Initial Environmental Examination

June 2017

SRI: Second Integrated Road Investment Program

Western Province (Appendices I.D-VI.B)

APPENDIX I.D SAMPLE ENVIRONMENTAL CHECKLISTS

ENVIRONMENTAL CHECKLIST
INCLUSIVE ROAD OPERATION AND DEVELOPMENT INVESTMENT PROGRAMME (iROAD)

Road Name : Road from Dissagewatta up to Dagonna Wela Meda
Road ID : WGA199
District Name : Gampaha
DSD & GNDs :

DSD	GNDs
Divulapitiya	Kondagammulla South East Ealuwarippuwa South Dagonna East

Total length of the road: 1.82 Km

This road starts from Dagonna area. The first 0+200 is carpeted. Section from 0+200 to 0+530 is in a poor condition. The concrete section of the road extends from 0+530 to 0+900. The macadamized road extends from 0+900 up to the end of the road. There are culverts at 0+260, 1+220 and 1+450. At the right side of the road t 0+880, Dagolla School is located. Sri Pabodharama Viharaya (temple) is on the right side at 1+000. A canal and a bridge is at 1+150. The width of the road is 3.20 m and the total length of the road is 1.814 km. The road ends at Disagewaththa Junction.

Climatic Conditions

Temperature-ºC	High: 29.26°C Low:26.88 °C
Humidity	High: 87.12% Low: 75.37%
Rainfall Rainy Season	2000mm -2500mm /year From : May to : September

(Source: Meteorology Department of Sri Lanka, 2014 – 2016 Average)

A. Location of the Road and Generic description of Environment

No:	Type of Ecosystem	Yes	No	Explanation
1.	Type of Terrain (Plain/ Undulating/ Hilly/ Mountainous etc.) (Explain the topography of the area and how many km of the road are located in the hilly area)	✓		From general Undulating terrain could be observed along the road trace. Altitude: Maximum elevation-21m at 0+547m Minimum elevation -10m at 1+028km
2.	Forest Area / Mangrove / Other natural habitats (Explain whether the road passes through forest areas or located along the forest areas and distance from shoulder to the forest area)?		√	
3.	Inhabited Area	√		Common home garden Vegetation
4.	Agricultural Land	√		Small and large scale coconut plantations Considerable road distance runs through and close to paddy fields.
5.	Barren Land		√	

B. Specific description of the Road Environment

No.	Parameter/ Component	Yes	No	Explanation
1.	Are there any areas with landslide or erosion problems along the road? (If yes, indicate the location whether Right or Left side and the chainage)		✓	
2.	Are there any Tanks/streams /rivers etc. along/crossing the road or any lakes/swamps beside the road? (If yes, list them indicating the location Right/ Left or crossing and the chainage)		✓	
3.	Is the area along the project road prone to flooding or any problems of water stagnation and other drainage issues? (If yes, mention chainage, flood level and frequency)		✓	
4.	Are there any trees with a girth of 600 mm or more within the existing ROW (within two fences on either sides) or within 2 m corridor from the edge of the carriageway on either side (if the existing ROW is not clear)? (If yes attach list of trees indicating the location (Right or Left side)and the chainage)	✓		13 trees on LHS and 16 trees on RHS could be observed within ROW
5.	Along the road and within 100 m of the road shoulder, are there any Faunal habitat areas, Faunal breeding ground, bird migration area, or other similar areas? (If yes, specify details of habitat with chainage)		√	
6.	Along the road and within 100m of the road shoulder is there any evidence of Flora and Fauna species that are classified as endangered / threatened species?		√	
7.	Are there any utility structures[1] within 2 m on either side from the centre line of the road alignment or within the existing ROW of the road? (If yes, attach list with chainage)	✓		34 Electric poles on LHS and 08 on RHS are present on either side of the road and there are 18 Telecommunication lines on LHS and 12 lines on the RHS are located. No pipe lines are located along the road
8.	Are there any religious, cultural or community structures/buildings[2] within 20 m on either side from the centre line of the road alignment? (If yes attach list with chainage)		✓	There are no any religious, cultural or community structures/buildings available of the road alignment.

C. Public Consultation

No.	Consultation Activities	Yes	No	Remarks
1.	Consultation with local community was conducted before finalizing the alignment. (Attach list of people met and dates)	✓		Public was consulted during field reconnaissance carried out for preparation of the Environmental Checklist. *Please refer to the annex 1 for the list of public consulted and their views*
2.	Any suggestion received in finalizing the alignment and road related environmental issues	✓		Public specified the need of improvement of road side and cross drainage system

[1] Water tap, hand pump, electric pole, telephone pole, pipe lines and other similar structures
[2] Religious/cultural/historical monuments, school, health centre, public toilet and other similar structures

No.	Consultation Activities	Yes	No	Remarks
3.	If suggestions received, were they incorporated into the design?	✓		

D. Please attach the following:

I. List of utility structures located within the study area (within exiting ROW or within 2m corridor of either sides of the road from the edge of the carriageway if the ROW is not clear) indicating location and side of the road (Right Hand Side (RHS) or Left Hand Side (LHS) as required under B.7.

Chainage (Km)	Utility structure	LHS	RHS
0.000 – 0.200	Electric pole	05	03
0.200 - 0.400	Electric pole	06	00
0.400 – 0.600	Electric pole	09	04
0.600 – 0.800	Electric pole	05	00
0.800 – 1.000	Electric pole	07	00
1.000 - 1.200	Electric pole	02	01
1.200 -1.400	Electric pole	00	00
1.400 -1.600	Electric pole	00	00
1.600 - 1.800	Electric pole	00	00
1.800 -2.000	Electric pole	00	00
Total		**34**	**08**

Chainage (Km)	Utility structure	LHS	RHS
0.000 – 0.200	Telephone poles	01	04
0.200 - 0.400	Telephone poles	02	05
0.400 – 0.600	Telephone poles	00	00
0.600 – 0.800	Telephone poles	00	00
0.800 – 1.000	Telephone poles	00	00
1.000 - 1.200	Telephone poles	03	02
1.200 -1.400	Telephone poles	04	01
1.400 -1.600	Telephone poles	05	00
1.600 - 1.800	Telephone poles	03	00
Total		**18**	**12**

II. List of community structures indicating location and the side of the road (RHS or LHS) as required under B.8.

Chainage	Community structure	LHS	RHS
	None		

III. Project map is attached in annex 2

IV. Photographs of the project area showing at least02 m on either side from centre line of road alignment are attached in annex 3.

V. List of trees with 600mm girth or more located within study area (within existing ROW or within 2m from edge of the carriageway to the either sides of the road if ROW is not clear) as required in B.4

Chainage	LHS			RHS		
	Common name	Botanical name	No. of trees	Common name	Botanical name	No. of trees
0.100 - 0.200	Hik Araliya	*Lannea coromandelica* *Plumeria obusta*	1 5			
0.200 - 0.300						

Chainage	LHS			RHS		
	Common name	Botanical name	No. of trees	Common name	Botanical name	No. of trees
0.300 - 0.400				Bomee Kotta Pulun Madithiya Na	*Litsea glutinosa* *Ceiba pentandra* *Adenanthera pavonina* *Mesua ferrea*	1 1 1 1
0.400 - 0.500						
0.500 - 0.600	Amba	*Mangifera indica*	2			
0.600 - 0.700	Kotta Pulun	*Ceiba pentandra*	2			
0.700 - 0.800				Godapara Kottan	*Dillenia retusa* *Terminalia catappa*	1 1
0.800 - 0.900				Hora Keena Pol	*Dipterocarpus zeylanicus* *Calophyllum calaba* *Cocos nucifera*	1 1 1
0.900 - 1.000				Pol Thekka	*Cocos nucifera* *Tectona grandis*	1 1
1.000 - 1.100	Pol	*Cocos nucifera*	1	Dawata	*Carallia brachiata*	1
1.100 - 1.200						
1.200 -1.300						
1.300 -1.400						
1.400 -1.500				Hik Nuga	*Lannea coromandelica* *Ficus sp.*	1 1
1.500 -1.600	Kenda	*Macaranga peltata*	1			
1.600 - 1.700	Domba	*Calophyllum inophyllum*	1	Domba Kottan	*Calophyllum inophyllum* *Terminalia catappa*	1 1
1.700 - 1.800						
1.800 - 1.900						

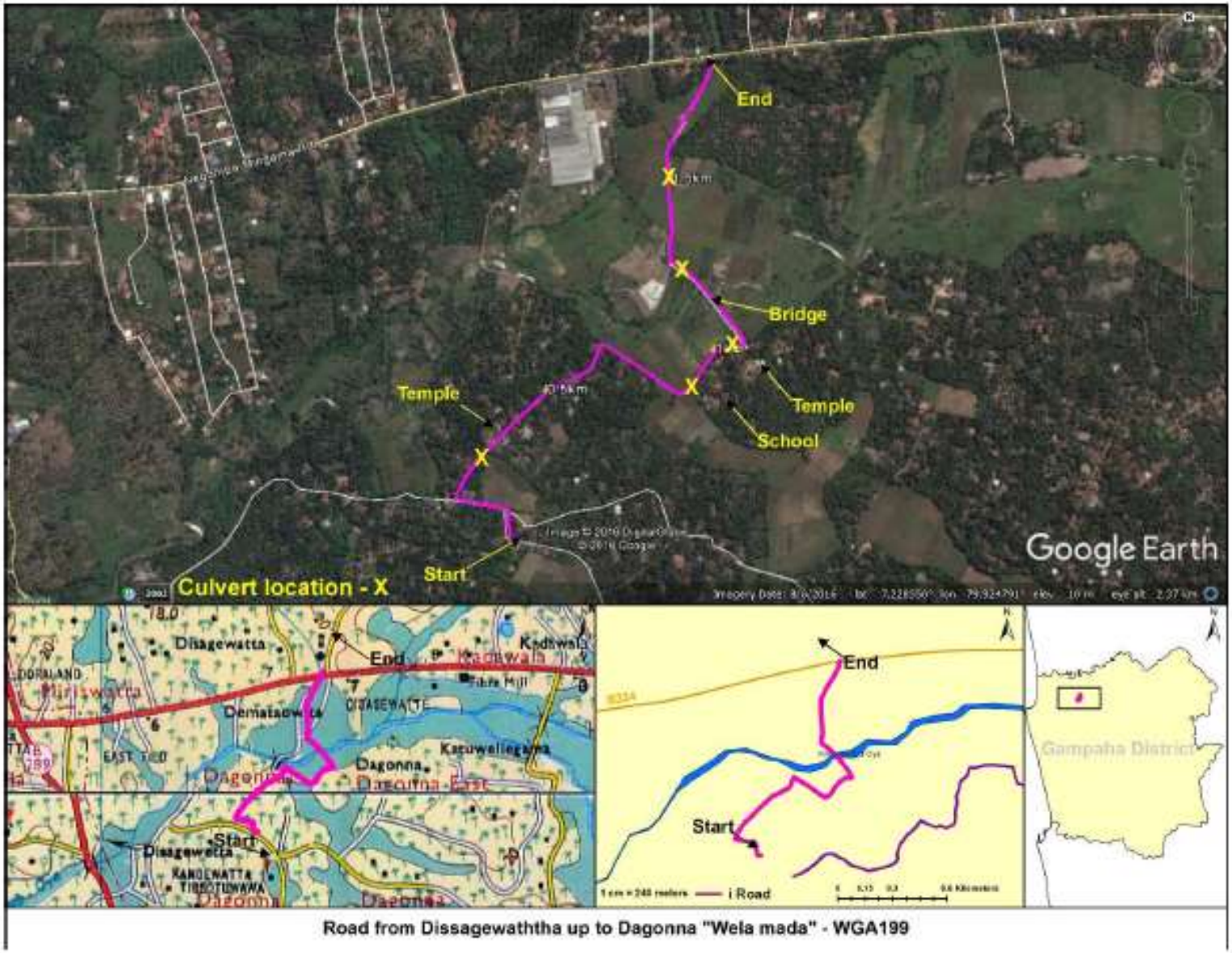
Annex -1

Public Consultation of 199 – Road from Dissagewatta upto Dagonna "Wela Meda"

Name of Respondent	Age	Sex	Address	Views
Mr. Sarath Wijesinghe	56	M	81/A, Dagonna, Divulapitiya	Road development is good. So many people use this road and side drains and culverts are necessary.
Mr. Shantha Bandara	38	M	59, Dagonna, Divulapitiya	Road users face difficulties. Drainage problems are there and culverts are necessary in suitable places.

Annex - 2

Location Map of the Road



Road from Dissagewaththa up to Dagonna "Wela mada" - WGA199

Annex – 3

Photographs of the 199 – Road from Dissagewatta upto Dagonna "Wela Meda"

Figure 1: Starting point of the Road from Dissagewatta upto Dagonna "Wela Meda"

Figure 2: Middle point of the road from Dissagewatta upto Dagonna "Wela Meda"

Figure 3: Upper point of the road from Dissagewatta upto Dagonna "Wela Meda"

Figure 4: Upper point of the road from Dissagewatta upto Dagonna "Wela Meda"

Figure 5: End point of the Road from Dissagewatta upto Dagonna "Wela Meda"

ENVIRONMENTAL CHECKLIST
INCLUSIVE ROAD OPERATION AND DEVELOPMENT INVESTMENT PROGRAMME (iROAD)

Road Name : Nedungahahena Embaraluwa
Road ID : WGA294
District Name : Gampaha
DSD & GNDs :

DSD	GNDs
Biyagama	Embaraluwa South 2 Embaraluwa North 2

Total length of the road: 1.6 Km

This road starts close to the Ambaraluva South Samurdhi bank. The entire road is macadamized and most of the section is in a dilapidated condition. There are small pot holes in the middle of the road. There is no drain system at both sides of the road and shoulders are also damaged. At around 1+000, the road is in a better condition, compared to other sections. There are no culverts and both sides of the road are covered with houses and cultivations. The width of the road is 4 m and the total length of the road is 1.594 km.

Climatic Conditions

Temperature-°C	High: 29.38°C Low:26.63 °C
Humidity	High: 87.12% Low: 75.37%
Rainfall Rainy Season	2000mm -2500mm /year From : May to : September

(Source: Meteorology Department of Sri Lanka, 2014-2015 Averege)

A. Location of the Road and Generic description of Environment

No:	Type of Ecosystem	Yes	No	Explanation
	Type of Terrain (Plain/ Undulating/ Hilly/ Mountainous etc.) (Explain the topography of the area and how many km of the road are located in the hilly area)	✓		From general plain to undulating terrain could be observed along the road trace. Altitude: Maximum elevation-52m at 1+150 km Minimum elevation -43m at 0+416 km
	Forest Area / Mangrove / Other natural habitats (Explain whether the road passes through forest areas or located along the forest areas and distance from shoulder to the forest area)?		✓	Type of Vegetation
	Inhabited Area	✓		Common home garden species
	Agricultural Land	✓		Small scale rubber plantations Small scale coconut plantations
	Barren Land		✓	

B. Specific description of the Road Environment

No.	Parameter/ Component	Yes	No	Explanation
1.	Are there any areas with landslide or erosion problems along the road? (If yes, indicate the location whether Right or Left side and the chainage)		✓	
2.	Are there any Tanks/streams /rivers etc. along/crossing the road or any lakes/swamps beside the road? (If yes, list them indicating the location Right/ Left or crossing and the chainage)		✓	
3.	Is the area along the project road prone to flooding or any problems of water stagnation and other drainage issues? (If yes, mention chainage, flood level and frequency)		✓	
4.	Are there any trees with a girth of 600 mm or more within the existing ROW (within two fences on either sides) or within 2 m corridor from the edge of the carriageway on either side (if the existing ROW is not clear)? (If yes attach list of trees indicating the location (Right or Left side)and the chainage)	✓		06 trees on LHS and 08 trees on RHS could be observed within ROW
5.	Along the road and within 100 m of the road shoulder, are there any Faunal habitat areas, Faunal breeding ground, bird migration area, or other similar areas? (If yes, specify details of habitat with chainage)		✓	
6.	Along the road and within 100m of the road shoulder is there any evidence of Flora and Fauna species that are classified as endangered / threatened species?		✓	
7.	Are there any utility structures[1] within 2 m on either side from the centre line of the road alignment or within the existing ROW of the road? (If yes, attach list with chainage)	✓		25 Electric Poles on LHS and 25 on RHS are present on either side of the road and there are 35 Telecommunication lines on LHS and 24 on RHS lines are located along the road. *Please refer to section D1*
8.	Are there any religious, cultural or community structures/buildings[2] within 20 m on either side from the centre line of the road alignment? (If yes attach list with chainage)		✓	There are no any religious, cultural or community structures/ buildings located in the road alignment. *Please refer to section D11* *However none of these structures will be affected due to the road improvement. However, it is recommended to implement mitigation measures as specified in the EMP to minimize impacts due to degradation of air quality and noise at these sensitive receptors.*

C. Public Consultation

No.	Consultation Activities	Yes	No	Remarks
1.	Consultation with local community was conducted before finalizing the alignment. (Attach list of people met and dates)	✓		Public was consulted during field reconnaissance carried out for preparation of the Environmental Checklist. *Please refer to the annex 1 for the list of public*

[1] Water tap, hand pump, electric pole, telephone pole, pipe lines and other similar structures
[2] Religious/cultural/historical monuments, school, health centre, public toilet and other similar structures

No.	Consultation Activities	Yes	No	Remarks
				consulted and their views
2.	Any suggestion received in finalizing the alignment and road related environmental issues	✓		Public specified the need of improvement of road side and cross drainage system
3.	If suggestions received, were they incorporated into the design?	✓		

D. Please attach the following:

I. List of utility structures located within the study area (within exiting ROW or within 2m corridor of either sides of the road from the edge of the carriageway if the ROW is not clear) indicating location and side of the road (Right Hand Side (RHS) or Left Hand Side (LHS) as required under B.7.

Chainage (Km)	Utility structure	LHS	RHS
0.000 – 0.200	Electric pole	02	07
0.200 - 0.400	Electric pole	00	05
0.400 – 0.600	Electric pole	02	04
0.600 – 0.800	Electric pole	01	08
0.800 – 1.000	Electric pole	04	01
1.000 - 1.200	Electric pole	04	00
1.200 -1.400	Electric pole	07	00
1.400 -1.600	Electric pole	05	00
Total		25	25

Chainage (Km)	Utility structure	LHS	RHS
0.000 – 0.200	Telephone poles	06	00
0.200 - 0.400	Telephone poles	08	01
0.400 – 0.600	Telephone poles	07	01
0.600 – 0.800	Telephone poles	07	01
0.800 – 1.000	Telephone poles	05	07
1.000 - 1.200	Telephone poles	01	03
1.200 -1.400	Telephone poles	01	06
1.400 -1.600	Telephone poles	00	05
Total		35	24

II. List of community structures indicating location and the side of the road (RHS or LHS) as required under B.8.

Chainage	Community structure	LHS	RHS
	None		

III. Project map is attached in annex 2

IV. Photographs of the project area showing at least02 m on either side from centre line of road alignment are attached in annex 3.

V. List of trees with 600mm girth or more located within study area (within existing ROW or within 2m from edge of the carriageway to the either sides of the road if ROW is not clear) as required in B.4.

Chainage	LHS			RHS		
	Common name	Botanical name	No. of trees	Common name	Botanical name	No. of trees
0.000 - 0.100	Attoniya Kenda	*Alstonia macrophylla* *Macaranga peltata*	2 1			
0.100 - 0.200	Attoniya	*Alstonia macrophylla*	2	Araliya	*Plumeria obusta*	1
0.200 - 0.300	Beli	*Aegle marmelos*	1			
0.900 - 1.000				Milla	*Vitex altissima*	1
1.300 -1.400				Kos Hora Wal Ehela	*Artocarpus heterophyllus* *Dipterocarpus zeylanicus* *Pterocarpus indicus*	3 2 1

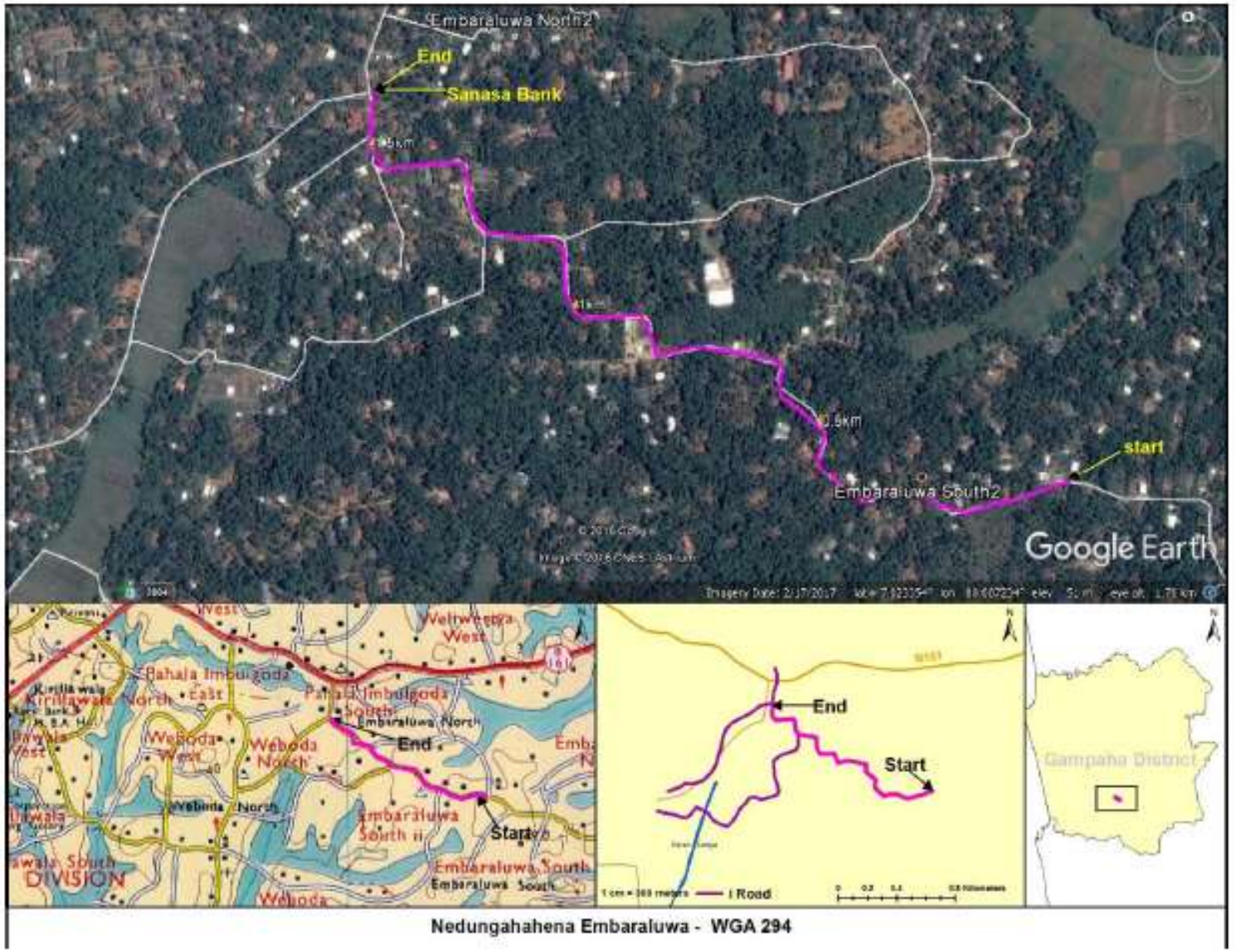
Annex -1

Public Consultation of 294 - Nedungahahena Embaraluwa

Name of Respondent	Age	Sex	Address	Views
Mr. W Wickramarachchi	57	M	325/3, Embaraluwa South, Veliweriya	The road is damaged very badly. Road uses face difficulties due to poor road surface condition. No side drains and lot of shoulder damages are there. When developing this road it need proper drainage system with culverts.
Mr. S Sumanaratne	34	M	75/4, Embaraluwa South, Veliweriya	Many people use this road, and relevant authorities does not properly maintain this road. Drainage problems are there and has to develop with culverts. Lot of school children use this road. Some extents of the road is in very bad condition. Need to develop with culverts.

