber sector will lose their employment as a result of the project. Coconut cultivation will only contribute to the loss of 11 persons from employment.

Table 6.10.6 (b) Loss in Foregone Earnings from loss in Employment in Agricultural Sector

Crop Type	Total No. employed per year	Total no. of days worked per year	Average Wage Rate per day (Rs.)	Annual Loss of Foregone Earnings (at market prices) (Rs.)	Loss of Foregone Earning (at economic prices) (Rs.)
Rubber	43	10,230	125.00	1,278,713	963,510
Coconut	11	2,704	125.00	338,044	254,716
Paddy	78	18,764	125.00	2,345,531	1,767,358
Total		31,698		3,962,288	2,985,584

The total value of the loss in employment from the agricultural sector was calculated using the loss in foregone earnings from the persons expected to lose their employment. Assuming an average daily wage rate of Rs. 125 in the rubber, coconut and paddy sectors, the loss in foregone earnings for each crop type was calculated. In order to convert the market value of labour into the true price of labour the average conversion factor for surplus labour and scarce labour of 0.7535 was used. Therefore, the economic value of the loss of employment from the agricultural sector is estimated to be almost Rs. 3 Mn per annum.

However, it should also be noted that in addition to the economic loss of foregone earnings, there is an additional social cost in terms of loss of livelihood, particularly for the farmers who depend solely on farming as a way of their livelihood. Farming is a livelihood that is passed on to future generations. The culture and social behaviour of the farming community revolve around the farmer's daily activities and will be disrupted if all or a large proportion of their paddy land is acquired. The farmers will find it difficult to find alternative sources of employment as their skills are restricted. Therefore, to minimize any disruption to the harmony of the farming community and

other agricultural community such as rubber tappers, appropriate mitigation measures should be implemented to reduce the additional social costs.

Employment Opportunities

The construction of the OCH will create new employment opportunities for the people of the area during both the construction and operation phase of the project. During the construction phase a significant number of persons will be employed in site clearance, earthworks, road surfacing etc. Although no exact numbers are available at this time on the number of persons to be employed, it is envisaged that a significant number of jobs in the unskilled and semi-skilled categories will be created. Similarly, the operation phase of the project will require labour for road maintenance work. New employment opportunities will be created over the life of the project and can therefore, provide sustainable employment to the displaced persons. In addition to the direct employment opportunities created by the construction and operation of the road, a number of indirect employment opportunities will be created with the spin off development activities that will occur as a result of the development of OCH. These indirect employment-generating activities include new shops, eating houses and petrol and service stations that will sprout up along the road trace.

The agricultural sector is finding it difficult to recruit the younger generation as they prefer to work in private sector jobs or jobs that are more paying and not considered as manual labour. The project will, therefore, provide new source of employment for the youth that are not interested in working in the agricultural sector.

It is envisaged that the direct and indirect benefits from the creation of new employment opportunities during the construction and operation phases of the project will be significant. However, due to difficulties in projecting the estimated benefits of employment generation, the overall benefit to the community has not been quantified.

6.10.7 Impact on Tourism

The proposed OCH may have positive impacts on the tourism development of the country, particularly in the CMR. A significant proportion of the tourists to Sri Lanka visits the beaches and the hill country areas. The OCH will provide opportunities for the tourists to see other areas and aspects such as the social customs and the village lifestyle of the people by visiting interior places currently not easily accessible to tourists. Villages along the OCH could be developed into tourist attractions, as is being practiced along the Colombo-Kandy road. The additional benefit of the OCH is its locality, which is close to the international airport and could facilitate day trips for transit or business visitors on short visits.

6.10.8 Impact on Demolition of Residential, Commercial and other Buildings

A major impact of the proposed road is the displacement of families and institutions currently located along the OCH trace. A large number of buildings including residential, industries and factories, warehouses, businesses, schools, workshops will need to be demolished for the construction of the proposed road.

