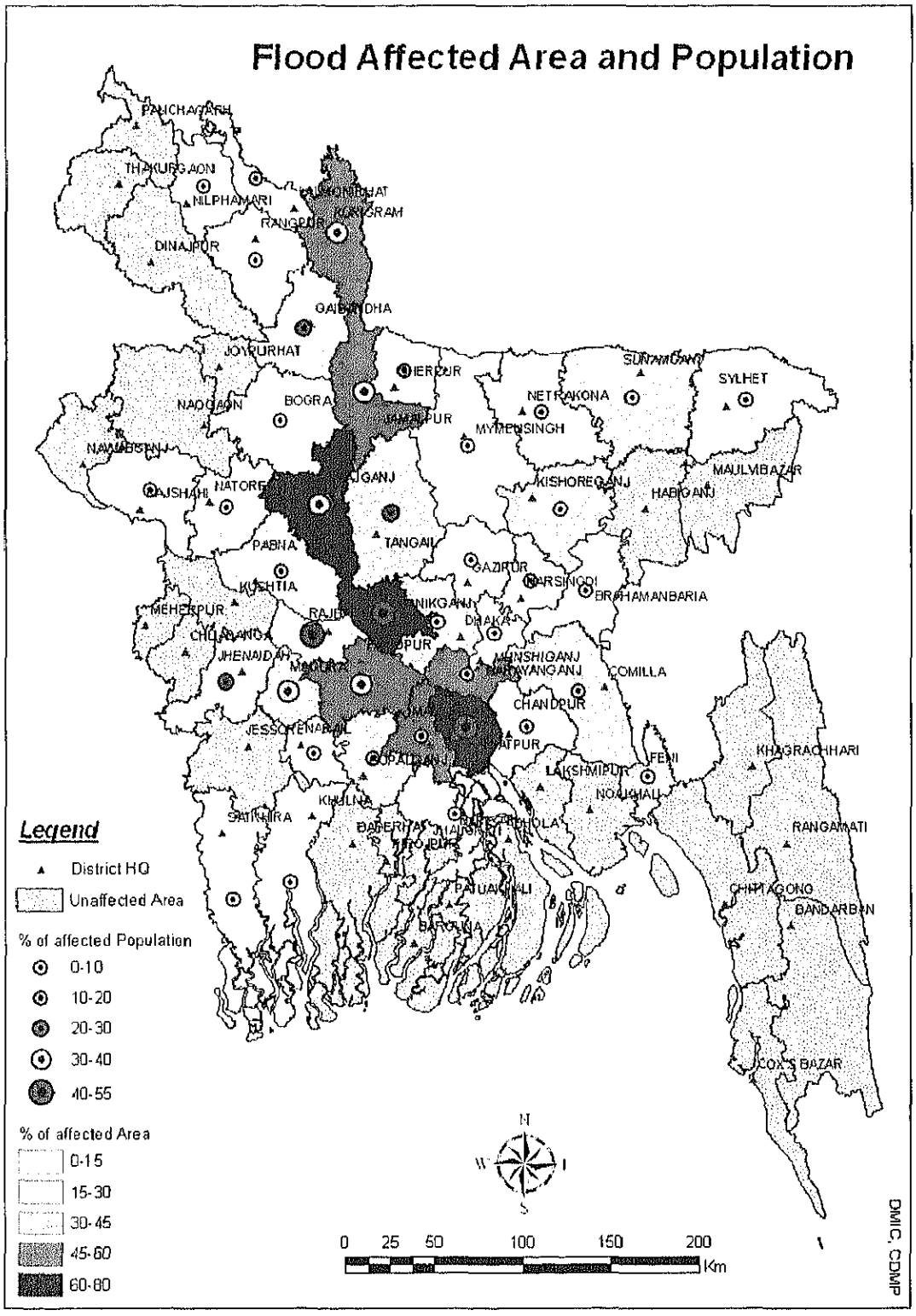


Source: Disaster Management Bureau (2007)

Figure 3-2 Flood-affected area and population of the 2007 floods

(2) Flood damage to infrastructure under the responsibility of LGED

Table 3-30 shows the assessment of the damage from the 2007 floods to the infrastructure under the responsibility of LGED. The damage varied from minor impact to embankments and pavements to total destruction and loss of a significant proportion of the roads. Bridges and culverts, markets, ghats, and drains also experienced minor to extensive damage. In a few cases, infrastructure was totally destroyed by the water movement. Such damage was found in 46 Districts.

Table 3-30 Damage to infrastructure under LGED responsibility by the 2007 floods

Type of infrastructure	Extent of damage	Total estimated cost of rehabilitation	
		(Mill. Tk.)	(%)
Rural infrastructure		**8,407**	**71.9**
Road (paved and unpaved)	10,754 km	6,979	59.7
Bridge and culvert	20,496 m	1,368	11.7
Growth center	122 locations	16	0.1
School and building	309 locations	44	0.4
Urban infrastructure		**3,203**	**27.4**
Road	1,823 km	2,866	24.5
Drain	45,687 m	132	1.1
Bridge and culvert	992 m	168	1.4
Others	40 locations	38	0.3
Small-scale water resources infrastructure		**89**	**0.8**
Embankment	216 km	54	0.5
Khal	62 km	8	0.1
Structure	176 locations	27	0.2
Total		**11,698**	**100.0**

Source: Project Monitoring and Evaluation Unit, LGED (2007)

In terms of costs, 72% of the total damage occurred within the rural infrastructure sector, 27% in the urban infrastructure sector, and 0.8% to the facilities of the small-scale water resources infrastructure sector. In the rural infrastructure sector, rural roads, and bridges and culverts were most severely affected, which hindered the socioeconomic activities of rural communities. In the rural infrastructure sector, a total of tk. 8,407 million was to be required for the post-flood rehabilitation. The estimated rehabilitation cost for the 10,754 km of rural roads was tk. 6,979 million, and tk. 1,368 million for the 20,496 m of bridges and culverts.

In the urban infrastructure sector, it was estimated that a total of tk. 3,203 million would be required to restore roads, drains, and bridges and culverts. Similarly, in the small-scale water resources infrastructure sector, tk. 89 million was estimated to be required for the rehabilitation of embankments, khal, and other structures in 29 Districts.

(3) Flood rehabilitation projects under LGED

To restore the flood-damaged infrastructure, GOB has taken on a series of post-flood rehabilitation projects using its own funds. As shown in Table 3-31, a total of tk. 2,000 million was budgeted in the Supplemental ADP for FY 2007/08. An additional budget was allocated to the ongoing projects for rehabilitation work. In addition, ADB provided tk. 2,791 million through the Emergency Disaster

Damage Rehabilitation Project (EDDRP), which is financially supported by JBIC[21] and CIDA as well. The allocation of the EDDRP funds is shown in Table 3-32. The World Bank also provided tk. 2,300 million for rehabilitation activities through the Rural Transport Improvement Project (RTIP). Thus, a total of tk. 7,091 million were allocated to emergency recovery operations in FY 2007/08 ,which was about 61% of the estimated total cost of rehabilitation at tk. 11,698 million. Up until now, the physical progress of EDDRP is 30%, and 25% of the loan funds have been disbursed, while the rehabilitation activities under RTIP have been initiated only recently.