Annex - 2

Location Map of the Road



Nedungahahena Embaraluwa - WGA 294

Annex – 3

Photographs of the 294 - Nedungahahena Embaraluwa

Figure 1: Starting Point at the Nedungahahena Embaraluwa

Figure 2: Consulting Public General

Figure 3: End Point of the Nedungahahena Embaraluwa

ENVIRONMENTAL CHECKLIST
INCLUSIVE ROAD OPERATION AND DEVELOPMENT INVESTMENT PROGRAMME (iROAD)

Road Name : 292 Village Winibula North Pinthaliya Road
Road ID : WGA301
District Name : Gampaha
DSD & GNDs :

DSD	GNDs
Mahara	Vilimbula North

Total length of the road: 1.359 Km

This road commences from Kirindiwela – Weliweriya main road. The initial section up to 0+900 is a macadamized road which is in a dilapidated condition. From 0+900 up to the end of the road, it is a gravelled section. At 0+300 and 0+600, there are culverts, irrigation canals and stretches of paddy fields. The width of the road is 2.80 m and the total length of the road is 1.359 km. The road ends at Puwakpitiya Junction

Climatic Conditions

Temperature-°C	High: 29.26°C Low:26.88 °C
Humidity	High: 87.12% Low: 75.37%
Rainfall Rainy Season	2500-3000mm /year From : May to : September

(Source: Meteorology Department of Sri Lanka, 2014 – 2016 Average)

A. Location of the Road and Generic description of Environment

No:	Type of Ecosystem	Yes	No	Explanation
1.	Type of Terrain (Plain/ Undulating/ Hilly/ Mountainous etc.) (Explain the topography of the area and how many km of the road are located in the hilly area)	✓		From general plain to undulating terrain could be observed along the road trace. Altitude: Maximum elevation-48m at 0+000 km Minimum elevation -27m at 0+778 km
2.	Forest Area / Mangrove / Other natural habitats (Explain whether the road passes through forest areas or located along the forest areas and distance from shoulder to the forest area)?		√	
3.	Inhabited Area	√		Common home garden species
4.	Agricultural Land	√		Small and large scale coconut plantations Thin strip of paddy field
5.	Barren Land		√	

B. Specific description of the Road Environment

No.	Parameter/ Component	Yes	No	Explanation
1.	Are there any areas with landslide or erosion problems along the road? (If yes, indicate the location whether Right or Left side and the chainage)		✓	
2.	Are there any Tanks/streams /rivers etc. along/crossing the road or any lakes/swamps beside the road? (If yes, list them indicating the location Right/ Left or crossing and the chainage)	✓		There is a canal at the left side of the road at the chainage 0+600 m.
3.	Is the area along the project road prone to flooding or any problems of water stagnation and other drainage issues? (If yes, mention chainage, flood level and frequency)		✓	
4.	Are there any trees with a girth of 600 mm or more within the existing ROW (within two fences on either sides) or within 2 m corridor from the edge of the carriageway on either side (if the existing ROW is not clear)? (If yes attach list of trees indicating the location (Right or Left side)and the chainage)	✓		Nine Trees on RHS could be observed within ROW.
5.	Along the road and within 100 m of the road shoulder, are there any Faunal habitat areas, Faunal breeding ground, bird migration area, or other similar areas? (If yes, specify details of habitat with chainage)		✓	
6.	Along the road and within 100m of the road shoulder is there any evidence of Flora and Fauna species that are classified as endangered / threatened species?		✓	
7.	Are there any utility structures[1] within 2 m on either side from the centre line of the road alignment or within the existing ROW of the road? (If yes, attach list with chainage)	✓		24 Electric Poles on LHS and 09 on RHS are present on either side of the road and there are 18 Telecommunication lines on LHS and 26 lines on RHS are located along the road. *Please refer to section D1*
8.	Are there any religious, cultural or community structures/buildings[2] within 20 m on either side from the centre line of the road alignment? (If yes attach list with chainage)		✓	There are no any religious, cultural or community structures/buildings located on road alignment. *Please refer to section D11*

C. Public Consultation

No.	Consultation Activities	Yes	No	Remarks
1.	Consultation with local community was conducted before finalizing the alignment. (Attach list of people met and dates)	✓		Public was consulted during field reconnaissance carried out for preparation of the Environmental Checklist. *Please refer to the annex 1 for the list of public consulted and their views*
2.	Any suggestion received in finalizing the alignment and road related environmental issues	✓		Public specified the need of improvement of road side and cross drainage system
3.	If suggestions received, were they incorporated into the design?	✓		

[1] Water tap, hand pump, electric pole, telephone pole, pipe lines and other similar structures
[2] Religious/cultural/historical monuments, school, health centre, public toilet and other similar structures

D. Please attach the following:

I. List of utility structures located within the study area (within exiting ROW or within 2m corridor of either sides of the road from the edge of the carriageway if the ROW is not clear) indicating location and side of the road (Right Hand Side (RHS) or Left Hand Side (LHS) as required under B.7.

0

Chainage (Km)	Utility structure	LHS	RHS
0.000 – 0.200	Electric pole	07	00
0.200 - 0.400	Electric pole	05	00
0.400 – 0.600	Electric pole	05	00
0.600 – 0.800	Electric pole	05	00
0.800 – 1.000	Electric pole	02	01
1.000 - 1.200	Electric pole	00	06
1.200 -1.400	Electric pole	00	02
Total		24	09

Chainage (Km)	Utility structure	LHS	RHS
0.000 – 0.200	Telephone poles	03	06
0.200 - 0.400	Telephone poles	02	06
0.400 – 0.600	Telephone poles	04	07
0.600 – 0.800	Telephone poles	02	03
0.800 – 1.000	Telephone poles	03	04
1.000 - 1.200	Telephone poles	03	00
1.200 -1.400	Telephone poles	01	00
Total		18	26

II. List of community structures indicating location and the side of the road (RHS or LHS) as required under B.8.

Chainage	Community structure	LHS	RHS
	None		

III. Project map is attached in annex 2

IV. Photographs of the project area showing at least02 m on either side from centre line of road alignment are attached in annex 3.

V. List of trees with 600mm girth or more located within study area (within existing ROW or within 2m from edge of the carriageway to the either sides of the road if ROW is not clear) as required in B.4.

Chainage	LHS			RHS		
	Common name	Botanical name	No. of trees	Common name	Botanical name	No. of trees
0.000 - 0.100						
0.100 - 0.200				Kenda	*Macaranga peltata*	1
0.200 - 0.300				Pol	*Cocos nucifera*	1
0.600 - 0.700				Amba	*Mangifera indica*	1
0.700 - 0.800				Pol	*Cocos nucifera*	1
0.800 - 0.900				Kaha Mara	*Peltophorum pterocarpum*	1
0.900 – 1.000				Attoniya	*Alstonia macrophylla*	1
1.000 - 1.100				Katu Pol Kos Halmilla	*Elaeis guineensis* *Artocarpus heterophyllus* *Berrya coridifolia*	1 1 1

Annex -1

Public Consultation of 301 - 292 Village-Pinthaliya Road

Name of Respondent	Age	Sex	Address	Views
Mr. S P Senaratne	39	M	142/3, Rubberwatta, Pinthaliya Road.	This road access to Puwakpitiya Junction, at the moment it is in very poor condition. School children and other road users face difficulties. Proper drainage system and culverts are needed. Awaiting for immediate process.
Ms. Geetha Adikari	42	F	259/1, Puwakpitiya, Henegama.	Since lot of people use this road development is good. Lot of drainage problems are there need improvement with culverts

Annex - 2

Location Map of the Road

Annex – 3

Photographs of the 301 - 292 Village-Pinthaliya Road.

Figure 1: Starting point of 292 Village-Pinthaliya Road.

Figure 2: Middle of the 292 Village-Pinthaliya Road.

Figure 3: End Point of 292 Village-Pinthaliya Road.

ENVIRONMENTAL CHECKLIST
INCLUSIVE ROAD OPERATION AND DEVELOPMENT INVESTMENT PROGRAMME (iROAD)

Road Name : Nagoda,Gama Meda Road.
Road ID : WGA333
District Name : Gampaha
DSD & GNDs :

DSD	GNDs
Attanagalla	Urapola Nagoda Kurawalana

Total length of the road: 3.430 Km

The access to this road is from Urapola – Aththanagalla Road. About first 200 meter section is concreted. Coconut cultivation could be observed at roadsides. Coconut cultivation of Kurunegala Plantation Company locates at roadsides. The road from 0+200 – 0+600 meters are macadamized, but in a dilapidated condition. The stretch from 0+600 to 1+300 meters is again concreted. A temple could be observed at the left side of the road. 1+300 +15 meter section is interlock paved. Again, from that point up to 1+500 meters is concreted. Marsh lands could be observed at around 1.600 meter location. At the point 1+600 meters, the concreted road ends and gravelled road commences. There are coconut and rubber cultivations at roadsides. The road ends at Kahatawita Junction and the total length of the road is 3+430 meters.The width of the road is 3.90 metersand vary depending on the layout of the road.

Climatic Conditions

Temperature-°C	High: 29.26°C Low:26.88 °C
Humidity	High: 87.12% Low: 75.37%
Rainfall Rainy Season	2500mm -3000mm /year From : May to : September

(Source: Meteorology Department of Sri Lanka, 2014 – 2016 Average)

A. Location of the Road and Generic description of Environment

No:	Type of Ecosystem	Yes	No	Explanation
1.	Type of Terrain (Plain/ Undulating/ Hilly/ Mountainous etc.) (Explain the topography of the area and how many km of the road are located in the hilly area)	✓		Altitude: Maximum elevation-47m at 2.57km Minimum elevation -29m at 0km From general plain to undulating terrain could be observed along the road trace.
2.	Forest Area / Mangrove / Other natural habitats (Explain whether the road passes through forest areas or located along the forest areas and distance from shoulder to the forest area)?		✓	Type of Vegetation
3.	Inhabited Area	✓		Common home garden vegetation
4.	Agricultural Land	✓		Small and large coconut plantations Rubber plantations
5.	Barren Land		✓	

B. Specific description of the Road Environment

No.	Parameter/ Component	Yes	No	Explanation
1.	Are there any areas with landslide or erosion problems along the road? (If yes, indicate the location whether Right or Left side and the chainage)		✓	
2.	Are there any Tanks/streams /rivers etc. along/crossing the road or any lakes/swamps beside the road? (If yes, list them indicating the location Right/ Left or crossing and the chainage)		✓	
3.	Is the area along the project road prone to flooding or any problems of water stagnation and other drainage issues? (If yes, mention chainage, flood level and frequency)		✓	
4.	Are there any trees with a girth of 600 mm or more within the existing ROW (within two fences on either sides) or within 2 m corridor from the edge of the carriageway on either side (if the existing ROW is not clear)? (If yes attach list of trees indicating the location (Right or Left side)and the chainage)	✓		Seven trees on LHS and Five trees on RHS could be observed within ROW
5.	Along the road and within 100 m of the road shoulder, are there any Faunal habitat areas, Faunal breeding ground, bird migration area, or other similar areas? (If yes, specify details of habitat with chainage)		✓	
6.	Along the road and within 100m of the road shoulder is there any evidence of Flora and Fauna species that are classified as endangered / threatened species?	✓		Ailanthus triphysa – WalBiling is a tree species that categorized as Critically Endangered species under "The National Red List 2012 of Sri Lanka"
7.	Are there any utility structures[1] within 2 m on either side from the centre line of the road alignment or within the existing ROW of the road? (If yes, attach list with chainage)		✓	62 Electric Poles on LHS and 40 on RHS are present on either side of the road and there are 17 Telecommunication lines on LHS and 36 on RHS lines are located along the road. No pipe lines are located along the road. There is a transformer at 1+400 on LHS. *Please refer to section D1*
8.	Are there any religious, cultural or community structures/buildings[2] within 20 m on either side from the centre line of the road alignment? (If yes attach list with chainage)	✓		There is a Dewalaya and a temple at 1+300 on LHS. *Please refer to section D11* *However none of these structures will be affected due to the road improvement. However, it is recommended to implement mitigation measures as specified in the EMP to minimize impacts due to degradation of air quality and noise at these sensitive receptors.*

[1] Water tap, hand pump, electric pole, telephone pole, pipe lines and other similar structures
[2] Religious/cultural/historical monuments, school, health centre, public toilet and other similar structures

C. Public Consultation

No.	Consultation Activities	Yes	No	Remarks
1.	Consultation with local community was conducted before finalizing the alignment. (Attach list of people met and dates)	✓		Public was consulted during field reconnaissance carried out for preparation of the Environmental Checklist. *Please refer to the annex 1 for the list of public consulted and their views*
2.	Any suggestion received in finalizing the alignment and road related environmental issues	✓		Public specified the need of improvement of road side and cross drainage system
3.	If suggestions received, were they incorporated into the design?	✓		

D. Please attach the following:

I. List of utility structures located within the study area (within exiting ROW or within 2m corridor of either sides of the road from the edge of the carriageway if the ROW is not clear) indicating location and side of the road (Right Hand Side (RHS) or Left Hand Side (LHS) as required under B.7.

Chainage (Km)	Utility structure	LHS	RHS
0.000 – 0.200	Electric pole	06	05
0.200 - 0.400	Electric pole	07	00
0.400 – 0.600	Electric pole	06	00
0.600 – 0.800	Electric pole	04	00
0.800 – 1.000	Electric pole	02	02
1.000 - 1.200	Electric pole	02	03
1.200 -1.400	Electric pole	04	00
1.400 -1.600	Electric pole	01	05
1.600 - 1.800	Electric pole	06	01
1.800 -2.000	Electric pole	06	00
2.000 – 2.200	Electric pole	05	01
2.200 – 2.400	Electric pole	06	03
2.400 - 2.600	Electric pole	00	05
2.600 -2.800	Electric pole	00	04
2.800-3.000	Electric pole	02	03
3.000-3.200	Electric pole	04	05
3.200-3.400	Electric pole	01	03
Total		62	40

Chainage (Km)	Utility structure	LHS	RHS
0.000 – 0.200	Telephone poles	08	02
0.200 - 0.400	Telephone poles	00	07
0.400 – 0.600	Telephone poles	00	04
0.600 – 0.800	Telephone poles	00	05
0.800 – 1.000	Telephone poles	04	02
1.000 - 1.200	Telephone poles	03	06
1.200 -1.400	Telephone poles	01	05
1.400 -1.600	Telephone poles	01	03
1.600 - 1.800	Telephone poles	00	02
Total		17	36

II. List of community structures indicating location and the side of the road (RHS or LHS) as required under B.8.

Chainage	Community structure	LHS	RHS
1300m-1400m	Dewalaya and Temple,	✓	-

III. Project map is attached in annex 2
IV. Photographs of the project area showing at least02 m on either side from centre line of road alignment are attached in annex 3.
V. List of trees with 600mm girth or more located within study area (within existing ROW or within 2m from edge of the carriageway to the either sides of the road if ROW is not clear) as required in B.4.

Chainage	LHS			RHS		
	Common name	Botanical name	No. of trees	Common name	Botanical name	No. of trees
0.000 – 0.200						
0.200 - 0.400						
0.400 – 0.600						
0.600 – 0.800						
0.800 – 1.000				Pol WalEhela Wal Bling	*Cocosnucifera* *Pterocarpusindicus* *Ailanthus triphysa*	1 2 1
1.000 - 1.200						
1.200 -1.400						
1.400 -1.600						
1.600 - 1.800						
1.800 -2.000						
2.000 – 2.200						
2.200 – 2.400						
2.400 - 2.600	Pol	*Cocosnucifera*	1			
2.600 -2.800	Bu Del	*Artocarpushirsuta*	1			
2.800-3.000	Rubber	*Heveabrasiliensis*	1			
3.000-3.200	Rubber	*Heveabrasiliensis*	2			
3.200-3.400	Rubber	*Heveabrasiliensis*	2			
3.400 - 3.600				Rubber	*Heveabrasiliensis*	1

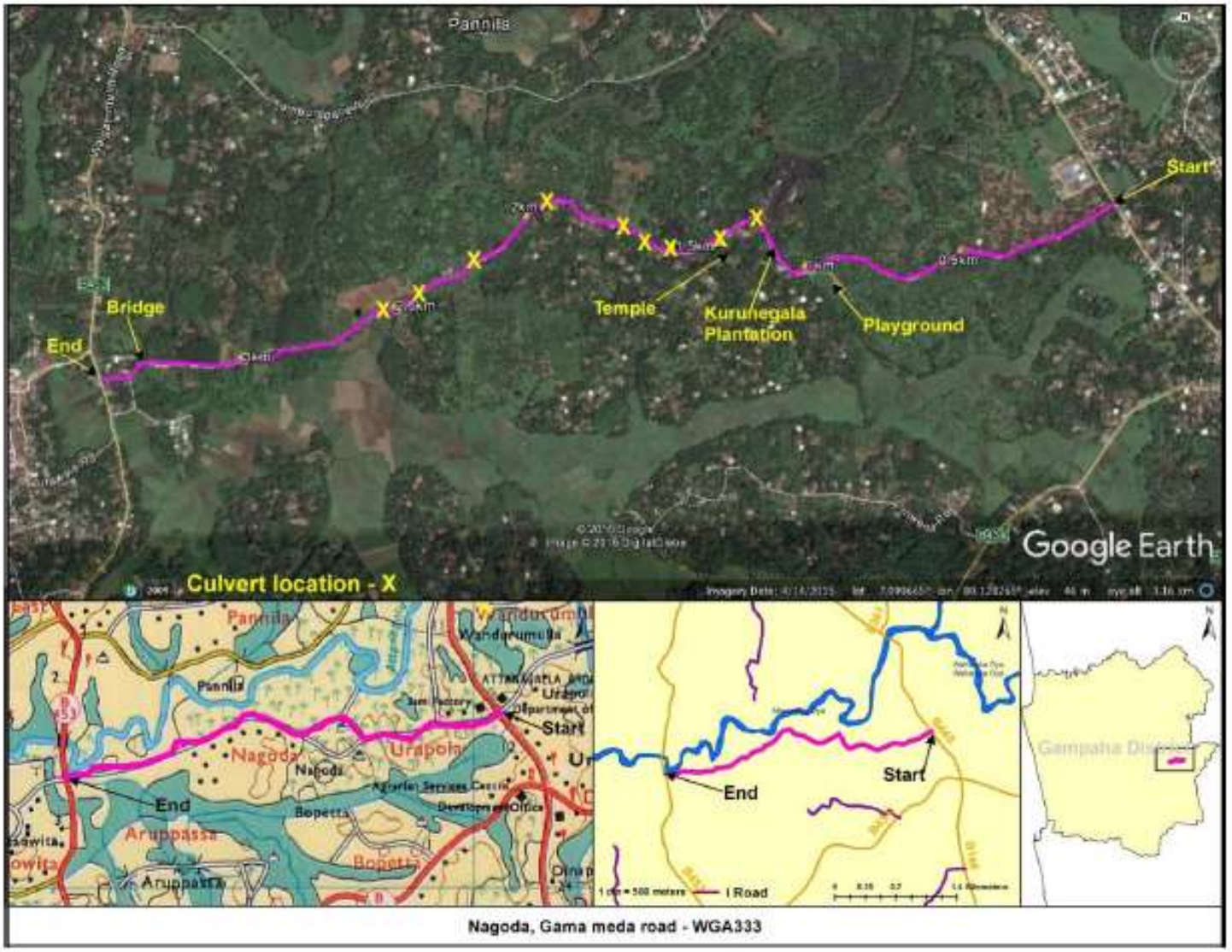
Annex -1

Public Consultation of 333 -Nagoda,Gama Meda Road

Name of Respondent	Age	Sex	Address	Views
Mr. R S Yatawara	33	M	77/5/A, Walgamulla Road, Kahatowita	Since lot of people use this road development is good. Lot of drainage problems are there need improvement with culverts
M N M Rishan	25	M	125/3, Walgamulla Road, Kahatowita	This road needs improvement since many people use this road it has to develop. Rain water get collected because of the drainage system is not in a suitable manner. Need culverts

Annex - 2

Location Map of the Road Nagoda



Nagoda, Gama meda road - WGA333

Annex – 3

Photographs of the 333 -Nagoda, Gamameda Road

Figure 1: Starting point of the Nagoda, Gamameda Road

Figure 2: Middle point of the Nagoda, Gamameda Road

Figure 3: There is a Bridge at upper middle point of the Nagoda, Gamameda Road

Figure 4: End point of the Nagoda, Gamameda Road

ENVIRONMENTAL CHECKLIST
INCLUSIVE ROAD OPERATION AND DEVELOPMENT INVESTMENT PROGRAMME (iROAD)

Road Name : Madawala Main Road
Road ID : WGA 378
District Name :Gampaha
DSD & GNDs :

DSD	GNDs
Katana	Kalahugoda

Total length of the road: *0.983*

The access to the road is from Averiwaththa - Ganemulla main road and starts from Kragahamulla Junction. The concreted section extends from the beginning to 0+300. The road from 0+300 up to the end of the road is macadamized. An industry producing chemical materials is located on the left side of the road at 0+100. There are houses and home gardens at both sides of the road. A community hall and a Buddha statue is on the right side of the road at 0+800. The width of the road is 2.50 m and the total length of the road is 0.983 km. This road ends at the Madhuwala Junction of the Nittambuwa – Katunayaka main road.

Climatic Conditions

Temperature-^{0}C	High: 29.38°C Low:26.63 °C
Humidity	High: 87.12% Low: 75.37%
Rainfall Rainy Season	2000mm -2500mm /year From : May to : September

(Source: Department of Meteorology Sri Lanka)

A. Location of the Road and Generic description of Environment

No:	Type of Ecosystem	Yes	No	Explanation
1.	Type of Terrain (Plain/ Undulating/ Hilly/ Mountainous etc.) (Explain the topography of the area and how many km of the road are located in the hilly area)	✓		From general plain to undulating terrain could be observed along the road trace. Altitude: Maximum elevation-65m at0+000 km Minimum elevation -12m at 0+000 km
2.	Forest Area / Mangrove / Other natural habitats (Explain whether the road passes through forest areas or located along the forest areas and distance from shoulder to the forest area)?		✓	
3.	Inhabited Area	✓		Common home garden species
4.	Agricultural Land		✓	
5.	Barren Land		✓	

B. Specific description of the Road Environment

No.	Parameter/ Component	Yes	No	Explanation
1.	Are there any areas with landslide or erosion problems along the road? (If yes, indicate the location whether Right or Left side and the chainage)		✓	
2.	Are there any Tanks/streams /rivers etc. along/crossing the road or any lakes/swamps beside the road? (If yes, list them indicating the location Right/ Left or crossing and the chainage)		✓	
3.	Is the area along the project road prone to flooding or any problems of water stagnation and other drainage issues? (If yes, mention chainage, flood level and frequency)		✓	
4.	Are there any trees with a girth of 600 mm or more within the existing ROW (within two fences on either sides) or within 2 m corridor from the edge of the carriageway on either side (if the existing ROW is not clear)? (If yes attach list of trees indicating the location (Right or Left side)and the chainage)	✓		01 tree on LHS and 03 trees on RHS could be observed within ROW.
5.	Along the road and within 100 m of the road shoulder, are there any Faunal habitat areas, Faunal breeding ground, bird migration area, or other similar areas? (If yes, specify details of habitat with chainage)		✓	
6.	Along the road and within 100m of the road shoulder is there any evidence of Flora and Fauna species that are classified as endangered / threatened species?	✓		*Aphanamixis polystachya* - Hingul is a tree species that categorized as Vulnerable under "The National Red List of Sri Lanka 2012"
7.	Are there any utility structures[1] within 2 m on either side from the centre line of the road alignment or within the existing ROW of the road? (If yes, attach list with chainage)	✓		10 Electric Poles on LHS and 25 on RHS are present on either side of the road and there are 20 Telecommunication lines on LHS and 16 on RHS lines are located along the road. There is a communication tower on LHS at 0+100. *Please refer to section D1*
8.	Are there any religious, cultural or community structures/buildings[2] within 20 m on either side from the centre line of the road alignment? (If yes attach list with chainage)	✓		There are no any religious, cultural or community structures/buildings located in the road alignment. *Please refer to section D11*

[1] Water tap, hand pump, electric pole, telephone pole, pipe lines and other similar structures
[2] Religious/cultural/historical monuments, school, health centre, public toilet and other similar structures

C. Public Consultation

No.	Consultation Activities	Yes	No	Remarks
1.	Consultation with local community was conducted before finalizing the alignment. (Attach list of people met and dates)	✓		Public was consulted during field reconnaissance carried out for preparation of the Environmental Checklist. *Please refer to the annex 1 for the list of public consulted and their views*
2.	Any suggestion received in finalizing the alignment and road related environmental issues	✓		Public specified the need of improvement of road side and cross drainage system
3.	If suggestions received, were they incorporated into the design?	✓		

D. Please attach the following:

I. List of utility structures located within the study area (within exiting ROW or within 2m corridor of either sides of the road from the edge of the carriageway if the ROW is not clear) indicating location and side of the road (Right Hand Side (RHS) or Left Hand Side (LHS) as required under B.7.