The number of structures to be demolished within a 100 meter corridor has been obtained from aerial photographs and field surveys. The residential properties to be demolished have been categorized as double story, single story houses according to size - large, medium and small, shanties and houses under construction. The total number of permanent houses to be demolished is 1,623 and the number of semi-permanent (shanty dwellings) houses to be demolished is 55. In addition to these houses, there are 8 houses under construction, which would also be demolished by the construction of the OCH. The number of residential properties to be demolished in each DS Division categorized by house type is given in the table below:

Table 6.10.8(a) -Types of Residential Buildings to be Demolished

DS Division	Double Story	Single Story			Under Construction		Shanties	Total
		Large	Medium	Small	Small	Medium		
Wattala	20	18	139	94	1	3	52	327
Mahara	15	7	52	22	-	-	-	96
Biyagama	38	20	180	98	-	-	-	336
Homagama	7	3	93	93	2	1	-	199
Maharagama	1	-	31	17	-	-	-	49
Bandaragama	1	8	121	88	-	-	-	218
Panadura	4	-	52	29	-	-	-	85
Kaduwela	30	17	245	80	-	1	3	376
Total	116	73	913	521	3	5	55	1,686

The greatest impact on relocation of people will be in Kaduwela, Biyagama and Wattala where the largest proportion of houses will need to be demolished.

The cost to society for the destruction of the residential properties has been based on the compensation cost for the value of the structures. Based on the general floor area of houses obtained during the socio-economic field surveys, the average floor area in relation to the house type was assumed at the rates given in the table below.

Table 6.10.8(b) -Estimated Floor Area for Residential Buildings

Type of House		Average Sq. Ft.
Double Story		3,000
Single Story and Houses under Construction	• Large	2,000
	• Medium	1,000
	• Small	500
Shanties		300

For the purpose of calculating the value of the structures it was assumed that the roofing type for all house categories except shanties, were either tile or asbestos and were permanent structures. Houses under construction were taken at 75 percent of the total estimated cost per building. Therefore, the value of residential structures to be demolished for the construction of the OCH is estimated to be Rs. 1,204 Mn as given in Table 6.10.8(c) below.

Table 6.15.7 (c) Cost of Demolition of Residential Buildings

Type of House	Average Floor Area (Sq ft.)	No. of Houses	Value per Sq ft (Rs./Sq ft.)	Total (Rs.)
Shanties	300	55	250	4,125,000
Single Storey – small	500	521	500	130,250,000
Single Storey – medium	900	913	850	698,445,000
Single Storey – large	1,500	73	850	93,075,000
Double storey	2,500	116	950	275,500,000
Under construction – small	500	3	500	562,500
Under construction – medium	900	5	850	2,868,750
Total				1,204,826,250

The proposed road will also have an impact on several office buildings, schools, temples and industries.

These non-residential building structures include industries, business places, shops, warehouses, container yards, workshops, schools and temples. Data obtained from the field surveys and aerial photographs (1999) provide an estimate of the number of building structures that will be demolished as a result of the proposed road.

Establishment such as an industry, temple and school sprawl many buildings and in some instances only a few of the buildings will be destroyed by the construction of the road. Since exact floor areas for each structure type was not available at the time of the study, it was assumed that a total floor area of 461,850 square feet would be demolished. In the case where only part of the establishment will be demolished, the number of buildings to be demolished in that establishment was taken in to account in estimating the total floor area for non-residential structures. Table 6.10.8(d) below gives the estimated number of structures that will be demolished and its estimated total floor area according to building type.

Table 6.10.8 (d) Floor Area of Non-Residential Structures to be Demolished

Type	Number	Total Floor Area (Sq. ft)
Industries	09	75,000
Business/shops (small)	63	37,800
Businesses/shops (large)	21	84,000
Warehouses	14	70,000
Container Yards	01	4,000
Workshops	04	8,550
Temples (total no. of buildings in 5 temple compounds)	17	42,500
Schools (total no. of buildings in 4 schools)	28	150,000
Total		461,850

The total cost of the structures was computed using the weighted average cost of Rs. 780 per square foot for non-residential structures. Based on the above information, the total value of non-residential properties to be destroyed is estimated at Rs. 360 Mn.