Table 3-31 GOB's supplementary budget allocation for the 2007 floods rehabilitation

	Project name	2007/08 ADP allocation (million Tk.)					
		Original allocation			Supplemental budget for flood rehabilitation		
		Total	GOB	Donor	Total	GOB	Donor
1	Rural Development-24: Greater Faridpur Rural Infrastructure Development Project	306	221	85	250	250	0
2	Greater Jessore District Infrastructure Development	246	246	0	150	150	0
3	Greater Khulna District Infrastructure Development	160	160	0	100	100	0
4	Rural Infrastructure Development Project: Greater Mymansingh District	622	622	0	250	250	0
5	Cyclone Rehabilitation Project: Whole Coastal Area (2nd Phase)	500	500	0	100	100	0
6	Greater Dhaka District Infrastructure Development	259	259	0	250	250	0
7	Rural Infrastructure Development Project	600	418	182	100	100	0
8	Greater Bogra, Rajshahi & Pabna District Infrastructure Development Project	502	502	0	300	300	0
9	Greater Rangpur & Dinajpur District Rural Infrastructure Development Project	238	238	0	150	150	0
10	Rural Development Project: Greater Comilla	170	170	0	200	200	0
11	Sylhet Division Rural Infrastructure Development Project (2nd Phase)	500	220	280	150	150	0
Total		**4,101**	**3,554**	**547**	**2,000**	**2,000**	**0**

Source: Annual Development Budget, GOB (2008)

Table 3-32 Activities of EDDRP

Activity	Quantity		Estimated Cost (Million Tk)
Rehabilitation of Upazila & Union Roads	5,000	km	1,921
Rehabilitation of Bridge / Culvert on Upazila & Union Road	8,000	m	800
Rehabilitation of Protection Works	30	km	60
Rehabilitation of flood Refuges Shelter	12	shelters	6
Rehabilitation of Cyclone Shelter	9	shelters	4
Total			2,791

Source: Development Project Proposal of EDDRP, LGED (2007)

[21] JBIC and JICA merged to become new JICA on October 1, 2008.

3.7.2 Cyclone Sidr

(1) Damage caused by Cyclone Sidr

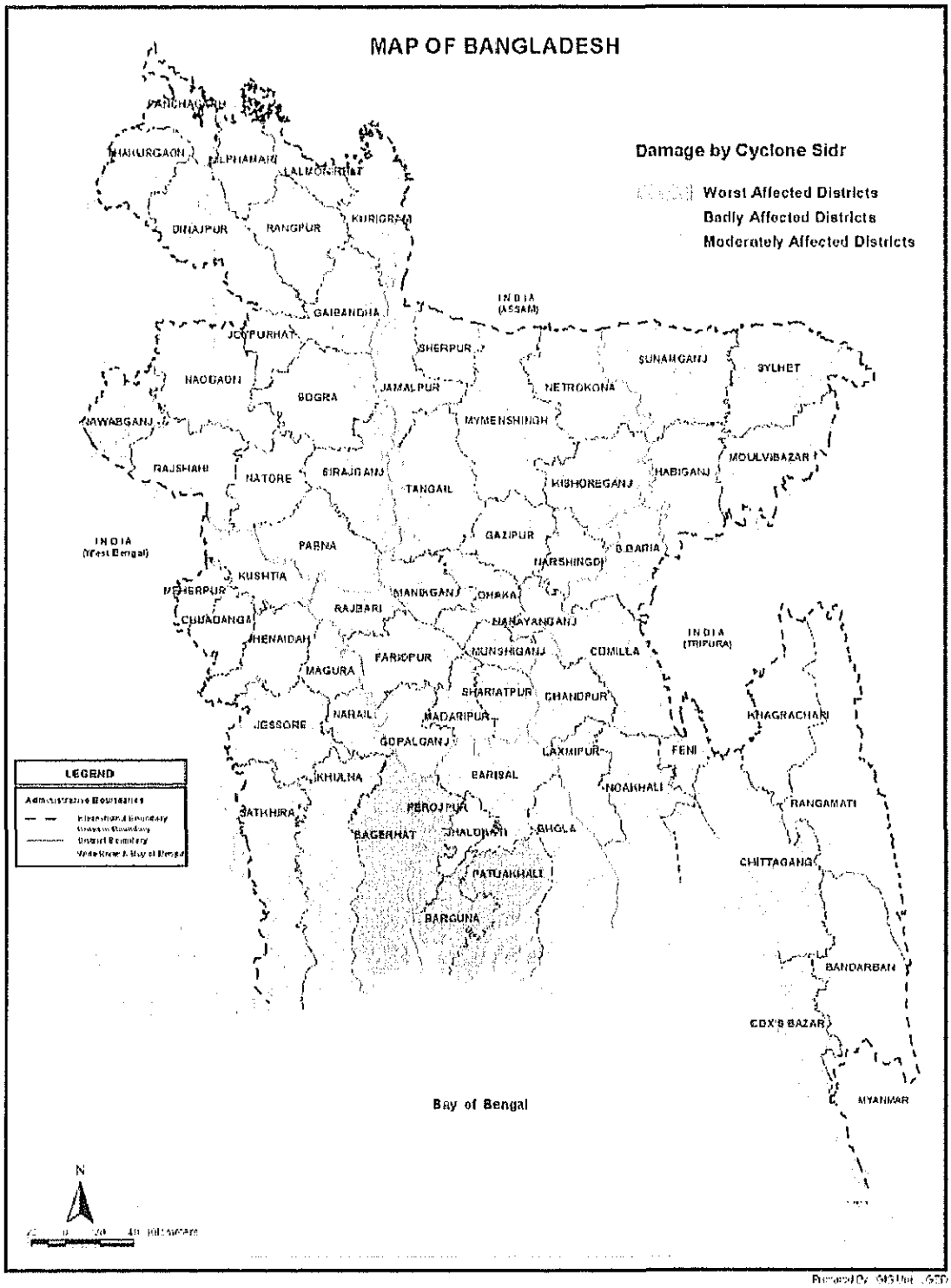
On the evening of November 15, 2007 at around 6:00 p.m., Sidr, a Category-4 super cyclone, hit the coasts of south-western Bangladesh, with winds up to 240 km per hour. The cyclone continued moving northwards, hitting the capital city of Dhaka at around 3:00 a.m. on the following day. Tidal waves up to five meters high hit the mainland, destroying many protection embankments, houses, and other infrastructure.

The extent of the destruction was not immediately known, as telephone communication and electricity supply were cut off in most parts of the country. It took a number of days for these services to be restored. Road blockages by debris kept the District officials from undertaking an initial assessment of the damage. By November 17, the search, rescue, and relief activities had been scaled up considerably. However, accessibility to the affected areas was still a problem. Telephone communication was partially restored, but power supply in many areas was still out. The United Nations launched a Rapid Initial Assessment mission to the affected Districts and, working in collaboration with government officials, was able to provide a detailed report within six days of the initial impact.

As shown in Figure 3-3, the Bagerhat, Barguna, Patuakhali, and Pirojpur Districts were the worst affected, while Barisal, Bhola, Faridpur, Gopalganj, Jhalakati, Khulna, Madaripur, Shariatpur, and Satkhira Districts were also badly affected. All of these Districts belong to the SWBRDP area .

Almost nine million people in 1,950 unions of 200 Upazilas under 30 southern Districts were affected by the cyclone. The largest number of people affected were in Bagerhat District (1,221,788), followed by Pirojpur (1,011,359), Barisal (846,076), and Barguna Districts (843,669). The most recent report indicates a death toll of 3,406 people, in addition to 1,001 missing, and over 55,000 injured. The total number of houses damaged was estimated at 1,522,077. The highest death toll was reported in Barguna District (1,335), followed by Bagerhat (810), Patuakhali (457), and Pirojpur (400). This indicates that 88% of the total recorded deaths occurred in these four worst-affected Districts.

Extensive damage to roads, bridges and culverts, and protection embankments was also reported. Public buildings, including 2,240 educational institutions, were damaged in addition to those 11,490 buildings which were partially damaged. Electricity and communication networks were knocked out, and roads and waterways became impassable. The cyclone caused contamination of drinking water sources, particularly wells and ponds, which were spoiled by debris and leaves, as well as by dead human bodies and animal carcasses. Many ponds were inundated by saline water brought by the tidal waves. Sanitation infrastructure was also damaged. The total cost of damage was estimated at US$ 2.3 billion.



Source: GIS Unit, LGED (2008)

Figure 3-3 Districts Affected by Cyclone Sidr

(2) Cyclone Sidr damage to rural infrastructure under the responsibility of LGED

After Sidr, LGED assessed the extent of damage to rural infrastructure and estimated a total loss of infrastructure caused by Sidr worth tk. 4,905 million. The cost of damage by sector is shown in Table 3-33. Damage to the rural and urban infrastructure sectors accounts for 67% and 32% of the total cost of damage, respectively.