Chainage (Km)	Utility structure	LHS	RHS
0.000 – 0.200	Electric pole	00	09
0.200 - 0.400	Electric pole	02	03
0.400 – 0.600	Electric pole	04	07
0.600 – 0.800	Electric pole	04	04
0.800 – 1.000	Electric pole	00	02
Total		10	25

Chainage (Km)	Utility structure	LHS	RHS
0.000 – 0.200	Telephone poles	07	01
0.200 - 0.400	Telephone poles	02	04
0.400 – 0.600	Telephone poles	04	06
0.600 – 0.800	Telephone poles	06	04
0.800 – 1.000	Telephone poles	01	01
Total		20	16

II. List of community structures indicating location and the side of the road (RHS or LHS) as required under B.8.

Chainage	Community structure	LHS	RHS
	None		

III. Project map is attached in annex 2

IV. Photographs of the project area showing at least02 m on either side from centre line of road alignment are attached in annex 3.

V. List of trees with 600mm girth or more located within study area (within existing ROW or within 2m from edge of the carriageway to the either sides of the road if ROW is not clear) as required in B.4.

Chainage	LHS			RHS		
	Common name	Botanical name	No. of trees	Common name	Botanical name	No. of trees
0.000 - 0.100	Gedumba	*Trema orientalis*	1	Hingul Dawata	*Aphanamixis polystachya* *Carallia brachiata*	1 2

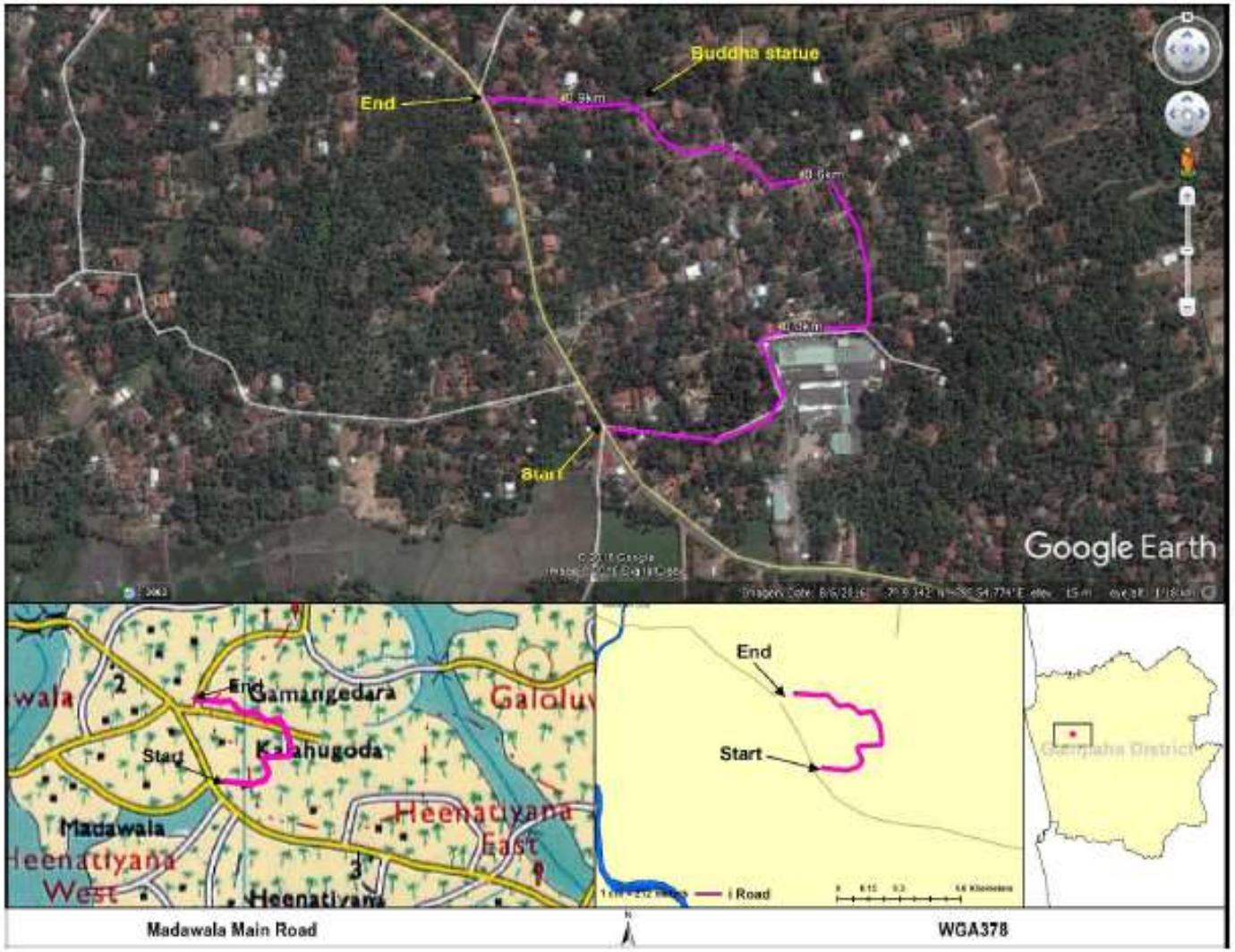
Annex -1

Public Consultation of Madawala Main Road

Name of Respondent	Age	Sex	Address	Views
Mr. Sunil Fernando	54	M	"Sunil Sewana", East Mandawala, Minuwangoda	When developing this road sharp bend need to be aligned as much as possible. It is necessary to provide adequate side drains and culverts in necessary points.
Mr. Chaminda Arandara	43	M	No 45, East Mandawala, Minuwangoda	Road development is good. Need culverts and solutions for count of water. School children and other pedestrians face difficulties. Road development is good. This road access to Nittambuwa - Katunayakemain road, so many people uses this road and side drains and culverts are necessary.

Annex - 2

Location Map of the Road



Annex – 3

Photographs of the Madawala Main Road

Figure 1: Starting point of the Madawala Main Road

Figure 2: Middle of the Madawala Main Road

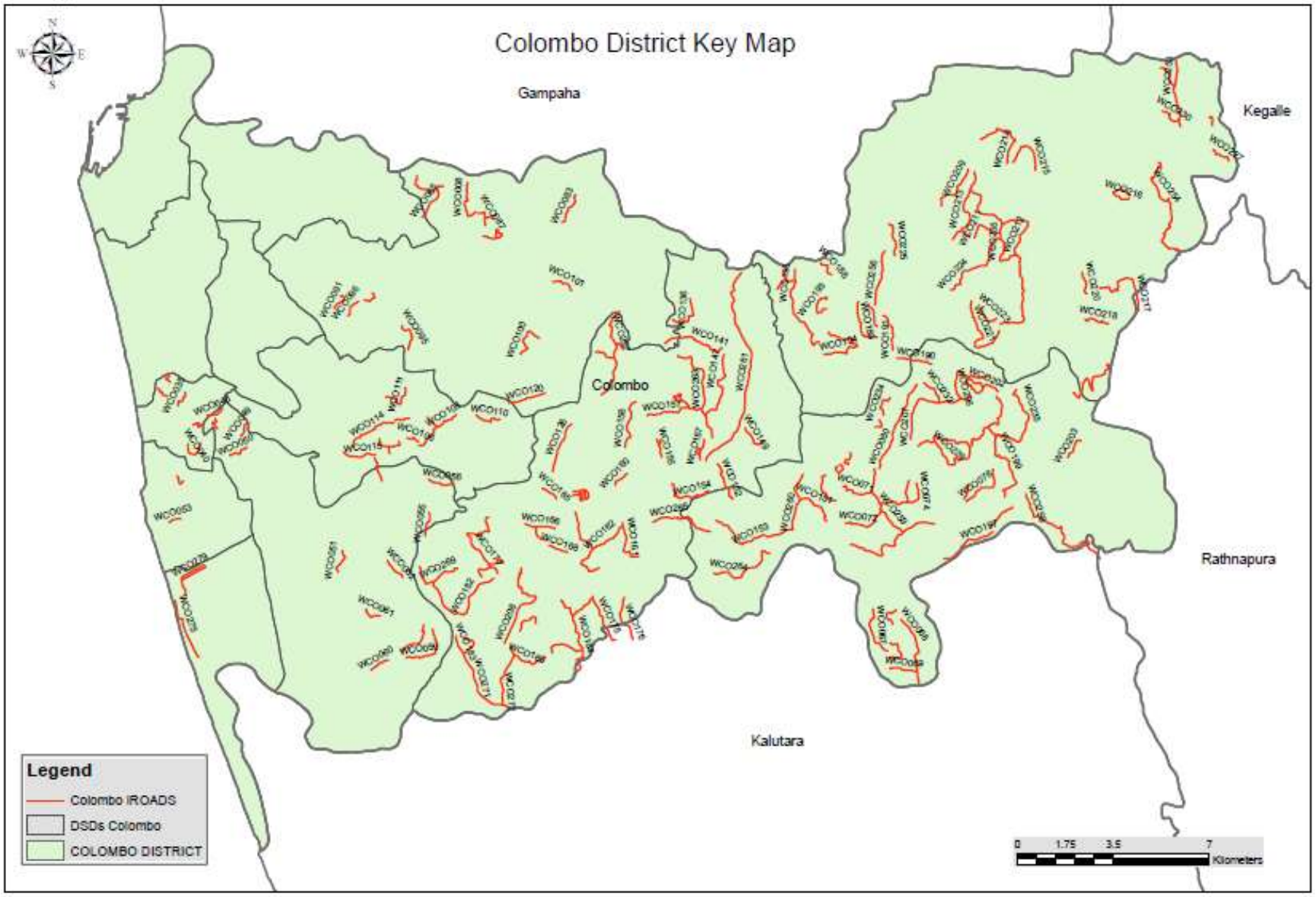
Figure 3: Communication Tower at the middle of Madawala Main Road

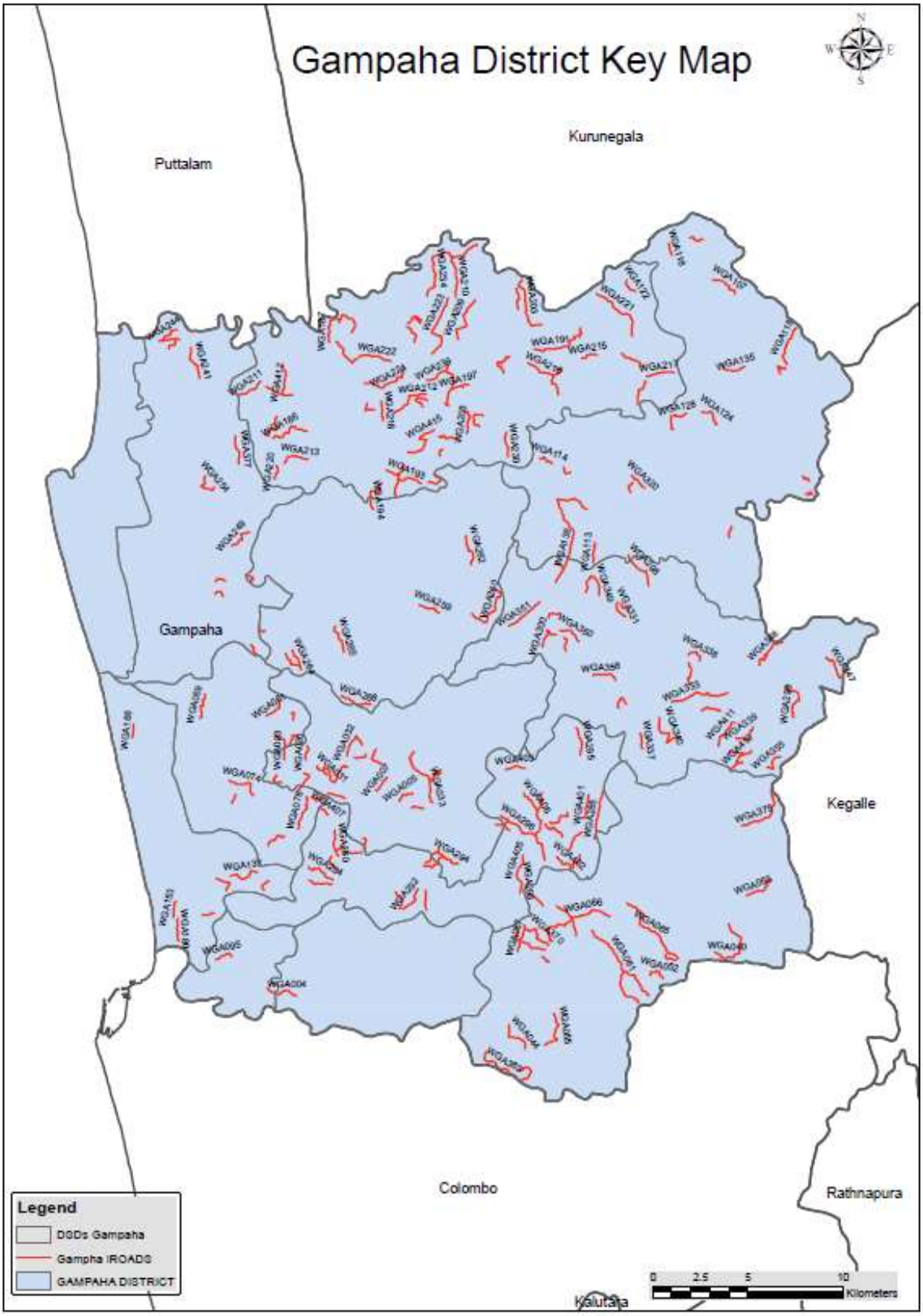
Figure 4: Upper point of the Madawala Main RoaD

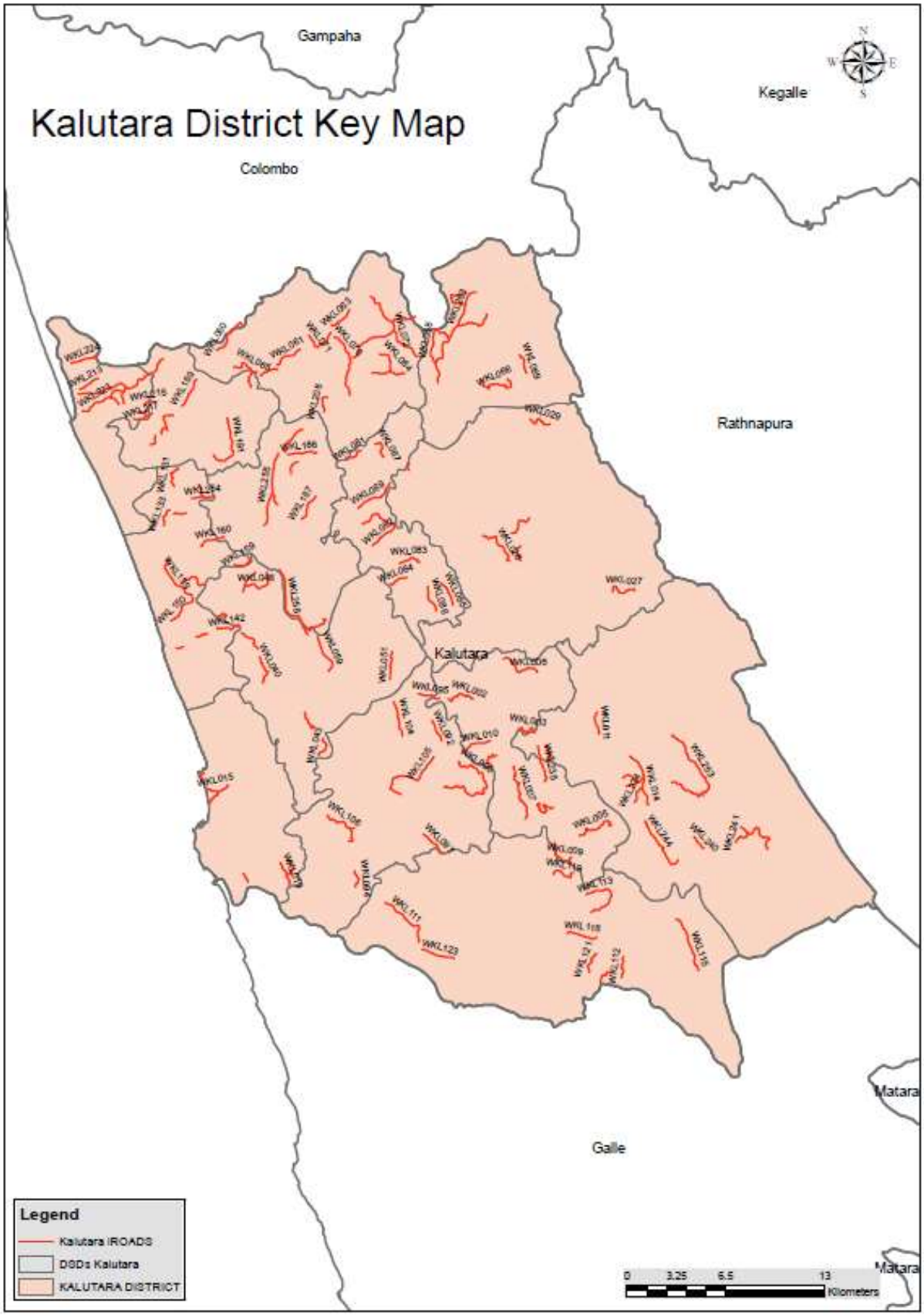
Figure 5: Upper point of the Madawala Main Road

Figure 6: End point of the Madawala Main Road.

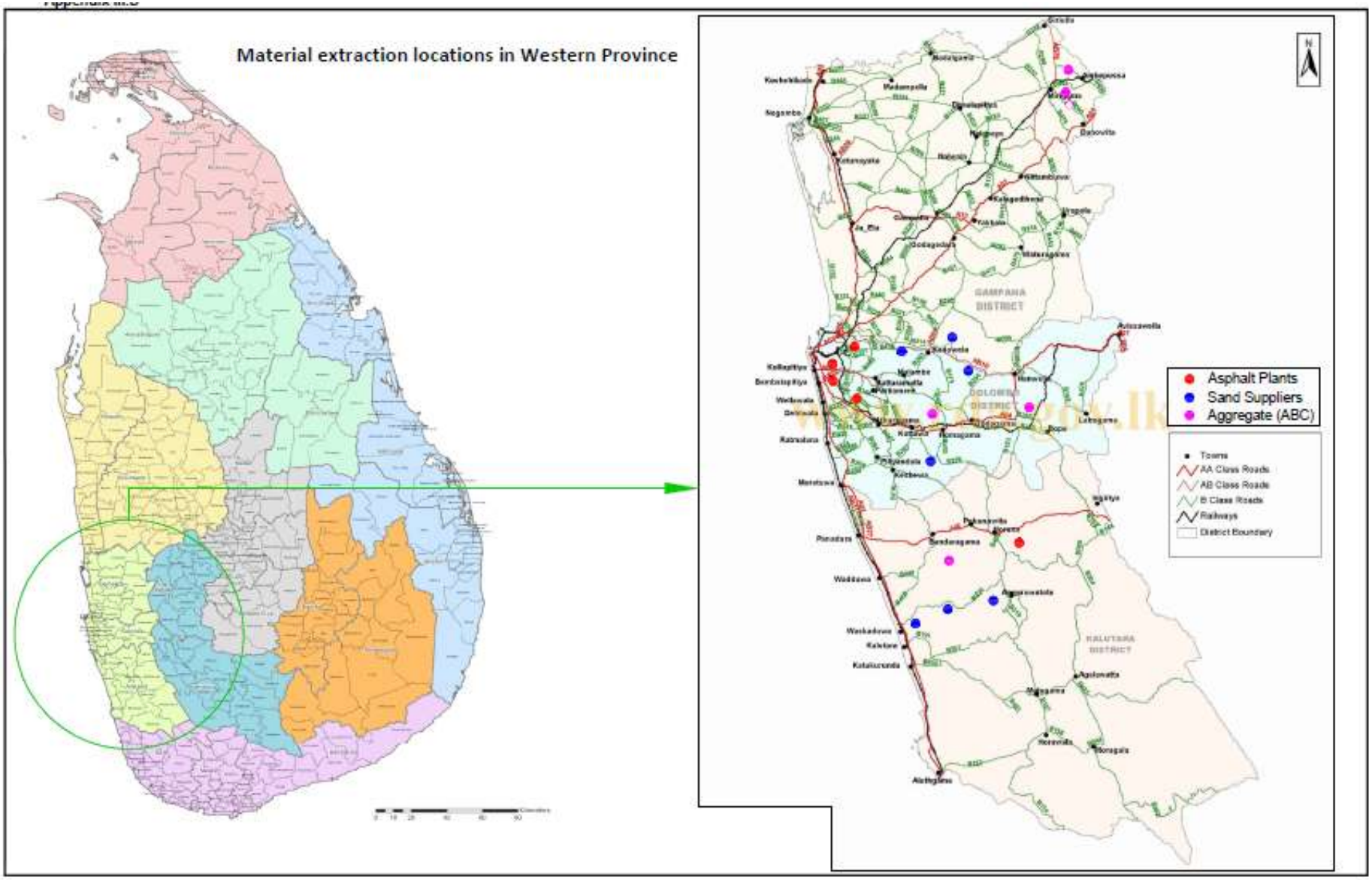
APPENDIX III.A GENERAL LOCATION MAPS



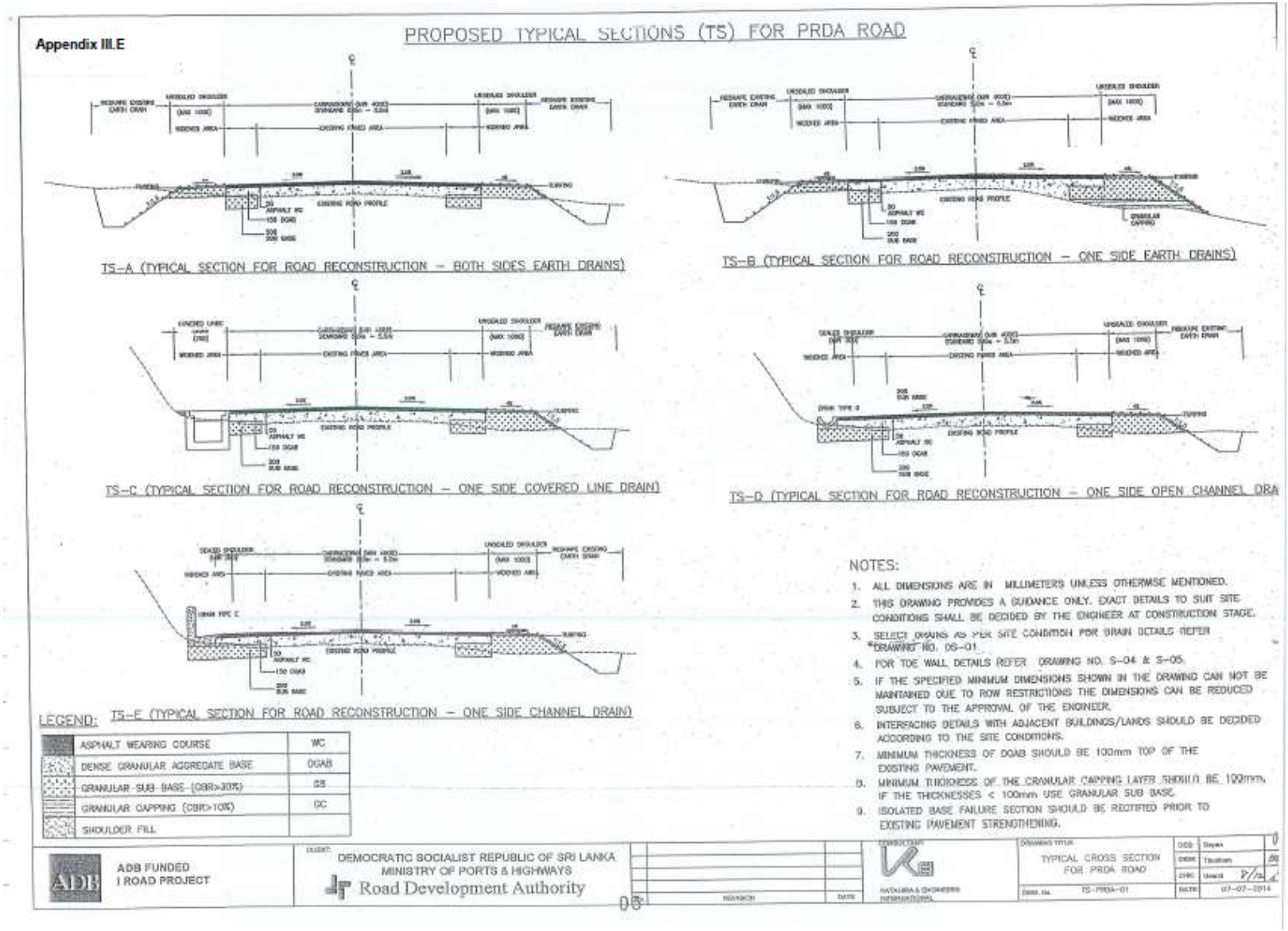

Gampaha District Key Map
N
W
E
S
Puttalam
Kurunegala
Gampaha
Kegalle
Colombo
Rathnapura
Kalutara
Legend
DSDs Gampaha
Gampha IROADS
GAMPAHA DISTRICT
0 2.5 5 10
Kilometers