6.10.9 Impact of Residential and Commercial Land Acquisition

It is estimated that around 482 ha of land will be acquired for the construction of the proposed road. This will include residential, commercial (includes industrial), agricultural, scrub and marshlands. The value of land per perch varies significantly depending on the proximity and access to existing roads, commercial facilities and utilities such as electricity, pipe-borne water and telecommunications. Almost 63 percent of the total land area to be acquired is agricultural land; a large share of this land being home gardens. Residential, commercial and industrial areas account for around 22 percent of the total land area to be acquired.

Land area for scrub and marshland lands is around 71 ha. along the road trace. Since these lands are considered to be crown land, the land acquisition costs given below have not accounted for scrub and marshlands.

The residential, commercial and industrial land area to be acquired for the construction of the proposed road is estimated to be around 103.65 ha. Slightly more than half of this area is to be acquired in Kaduwela and Biyagama, two rapidly growing areas in terms of urbanization and industrial activity. Table 6.10.9 (a), gives the land area to be acquired per DS Division along with the respective land value per perch. The land area given under Biyagama includes a metal quarry site of 1.6 ha.

Table 6.10.9(a) Residential Area to be Acquired and Land Values by GN Divisions

DS Divisions	Built Up Land Area to be Acquired (ha)	Land Value (Rs. per Perch)
Wattala	18.50	80,000
Mahara	4.75	15,000
Biyagama	24.00	60,000
Kaduwela	30.20	45,000
Maharagama	0.50	45,000
Homagama	6.65	35,000
Bandaragama	13.65	30,000
Panadura	7.00	40,000
<i>Total</i>	<i>103.65</i>	

The land acquisition costs for residential and commercial properties given in Table 6.10.9(a) are based on average land values obtained from the socio-economic survey and from property assessors. The land acquisition costs for residential and commercial areas are estimated to be in the order of Rs. 342 Mn.

Agricultural Land to be acquired by the Project

The agricultural lands to be acquired for the proposed project comprise of lands under rubber, coconut, paddy, homegardens and market gardens. The land use data has been obtained from aerial photographs taken in 1999 and field surveys. Almost 63 percent

of the total area to be acquired for the construction of the proposed OCH road constitute of agricultural land. The agricultural land area by crop type to be acquired along the road trace is given in Table 6.10.9(b).

Table 6.10.9(b) Agricultural Land Area to be Acquired by the Project

Crop	Area (ha)	Percentage	Main DS Divisions under Cultivation
Rubber	39.65	07.31%	Homagama, Bandaragama
Coconut	22.35	12.97%	Bandaragama, Biyagama
Paddy	95.25	31.17%	Homagama, Kaduwela, Maharagama
Abandoned Paddy	14.85	04.86%	Bandaragama
Home gardens	116.30	38.06%	Biyagama, Kaduwela, Homagama and Bandaragama
Market gardens	17.20	05.63%	Maharagama
Total	305.60	100%	

Around 56 percent of these lands are rubber, paddy and coconut lands. The largest proportion of the agricultural lands to be acquired is in Homagama and Bandaragama. Home gardens and market gardens take up approximately 43 percent of the total agricultural land to be acquired for the proposed project. The most affected crop in terms of area to be acquired is paddy land, which takes up approximately 36 percent of total agricultural land area. Almost one-third of these paddy lands is in Homagama. Of the total paddy lands around 13 percent is abandoned paddy lands, located mainly in the Bandaragama area. Coconut land occupies less than 8 percent of the agricultural land area to be affected by the proposed project whilst around 13 percent of rubber land will be affected.

Since the land prices for agricultural land were less than residential land prices, the land acquisition costs for homegardens and market gardens were based on the land values obtained for residential areas. This was based on the assumption that home gardens and market gardens are located in the same compounds of residential properties.

Land acquisition cost for other agricultural land – rubber, coconut and paddy - were calculated using the agricultural land area to be acquired along the road trace and the weighted average land value of Rs. 17,735 per perch.

The total land acquisition costs for agricultural lands are estimated to be around Rs. 567 Mn.

The total land acquisition costs for residential, commercial and agricultural lands is approximately Rs. 909 Mn. The table below gives a summary of the costs by each land use category.