Table 3-33 Cost of damage from Cyclone Sidr by sector, assessed by LGED

Sector	Cost of damage	
	(Mill. Tk.)	(%)
Rural Infrastructure	3,277	66.8
Urban Infrastructure	1,562	31.8
Small-scale Water Resource Infrastructure	65	1.3
Total	**4,905**	**100.0**

Source: Project Monitoring and Evaluation Unit, LGED (2007)

Table 3-34 Cyclone Sidr damage to rural infrastructure under LGED responsibility

District[*1]	Road		Bridge/ culvert (m)	Bridge approach (m)	Other infrastructure	Estimated rehabilitation cost	
	Paved (km)	Un-paved (km)				(million tk.)	(% to the total)
Barisal Division	*1,449*	*898*	*6,471*	*1,231*		*1,973*	*60.2%*
Barguna	362	203	1,797	480	16 growth centers, 5 UPCs	488	14.9%
Barisal	253	134	1,529	51	11 growth centers, 9 UPC, 2 helipads	102	3.1%
Bhola	80	46		700	10 growth centers	115	3.5%
Jhalakathi	121	52	855		8 growth centers, 1 UPC	75	2.3%
Patuakhali	239	232	877		17 growth centers, 7 UPCs	293	8.9%
Pirojpur	394	232	1,413		26 growth centers	900	27.4%
Chittagong Division	*30*	*72*	*77*	*140*		*44*	*1.3%*
Chandpur	10	20	25	50		14	0.4%
Lakshmipur	12	30	40	70		19	0.6%
Noakhali	8	22	12	20		11	0.3%
Dhaka Division	*4*	*23*		*200*		*8*	*0.3%*
Munshiganj	4	23		200		8	0.3%
Greater Faridpur	*20*	*45*	*150*	*820*		*38*	*1.2%*
Gopalgonj	15	20	150	350		26	0.8%
Madaripur					1 growth center	1	0.0%
Shariatpur	5	25		470		12	0.4%
Khulna Division	*485*	*632*	*1,180*	*400*		*1,214*	*37.0%*
Bagerhat	336	586	1,140			1,128	34.4%
Jessore	49					40	1.2%
Khulna	86	28			6 ferry ghats	24	0.7%
Satkhira	14	18	40	400		23	0.7%
Total	**3,976**	**3,340**	**15,757**	**5,582**	**83 growth centers, 22 UPCs, 2 helipads, 6 ferry ghats**	**3,277**	**100.0%**

Note: 1) Names of districts in bold are target Districts for SWBRDP.
Source: Project Monitoring and Evaluation Unit, LGED (2007)

In terms of estimated rehabilitation costs, most of the damage to the rural infrastructure, urban infrastructure, and infrastructure developed by the Small-scale Water Resources Development Sector Project (SSWRDSP) was observed in the Project area. According to the estimates shown in Table 3-34, about 60% of the total rehabilitation cost of rural infrastructure was incurred in the six Project Districts in Barisal Division, and 35% was incurred in Bagerhat District, which is also a Project District in Greater Khulna. With regard to urban infrastructure, more than 90% of the damage was reported in the Project Districts in Barisal Division, Greater Khulna, and Greater Faridpur. Furthermore, damage to the infrastructure developed by SSWRDSP was concentrated in the five Project Districts.

(3) Immediate responses from national and international organizations

Immediately after the cyclone, a number of national organizations launched relief operations. BRAC, for instance, distributed more than 80,000 food packets to families in 11 Districts, and dispatched 13 medical teams, which treated more than 7,800 patients. BRAC, ADRA[22] and other national NGOs delivered food and non-food relief items to the affected families. Grameen Bank, BRAC, and ASA waived loan payments for their micro-credit group members who had been affected by the cyclone.

Although no formal international appeal was made by the government, foreign assistance was welcomed. The international community was quick to respond and committed approximately US$ 221.9 million to cyclone relief as of January 22, 2008. By far, the biggest contribution was from the Kingdom of Saudi Arabia with a pledge of US$ 102.8 million (i.e., 46.3% of the total aid from the international community). The World Bank pledged up to US$ 250 million, and ADB formulated a relief and reconstruction proposal worth US$ 150 million.

The International Federation of the Red Cross and World Vision launched relief operations in the most severely-affected Districts on November 18 and November 16, 2007, respectively. They distributed plastic sheets, blankets, and cash, as well as family packages that included rice, lentils, and oil. As of December 3, 2007, WFP distributed High Energy Biscuits and rice through its NGO partners to 249,187 families in the affected Districts. United Nations Development Programme (UNDP), United Nations Children's Fund (UNICEF), OXFAM, SCF Alliance, World Vision, Care Bangladesh, Islamic Relief, Caritas, Christian Aid, Concern Worldwide, and Action Aid Bangladesh also distributed relief packages.

(4) Newly-established cyclone rehabilitation programs under LGED

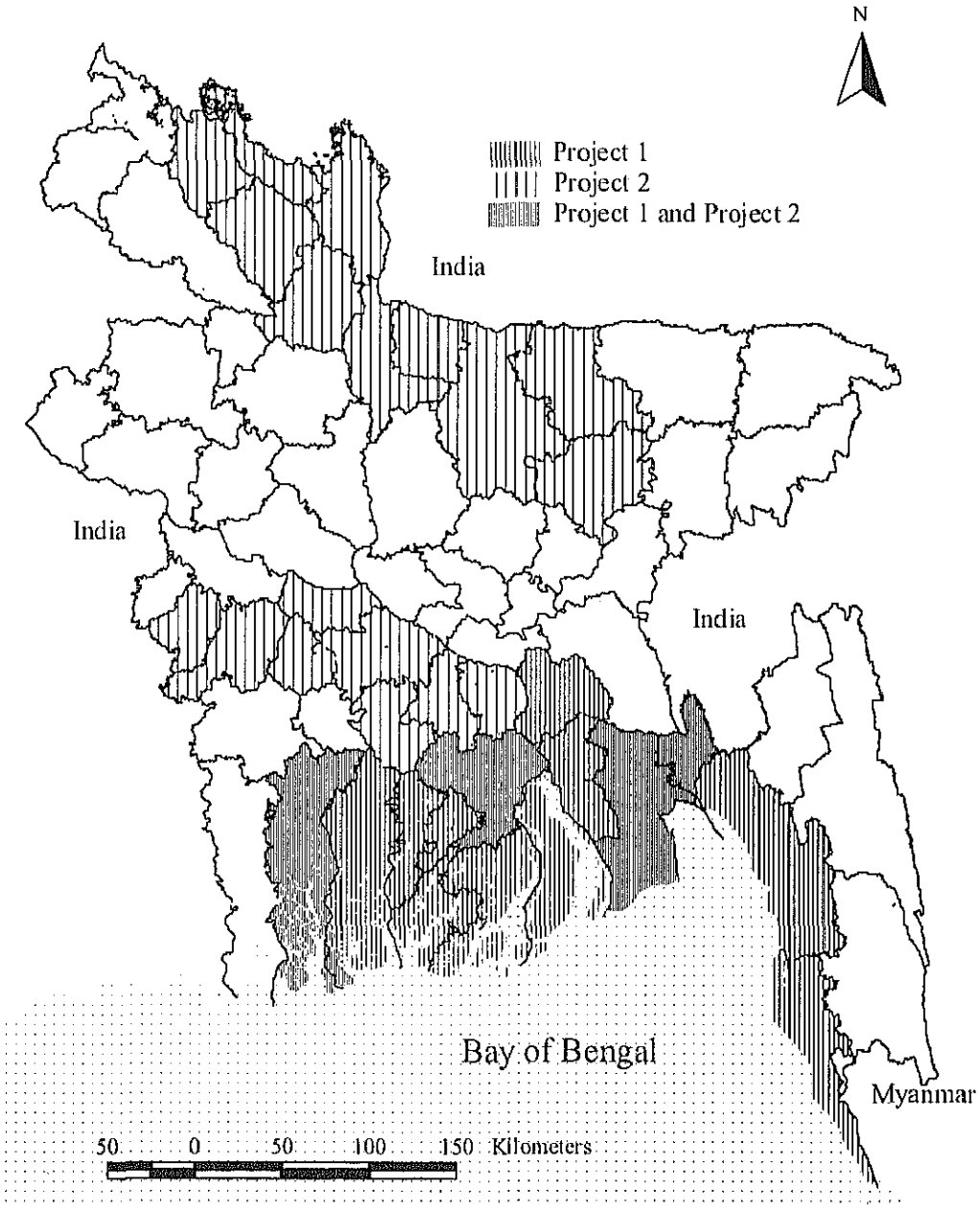
After Sidr, a series of schemes and projects have been established and implemented by LGED for the rehabilitation of infrastructure in the affected areas. Some of these rehabilitation programs are implemented through ongoing LGED projects, as described in the next subsection, and some are implemented separately as new projects, as described below.