Kalutara District Key Map
Gampaha
Kegalle
Colombo
Rathnapura
Kalutara
Matara
Galle
Legend
Kalutara IROADS
DSDs Kalutara
KALUTARA DISTRICT
0 3.25 6.5 13
Kilometers

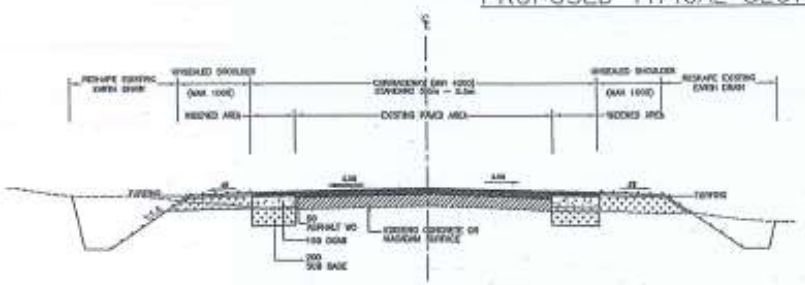
APPENDIX III.D MAP OF MATERIAL EXTRACTION LOCATIONS IN WESTERN PROVINCE



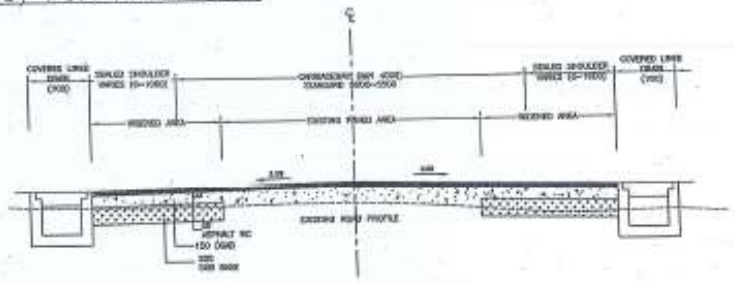
APPENDIX III.E PROPOSED CROSS SECTIONS



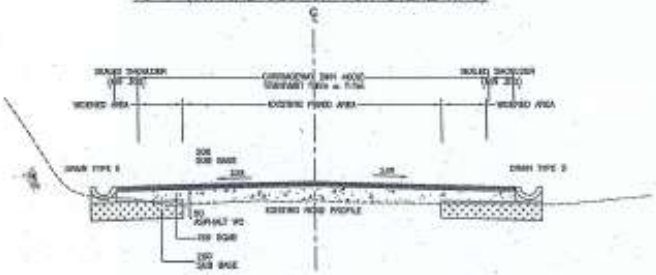
PROPOSED TYPICAL SECTIONS (TS) FOR PRDA ROAD



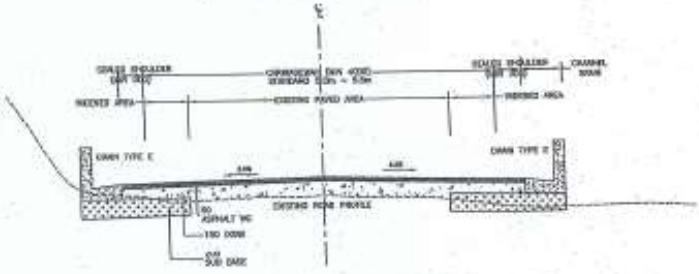
TS-F (TYPICAL SECTION FOR OVERLAYING)



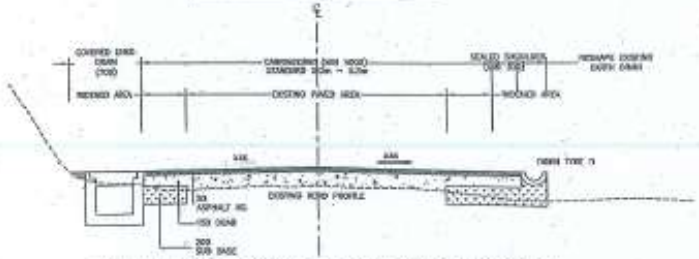
TS-G (TYPICAL SECTION FOR ROAD RECONSTRUCTION)
(BOTH SIDE LINED DRAIN)



TS-H (TYPICAL SECTION FOR ROAD RECONSTRUCTION)
(BOTH SIDE TYPE "D" DRAIN)



TS-I (TYPICAL SECTION FOR ROAD RECONSTRUCTION)
(BOTH SIDE TYPE "E" DRAIN)



TS-J (TYPICAL SECTION FOR ROAD RECONSTRUCTION)
(ONE SIDE LINED DRAIN AND OTHER SIDE TYPE "D")

LEGEND:

ASPHALT WEARING COURSE	WC
DENSE GRANULAR AGGREGATE BASE	DGAB
GRANULAR SUB BASE (CBR>30%)	GS
GRANULAR CAPPING (CBR>10%)	GC
SHOULDER FILL	

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE MENTIONED.
2. THIS DRAWING PROVIDES A GUIDANCE ONLY. EXACT DETAILS TO SUIT SITE CONDITIONS SHALL BE DECIDED BY THE ENGINEER AT CONSTRUCTION STAGE.
3. SELECT DRAINS AS PER SITE CONDITION FOR DRAIN DETAILS REFER DRAWING NO. DS-01
4. FOR TOE WALL DETAILS REFER DRAWING NO. S-04 & S-05.
5. IF THE SPECIFIED MINIMUM DIMENSIONS SHOWN IN THE DRAWING CAN NOT BE MAINTAINED DUE TO ROW RESTRICTIONS THE DIMENSIONS CAN BE REDUCED SUBJECT TO THE APPROVAL OF THE ENGINEER.
6. INTERFACING DETAILS WITH ADJACENT BUILDINGS/LANDS SHOULD BE DECIDED ACCORDING TO THE SITE CONDITIONS.
7. MINIMUM THICKNESS OF DGAB SHOULD BE 100mm TOP OF THE EXISTING PAVEMENT.
8. MINIMUM THICKNESS OF THE GRANULAR CAPPING LAYER SHOULD BE 100mm, IF THE THICKNESSES < 100mm USE GRANULAR SUB BASE.
9. ISOLATED BASE FAILURE SECTION SHOULD BE RECTIFIED PRIOR TO EXISTING PAVEMENT STRENGTHENING.

ADB FUNDED
I ROAD PROJECT

CLIENT:
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF PORTS & HIGHWAYS
Road Development Authority

No.	REVISION	DATE

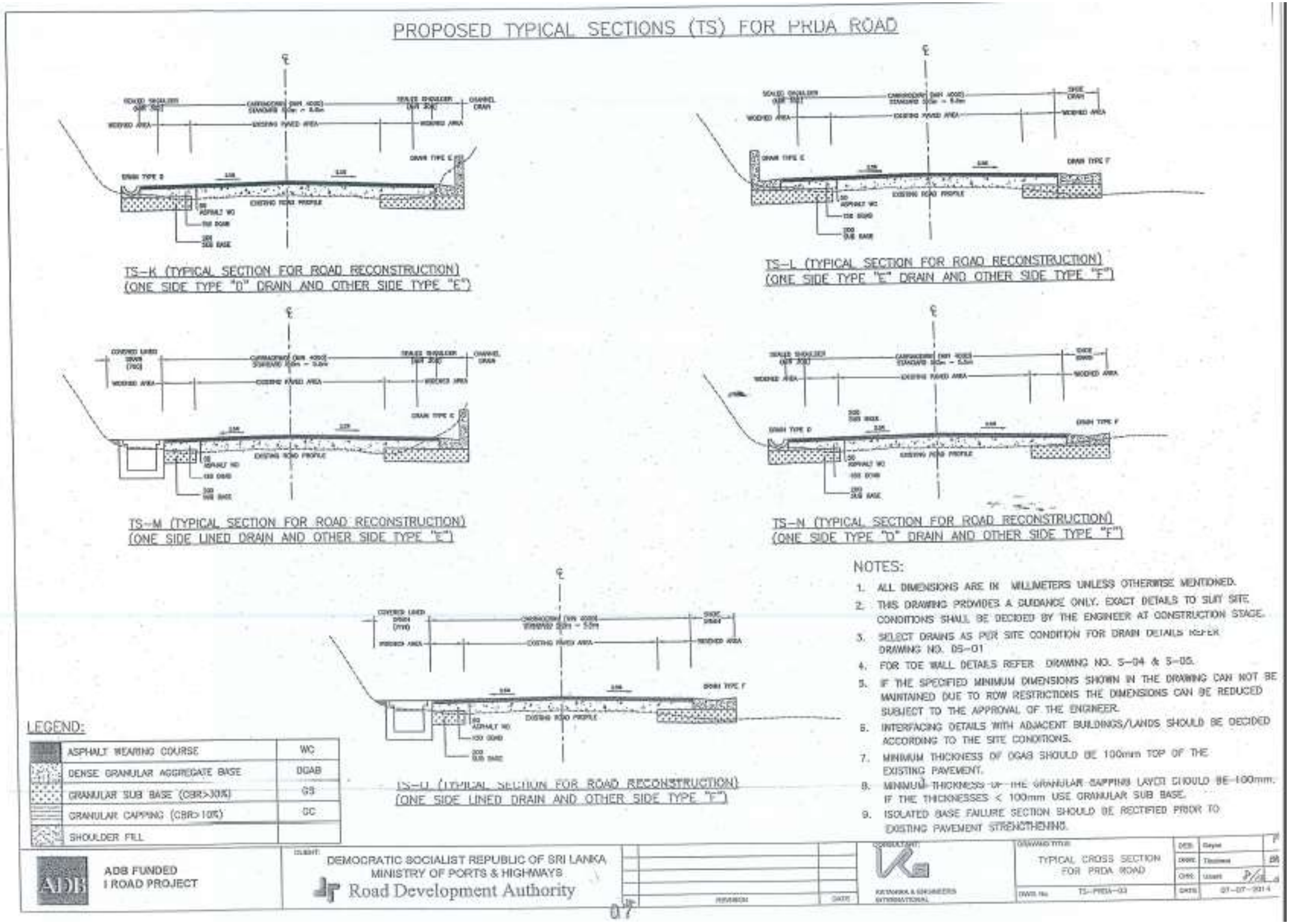
CONSULTANT
KATAHIRA & ENGINEERS INTERNATIONAL

DRAWING TITLE:
TYPICAL CROSS SECTION FOR PRDA ROAD

DRWG No. TS-PRDA-02

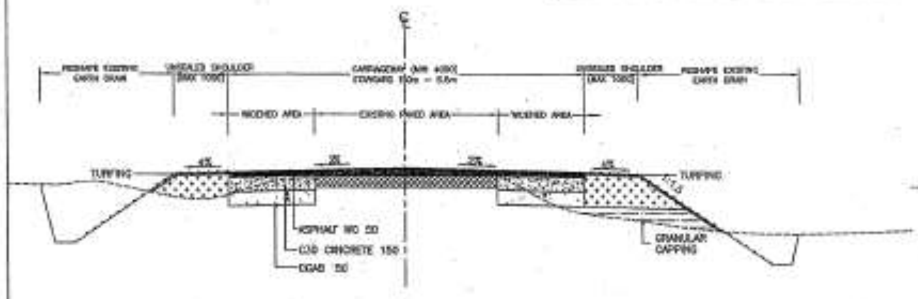
DSGN:	Rajeev
DRW:	Thushara
CHK:	Dinesh
DATE:	07-07-2014

08

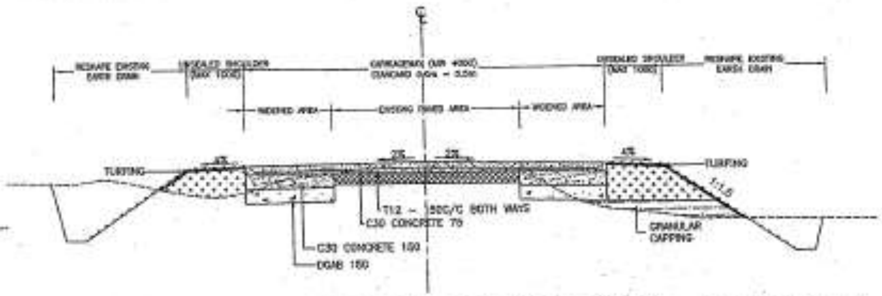


PROPOSED TYPICAL SECTIONS (TS) FOR PRDA ROAD
TS–K (TYPICAL SECTION FOR ROAD RECONSTRUCTION)
(ONE SIDE TYPE "D" DRAIN AND OTHER SIDE TYPE "E")
TS–L (TYPICAL SECTION FOR ROAD RECONSTRUCTION)
(ONE SIDE TYPE "E" DRAIN AND OTHER SIDE TYPE "F")
TS–M (TYPICAL SECTION FOR ROAD RECONSTRUCTION)
(ONE SIDE LINED DRAIN AND OTHER SIDE TYPE "E")
TS–N (TYPICAL SECTION FOR ROAD RECONSTRUCTION)
(ONE SIDE TYPE "D" DRAIN AND OTHER SIDE TYPE "F")
TS–O (TYPICAL SECTION FOR ROAD RECONSTRUCTION)
(ONE SIDE LINED DRAIN AND OTHER SIDE TYPE "F")
NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE MENTIONED.
2. THIS DRAWING PROVIDES A GUIDANCE ONLY. EXACT DETAILS TO SUIT SITE CONDITIONS SHALL BE DECIDED BY THE ENGINEER AT CONSTRUCTION STAGE.
3. SELECT DRAINS AS PER SITE CONDITION FOR DRAIN DETAILS REFER DRAWING NO. DS–01
4. FOR TOE WALL DETAILS REFER DRAWING NO. S–04 & S–05.
5. IF THE SPECIFIED MINIMUM DIMENSIONS SHOWN IN THE DRAWING CAN NOT BE MAINTAINED DUE TO ROW RESTRICTIONS THE DIMENSIONS CAN BE REDUCED SUBJECT TO THE APPROVAL OF THE ENGINEER.
6. INTERFACING DETAILS WITH ADJACENT BUILDINGS/LANDS SHOULD BE DECIDED ACCORDING TO THE SITE CONDITIONS.
7. MINIMUM THICKNESS OF DGAB SHOULD BE 100mm TOP OF THE EXISTING PAVEMENT.
8. MINIMUM THICKNESS OF THE GRANULAR CAPPING LAYER SHOULD BE 100mm. IF THE THICKNESSES < 100mm USE GRANULAR SUB BASE.
9. ISOLATED BASE FAILURE SECTION SHOULD BE RECTIFIED PRIOR TO EXISTING PAVEMENT STRENGTHENING.
LEGEND:
ASPHALT WEARING COURSE WC
DENSE GRANULAR AGGREGATE BASE DGAB
GRANULAR SUB BASE (CBR>30%) GS
GRANULAR CAPPING (CBR>10%) GC
SHOULDER FILL
ADB FUNDED
I ROAD PROJECT
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF PORTS & HIGHWAYS
Road Development Authority
TYPICAL CROSS SECTION
FOR PRDA ROAD

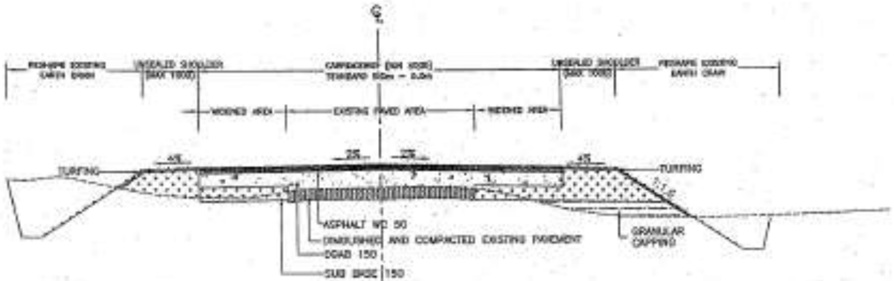
PROPOSED TYPICAL SECTIONS (TS) FOR PRDA ROAD



TS-P (TYPICAL SECTION FOR OVERLAYING ON CONCRETE SURFACE)



TS-Q (TYPICAL SECTION FOR OVERLAYING ON CONCRETE SURFACE - PARTLY DAMAGED)



TS-R (TYPICAL SECTION FOR OVERLAYING ON CONCRETE SURFACE - DAMAGED)

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE MENTIONED.
2. THIS DRAWING PROVIDES A GUIDANCE ONLY. EXACT DETAILS TO SUIT SITE CONDITIONS SHALL BE DECIDED BY THE ENGINEER AT CONSTRUCTION STAGE.
3. SELECT DRAINS AS PER SITE CONDITION FOR DRAIN DETAILS REFER DRAWING NO. DS-01
4. FOR TOE WALL DETAILS REFER DRAWING NO. S-04 & S-05.
5. IF THE SPECIFIED MINIMUM DIMENSIONS SHOWN IN THE DRAWING CAN NOT BE MAINTAINED DUE TO ROW RESTRICTIONS THE DIMENSIONS CAN BE REDUCED SUBJECT TO THE APPROVAL OF THE ENGINEER.
6. INTERFACING DETAILS WITH ADJACENT BUILDINGS/LANDS SHOULD BE DECIDED ACCORDING TO THE SITE CONDITIONS.
7. MINIMUM THICKNESS OF DGAB SHOULD BE 100mm TOP OF THE EXISTING PAVEMENT.
8. MINIMUM THICKNESS OF THE GRANULAR CAPPING LAYER SHOULD BE 100mm. IF THE THICKNESSES < 100mm USE GRANULAR SUB BASE.
9. ISOLATED BASE FAILURE SECTION SHOULD BE RECTIFIED PRIOR TO EXISTING PAVEMENT STRENGTHENING.

LEGEND:

ASPHALT WEARING COURSE	WC
DENSE GRANULAR AGGREGATE BASE	DGAB
GRANULAR SUB BASE (TYPE I-CBR>30%)	GS
GRANULAR CAPPING (TYPE II-CBR>10%)	GC
SHOULDER FILL	
BLINDING LAYER (GRADED AGGREGATE)	
ROCK FILL (MAXIMUM SIZE 250mm)	
QUARRY FINE	
C30 CONCRETE	

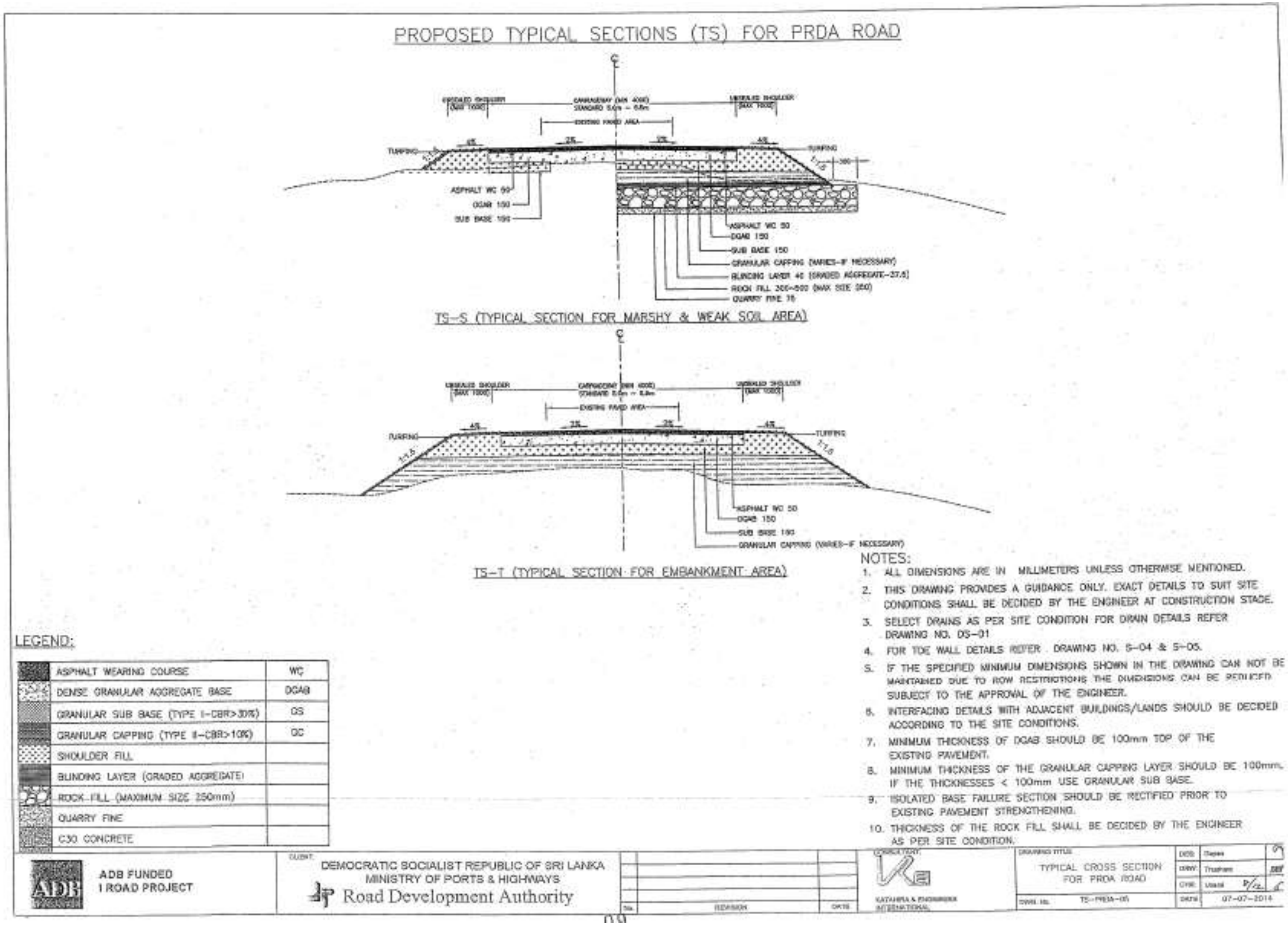
ADB FUNDED
I ROAD PROJECT

CLIENT: DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF PORTS & HIGHWAYS
Road Development Authority

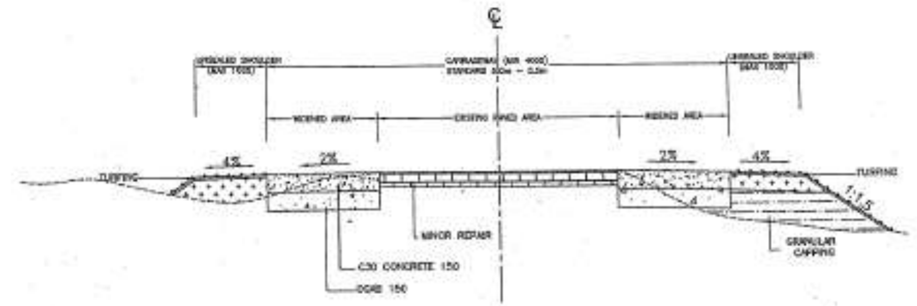
DRAWING TITLE: TYPICAL CROSS SECTION FOR PRDA ROAD

DWG. No. TS-PRDA-04

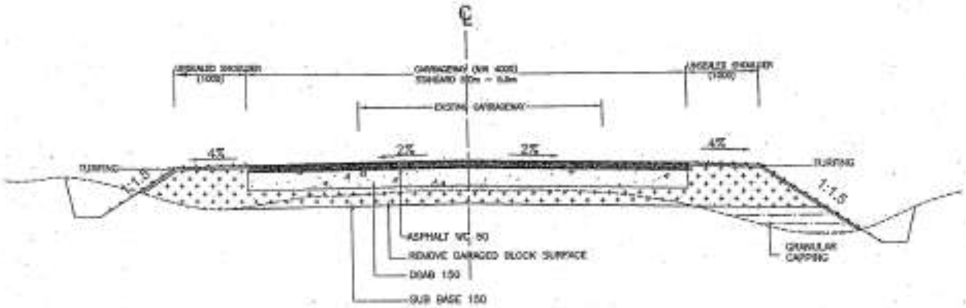
DATE 07-07-2014


PROPOSED TYPICAL SECTIONS (TS) FOR PRDA ROAD
TURFING
ASPHALT WC 50
DGAB 150
SUB BASE 150
GRANULAR CAPPING (VARIES-IF NECESSARY)
BLINDING LAYER 40 (GRADED AGGREGATE-37.5)
QUARRY FINE 75
TS-S (TYPICAL SECTION FOR MARSHY & WEAK SOIL AREA)
TS-T (TYPICAL SECTION FOR EMBANKMENT AREA)
NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE MENTIONED.
2. THIS DRAWING PROVIDES A GUIDANCE ONLY. EXACT DETAILS TO SUIT SITE CONDITIONS SHALL BE DECIDED BY THE ENGINEER AT CONSTRUCTION STAGE.
3. SELECT DRAINS AS PER SITE CONDITION FOR DRAIN DETAILS REFER DRAWING NO. DS-01
4. FOR TOE WALL DETAILS REFER DRAWING NO. S-04 & S-05.
5. IF THE SPECIFIED MINIMUM DIMENSIONS SHOWN IN THE DRAWING CAN NOT BE MAINTAINED DUE TO ROW RESTRICTIONS THE DIMENSIONS CAN BE REDUCED SUBJECT TO THE APPROVAL OF THE ENGINEER.
6. INTERFACING DETAILS WITH ADJACENT BUILDINGS/LANDS SHOULD BE DECIDED ACCORDING TO THE SITE CONDITIONS.
7. MINIMUM THICKNESS OF DGAB SHOULD BE 100mm TOP OF THE EXISTING PAVEMENT.
8. MINIMUM THICKNESS OF THE GRANULAR CAPPING LAYER SHOULD BE 100mm. IF THE THICKNESSES < 100mm USE GRANULAR SUB BASE.
9. ISOLATED BASE FAILURE SECTION SHOULD BE RECTIFIED PRIOR TO EXISTING PAVEMENT STRENGTHENING.
10. THICKNESS OF THE ROCK FILL SHALL BE DECIDED BY THE ENGINEER AS PER SITE CONDITION.
LEGEND:
ASPHALT WEARING COURSE WC
DENSE GRANULAR AGGREGATE BASE DGAB
GRANULAR SUB BASE (TYPE I-CBR>30%) GS
GRANULAR CAPPING (TYPE II-CBR>10%) GC
SHOULDER FILL
BLINDING LAYER (GRADED AGGREGATE)
ROCK FILL (MAXIMUM SIZE 250mm)
QUARRY FINE
C30 CONCRETE
ADB FUNDED
I ROAD PROJECT
CLIENT:
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF PORTS & HIGHWAYS
Road Development Authority
REVISION
DATE
TYPICAL CROSS SECTION FOR PRDA ROAD
07-07-2014

PROPOSED TYPICAL SECTIONS (TS) FOR PRDA ROAD



TS-U (TYPICAL SECTION FOR BLOCK PAVED SURFACE – GOOD CONDITION)



TS-V (TYPICAL SECTION FOR BLOCK PAVED SURFACE – DAMAGED)

LEGEND:

ASPHALT WEARING COURSE	WC
DENSE GRANULAR AGGREGATE BASE	DGAB
GRANULAR SUB BASE (TYPE I–CBR>30%)	GS
GRANULAR CAPPING (TYPE II–CBR>10%)	GC
SHOULDER FILL	
BLINDING LAYER (GRADED AGGREGATE)	
ROCK FILL (MAXIMUM SIZE 250mm)	
QUARRY FINE	
C30 CONCRETE	
INTERLOCKING BLOCK	

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE MENTIONED.
2. THIS DRAWING PROVIDES A GUIDANCE ONLY. EXACT DETAILS TO SUIT SITE CONDITIONS SHALL BE DECIDED BY THE ENGINEER AT CONSTRUCTION STAGE.
3. SELECT DRAINS AS PER SITE CONDITION FOR DRAIN DETAILS REFER DRAWING NO. DS–01
4. FOR TOE WALL DETAILS REFER DRAWING NO. S–04 & S–05.
5. IF THE SPECIFIED MINIMUM DIMENSIONS SHOWN IN THE DRAWING CAN NOT BE MAINTAINED DUE TO ROW RESTRICTIONS THE DIMENSIONS CAN BE REDUCED SUBJECT TO THE APPROVAL OF THE ENGINEER.
6. INTERFACING DETAILS WITH ADJACENT BUILDINGS/LANDS SHOULD BE DECIDED ACCORDING TO THE SITE CONDITIONS.
7. MINIMUM THICKNESS OF DGAB SHOULD BE 100mm TOP OF THE EXISTING PAVEMENT.
8. MINIMUM THICKNESS OF THE GRANULAR CAPPING LAYER SHOULD BE 100mm IF THE THICKNESSES < 100mm USE GRANULAR SUB BASE.

ADB FUNDED
I ROAD PROJECT

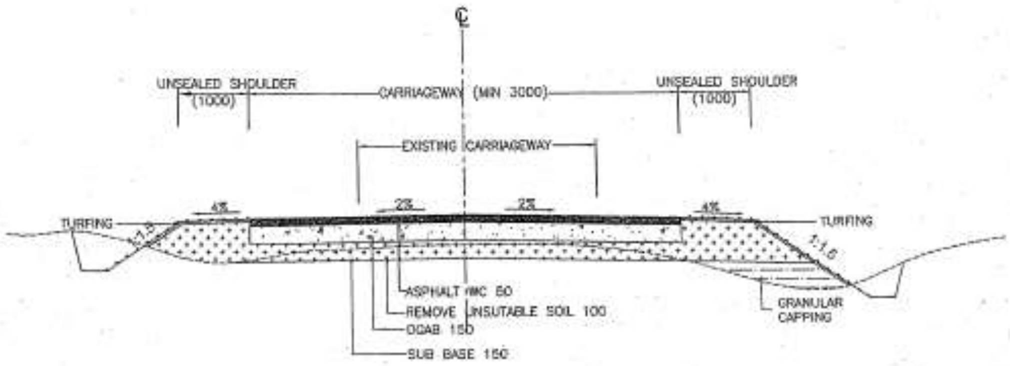
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF PORTS & HIGHWAYS
Road Development Authority

TYPICAL CROSS SECTION FOR PRDA ROAD

DATE 07-07-2014

10

PROPOSED TYPICAL SECTIONS (TS) FOR GRAVEL ROAD



TS-A (TYPICAL SECTION FOR GRAVEL SURFACE

LEGEND:

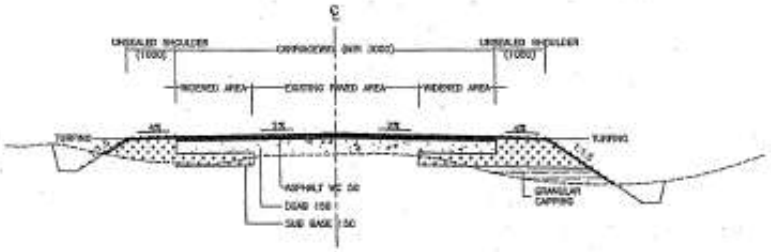
	ASPHALT WEARING COURSE	WC
	DENSE GRANULAR AGGREGATE BASE	DGAB
	GRANULAR SUB BASE (TYPE I–CBR>30%)	GS
	GRANULAR CAPPING (TYPE II–CBR>10%)	GC
	SHOULDER FILL	
	BLINDING LAYER (GRADED AGGREGATE)	
	ROCK FILL (MAXIMUM SIZE 250mm)	
	QUARRY FINE	
	C30 CONCRETE	
	INTERLOCKING BLOCK	

NOTES:

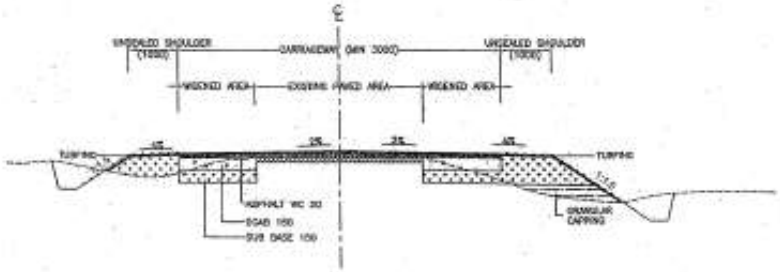
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE MENTIONED.
2. THIS DRAWING PROVIDES A GUIDANCE ONLY. EXACT DETAILS TO SUIT SITE CONDITIONS SHALL BE DECIDED BY THE ENGINEER AT CONSTRUCTION STAGE.
3. SELECT DRAINS AS PER SITE CONDITION FOR DRAIN DETAILS REFER DRAWING NO. DS–01
4. FOR TOE WALL DETAILS REFER DRAWING NO. S–04 & S–05.
5. IF THE SPECIFIED MINIMUM DIMENSIONS SHOWN IN THE DRAWING CAN NOT BE MAINTAINED DUE TO ROW RESTRICTIONS THE DIMENSIONS CAN BE REDUCED SUBJECT TO THE APPROVAL OF THE ENGINEER.
6. INTERFACING DETAILS WITH ADJACENT BUILDINGS/LANDS SHOULD BE DECIDED ACCORDING TO THE SITE CONDITIONS.
7. MINIMUM THICKNESS OF THE GRANULAR CAPPING LAYER SHOULD BE 100mm, IF THE THICKNESSES < 100mm USE GRANULAR SUB BASE.

ADB FUNDED I ROAD PROJECT	CLIENT: DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA MINISTRY OF PORTS HIGHWAYS & SHIPPING Road Development Authority	REVISION	DATE	CONSULTANT: KATAHIRA & ENGINEERS INTERNATIONAL	DRAWING TITLE: TYPICAL CROSS SECTION FOR PS ROAD; DWG. No. TS–PS–01; DATE 07–07–2014

PROPOSED TYPICAL SECTIONS (TS) FOR MACADAM ROAD



TS-B (TYPICAL SECTION FOR RECONSTRUCTION OF MACADAM SURFACE)



TS-C (TYPICAL SECTION FOR OVERLAYING ON MACADAM SURFACE)

LEGEND:

	ASPHALT WEARING COURSE	WC
	DENSE GRANULAR AGGREGATE BASE	DGAB
	GRANULAR SUB BASE (TYPE I-CBR>30%)	GS
	GRANULAR CAPPING (TYPE II-CBR>10%)	GC
	SHOULDER FILL	
	BLINDING LAYER (GRADED AGGREGATE)	
250	ROCK FILL (MAXIMUM SIZE 250mm)	
	QUARRY FINE	
	C30 CONCRETE	
	INTERLOCKING BLOCK	

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE MENTIONED.
2. THIS DRAWING PROVIDES A GUIDANCE ONLY. EXACT DETAILS TO SUIT SITE CONDITIONS SHALL BE DECIDED BY THE ENGINEER AT CONSTRUCTION STAGE.
3. SELECT DRAINS AS PER SITE CONDITION FOR DRAIN DETAILS REFER DRAWING NO. DS-01
4. FOR TOE WALL DETAILS REFER DRAWING NO. S-04 & S-05.
5. IF THE SPECIFIED MINIMUM DIMENSIONS SHOWN IN THE DRAWING CAN NOT BE MAINTAINED DUE TO ROW RESTRICTIONS THE DIMENSIONS CAN BE REDUCED SUBJECT TO THE APPROVAL OF THE ENGINEER.
6. INTERFACING DETAILS WITH ADJACENT BUILDINGS/LANDS SHOULD BE DECIDED ACCORDING TO THE SITE CONDITIONS.
7. MINIMUM THICKNESS OF DGAB SHOULD BE 100mm TOP OF THE EXISTING PAVEMENT.
8. MINIMUM THICKNESS OF THE GRANULAR CAPPING LAYER SHOULD BE 100mm, IF THE THICKNESSES < 100mm USE GRANULAR SUB BASE.
9. ISOLATED BASE FAILURE SECTION SHOULD BE RECTIFIED PRIOR TO EXISTING PAVEMENT STRENGTHENING.

ADB FUNDED
I ROAD PROJECT

CLIENT: DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF PORTS HIGHWAYS & SHIPPING
Road Development Authority

REVISION | DATE

CONSULTANT: KATAHIRA & ENGINEERS INTERNATIONAL

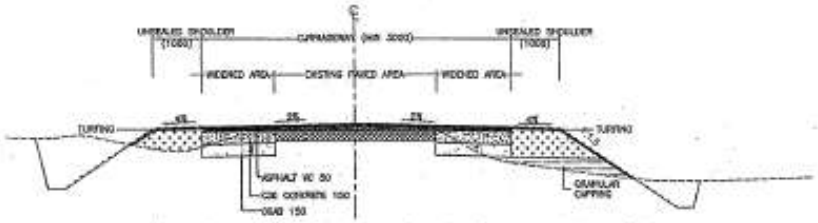
DRAWING TITLE: TYPICAL CROSS SECTION FOR PS ROAD

DWG. No. TS-PS-02

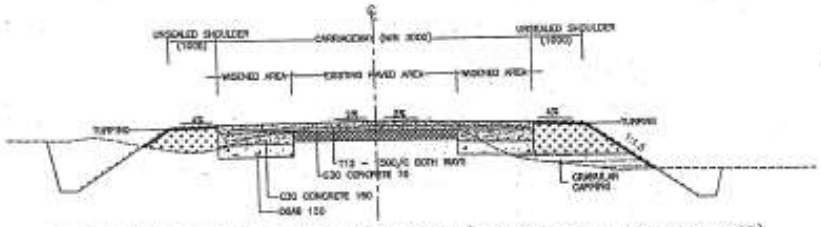
DES: Dupasi
DRN: Thushara
CHK: Vimal
DATE: 07-07-2014

12

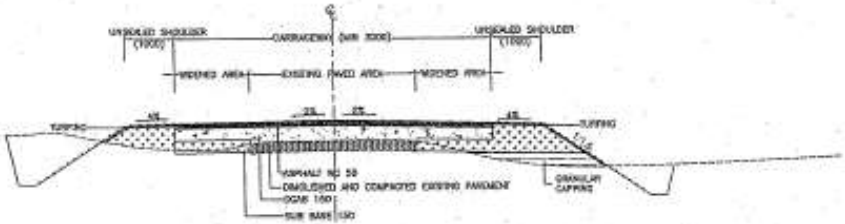
PROPOSED TYPICAL SECTIONS (TS) FOR CONCRETE ROAD



TS–D (TYPICAL SECTION FOR OVERLAYING ON CONCRETE SURFACE)



TS–E (TYPICAL SECTION FOR OVERLAYING ON CONCRETE SURFACE – PARTLY DAMAGED)



TS–F (TYPICAL SECTION FOR OVERLAYING ON CONCRETE SURFACE – DAMAGED)

LEGEND:

ASPHALT WEARING COURSE	WC
DENSE GRANULAR AGGREGATE BASE	DGAB
GRANULAR SUB BASE (TYPE I–CBR>30%)	GS
GRANULAR CAPPING (TYPE II–CBR> 0%)	GC
SHOULDER FILL	
BUNDING LAYER (GRADED AGGREGATE)	
ROCK FILL (MAXIMUM SIZE 250mm)	
QUARRY FINE	
C30 CONCRETE	
INTERLOCKING BLOCK	

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE MENTIONED.
2. THIS DRAWING PROVIDES A GUIDANCE ONLY. EXACT DETAILS TO SUIT SITE CONDITIONS SHALL BE DECIDED BY THE ENGINEER AT CONSTRUCTION STAGE.
3. SELECT DRAINS AS PER SITE CONDITION FOR DRAIN DETAILS REFER DRAWING NO. DS–01
4. FOR TOE WALL DETAILS REFER DRAWING NO. S–04 & S–05.
5. IF THE SPECIFIED MINIMUM DIMENSIONS SHOWN IN THE DRAWING CAN NOT I MAINTAINED DUE TO ROW RESTRICTIONS THE DIMENSIONS CAN BE REDUCED SUBJECT TO THE APPROVAL OF THE ENGINEER.
6. INTERFACING DETAILS WITH ADJACENT BUILDINGS/LANDS SHOULD BE DECIDEI ACCORDING TO THE SITE CONDITIONS.
7. MINIMUM THICKNESS OF DGAB SHOULD BE 100mm TOP OF THE EXISTING PAVEMENT.
8. MINIMUM THICKNESS OF THE GRANULAR CAPPING LAYER SHOULD BE 100mm IF THE THICKNESSES < 100mm USE GRANULAR SUB BASE.
9. ISOLATED BASE FAILURE SECTION SHOULD BE RECTIFIED PRIOR TO EXISTING PAVEMENT STRENGTHENING.

ADB FUNDED
I ROAD PROJECT

CLIENT: DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF PORTS HIGHWAYS & SHIPPING
Road Development Authority

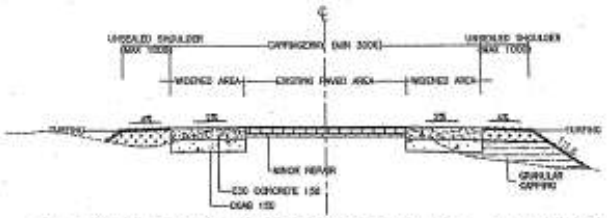
CONSULTANT: KATAHIRA & ENGINEERS INTERNATIONAL

DRAWING TITLE: TYPICAL CROSS SECTION FOR PS ROAD

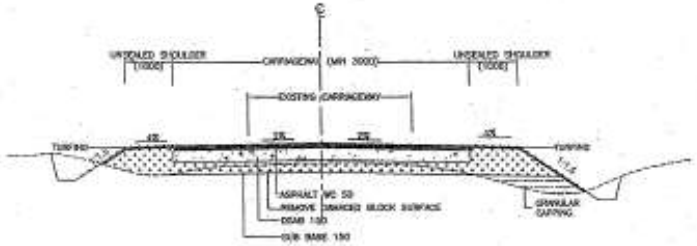
DWG. No. TS–PS–03

DES: Dayan
DWN: Thushan
CHK: Laxmi
DATE: 07–07–2014

PROPOSED TYPICAL SECTIONS (TS) FOR BLOCK PAVED ROAD



TS-G (TYPICAL SECTION FOR BLOCK PAVED SURFACE – GOOD CONDITION)



TS-H (TYPICAL SECTION FOR BLOCK PAVED SURFACE – DAMAGED)

LEGEND:

	ASPHALT WEARING COURSE	WC
	DENSE GRANULAR AGGREGATE BASE	DGAB
	GRANULAR SUB BASE (TYPE I-CBR>30%)	GS
	GRANULAR CAPPING (TYPE II-CBR>10%)	GC
	SHOULDER FILL	
	BLINDING LAYER (GRADED AGGREGATE)	
	ROCK FILL (MAXIMUM SIZE 250mm)	
	QUARRY FINE	
	C30 CONCRETE	
	INTERLOCKING BLOCK	

NOTES:

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3. SELECT DRAINS AS PER SITE CONDITION FOR DRAIN DETAILS REFER DRAWING NO. DS-01
4. FOR TOE WALL DETAILS REFER DRAWING NO. S-04 & S-05.
5. IF THE SPECIFIED MINIMUM DIMENSIONS SHOWN IN THE DRAWING CAN NOT BE MAINTAINED DUE TO ROW RESTRICTIONS THE DIMENSIONS CAN BE REDUCED SUBJECT TO THE APPROVAL OF THE ENGINEER.
6. INTERFACING DETAILS WITH ADJACENT BUILDINGS/LANDS SHOULD BE DECIDED ACCORDING TO THE SITE CONDITIONS.
7. MINIMUM THICKNESS OF THE GRANULAR CAPPING LAYER SHOULD BE 100mm. IF THE THICKNESSES < 100mm USE GRANULAR SUB BASE.
8. ISOLATED BASE FAILURE SECTION SHOULD BE RECTIFIED PRIOR TO EXISTING PAVEMENT STRENGTHENING.

ADB FUNDED
I ROAD PROJECT

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF PORTS HIGHWAYS & SHIPPING
Road Development Authority

NO.	REVISION	DATE

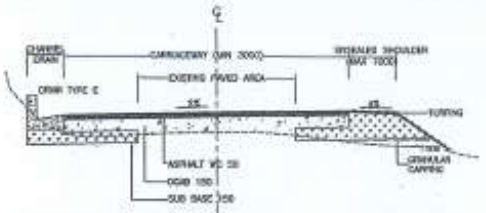
KATAHIRA & ENGINEERS INTERNATIONAL

DRAWING TITLE: TYPICAL CROSS SECTION FOR PS ROAD

DWG. No. TS-PS-04

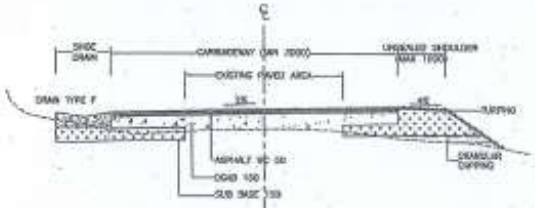
DES.	Gayan	
DRAWN	Thushan	
CHK.	Umesh	P/12
DATE	07-07-2014	

PROPOSED TYPICAL SECTIONS (TS) FOR NARROW ROAD (OVERLAYING OF MACADAM SURFACE)

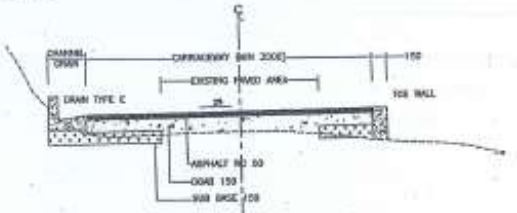


TS-I (TYPICAL SECTION FOR RESTRICTED ROW – ONE SIDE DRAIN TYPE "E")

TS-J (TYPICAL SECTION FOR RESTRICTED ROW – ONE SIDE DRAIN TYPE "D")

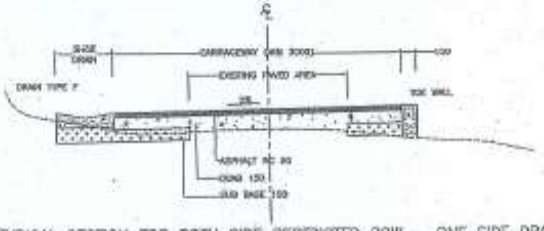


TS-O (TYPICAL SECTION FOR RESTRICTED ROW – ONE SIDE DRAIN "F")



TS-K (TYPICAL SECTION FOR BOTH SIDE RESTRICTED ROW – ONE SIDE DRAIN TYPE "E")

TS-L (TYPICAL SECTION FOR BOTH SIDE RESTRICTED ROW – ONE SIDE DRAIN "D")



TS-P (TYPICAL SECTION FOR BOTH SIDE RESTRICTED ROW – ONE SIDE DRAIN TYPE "F")

LEGEND:

	ASPHALT WEARING COURSE	WC
	DENSE GRANULAR AGGREGATE BASE	DGAB
	GRANULAR SUB BASE (TYPE I-CBR>30%)	GS
	GRANULAR CAPPING (TYPE II-CBR>10%)	GC
	SHOULDER FILL	
	BUNDING LAYER (GRADED AGGREGATE)	
	ROCK FILL (MAXIMUM SIZE 250mm)	
	QUARRY FINE	
	C30 CONCRETE	
	INTERLOCKING BLOCK	

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE MENTIONED.
2. THIS DRAWING PROVIDES A GUIDANCE ONLY. EXACT DETAILS TO SUIT SITE CONDITIONS SHALL BE DECIDED BY THE ENGINEER AT CONSTRUCTION STAGE.
3. SELECT DRAINS AS PER SITE CONDITION FOR DRAIN DETAILS REFER DRAWING NO. DS-01
4. FOR TOE WALL DETAILS REFER DRAWING NO. S-04 & S-05.
5. IF THE SPECIFIED MINIMUM DIMENSIONS SHOWN IN THE DRAWING CAN NOT BE MAINTAINED DUE TO ROW RESTRICTIONS THE DIMENSIONS CAN BE REDUCED SUBJECT TO THE APPROVAL OF THE ENGINEER.
6. INTERFACING DETAILS WITH ADJACENT BUILDINGS/LANDS SHOULD BE DECIDED ACCORDING TO THE SITE CONDITIONS.
7. MINIMUM THICKNESS OF DGAB SHOULD BE 100mm TOP OF THE EXISTING PAVEMENT.
8. MINIMUM THICKNESS OF THE GRANULAR CAPPING LAYER SHOULD BE 100mm IF THE THICKNESSES < 100mm USE GRANULAR SUB BASE.
9. ISOLATED BASE FAILURE SECTION SHOULD BE RECTIFIED PRIOR TO EXISTING PAVEMENT STRENGTHENING.
10. TYPICAL NARROW ROAD SECTIONS ARE PREPARED ONLY FOR OVERLAYING OF MACADAM ROAD SURFACE.OTHER PAVEMENT STRUCTURES SHALL BE SUBSTITUTE BY THE ENGINEER AS PER SITE CONDITION.