Emergency Disaster Damage Rehabilitation (Sector) Project-2007 (Part-B, Rural Infrastructure)

With an estimated cost of tk. 3,085 million, this short-term project was prepared and took effect in January 2008 specifically to restore the infrastructure damaged by the cyclone as well as by the floods

[22] Adventist Development and Relief Agency

in 2007. The project will connect the existing and newly-built cyclone shelters including the 2000 shelters to be constructed by other projects in the coastal belt areas. GOB, ADB, Canadian International Development Agency (CIDA), and JBIC[23] is financing the project costs. The activities of this project were summarized above in Table 3-32. The coverage areas of this project and the disaster damage rehabilitation project that started earlier, the Cyclone Rehabilitation Project: Entire Coastal Area (Phase-II), are illustrated in Figure 3-4.



Project 1: Cyclone Rehabilitation Project: Entire Coastal Area (Phase-II)
Project 2: Emergency Disaster Damage Rehabilitation (Sector) Project-2007 (Part-B, Rural Infrastructure)

Figure 3-4 Project Districts of the two disaster rehabilitation projects included in ADP 2008/09

[23] JBIC and JICA merged to become new JICA on October 1, 2008.

Multipurpose Cyclone Shelters Construction Project of Cyclone (Sidr) Affected Areas

Under the JICA grants, the Multipurpose Cyclone Shelters Construction Project of Cyclone (Sidr) Affected Areas, with an estimated cost of tk. 730 million, has been developed by LGED and approved by the Planning Commission. The project will construct 38 multi-purpose cyclone shelters in the four severely-affected Districts of Pirojpur, Patuakhali, Barguna, and Bagerhat. Moreover, JICA has already allocated a tk. 34 million grant for the emergency rehabilitation of those four worst-affected Districts.

(5) Rehabilitation schemes carried out under LGED projects

LGED incorporated cyclone recovery and rehabilitation activities into a number of ongoing projects by obtaining supplemental budgetary allocations and/or modifying their original project plans. Examples of such projects are given below.

Rural Road and Culvert Maintenance Program

Immediately after the cyclone, LGED restored road communication in seventeen affected Districts under the Rural Road and Culvert Maintenance Program for a cost of tk. 17 million. For FY 2007/08, LGED secured tk. 217 million for the repair, reconstruction, and maintenance of the damaged roads, bridges, and culverts for 366 schemes under the program. The program allocates about 80% of the total funds to the schemes in the Project Districts, equivalent to about 4% of the estimated total rehabilitation cost of tk. 4,905 million.

Rural Road and Market Access Infrastructure Development Project (RRMAIDP)

Under the RRMAIDP supported by DANIDA, the construction of 56 m and 100 m of reinforced cement concrete (RCC) bridges is being undertaken for a cost of tk. 16.6 million and tk. 40 million, respectively. The rehabilitation work of Nishanbari Bridge (119 m) on the Undermanik River at Kalapara-Tairkada road of Patuakhali District has been completed at the cost of tk. 1.1 million.

Agriculture Sector Assistance Project-2

For the rehabilitation of the damaged paved and earthen roads, bridges, culverts, growth centers, and hat bazaars, 95 schemes have been undertaken with an estimated total cost of tk. 259.8 million in the Patuakhali, Barguna, Noakhali, and Laxmipur Districts. To date, 10% and 3.85% of the physical and financial aspects, respectively, of the rehabilitation work have been completed .

Cyclone Rehabilitation Project: Entire Costal Area Project (Phase-II)

With an estimated cost of tk. 100 million, 75 schemes have been undertaken to rehabilitate 36 km of Upazila roads, 73 km of union roads, 400 m of bridges and culverts, and two growth centers in the Barisal District. A map indicating the project area is given in Figure 3-4.

Construction and Reconstruction of Roads, Bridges & Culverts in Rural Areas on Priority Basis (Part-III)

Based on the decision of the Planning Commission, tk. 500 million has been allocated to the rehabilitation of damaged bridges and culverts under this project. So far, 15% of the physical work has been completed.

Rural Development Project: Greater Noakhali & Chittagong Districts; and Rural Infrastructure Development Project (Part-II)

To rehabilitate cyclone-damaged roads, bridges, and culverts, an additional tk. 500 million was allocated to both the Rural Development Project of Greater Noakhali and Chittagong Districts, and the Rural Infrastructure Development Project (Part-II). Development Project Proposals for both projects have been revised, and steps have been taken to implement rehabilitation activities.

3.7.3 Rehabilitation needs of the 2007 floods and Cyclone Sidr affected roads

(1) Field examination of the 2007 floods and Cyclone Sidr affected roads

a) Earthen roads

As earthen roads are generally constructed with soft, silty clay and sandy soil in the Project area, they were especially susceptible to damage during the 2007 floods and Cyclone Sidr. Due to the floods and cyclone, the top surfaces of roads became muddy, and deep potholes were formed along the road top. Side slopes were eroded in many places.

In addition to the strengthening of road surfaces with bituminous carpeting (BC), the embankment height, width, and side slope improved by earth filling and slope protection works are required. As earthen roads are vulnerable to heavy rain and flooding, earthen segments of the roads should receive the highest priority for upgrading to BC in SWBRDP from the viewpoint of disaster mitigation and strengthening of the rural road network.

b) HBB road

Some portions of the road surface were deflected downward due to the 2007 floods and Cyclone Sidr. Potholes developed, and serious damage was incurred on some roads. In some places, parts of the herring bone bond (HBB) surface slid off, and bricks were completely lost due to erosion of the embankment.

When reconstructing HBB roads, upgrading to BC surface is recommended, as it will strengthen the roads' capacity to withstand floods. Moreover, proper earthwork, suitable retaining walls, and block placing should be provided for embankment protection, which will help resist wave action and prevent soil erosion during floods and cyclones.

c) BC road

Some portions of the pavement surface were found to be deflected downwards. Potholes were developed, serious damage was inflicted in some places, and parts of BC were eroded and worn out. On some roads, deep potholes and serious damage occurred during the floods and cyclone, most likely due to the use of substandard pavement designs. In the future, road designs should follow the standard specifications, in respect to pavement thickness at a minimum. This pertains to SWBRDP as well. According to the field observations, most of the affected BC roads require rehabilitation under LGED's maintenance project.

(2) Inclusion of the affected Upazila roads in the SWBRDP subproject candidate list

An updated version of the list of Upazila roads to be upgraded under SWBRDP, reflecting the flood and cyclone damage assessment, was provided by LGED during the Kick-off Meeting of SAPROF on July 3, 2008. As shown in Table 3-35, 30% of the proposed Upazila roads for upgrading on the new list are those that were affected by Cyclone Sidr. They are mostly located in Barisal Division. Eight percent of the proposed roads are those that were affected by the 2007 floods. They are mainly in Greater Faridpur.