ADB FUNDED
I ROAD PROJECT

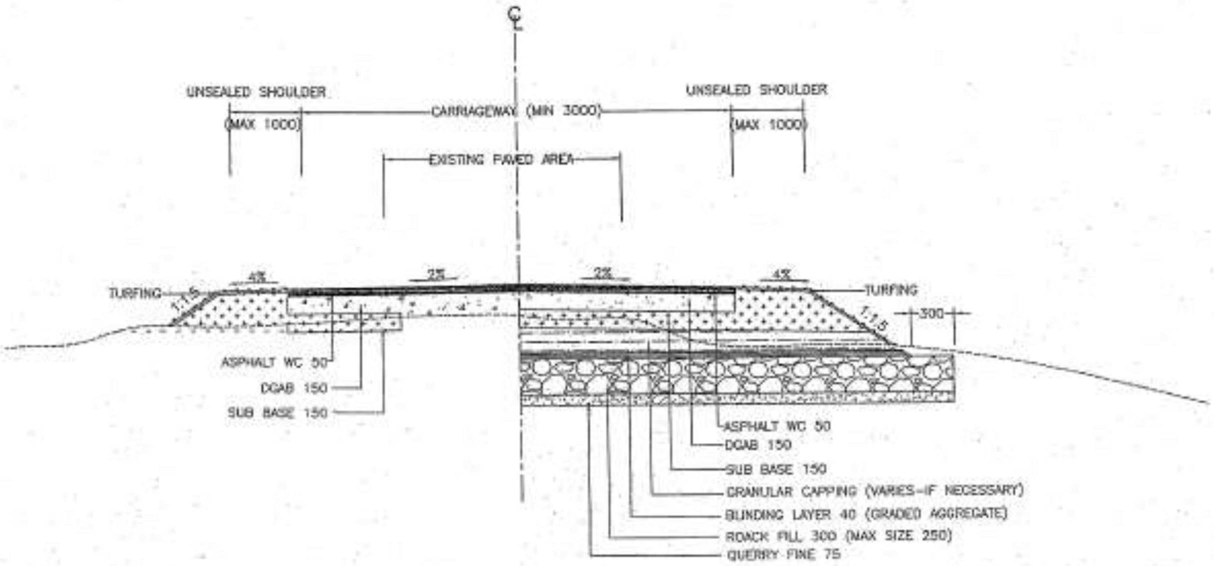
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF PORTS HIGHWAYS & SHIPPING
Road Development Authority

TYPICAL CROSS SECTION FOR PS ROAD

DWG No. TS-PS-03

DATE 07-07-2014

PROPOSED TYPICAL SECTIONS (TS) FOR WEEK SOIL AREA



TS-M (TYPICAL SECTION FOR MARSHY & WEAK SOIL AREA)

LEGEND:

ASPHALT WEARING COURSE	WC
DENSE GRANULAR AGGREGATE BASE	DGAB
GRANULAR SUB BASE (TYPE I-CBR>30%)	GS
GRANULAR CAPPING (TYPE II-CBR>10%)	GC
SHOULDER FILL	
BLINDING LAYER (GRADED AGGREGATE)	
ROCK FILL (MAXIMUM SIZE 250mm)	
QUARRY FINE	
C30 CONCRETE	
INTERLOCKING BLOCK	

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE MENTIONED.
2. THIS DRAWING PROVIDES A GUIDANCE ONLY. EXACT DETAILS TO SUIT SITE CONDITIONS SHALL BE DECIDED BY THE ENGINEER AT CONSTRUCTION STAGE.
3. SELECT DRAINS AS PER SITE CONDITION FOR DRAIN DETAILS REFER DRAWING NO. DS-01
4. FOR TOE WALL DETAILS REFER DRAWING NO. S-04 & S 06.
5. IF THE SPECIFIED MINIMUM DIMENSIONS SHOWN IN THE DRAWING CAN NOT BE MAINTAINED DUE TO ROW RESTRICTIONS THE DIMENSIONS CAN BE REDUCED SUBJECT TO THE APPROVAL OF THE ENGINEER.
6. INTERFACING DETAILS WITH ADJACENT BUILDINGS/LANDS SHOULD BE DECIDED ACCORDING TO THE SITE CONDITIONS.
7. MINIMUM THICKNESS OF DGAB SHOULD BE 100mm TOP OF THE EXISTING PAVEMENT.
8. MINIMUM THICKNESS OF THE GRANULAR CAPPING LAYER SHOULD BE 100mm, IF THE THICKNESSES < 100mm USE GRANULAR SUB BASE.
9. ISOLATED BASE FAILURE SECTION SHOULD BE RECTIFIED PRIOR TO EXISTING PAVEMENT STRENGTHENING.

ADB FUNDED
I ROAD PROJECT

CLIENT:
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF PORTS HIGHWAYS & SHIPPING
Road Development Authority

18

No. | REVISION | DATE

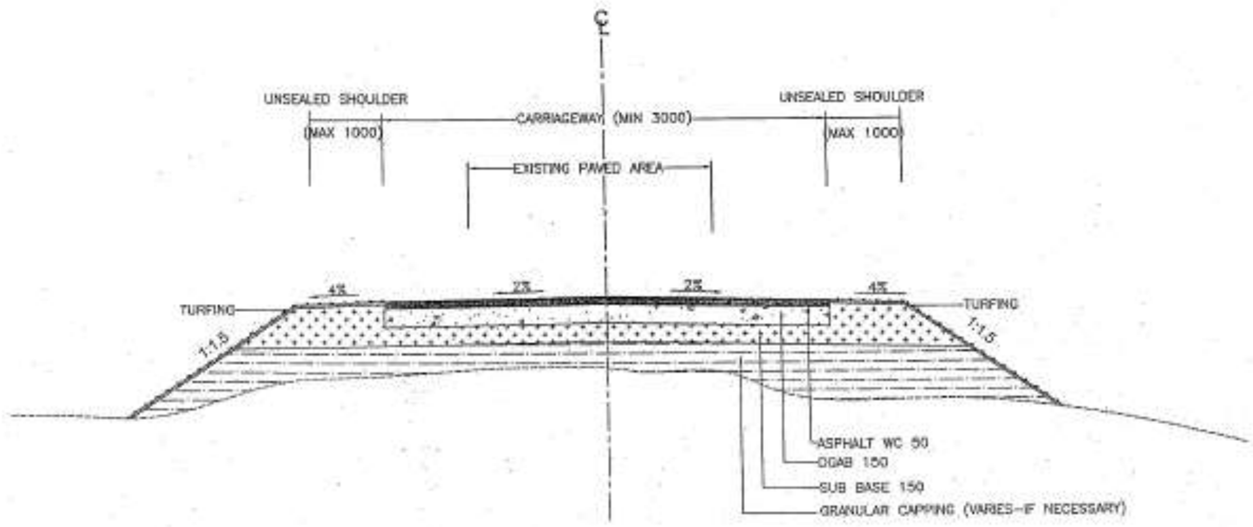
CONSULTANT:
KATAHIRA & ENGINEERS INTERNATIONAL

DRAWING TITLE:
TYPICAL CROSS SECTION FOR PS ROAD

DWG. No. TS-PS-03

DATE 07-07-2014

PROPOSED TYPICAL SECTIONS (TS) FOR EMBANKMENT AREA



TS–N (TYPICAL SECTION FOR EMBANKMENT AREA)

LEGEND:

ASPHALT WEARING COURSE	WC
DENSE GRANULAR AGGREGATE BASE	DGAB
GRANULAR SUB BASE (TYPE I–CBR>30%)	GS
GRANULAR CAPPING (TYPE II–CBR>12%)	GC
SHOULDER FILL	
BLINDING LAYER (GRADED AGGREGATE)	
ROCK FILL (MAXIMUM SIZE 250mm)	
QUARRY FINE	
C30 CONCRETE	
INTERLOCKING BLOCK	

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE MENTIONED.
2. THIS DRAWING PROVIDES A GUIDANCE ONLY. EXACT DETAILS TO SUIT SITE CONDITIONS SHALL BE DECIDED BY THE ENGINEER AT CONSTRUCTION STAGE.
3. SELECT DRAINS AS PER SITE CONDITION FOR DRAIN DETAILS REFER DRAWING NO. DS–01
4. FOR TOE WALL DETAILS REFER DRAWING NO. S–04 & S–05
5. IF THE SPECIFIED MINIMUM DIMENSIONS SHOWN IN THE DRAWING CAN NOT BE MAINTAINED DUE TO ROW RESTRICTIONS THE DIMENSIONS CAN BE REDUCED SUBJECT TO THE APPROVAL OF THE ENGINEER.
6. INTERFACING DETAILS WITH ADJACENT BUILDINGS/LANDS SHOULD BE DECIDED ACCORDING TO THE SITE CONDITIONS.
7. MINIMUM THICKNESS OF DGAB SHOULD BE 100mm TOP OF THE EXISTING PAVEMENT.
8. MINIMUM THICKNESS OF THE GRANULAR CAPPING LAYER SHOULD BE 100mm. IF THE THICKNESSES < 100mm USE GRANULAR SUB BASE.
9. ISOLATED BASE FAILURE SECTION SHOULD BE RECTIFIED PRIOR TO EXISTING PAVEMENT STRENGTHENING.

ADB FUNDED
I ROAD PROJECT

CLIENT:
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF PORTS HIGHWAYS & SHIPPING
Road Development Authority