Table 3-35 Upazila roads proposed for upgrading under SWBRDP in the updated list of F/S

District		Unaffected roads		Roads affected by the 2007 floods		Roads affected by Cyclone Sidr		Grand Total	
		No. of roads	Road length (km)	No. of roads	Road length (km)	No. of roads	Road length (km)	No. of roads	Road length (km)
Barisal Division	Barguna	3	27			5	62	8	90
	Barisal	9	107	1	11	6	89	16	207
	Bhola	6	58			2	28	8	86
	Jhalakati	2	20			5	68	7	88
	Patuakhali	6	82			9	119	15	201
	Pirojpur	7	87			5	56	12	143
	Sub-total	**33**	**381**	**1**	**11**	**32**	**422**	**66**	**814**
Greater Faridpur	Faridpur	8	89	2	23			10	112
	Gopalganj	4	36	1	10	1	14	6	59
	Madaripur	4	45					4	45
	Rajbari	4	50	2	21			6	71
	Shariatpur	5	38	2	26	1	6	8	69
	Sub-total	**25**	**257**	**7**	**80**	**2**	**20**	**34**	**357**
Greater Khulna	Bagerhat	9	79			5	54	14	133
	Khulna	11	148	3	41	2	28	16	217
	Satkhira	7	107					7	107
	Sub-total	**27**	**334**	**3**	**41**	**7**	**82**	**37**	**457**
Total		**85**	**973**	**11**	**132**	**41**	**524**	**137**	**1,628**
(% to Grand Total)		**62%**	**60%**	**8%**	**8%**	**30%**	**32%**	**100%**	**100%**

Source: LGED and SAPROF study team

The rehabilitation costs of the 2007 floods are estimated at tk. 11,698 million, whereas the total allocation of funds for emergency recovery operations in FY 2007/08 was approximately tk. 7,091 million, i.e., about 61% of the total estimated cost of rehabilitation. Thus, inclusion of the roads affected by the 2007 floods in the list of candidate Upazila roads to be upgraded under SWBRDP is justified, as it should accelerate the recovery from flood damages.

For the Cyclone Sidr-affected roads, the expected allocation of the budget (approximately tk. 7,800 million) over multi-year project periods exceeds the estimated recovery costs of tk. 4,905 million. However, since the completion of the recovery schemes already introduced will take several years, and

the Cyclone-affected candidate roads have not yet been selected for rehabilitation by other projects, inclusion of the roads in the list of candidate roads to be upgraded under SWBRDP is recommended. If any of these roads are taken up by other projects for upgrading, however, such roads can be excluded from upgrading under SWBRDP.

3.8 Relevant projects

There are 22 nation-wide projects implemented by LGED in the Agriculture, Education, Maintenance, Rural Development and Institution, and Transportation sectors covering all of Bangladesh. Based on the information obtained from District offices, at least 11 such projects are currently implemented in the Project area. Of the 11 projects, six are Rural Development and Institution sector projects. The names and reference numbers of the six projects are given below. Brief information on these projects can be found in Table 2-17.

- Construction of UPC Building (No 1)
- Construction of Bridge on Upazila & Union Road (Formal Construction of Portable Steel Bailey Bridges under Netherlands Assistance ORET Programme) (No 4)
- Construction and Reconstruction of Roads, Bridges & Culverts in Rural Areas on Priority Basis (Part-III) (No 7)
- Construction of Light Traffic Bridge on Rural Roads Project (No 21)
- Project for the Provision of Portable Steel Bridges on Upazila & Union Roads (No 23)
- Construction of Steel Baily Bridge Project (3rd Phase) (No 27)

There are 14 area-specific projects currently in operation, of which five are being implemented in the Project area. A brief explanation of the five projects is given below.

Rural Development Project-24: Greater Faridpur Infrastructure Development (RDP-24)

The project covers 27 Upazilas of five Districts under Greater Faridpur. The project started with GOB's own financing in July 1998 and its main activities were closed in June 2008[24]. JBIC[25] has been providing loans to this project since 2001. The total cost of the project was tk. 4,759 million, excluding the additional cost for the 2007 disaster recovery. This was shared by JBIC (44%), Debt Relief Grant Assistance (DRGA) (36%) and GOB (20%). Major physical components included in the project are improvements to 576 km of Upazila roads and 215 km of union roads, construction of 6,457 m of bridges and culverts on Upazila roads, construction of 2,046 m of bridges and culverts on union roads, and development of 62 growth centers and 27 UPCs. The project has provided facilitation and coordination services to UPCs in the form of LDCP for strengthening UP capacity.

Rural Infrastructure Improvement Project-25 (RDP-25)

The project commenced in July 2003 and will continue until 2009. The project area includes 16 Districts of Greater Kushtia, Greater Jessore, Greater Khulna, Greater Barisal, and Greater Patuakhali. The initial total cost of the project, tk. 6,798 million (US$ 117 million), is shared by ADB (51.2%),

[24] Only the disaster rehabilitation works remain.
[25] JBIC and JICA merged to become new JICA on October 1, 2008.

KfW (12.8%), GTZ (5.1%) and GOB (30.9%). Major physical components included in the project are improvements to 1,060 km of Upazila roads and 50 km of union roads, construction of 5,050 m of bridges and culverts on Upazila roads and union roads, development of 68 growth centers, 100 UPCs, and 55 ghats, and construction and installation of five small ferries.

Emergency Disaster Damage Rehabilitation (Sector) Project-2007 (Part-B, Rural Infrastructure)
The project was set up specifically to restore infrastructure damaged by the cyclone and 2007 floods, with an estimated cost of tk. 3,085 million. A brief description of this project is given earlier in subsections 3.7.1 and 3.7.2 with a table summarizing its activities (Table 3-32) and a map of the project areas (Figure 3-4).

ASPS-II: Rural Road & Market Access Infrastructure Development Project
The project was launched under the Agriculture Sector Program Support (ASPS)-II with the objective of improving the efficiency and sustainability of rural roads and market infrastructure, and the efficiency of LGED's maintenance management. The project covers Patuakhali and Barguna Districts of Barisal Division, and Noakhali and Laxmipur Districts of Chittagong Division. The total cost of the project is approximately tk. 3,000 million, of which DANIDA will contribute tk. 2,100 million and GOB tk. 900 million. The major physical components of the project are improvements to 112.5 km of Upazila roads and 212 km of union roads, construction of 1,379 m of bridges and culverts on Upazila roads and union roads, upgrading of 212 km of village road, construction of 1,000 m of bridges and culverts on village road, development of 72 growth centers and 24 UPCs, 100 km of road maintenance, and 480 km of tree-planting.

Market Infrastructure Development Project in Charland Regions
The project is implemented with assistance from IFAD and the Government of Netherlands. The project period is 2006 to 2013. The total estimated cost is tk. 2,944 million. GOB (16.9%), NGOs and micro finance institutions (9.9%), beneficiaries (3.3%), a grant from the Government of Netherlands (11.2%), and IFAD loan (58.8%) contribute to cover the total project costs. The infrastructure development components of the project consist of 65 small markets, five assembly markets, 150 km of union roads, 290 km of village roads, and 40 ghats. The project covers 20 Upazilas of the five Districts of Noakhali, Laxmipur, Barisal, Bhola, and Patuakhali.

On the one hand, in order to maximize the development effect of SWBRDP, coordination and collaboration with the above-mentioned area-specific projects covering the Project area as well as the relevant nation-wide projects is required. For example, roads to be developed by SWBRDP can connect growth centers, UPCs, cyclone shelters, and other important facilities for rural people developed by other projects when other projects have no plans to develop such a road. Conversely, SWBRDP can give priority to development of growth centers whose road access has been improved by other projects. In addition, lessons learned by projects with a similar scope to that of SWBRDP should be utilized. On the other hand, as the gaps between the targets set by the Master Plan and the actual progress are still large compared to the ongoing and planned investments, and the two major projects in the Project area, RDP-24 and -25, will terminate by 2009, there will be no duplication of investments as long as planning is done properly.