17

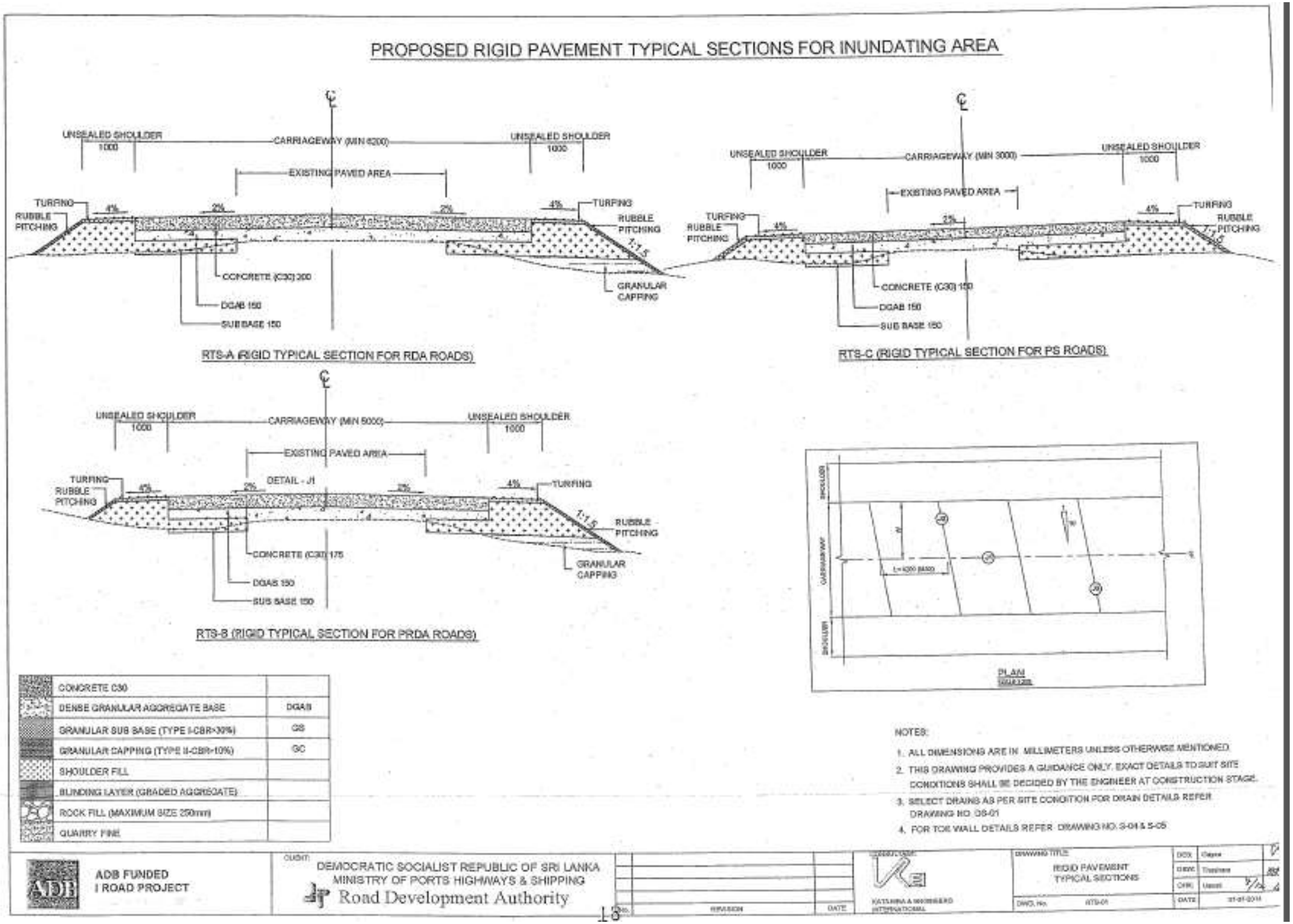
No. | REVISION | DATE

CONSULTANT:
KATAHIRA & ENGINEERS INTERNATIONAL

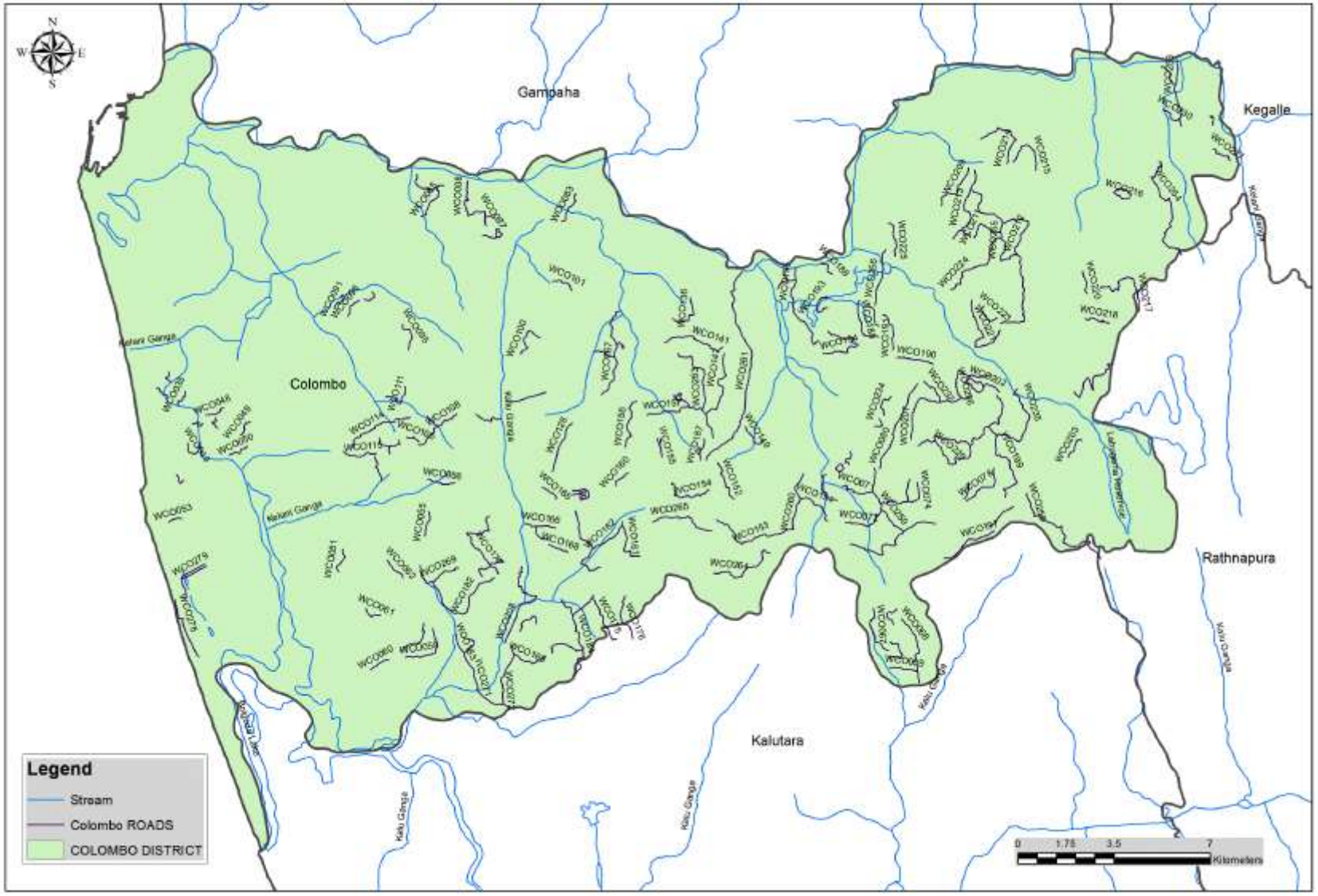
DRAWING TITLE:
TYPICAL CROSS SECTION FOR PS ROAD

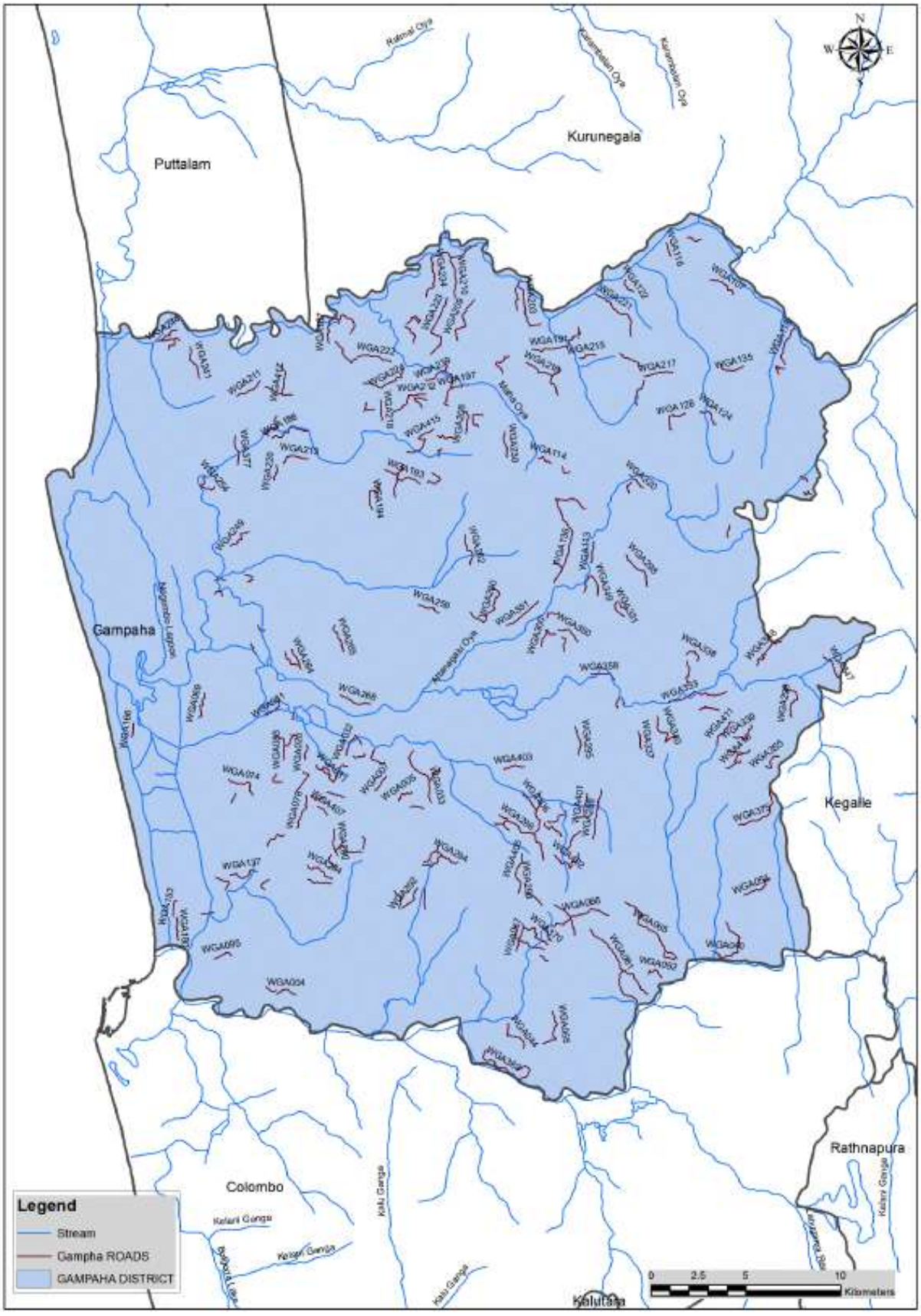
DRWG. No. TS–PS–07

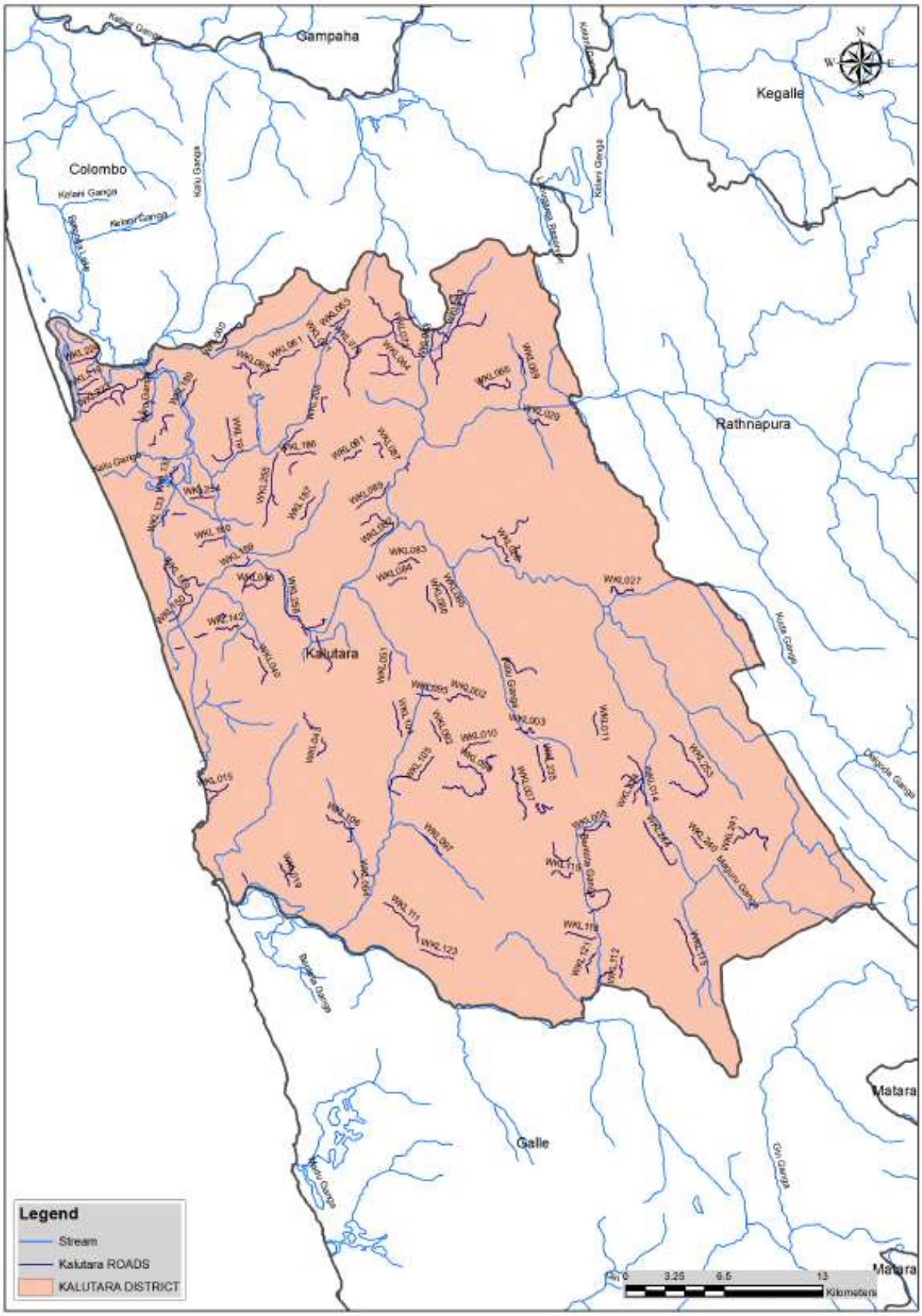
DATE 07–07–2014


PROPOSED RIGID PAVEMENT TYPICAL SECTIONS FOR INUNDATING AREA
UNSEALED SHOULDER 1000
CARRIAGEWAY (MIN 6200)
EXISTING PAVED AREA
TURFING
RUBBLE PITCHING
4%
2%
1:1.5
CONCRETE (C30) 200
DGAB 150
SUB BASE 150
GRANULAR CAPPING
RTS-A (RIGID TYPICAL SECTION FOR RDA ROADS)
CARRIAGEWAY (MIN 3000)
CONCRETE (C30) 150
RTS-C (RIGID TYPICAL SECTION FOR PS ROADS)
CARRIAGEWAY (MIN 5000)
DETAIL - J1
CONCRETE (C30) 175
RTS-B (RIGID TYPICAL SECTION FOR PRDA ROADS)
SHOULDER
CARRIAGEWAY
PLAN
CONCRETE C30
DENSE GRANULAR AGGREGATE BASE DGAB
GRANULAR SUB BASE (TYPE I-CBR>30%) GS
GRANULAR CAPPING (TYPE II-CBR>10%) GC
SHOULDER FILL
BLINDING LAYER (GRADED AGGREGATE)
ROCK FILL (MAXIMUM SIZE 250mm)
QUARRY FINE
NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE MENTIONED.
2. THIS DRAWING PROVIDES A GUIDANCE ONLY. EXACT DETAILS TO SUIT SITE CONDITIONS SHALL BE DECIDED BY THE ENGINEER AT CONSTRUCTION STAGE.
3. SELECT DRAINS AS PER SITE CONDITION FOR DRAIN DETAILS REFER DRAWING NO. DS-01
4. FOR TOE WALL DETAILS REFER DRAWING NO. S-04 & S-05
ADB FUNDED
I ROAD PROJECT
CLIENT:
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF PORTS HIGHWAYS & SHIPPING
Road Development Authority
REVISION
DATE
DRAWING TITLE
RIGID PAVEMENT TYPICAL SECTIONS
DWG. No. RTS-01
DATE

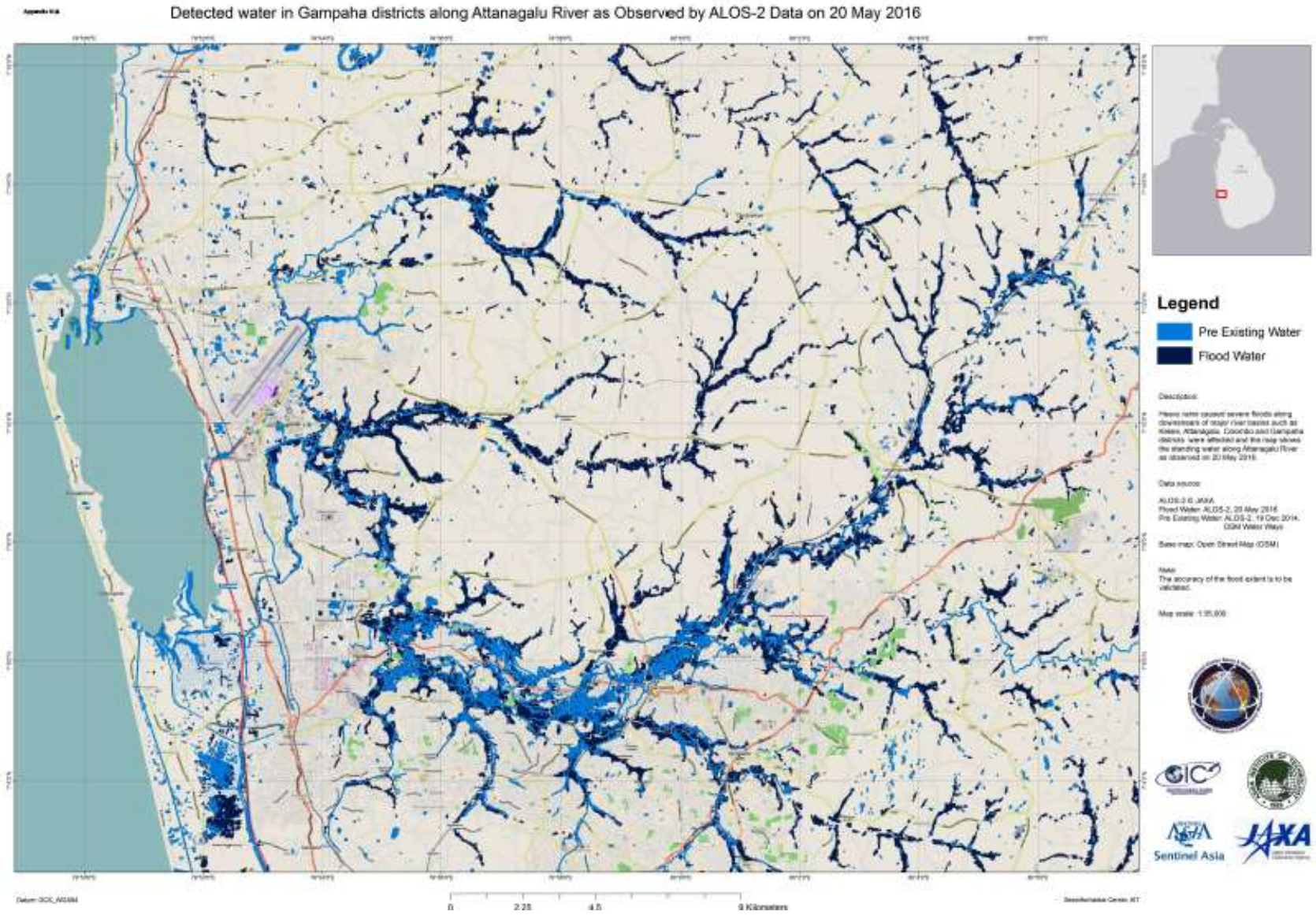
APPENDIX IV.A MAP OF STREAM CROSSINGS OF PROJECT ROADS

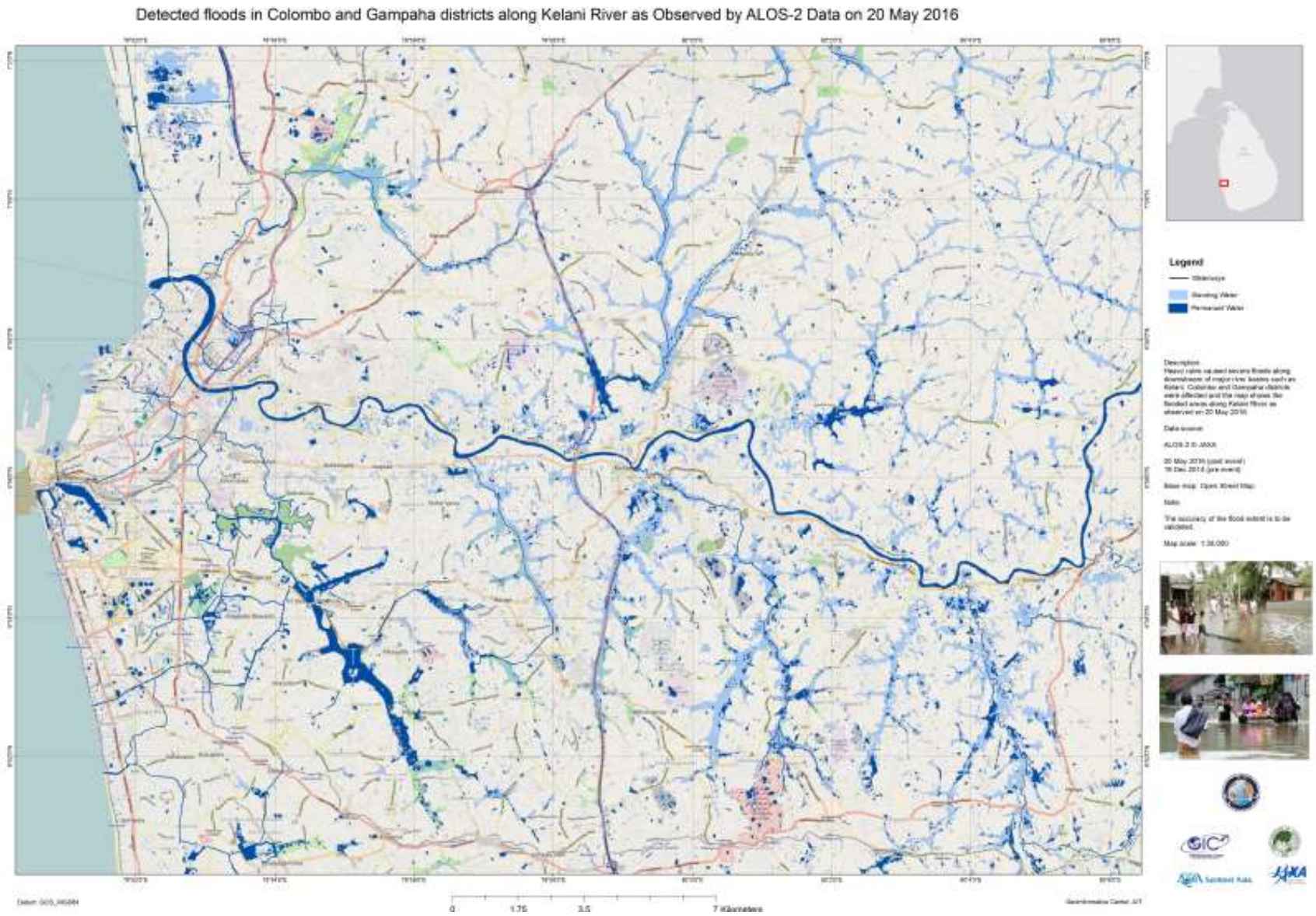



Puttalam
Kurunegala
Gampaha
Kegalle
Colombo
Rathnapura
Kaluthara
Legend
Stream
Gampha ROADS
GAMPAHA DISTRICT
0 2.5 5 10
Kilometers


Gampaha
Kegalle
Colombo
Kelani Ganga
Kalu Ganga
Rathnapura
Kalutara
Matara
Galle
Legend
Stream
Kalutara ROADS
KALUTARA DISTRICT
0
3.25
6.5
13
Kilometers

APPENDIX IV.B MAP OF DETECTED FLOODS IN COLOMBO AND GAMPAHA




Detected floods in Colombo and Gampaha districts along Kelani River as Observed by ALOS-2 Data on 20 May 2016
Legend
Description
Data source
Base map: Open Street Map
Note
Map scale: 1:35,000
0
1.75
3.5
7 Kilometers

APPENDIX VI.A SAMPLE ENVIRONMENTAL MANAGEMENT PLAN FOR RURAL ROADS

No.	Environment Attributes/ Project Action	Mitigation Measures	Location/ numbers	Costs	Responsible for implementing	Responsible for Monitoring
1	**Design and Preconstruction Stage**					
1	Clearing of vegetation and cutting trees	• Cutting Trees shall be minimized as much as possible. • Permission shall be granted from Divisional Secretary (DS) before cutting of roadside trees. • Trees shall be cut carefully to minimize the damage to nearby trees. • Cut trees shall be handed over to the State Timber Corporation. • Compensatory Afforestation shall be provided on 1:3.ratio basis. • Native species only will be selected for replanting with the advice of Department of Forest and locations for tree replanting will be as closer as possible to the tree removed.	Throughout the project area and other possible areas of tree planting	Costs for tree removal and Tree replanting.	Contractor	Project Implementation Unit(PIU), Project Implementation Consultant (PIC), Divisional Secretary
2	Climate Change Consideration and Vulnerability screening	• Compliance to climate change vulnerability check point given under IEE and adoption of necessary migratory measures as required. • Additional trees shall be planted for increasing the carbon sink. The trees may be planted with help of Department of Forest	Throughout the Project area and other possible areas of tree planting	Design costs	Project Implementation Unit(PIU), Design consultant	Project Implementation Unit (PIU)

No.	Environment Attributes/ Project Action	Mitigation Measures	Location/ numbers	Costs	Responsible for implementing	Responsible for Monitoring
		and space for additional planting (if sufficient space is not available within ROW) will be explored with the help of Divisional Secretary (DS) and Community Organizations.				
3	Hydrology and Drainage	• Adequate cross drainage structures shall be provided to ensure smooth passage of water especially in flood prone areas. • The discharge capacity of the cross drainage culverts shall be designed accordingly. • Additional cross drainage structures shall be provided in the areas where nearby land is sloping towards road alignment in both sides. • The construction work near water body shall be planned carefully in dry season so that water quality is not affected due to sedimentation and rain water runoff.	All cross drainage culverts , rivers, other minor streams and flood prone areas.	Must be included under Project cost	Project Implementation Unit(PIU), Design consultant	Project Implementation Unit(PIU)
4	Shifting of utilities	• Shifting of utilities shall be planned in consultation with the Client and relevant service provider. • The proposed Right of Way (ROW) shall be marked off	Utility lines located along either side of the road which are shifted due	Costs to cover shifting and reconstruction of utilities must be included under project costs	Contractor	Project Implementation Unit(PIU), CEB,LECO SLT, NWS&DB

No.	Environment Attributes/ Project Action	Mitigation Measures	Location/ numbers	Costs	Responsible for implementing	Responsible for Monitoring
		clearly. • Shifting of utilities shall be minimized as much as possible. • Required permissions will be taken and from relevant service provider for removing and shifting utility poles before the commencement of construction activities. • The public should be aware well in advance about the timing of the shifting of relevant utility lines if the services are disrupted.	to the road construction			and any other Utility agencies
5	Impacts to common properties	• Shifting of common properties located within the ROW shall be minimized as much as possible. • Structures with archaeological or religious importance will not be shifted. • Any common property removed due to road improvement will be reconstructed to a satisfactory level.	Locations with common properties	Costs of removing and Reconstruction of common properties	Contractor	Project Implementation Unit(PIU),Project Implementation Consultant(PIC)
2	**Construction Stage**					
1	Air Quality, Noise and vibration	• Dust elimination measures such as water sprinkling, shall be applied in all dust prone locations such as unpaved	Throughout the road specially near schools, hospitals and	Must be included under contractors cost	Contractor	Project Implementation Unit(PIU),Project Implementation Consultant(PIC)

No.	Environment Attributes/ Project Action	Mitigation Measures	Location/ numbers	Costs	Responsible for implementing	Responsible for Monitoring
		haulage roads, earthworks and stockpiles. • Concrete and Asphalt Batching plants and crushers should be operated with necessary licenses (Environmental Protection License and Quarry license). • Sand and aggregates shall be covered during transportation. • Stock piles and batching plants shall be located at considerable distance away from the human settlements. • Generators and other machineries shall be sound proof. • Construction vehicles and machineries shall be properly maintained must be operated full compliance with the standards and regulations. • Contractor shall take necessary action to ensure that construction works do not result in damage to adjacent properties due to vibration. If any damages occur, contractor will be responsible for rectifying the damage. • No construction along community areas will be permitted during night time.	other community properties.			
2	Ground Water and Surface	• Suitable measures shall be taken for prevention of	Throughout the road specially	Must be included under	Contractor	Project Implementation

No.	Environment Attributes/ Project Action	Mitigation Measures	Location/ numbers	Costs	Responsible for implementing	Responsible for Monitoring
	Water Quality	pollution of water bodies such as proper storage of unsuitable materials, construction chemicals, slope stabilization servicing construction vehicles in approved sites, etc. • The contractor shall utilize water during construction in such a way that the water availability and supply to nearby communities is unaffected.	near streams, marshy lands and public wells	contractors cost		Unit(PIU),Project Implementation Consultant(PIC)
3	Impacts on Biodiversity	• Solid waste disposal sites, hot mix asphalt plants, borrow pits, labour accommodations should not be located within or close to the forest areas. • Restrictions on the daily working hours between daylight and sunset must be enforced in sites near forest areas • Conditions must be met which may be required by the Department of Wild life and Department of Forest Conservation for roads located close to forest areas.	Near forest Areas especially in Kalutara District	Must be included under contractors cost	Contractor	Project Implementation Unit(PIU),Project Implementation Consultant(PIC)
4	Occupational Health and Safety	• Personal Protection Equipment such as helmet, mask, boot, hand gloves, safety jackets shall be provided to the construction	Throughout the road	Costs should be borne by Contractor	Contractor	Project Implementation Unit(PIU),Project Implementation

No.	Environment Attributes/ Project Action	Mitigation Measures	Location/ numbers	Costs	Responsible for implementing	Responsible for Monitoring
		workers and ensure that workers use them during working hours. • First aid facilities should be available at every construction site throughout the construction period. • Mobile toilets fitted with anaerobic treatment facility shall be provided at every construction site. • Domestic solid waste at construction site shall be properly collected and handed over to the solid waste collecting system of Local Authority. • Records on health and safety related accidents prevention measures taken must be maintained.				Consultant(PIC)
5	Traffic Management and Road Safety	• Adequate warning signboards shall be placed ahead of diversion sites to caution the road users. The road signs should comply with the Road Safety Manual of RDA. • Adequate clearly visible sign shall be provided on both sides of bridges and culverts under construction.	Throughout the road specially near culverts and bridges under construction	Must be included under contractors cost	Contractor	Project Implementation Unit(PIU), Project Implementation Consultant(PIC)

No.	Environment Attributes/ Project Action	Mitigation Measures	Location/ numbers	Costs	Responsible for implementing	Responsible for Monitoring
		• Monitor and record road crashes during construction and maintenance stages and take appropriate remedial actions. • Sufficient lighting shall be provided for construction sites during night. • Road furniture including traffic signs, road markings, storm water drains, crash barrier and any other items will be provided to enhance the road safety where necessary during the operation stage.				
6	Construction Debris and waste	• Disposal sites and locations shall be selected with the help the Project Implementation Consultant and villagers. • The dumping sites should be of adequate capacity and should be located without causing nuisance to residential areas. • Flood prone areas should be avoided in selecting disposal sites. • Excavated materials from roadway, shoulders, drains, culverts will be used for backfilling embankments, filling pits, and landscaping if suitable.	Throughout the road, Contractors site and Stock piles	Must be included under contractors cost	Contractor	Project Implementation Unit(PIU), Project Implementation Consultant(PIC)

No.	Environment Attributes/ Project Action	Mitigation Measures	Location/ numbers	Costs	Responsible for implementing	Responsible for Monitoring
		• Unusable excavated materials should be suitably disposed at disposal sites, with approval of the relevant local authority.				
7	Sourcing of construction material	• Necessary approvals and licenses should be obtained from GSMB and CEA for new borrow pits and quarries. • Borrowing earth from agricultural land shall be minimized to the extent possible. • And, no earth shall be borrowed from low-lying areas. • Topsoil to be stockpiled and protected for use at the rehabilitation stage.	Throughout the project area specially in borrow pits and quarries	Must be included under contractors cost	Contractor	Project Implementation Unit(PIU), Project Implementation Consultant(PIC)
8	Transportation of Materials	• The vehicles deployed for material transportation shall be spillage proof to avoid or minimize the spillage of the material during transportation. • Vehicles transporting loose and fine materials like sand, aggregates and soils shall be covered.	Throughout the road	Must be included under contractors cost	Contractor	Project Implementation Unit(PIU), Project Implementation Consultant(PIC)
9	Flood impacts	• The contractor shall take all necessary actions as directed by the Engineer to ensure smooth passage of water and	Throughout the project area specially in roads which are	Must be included under contractors cost	Contractor	Project Implementation Unit(PIU), Project

No.	Environment Attributes/ Project Action	Mitigation Measures	Location/ numbers	Costs	Responsible for implementing	Responsible for Monitoring
		maintaining natural drainage pattern of the area. special attention should be paid for flood prone areas. • If flooding is caused by contractor's activities, contractors shall provide suitable means to prevent loss of access to any land or property and prevent damage to land and property. • Temporary storage of material should only be within approved sites by the Engineer where natural drainage paths are not disturbed. • Excavated soil should not be allowed to be disposed near water bodies or in low-lying areas. • All wastes should be disposed to disposal sites approved by the relevant Local Authority. • The contractor shall not damage or block any manmade drainage canal. If blocked the contractor should remove such debris without any delay preventing any long interruptions of water flow	prone to floods			Implementation Consultant(PIC)

No.	Environment Attributes/ Project Action	Mitigation Measures	Location/ numbers	Costs	Responsible for implementing	Responsible for Monitoring
		which could affect cultivation activities.				
10	Landslide impact	• Proper coordination should be maintained with NBRO for roads which already have landslides or slope failures along its trace when construction activities are carried out and any recommendation from NBRO should be followed. • Contractor's activities shall not lead to create landslides and if any such incident occurs, Contractor should immediately inform PIC and shall take necessary actions to prevent loss of any access and prevent damage to adjacent properties.	Throughout the project area specially which are prone to landslides in Kalutara District	Must be included under contractors cost	Contractor	Project Implementation Unit(PIU), Project Implementation Consultant(PIC)
11	Slope protection and stabilization	• Slope protection and stabilization measures must be taken as directed by the Engineer in combination with drainage improvement measures where appropriate • Only native plant species will be selected for the bio-engineering works • To ensure the survival of the plants and success of the slope stabilization maintenance of	Throughout the project area specially which are prone to landslides in Kalutara District	Must be included under contractors cost	Contractor	Project Implementation Unit(PIU), Project Implementation Consultant(PIC)

No.	Environment Attributes/ Project Action	Mitigation Measures	Location/ numbers	Costs	Responsible for implementing	Responsible for Monitoring
		the plants including watering must be carried out				
12	Establishment of Workers accommodation , temporary offices and stock piles	• Construction sites, stock piles and stores shall be located away from human settlements, water bodies and forested areas and preferably located on land which is not productive such as a barren, waste lands. • Sufficient water supply, sanitation and all other infrastructure facilities shall be provided for the construction sites, office and stores. • Health care facilities shall be provided for adults, pregnant women and children in the at accommodations, office and storage areas • Septic tank/soakage pit of adequate capacity shall be provided for workers accommodations, office and storage areas. • Domestic solid waste shall be handed over to the waste collecting system of the Local Authority of the area. • Wastewater shall disposed in acceptable manner with the	Throughout the project area especially in stock piles, borrow pits and site office	Must be included under contractors cost	Contractor	Project Implementation Unit(PIU), Project Implementation Consultant(PIC), Relevant Local authority

No.	Environment Attributes/ Project Action	Mitigation Measures	Location/ numbers	Costs	Responsible for implementing	Responsible for Monitoring
		approval of the PIC. • Personal Protective Equipment (PPEs) such as helmet, shoes, and safety jackets for workers, first aid and firefighting equipment shall be available at every construction site. An emergency plan shall be prepared for an emergency such as fire.				
13	Loss of Productive Soil, erosion	• The top soil excavated from the productive land (borrow areas, road widening areas etc.) shall be reused as top cover of embankment slope for growing vegetation to protect soil erosion. • Shrubs shall be planted in loose soil areas.	Throughout the project area	Must be included under contractors cost	Contractor	Project Implementation Unit(PIU), Project Implementation Consultant(PIC)
14	Compaction and Contamination of Soil	• The movement of construction vehicles, machinery and equipment shall be restricted especially near paddy fields and other agricultural lands to prevent soil compaction in the adjacent lands. • Waste generation should be minimized and Unavoidable	Throughout the project area with especially near paddy and other agricultural lands close to ROW	Must be included under contractors cost	Contractor	Project Implementation Unit(PIU), Project Implementation Consultant(PIC)

No.	Environment Attributes/ Project Action	Mitigation Measures	Location/ numbers	Costs	Responsible for implementing	Responsible for Monitoring
		waste shall be stored at an appropriate place prior to disposal. • Fuel and oils shall be stored at an appropriate storage location and the storage area shall be paved with gentle slope to a corner and to collect any spills of the oils. • Oil interceptors shall be provided at the wash-down and re-fuelling areas to avoid soil contamination. • Oil and grease spill and oil soaked materials are to be collected and stored in labelled containers • If lands are degraded due to construction activities should be restored to the satisfactory level of the owner				
15	Change of Land use	• It shall be ensured that the land taken on lease for access road, construction camp and temporary office of the storage facilities is restored back to its original land use before handing it over to land owner.	Construction site, storage areas, stock piles and temporary offices	Must be included under contractors cost	Contractor	Project Implementation Unit(PIU), Project Implementation Consultant(PIC)
3	**Operational and Post Construction Stage**					

No.	Environment Attributes/ Project Action	Mitigation Measures	Location/ numbers	Costs	Responsible for implementing	Responsible for Monitoring
1	Site restoration	• All construction sites/temporary office/stock pile areas are to be restored to its original conditions or satisfactory condition of the land owner. • The borrow areas rehabilitation will be according to the conditions laid down in GSMB approval.	All locations of construction sites/ temporary office/ stock piles, and borrow areas	Should be borne by the contractor	Contractor (during Defects liability period) and RDA	Project Implementation Unit(PIU)-RDA
2	Air and Noise Quality	• Installation of noise barriers if noise levels exceeded the required standards. • Placing sign boards for speed limitation and honking restrictions near sensitive locations. • Removal of dust & mud collected on road surface to avoid dust emanation	Throughout the road	construction cost and maintenance cost	Contractor (during Defects liability period) and RDA	Project Implementation Unit(PIU)-RDA
3	Hydrology and Drainage	• Deposited silt in drainage canals and culverts shall be removed before the rainy season. • Renovation of the drainage system by repairing removing encroachments/ congestions regulary.	All roads at locations with cross drainage culverts	Must included in contractor's maintenance cost	Contractor (during Defects liability period) and RDA	Project Implementation Unit(PIU)-RDA
4	Occupational Health and Safety	• Personal Protection Equipment such as helmet, mask, boot, hand gloves, safety jackets shall be provided to the construction	Throughout the roads and site offices, storage areas	To be borne by the contractor	Contractor (during Defects liability period) and RDA	Project Implementation Unit(PIU)-RDA

No.	Environment Attributes/ Project Action	Mitigation Measures	Location/ numbers	Costs	Responsible for implementing	Responsible for Monitoring
		workers and ensure that workers use them during working hours. • First aid facilities should be available at every construction site throughout the construction period. • Mobile toilets fitted with anaerobic treatment facility shall be provided at every construction site. • Domestic solid waste at construction site shall be properly collected and handed over to the solid waste collecting system of Local Authority. • Records on health and safety related accidents prevention measures taken must be maintained.				
5	Impact of landslides	• If any landslide occur during the Defects liability period contractor is responsible for clearing the road and restore the access as soon as possible after informing RDA. (Contractor should also comply with recommendations of NBRO)	Throughout the roads	Must included in contractor's maintenance cost	Contractor (during Defects liability period) and RDA	Project Implementation Unit(PIU)-RDA

APPENDIX VI.B SAMPLE ENVIRONMENTAL MONITORING CHECKLIST FOR RURAL ROADS

I. Environmental Monitoring Checklist during Design and Pre-Construction Stage

Upgrading of Rural Roads to all Weather Standards

District:
Road Name:
Road ID:
Total length:
Report No. and date:
Completed by:

SL. NO.	Project Action/ Environmental Attributes	Mitigation Measures	Location/ numbers	Compliance status (Complied, partly complied, not complied)	Corrective action proposed if any
I	**Design and Preconstruction Stage**				
1.	Climate Change Consideration and Vulnerability screening	o Compliance to climate change vulnerability check point given under IEE and adoption of necessary mitigative measures as may be required o Efforts shall be made to plant additional trees for increasing the carbon sink. The trees may be planted with help of DoF (Department of Forest) and space for additional planting (if the remaining space within ROW is not adequate) will be explored with the help of DoF, Divisional Secretary (DS) and Community Based Organizations (CBO).	Throughout the project area and other possible areas of tree planting		
2.	Clearing of vegetation and removing trees	o All efforts shall be taken to avoid tree cutting wherever possible. o Requisite permission from DS shall be obtained for cutting of roadside trees	Throughout the project area		

		○ Cut trees shall be handed over to the Timber Corporation. ○ Provision of Compensatory Afforestation shall be made on 1:3.ratio basis. ○ Only native species with the advice of DoF will be selected for replanting and locations for tree replanting will be as closer as possible to the tree removed. ○ And if road side space for replanting is not available, other possible locations such as schools, public areas will be explored with the help of DoF, DS and CBOs of the area. ○ Provision shall be made for additional compensatory tree plantation. Any leftover of trees shall be removed and disposed in approved manner.			
3.	Shifting of utilities	○ The proposed Right of Way (ROW) shall be clearly demarcated on the ground. ○ All efforts will be made to minimize shifting of utilities ○ Utility shifting shall be planned in consultations and concurrence of the relevant service provider. ○ Required permissions and necessary actions will be taken from relevant service provider on a timely basis for removing and shifting utility structures before road construction activities begin. ○ The public/users of the particular service should be aware well in advance about the timing of the shifting/removal of the relevant utility lines when the service will be disrupted	Utility poles located along either the side of the road which may be shifted due to the road improvement		
4.	Impacts to common properties	○ Common properties outside the ROW will not be affected due to road improvement ○ All efforts will be made to minimize shifting of common properties located within the	Throughout the road with special attention to any common property to be		

		ROW if any. o Structures with religious importance will not be touched o Any common property built within the existing ROW and to be removed due to road improvement will be reconstructed as to the satisfactory level to the relevant owner	shifted		
5.	Hydrology and Drainage	o Provision of adequate cross drainage structure shall be made to ensure smooth passage of water and maintaining natural drainage pattern of the area. Here, special attention should be paid for flood prone areas. o The discharge capacity of the cross drainage structure shall be designed accordingly. o Provision of adequate drainage structures shall be made in water stagnant/logging areas. o The construction work near water body shall be planned preferably in dry season so that water quality of the water channel is not affected due to siltation and rain water runoff. o Provision of additional cross drainage structure shall be made in the areas where nearby land is sloping towards road alignment on both the sides.	Near all drainage crossings, rivers, streams and flood prone areas		
6.	Landslide impacts	o Possibility of occurrence of project induced landslides is marginal as the road improvement activities will not touch slopes outside ROW. o However prior consent should be obtained from National Building Research Organization (NBRO) for roads along which landslide prone locations are already observed. o And special attention should be paid in designing at particular locations of such roads and also recommendation of NBRO if any should be incorporated to the designs	Throughout the project area with special attention to locations which are landslide prone		

NOTE: Each report must enclose photographs to demonstrate the mitigation measures implemented

II. Environmental Monitoring Checklist during Construction Stage
Upgrading of Rural Roads to all Weather Standards

District:
Road Name:
Road ID:
Total length:
Report No. and date:
Completed by:

SL. NO.	Project Action/ Environmental Attributes	Mitigation Measures	Location/ numbers	Compliance status (Complied, partly complied, not complied)	Corrective action proposed if any
1.	Landslide impact	o As the improvement will be within the ROW, there will be minimal disturbance to the road side natural slopes and therefore possibility of occurring project induced landslides is minimal. o However proper coordination should be maintained with NBRO for roads which already have landslides or slope failures along its trace when construction activities are carried out and any recommendation from NBRO should be adhered. o Further contractor's activities shall not lead to create landslides and if any such incident occurs, he should immediately inform RDA and contractors shall provide suitable means to prevent loss of any access and prevent damage to land and property	Throughout the project area with special attention to roads which already have landslides and locations previously stuck by landslides		
2.	Flood impacts	o The contractor shall take all measures necessary or as directed by the Engineer to keep all drainage paths and drains clear of	Throughout the project area with special attention to		

SL. NO.	Project Action/ Environmental Attributes	Mitigation Measures	Location/ numbers	Compliance status (Complied, partly complied, not complied)	Corrective action proposed if any
		blockage at all times. Here special attention should be paid to flood prone areas in the District. o Temporary storage of material should only be within approved sites by the engineer where natural drainage is not disturbed. o All wastes should be disposed only at locations approved by the Local Authority of the area. o If flooding or stagnation of water is caused by contractor's activities, contractors shall provide suitable means to prevent loss of access to any land or property and prevent damage to land and property. o No material including excavated soil should be allowed to be disposed near water bodies or in paddy lands (even on temporary basis) to curtail any undue wash off of soil and debris in to such nearby water bodies and agricultural lands. o The contractor should be advised not to damage or block any manmade drainage canal even for temporary basis. If blocked the contractor should remove such debris without any delay preventing any long interruptions of water flow which could damage or hinder cultivation activities resulting in loss of crop and produce especially in the upstream side of the drainage path	roads which are prone to floods		
3.	Sourcing and transportation of construction material	**Borrow Earth:** o The borrow earth shall be obtained from borrow pits which are operated with GSMB and CEA approvals.	Throughout the project area with special attention to borrow pits and		

SL. NO.	Project Action/ Environmental Attributes	Mitigation Measures	Location/ numbers	Compliance status (Complied, partly complied, not complied)	Corrective action proposed if any
		o And if new borrow pits are opened for the project, necessary approvals and licenses should be obtained from GSMB and CEA. And all conditions laid down in such licenses should be strictly adhered. o All completed borrow pits should be rehabilitated to satisfy conditions given in the industrial mining license of GSMB o Borrowing earth from agricultural land shall be minimized to the extent possible. Further, no earth shall be borrowed from already low-lying areas. **Aggregate :** o The stone aggregate shall be sourced from existing licensed quarries o Copies of consent/ approval / rehabilitation plan for use of existing source will be submitted to PIU through PIC. o Topsoil to be stockpiled and protected for use at the rehabilitation stage. **Transportation of Construction Material** o Existing tracks / roads are to be used for hauling of materials to the extent possible. o The vehicles deployed for material transportation shall be spillage proof to avoid or minimize the spillage of the material during transportation.	quarries		
5.	Loss of Productive Soil, erosion and land use change	o The top soil from the productive land (borrow areas, road widening areas etc.) shall be preserved and reused for plantation purposes. o It shall also be used as top cover of embankment slope for growing vegetation to protect soil erosion.	Throughout the project area and camps sites, storage areas and temporary offices		

SL. NO.	Project Action/ Environmental Attributes	Mitigation Measures	Location/ numbers	Compliance status (Complied, partly complied, not complied)	Corrective action proposed if any
		o Shrubs shall be planted in loose soil area. o It shall be ensured that the land taken on lease for access road, construction camp and temporary office of the storage facilities is restored back to its original land use before handing it over to land owner.			
6.	Slope protection and stabilization	o Slope protection measures must be carried out using appropriate engineering and bio-engineering measures in combination with drainage improvement measures were appropriate o Only native plant species will be selected for the bio-engineering works o Follow up watering and maintenance of the plants must be carried out to ensure the survival of the plants and success of the slope stabilization	In project areas falling inside landslide prone		
.	Compaction and Contamination of Soil	o To prevent soil compaction in the adjoining productive lands beyond the ROW, the movement of construction vehicles, machinery and equipment shall be restricted to the designated haulage route. o The productive land shall be reclaimed after construction activity. o Fuel and lubricants shall be stored at the predefined storage location. o The storage area shall be paved with gentle slope to a corner and connected with a chamber to collect any spills of the oils. o All efforts shall be made to minimise the waste generation. Unavoidable waste shall be stored at the designated place prior to disposal. o To avoid soil contamination at the wash- down and re-fuelling areas, "oil interceptors" shall	Throughout the project area with special attention to paddy and other agricultural lands		

SL. NO.	Project Action/ Environmental Attributes	Mitigation Measures	Location/ numbers	Compliance status (Complied, partly complied, not complied)	Corrective action proposed if any
		be provided. Oil and grease spill and oil soaked materials are to be collected and stored in labelled containers (Labelled: WASTE OIL; and hazardous sign be displayed) and sold off to relevant parties. o Any land degraded due to construction activities should be restored to the satisfactory level of the owner			
8.	Establishment of Construction Camp, temporary office and storage area	o Construction camp sites and storage areas shall be located away from any local human settlements, water bodies and forested areas (minimum 0.2 km away) and preferably located on land which is not productive (barren/waste lands presently). If these are not possible private land maybe taken on lease as standard practice. o The construction camps, office and storage areas shall have provision of adequate water supply, sanitation and all requisite infrastructure facilities. o The construction camps, office and storage areas shall have provision of septic tank/soak pit of adequate capacity so that it can function properly for the entire duration of its use. o All construction camps shall have provision of rationing facilities particularly for kerosene/LPG so that dependence on firewood for cooking is avoided to the extent possible. The construction camps, office and storage areas shall have provision of health care facilities for adults, pregnant women and children. Personal Protective Equipment (PPEs) such as helmet, boots, earplugs for workers, first aid	Throughout the project area with special attention to labour camps, storage areas and office premises		

SL. NO.	Project Action/ Environmental Attributes	Mitigation Measures	Location/ numbers	Compliance status (Complied, partly complied, not complied)	Corrective action proposed if any
		and firefighting equipment shall be available at construction sites before start of construction. An emergency plan shall be prepared to fight with any emergency like fire. o Provision shall be made for domestic solid waste disposal in acceptable manner. The solid waste shall be handed over to the waste collecting system of the Local			
		Authority (LA) of the area and wastewater should be disposed with the approval of the PIC. o Provision of paved area for unloading and storage of fuel oil, lubricant oil, away from storm water drainage.			
9.	Establishment of Construction Camp, temporary office and storage area	o Excavated materials from roadway, shoulders, verges, drains, cross drainage will be used for backfilling embankments, filling pits, and landscaping. o Unusable debris material and removed pavements of roads should be suitably disposed off at pre-designated disposal locations, with approval of the concerned authority such as LA/DS. o The bituminous wastes if any shall be disposed in secure manner and environmentally accepted manner eg. Disposed in a pit that is covered properly and adequate revegetation is carried out or others. o In establishing disposal sites, unproductive/wastelands shall be selected with the help the PIC and villagers. The dumping site should be of adequate capacity. It should be located without causing nuisance to residential areas. Dumping sites. Further flood	Throughout the project area and all disposal sites		

SL. NO.	Project Action/ Environmental Attributes	Mitigation Measures	Location/ numbers	Compliance status (Complied, partly complied, not complied)	Corrective action proposed if any
		prone areas should be avoided in selecting disposal sites			
10.	Air and Noise Quality and vibration	o Vehicles delivering loose and fine materials like sand and aggregates shall be covered. o Dust suppression measures such as water sprinkling, shall be applied in all dust prone locations such as unpaved haulage roads, earthworks, stockpiles and asphalt mixing areas. o Batching plants and asphalt (hot mix) should be operated with necessary licenses (Environmental Protection License (EPL) and trade license) and plants shall be located at least 0.2 km away and in downwind direction of the human	Throughout the project road with special attention to schools, hospitals and religious places		
		settlements and should not disturb normal life of residents. o Material storage areas shall also be located downwind of the habitation area. o Hot mix plant shall be fitted with stack of adequate height (30m) or as may be prescribed in the EPL to ensure enough dispersion of exit gases. o Diesel Generators (DG) shall also be sound proof or fitted with stack of adequate height. o Construction vehicles and machineries shall be periodically maintained. o All heavy equipment and machinery shall be fitted in full compliance with the national regulation, Noise Control Regulations - Extra Ordinary Gazette No. 924/12 May 1996 amended by Extra Ordinary Gazette 937/7 April 1997. o No construction along community areas will be permitted during night time o Contractor shall take appropriate action to			

SL. NO.	Project Action/ Environmental Attributes	Mitigation Measures	Location/ numbers	Compliance status (Complied, partly complied, not complied)	Corrective action proposed if any
		ensure that construction works do not result in damage to adjacent properties due to vibration. If any damages occur, contractor will be responsible for rectifying the damage.			
11.	Tree plantation	o Compensatory afforestation shall be made on 1:3.ratio basis. o Only native species should be selected with the consent of DoF for replanting o Additional trees shall be planted wherever feasible. o Follow up maintenance of planted saplings will be carried out for a minimum of 3 years	Throughout the road.		
12.	Ground Water and Surface Water Quality and Availability	o The contractor shall arrange for water required during construction in such a way that the water availability and supply to nearby communities remains unaffected. o Water intensive activities shall not be undertaken during dry period to the extent feasible. o Provision shall be made to link side drains with the nearby ponds for facilitating water harvesting if feasible. o Preventive measures such as proper storage of unsuitable soil, construction chemicals, servicing construction vehicles in approved sites, slope stabilisation, etc shall be taken for prevention of siltation and pollution of water bodies.	Throughout road with special attention to streams, tanks and marshes		
13.	Occupational Health and Safety	o The requisite PPE (helmet, mask, boot, hand gloves, earplugs) shall be provided to the construction workers and it should be ensured that labourers use PPE during working hours. o Workers' exposure to noise will be restricted to	Throughout the road		

SL. NO.	Project Action/ Environmental Attributes	Mitigation Measures	Location/ numbers	Compliance status (Complied, partly complied, not complied)	Corrective action proposed if any
		less than 8 hours a day. Workers duty shall be regulated accordingly. o First aid facility should be readily available at every construction site throughout the construction period o Septic tank or mobile toilets fitted with anaerobic treatment facility shall be provided at construction camp/temporary office/storage areas. o Domestic solid waste at construction camp shall be properly collected and handed over to the solid waste collecting system of LA. o Records on health and safety related accidents measures taken to address must be maintained			
		o Adequate signboards shall be placed much ahead of diversion site to caution the road users. The road signs should comply with the Road Safety Manual of RDA. o It is proposed to discuss with the Department of Railways for providing adequate safety measures at unmanned railway crossing where applicable. Adequate clearly visible sign shall be provided on both sides of the railway crossing. o Road furniture including footpaths, railings, storm water drains, crash barrier, traffic signs, speed zone signs, pavement markers and any other such items will be provided to enhance the road safety where necessary at the completion of the project o Monitor and record road crashes during construction and maintenance stages and take appropriate remedial actions			
14.	Impacts on Biodiversity	o No solid waste or spoil dumping sites, hot	Near forest	To be included in	PIU, PIC

SL. NO.	Project Action/ Environmental Attributes	Mitigation Measures	Location/ numbers	Compliance status (Complied, partly complied, not complied)	Corrective action proposed if any
		mix plants and worker camps should be located within or close to the protected areas. o Prior approval should be taken from the relevant department for entrance or temporary alteration of properties belongs to such areas. Strict worker force supervision should be carried out by the contractor when conducting construction work within the area and the construction works should be completed within a minimum specified time period.	reserves, national parks, sanctuaries if any	contractor's cost	
		o Restrictions on the daily working hours between daylight and sunset must be enforced in sites near protected areas or wildlife zones o Conditions which may be required by the DWLC for roads located adjacent or close to protected areas must be met o For roads falling near protected areas appropriate measures such as posting of information sign boards on the presence of wildlife, speed controls such as speed bumps etc. must be installed as appropriate o Other measures to facilitate wildlife movement across the road such as exclusion fences may be installed with advise of DWLC o Ensure that construction timing of cross drains and bridges will not affect the migration or breeding of aquatic species. The contractor will seek guidance from pertinent agencies to identify rivers and creeks harbouring sensitive aquatic life. o Ensure that the timing of tree removal does			

SL. NO.	Project Action/ Environmental Attributes	Mitigation Measures	Location/ numbers	Compliance status (Complied, partly complied, not complied)	Corrective action proposed if any
		not coincide with breeding season of birds or other fauna if the trees are being used by birds and other fauna			

NOTE: Each report must enclose photographs to demonstrate the mitigation measures implemented

III. Environmental Monitoring Checklist during Post-Construction or Operation Stage

Upgrading of Rural Roads to all Weather Standards

District:
Road Name:
Road ID:
Total length:
Report No. and date:
Completed by:

SL. NO.	Environmental Attributes	Mitigation Measures	Location	Compliance status (Complied, partly complied, not complied)	Corrective action proposed if any
III	**Post Construction and Operational Stage**				
1.	Occurrence of landslides	o In such case, contractor is responsible for clearing the road and restore the access as soon as possible (during the maintenance period) after informing RDA (PIU and relevant Executive Engineer of RDA). o Here, contractor should also comply with recommendations of NBRO if any.	Throughout the project area		
2.	Hydrology and Drainage	o Regular removal/cleaning of deposited silt shall be done from drainage channels and outlet points before the monsoon season. o Renovation of the drainage system by repairing removing encroachments/ congestions shall be regularly conducted	At project road locations with drainage structures		
3.	Air and Noise Quality	o Placing sign boards for speed limitation and honking restrictions to be enforced near sensitive locations. o Removal of dust & mud collected on road surface to avoid dust emanation o Strategically locating compensatory plantation along	Throughout the road		

SL. NO.	Environmental Attributes	Mitigation Measures	Location	Compliance status (Complied, partly complied, not complied)	Corrective action proposed if any
		sensitive noise receptors to provide additional attenuation o Installation of noise and dust barriers if levels are found to exceed required standards.			
4.	Site restoration	o All construction camp/temporary office/material storage areas are to be restored to its original conditions or as agreed with the land owner. o The borrow areas rehabilitation will be as per the conditions laid down in GSMB approval.	All locations of construction camps/temporary office/ material storage, and borrow areas		
5.	Tree replanting	o Contractor to undertake survivability assessment and report to PIU the status of compensatory tree plantation. o Additional plants should be planted for dead plants if any	Tree replanted areas		
6.	Occupational Health and Safety	o The requisite PPE (helmet, mask, boot, hand gloves, earplugs) shall be provided to the construction workers and it should be ensured that labourers use PPE during working hours. o First aid facility should be readily available at the construction site o Septic tank or mobile toilets fitted with anaerobic treatment facility shall be provided at construction camp/temporary office/storage areas. o Domestic solid waste at construction camp shall be properly collected and handed over to the solid waste collecting system of LA. o Records on health and safety related accidents measures taken to address must be maintained	Throughout the project road and camp sites if any		