3.9 Capacity of LGED in the Project area

(1) Staff deployment

The total number of those employed in the LGED offices in the circles, Districts, and Upazilas within the Project area is about 2,060. Of these, about 21 are in circle, 199 in District, and 1,840 in Upazila offices. They include 620 engineers, 14 sociologists, 92 community organizers, 795 other professionals, and 539 non-technical staff. The LGED circle offices in Khulna, Faridpur, and Barisal Districts have Regional Training Centers. The LGED offices in these Districts are also equipped with laboratory facilities so that samples of constructed roadbeds can be tested for quality control.

(2) ADP Expenditures

The Annual Development Program (ADP) expenditures in the Project area have increased over the years. The total ADP expenditure in FY 2007/08 was tk. 3,886 million, which is almost a three-fold increase as compared to tk. 1,445 million ten years earlier in FY 1998/99 (Figure 3-5 and Table 3-36). However, in 1998 constant tk., the real-term improvement is about two-fold. ADP expenditures in FY 2007/08 ranged from tk. 69 million in Bhola District to tk. 652 million in Barisal District.

(3) District-level project implementation arrangements for ongoing projects in the Project area

The number of projects in the Project area included in ADP for implementation by the LGED District offices ranged from six to 18 in 2007/08. Greater Faridpur Infrastructure Development Project (RDP-24) and Rural Infrastructure Improvement Project-25 (RDP-25) are the two major projects in the Project area.

In RDP-24 and RDP-25, 11 to 17 LGED officials and one to five consultants are engaged in each District for project implementation (Table 3-37). Budget allocation for the two projects in the Project area in FY 2007/08 ranged from tk. 25 million for Rajbari District to more than tk. 221 million for Barguna District. The number of contracts awarded ranged from four to 34. The data shown here is utilized later to draft the project plan for SWBRDP.

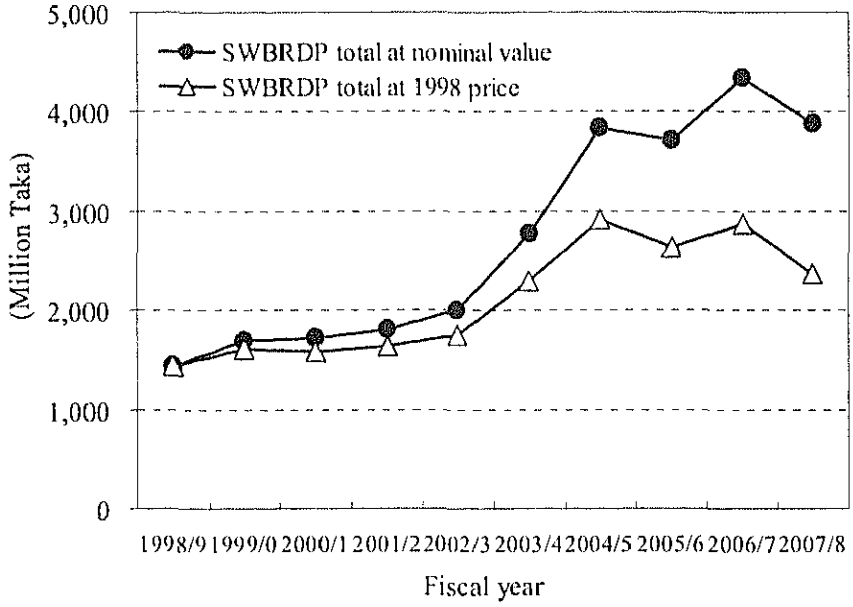


Figure 3-5 Evolution of ADP expenditures in the Project area

Table 3-36 LGED's District-wise ADP expenditures in the Project area

(million tk.)

District		Fiscal Year									
		1998/9	1999/0	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8
Barisal Division	Barguna	106	114	123	135	159	240	257	311	390	455
	Barisal	19	76	147	217	186	266	454	455	710	653
	Bhola	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	99	145	95	69
	Jhalakati	58	83	139	154	172	274	398	508	608	385
	Patuakhali	165	197	200	125	20	205	262	220	291	373
	Pirojpur	15	33	31	29	38	48	202	122	38	90
	Sub-total	**363**	**502**	**640**	**660**	**576**	**1,034**	**1,670**	**1,760**	**2,131**	**2,025**
Greater Faridpur	Faridpur	200	247	232	208	163	292	424	388	316	326
	Gopalganj	230	135	96	164	249	265	355	234	238	219
	Madaripur	140	220	206	160	216	218	264	225	278	204
	Rajbari	83	62	96	110	152	147	241	179	188	163
	Shariatpur	104	158	203	235	281	327	383	341	408	328
	Sub-total	**757**	**822**	**833**	**876**	**1,061**	**1,249**	**1,666**	**1,368**	**1,428**	**1,240**
Greater Khulna	Bagerhat	35	35	39	40	45	51	53	75	63	71
	Khulna	166	184	107	161	211	213	207	213	343	289
	Satkhira	124	158	103	76	105	233	244	301	372	260
	Sub-total	**326**	**377**	**250**	**277**	**361**	**496**	**504**	**590**	**778**	**621**
Total		**1,445**	**1,702**	**1,723**	**1,814**	**1,999**	**2,780**	**3,840**	**3,718**	**4,336**	**3,886**

Table 3-37 ADP allocation, involvement of LGED staff and consultants, and contract awards in 2007/08 for RDP-24 and RDP-25 in the Project area

Project / District	Human resource input			Budget allocation	Number of contracts awarded	Management indicators		
	LGED project Staff (no.)	Consultant (no.)	Project staff total (no.)	(mill. tk)	(no.)	Size of contract (mill.tk/ contract)	Budget/ staff (mill.tk/ staff)	Contracts/ staff (no./staff)
	a	b	c=a+b	d	e	f=d/e	g=d/c	g=e/c
A. RDP-24								
Faridpur	11	5	16	62.7	5	12.5	3.9	0.3
Gopalganj	17	4	21	19.6	14	1.4	0.9	0.7
Madaripur	13	4	17	10.5	8	1.3	0.6	0.5
Rajbari	11	3	14	25.0	6	4.2	1.8	0.4
Shariatpur	13	2	15	73.0	9	8.1	4.9	0.6
Greater Faridpur	**65**	**18**	**83**	**190.8**	**42**	**4.5**	**2.3**	**0.5**
B. RDP-25	**108**	**12**	**120**	**924.8**	**81**	**11.4**	**81.0**	**0.7**
Barguna	12	1	13	96.7	10	9.7	10.0	0.8
Barisal	12	1	13	221.4	11	20.1	11.0	0.8
Bhola	12	1	13	68.8	no data			
Jhalakati	12	1	13	80.0	4	20.0	4.0	0.3
Patuakhali	12	2	14	59.0	8	7.4	8.0	0.6
Pirojpur	12	2	14	34.1	6	5.7	6.0	0.4
Barisal Division	**72**	**8**	**80**	**560.0**	**39**	**14.4**	**39.0**	**0.5**
Bagerhat	12	2	14	209.9	34	6.2	34.0	2.4
Khulna	12	1	13	85.0	8	10.6	8.0	0.6
Satkhira	12	1	13	70.0	no data			
Greater Khulna	**36**	**4**	**40**	**364.9**	**42**	8.7	42.0	1.1

CHAPTER 4 Lessons learned and needs identified

4.1 Lessons from similar projects[1]

(1) Impacts

a) Rural Roads

The impacts of rural road development are very positive. The gains realized from road development are well illustrated in the mid-term survey report on benefit monitoring carried out by RDP-25 (LGED and GTZ, 2006)[2]. The costs and time required for travel have decreased substantially. The number of transport operators, traffic, and amount of cargo on the developed roads grew dramatically. Land value and the number of shops along developed roads increased. The number of roadside employment, the income of employees in roadside establishments, and the income of households along the developed roads increased, and the proportion of hardcore poor decreased. The survey also revealed that access to social services such as health services improved.

The sample survey and the key informant interviews carried out by the SAPROF team support the above findings by RDP-25. All 100 respondents in the sample survey replied that the overall impact of road development was positive. The reasons given in support of this view were diverse. The major positive impacts observed by the respondents, not mentioned above, include: increased availability of information on agriculture and agricultural markets; improvement in the law and order situation; improved access to better housing materials; improved access to better education; increase in the literacy rate; increase in opportunities to marry a spouse from a "good family"; increase in the number of timber, fruit and herbal trees; and an increase in the proportion of households using water-sealed latrines. In addition, many respondents suggested that road construction and maintenance, particularly the maintenance work by Labor Contracting Societies (LCS's), generated substantial local employment.

The major negative effect of road development identified was an increase in the number of accidents. Bad driving manners, improper use of roads such as the drying of paddy, and lack of road safety measures have been blamed.

b) Growth center

Quantitative evidence illustrating the impact of growth center development is rather limited. Still, the available information suggests that the positive impacts are substantial. The average EIRR of the 113 markets developed by RDP-21 was 41.4%, according to the 2004 report on post development benefit monitoring (LGED, 2004b). This report claims that the average annual market revenue of the growth centers grew by 37 % after development. Another report produced by RDP-26 (LGED, 2007b) claims a 35 % growth of market revenue for the growth centers it has developed.

[1] This section is based on Annex 9, 10, 11 and 12.

[2] Also see Annex 11.

According to the sample survey conducted by the SAPROF team, 99% of the consumers and 100% of the vendors surveyed at the developed growth center felt that the overall impact of the growth center development was positive. On the one hand, the amount of purchases increased for 87% of the consumers, while for 13% there was no change. On the other hand, 90% of the vendors stated that their sales increased, while 8% said that there was no change, and 2% said that their sales decreased. The variety of goods and services provided at the growth center increased according to 96% of both consumers and vendors. The frequency of visits to the growth center increased for 97% of the consumers and 88% of the vendors, while the remainder answered it did not change.

Other major positive impacts observed by the sample survey respondents and the key informant interviewees include: improvement in drainage, sanitation, and hygiene; and increased presence of women in trading; increased number of shops and buyers' better cleaning and maintenance of facilities, including toilets; and increased annual lease fee collection. Establishment of the Women's Market Section (WMS) was noted by many as an effective measure to encourage women to come to the growth center.

Interestingly, when the respondents were asked for the reasons for their increased visits to the growth center, "better access" was the most common reply. Similarly, improved road access was one the main reasons given by the buyers for their increased sales and by the consumers for their increased purchases. The above results clearly illustrate the amplifying effect of developing rural roads and growth centers simultaneously.

c) Union Parishad Complex

During the survey of Union Parishad Complex (UPC) users conducted by the SPAROF team, all respondents suggested that the overall impact of the UPC development was positive. Service provision by Union Parishads (UPs) and government line departments improved according to 99% and 84% of the respondents respectively. All but 3% of the respondents stated that the frequency of visits to the UPC increased. However, caution is required in interpreting these results, as the respondents were selected from people who visited the UPC during the survey, while it is quite common for local people to visit the UPC only several times a year.

Major positive impacts identified by the sample survey respondents and the key informant interviewees include: increased availability of the UP Chairperson, UP Members, and line government officials at the UPC; increased implementation of government and non-governmental social programs; functioning of the UPC as a cyclone shelter and relief distribution center; enhancement of local conflict arbitration; improvement in tax and other revenue collection by UPs; and the development of a sense of pride among local people in having a UPC. Regarding the service provision by UPs, improvements were observed in birth and death registration, issuance of certificates, and distribution of relief goods, among other matters.

d) Capacity development components

The SAPROF team's review of past and ongoing similar projects indicates that capacity development of stakeholders such as LGED staff, contractors, UP Chairpersons and Members, Market Management

Committee (MMC) members, LCS members, and women shopkeepers of WMS is an integral component of rural development projects. Many positive impacts have been generated by capacity development components.

The institutional capacity of LGED has improved as a result of capacity development components, particularly in the area of participatory planning. LGED has made progress in its ability to employ gender sensitive approaches and to meet local needs.

As for UPs, their ability to mobilize resources has improved, as manifested by their better performance in tax collection. A sense of ownership and responsibility regarding rural infrastructure development and other development activities among UP Chairpersons and Members was enhanced after the implementation of project interventions in many cases.

MMC Members and other market stakeholders have gradually increased awareness of their responsibilities regarding growth center management through participating in the planning process of growth center and rural market development. In a few cases, they have taken the initiative in keeping the concerned markets clean by employing cleaners following the action plan prepared by MMC Members and other stakeholders.

The capacity development component is also beneficial for destitute people, particularly women in rural areas. Evidence suggests that income obtained from earthwork maintenance and tree-planting and caretaking helps LCS members enhance the sustainability of their livelihoods. LCS members can enhance the sustainability of their livelihood by income obtained from earthwork maintenance, and tree-planting and caretaking. The savings accumulated through saving schemes encouraged by the projects have also been found to contribute to their livelihoods.

In 2006, LGD launched the Local Governance Support Project (LGSP), a national program aimed at enhancing the capacity of UPs. The project is expected to develop the capacity of UPs and strengthen local governance through provision of the expanded block grant and training to UPs. As it is a new initiative, the effects are yet to become apparent. However, significant positive impacts are expected as the project plans to cover all 4,498 UPs in the country by 2011.

(2) Problems and challenges

a) Rural roads

Cost of civil work is generally higher in the South-West than in other parts of Bangladesh. One major reason is because the area is low-lying and requires much earthwork to raise the road surface above the specified flood level.

Engineering work is technically challenging in many areas because compaction of the road bed is difficult due to the nature of the soil in the South-West. In some cases, Bituminous Carpeting (BC) roads cannot be developed because the load-bearing capacity is too low. In addition, the high density of rivers and canals makes maintaining the specified road width difficult, and requires measures to protect the side slopes.

Drainage is an issue given attention to by both the planners and the road users. Despite the efforts made by the planners to not alter the water flow pattern, drainage problems are frequently identified as a negative impact of road development by road users. The insufficient budget allocated to constructing drainage structures is one of the causes of this problem. However, the fact that the South-West is a low-lying flat area and that many roads utilize the embankments originally built to prevent flood water makes drainage a challenging issue. It is very difficult to smoothly drain water because of the possibility that flood water will exceed the road surface and flow inside the road embankment.

Subsidence of bridge approaches has been observed in a few cases. After completion of the bridge, the approach starts to sink, causing damage to the road surface and creating a difference in height between the bridge and the approach.

Road development is implemented by utilizing the alignment of existing roads to the extent possible. Due to the high population density and the shortage of funds for acquiring land, however, securing sufficient land to develop the road according to the required specification is sometimes difficult. Loss of agricultural land and removal of homesteads are frequently identified as the negative impacts of road development.

Maintenance of Upazila roads and Union roads is generally not a problem, as LGED has established an efficient maintenance system, and GOB has been allocating more resources to road maintenance. However, not all the demands have been met.

Road safety becomes an issue after completion of road development. Rural roads are narrow, and, because of budget and land constraints, sharp bends remain even after upgrading. Yet vehicles run much faster than before. With increased traffic, accidents tend to increase.

Some LCS's have not performed their specified tasks. More specifically, some of them have neglected the maintenance of soft shoulders and side slopes and caretaking of planted trees.

b) Growth center

The requests of market users regarding facility development are not always fulfilled. One likely cause is the lack of local consultation through such means as planning meetings with stakeholders. Another is the negligence of the planners. Other major reasons include the lack of a sufficient development budget and constraints in the availability of land.

Landownership is unclear in many cases. Demarcation is challenging. In some cases, ownership and/or boundaries are disputed. As LGED can only develop facilities on secured government land, such cases cause delay in project implementation. If the dispute is not settled, the concerned subproject must be abandoned.

Some people have occupied khash land. Even when the land ownership is not contested, it is sometimes difficult to evict these people.

Maintenance after development is another common problem. Many people have suggested that the market lessees who are responsible for regular cleaning and maintenance are not performing their tasks. Cleaning of toilets and drains, and garbage disposal are not done properly. MMCs, which are responsible for monitoring the performance of the lessees, are not functioning well in many cases. In some growth centers, the MMCs are dormant or not formed at all.

Development of the WMS is generally regarded as a successful intervention. However, some shopkeepers do not run their shops on a regular basis. Some lack capital to run businesses. In RDP-21, it was found that some areas were not quite ready to accept the idea of women going out to do business in growth centers due mainly to social reasons; therefore the utilization and the impact of the development of WMS's and open sheds for women vendors were limited in those areas. Some WMS's have been constructed in remote sections of growth centers where customers rarely visit. In such cases, the businesses of WMS shopkeepers have failed, and in some cases, the spaces that used to be occupied by WMS shops have become vacant.

On the other hand, successful shopkeepers expanded their businesses and continued to keep their shops in the WMS, because the contracts are renewable except for default of lease payments. This, however, deprives other women interested in starting businesses in the WMS of the opportunity to do so. Also, there are indications that the selection of shopkeepers is not done according to set rules.

c) Union Parishad Complex

Securing land to build the UPC proved difficult in many past projects. In order to construct a UPC, 0.5 acres of non-disputable land is required. In many cases, sufficient land was not available, while in other cases, land was available but the local people could not agree on a specific site to construct the UPC. As LGED is progressively constructing UPCs through various projects, the number of Unions with a UPC is increasing each year. The Unions yet to have a UPC tend to be the problematic ones; i.e., many of them have not successfully dealt with the land problems.

In several donor-assisted projects including RDP-24, RDP-25 and Eastern Bangladesh Rural Infrastructure Development Project (EBRIDP), UPs are asked to raise funds equivalent to 10% of the UPC construction cost and to appropriate them to their future maintenance budget. However, this is very challenging for UPs. Ten percent of the construction cost amounts to tk. 600-900 thousand, which far exceeds the annual budget of an average UP, which is typically tk. 200-300 thousand. From the point of view of UPs, this 10% provision does not make sense, as the UPC construction project financed individually by GOB does not impose such a condition. As such, in RDP-24, only 20 out of the 27 UPCs planned could be developed.

The UPCs developed are not fully utilized in many cases. According to government policy, eight government line departments are to deploy their officials on a regular basis to render services at the Union level. UPCs are equipped with a room for each of these departments. However, many line departments are still not sending their staff regularly to UPCs.

d) Capacity development components

As mentioned earlier, the capacity of MMCs, including UP Chairpersons serving concurrently as MMC Chairpersons and other market stakeholders, tends to be weak. MMCs neither prepare plans for development and maintenance of markets nor supervise the lessees in fulfilling their obligations. Growth centers and rural markets lack funds for maintenance. This is mainly because the market lease revenue is not provided to the concerned markets as per the leasing policy. According to the *Manual on Leasing Procedures, Management of Government Owned Markets and Methods for Distribution of Incomes Amongst Union Parishad/Municipality/City Cooperation*, 25% of the market lease revenue must go to maintenance of the growth center if the growth center development has been completed by LGED. However, Upazila Nirbahi Officers (UNOs) who manage the revenue frequently do not respect this rule. Moreover, many MMC members are not even aware of such rules or their responsibilities. MMCs and Banik Samity members should first improve their knowledge about the resources available to each growth center and rural market, their expected roles and responsibilities, and only then be empowered to claim such resources and execute their duties.

Many projects have provided training to women shopkeepers after construction of WMS's in growth centers. However, lack of business sense and experience on the part of women shopkeepers has hindered the success of their businesses. To make the training more effective, close review of interventions that have been successful in promoting women's businesses is required so that such efforts can be replicated. In addition, the criteria and methods for selecting shopkeepers could be modified so that women with better chances of succeeding are selected.

The Local Development Coordination Program (LDCP) implemented by RDP-24 was effective in revitalizing the UPs and enhancing coordination between UPs and government line departments. However, the sustainability of such effects, without such inputs from LDCP as external facilitators, is in question. Also, capacity development for service delivery by other government line departments, though important, is beyond the mandate of LGED.

The grant schemes of RDP-25, whereby 32 pilot UPs out of 900 UPs are implementing income generation and welfare activities, have contributed to strengthening the capacity of the selected UPs and improving the livelihoods of the poor. However, scaling up such schemes from pilot UPs to other non-pilot UPs under LGED's projects remains a challenge due to budget constraints. Moreover, such interventions are beyond the scope of LGED's mandates. One solution is to incorporate the lessons learned into LGSP[3], a national program covering all UPs throughout the country, so that the block grants LGSP provides could be utilized to extend the positive impacts.

e) Cross-cutting problems

Many contracts were not completed within the specified time period in past projects. The main causes were: price hikes of construction materials; negligence by contractors of the specifications regarding materials to be used; and awarding of contracts to insolvent contractors.

[3] See Annex 12 for more details.

Project and subproject implementation were often delayed while waiting for procedures to be completed by institutions outside LGED. For example, in order to start a project, the plan must be approved by the Planning Commission, and the Executive Committee of the National Economic Council. This may take more than one year. When land acquisition is required or tree felling is necessary for subproject implementation, LGED must wait for DC or the Forest Department to complete the required administrative procedures.

(3) Recommendations

a) Rural roads

Select roads that run on existing embankments for development, whenever possible, so that construction costs can be saved. In Bangladesh, Bangladesh Water Development Board (BWDB) has established embankments along rivers to block flood water in many places. These embankments are generally utilized as roads as well. The required earthwork for upgrading these roads is much less than other roads. The road bed generally requires less compaction work, as soil compaction should have progressed naturally since the initial establishment of the embankment by BWDB.

Do not develop roads which face a high risk of river erosion. Some streams rapidly change their flow and have unstable water paths. Roads running close to such streams should not be chosen for development.

Where load-bearing capacity is low, consider measures to improve soil conditions so that the road bed can be sufficiently compacted. If there is no practical solution, upgrade roads to Herring Bone Bond (HBB) instead of BC.

When developing roads on islands without bridge connection, roads should be developed with HBB even if the road is an Upazila road. For such roads, lower specifications should be adopted. Such roads may be upgraded when motorized traffic starts to increase. It is also advisable to provide ghats at the end of island roads so that crossing water by boat becomes easier.

Consider drainage problems of past subprojects, and reflect the lessons learned in future subproject designs. In addition, sufficient inlets should be provided to ensure movement of water for shrimp cultivation.

For roads that run adjacent to rivers or canals, side slopes should be protected by trees, turf and retention walls.

Pay special attention to the work quality of structures as well as the bridge approach. Make sure that the earthwork and compaction are properly done. Prepare a sufficient budget for land acquisition.

Realistically consider the amount of earth transportation and earthwork required, the drainage structures required, and the necessary protective measures for road embankment, and do the costing accordingly.

Salinity should be considered in the coastal areas. Reinforcement steel rods for RCC bridges should be given a clear cover of 70 mm instead of the regular 40 mm. Saline-resistant species should be chosen for roadside tree-planting.

In order to secure the land required for construction and to implement the engineering work on time, people residing along the road to be developed should be informed well in advance of the subproject implementation. They should be well-informed of the benefits of the subproject, the steps involved, and the contributions expected of them so that consent and cooperation can be gained.

Appropriate road safety measures should be considered and implemented so that accidents will not increase with the development of roads. Measures such as an awareness-raising campaign on road safety, provision of turnouts on busy sections of roads, and the installation of traffic signs may be considered. However, awareness-raising on roads safety is basically a mandate of Roads and Highways Department (RHD).

LCS should continue to be engaged for off-pavement maintenance and tree-planting, as it is an effective measure to mitigate poverty and to protect side slopes and soft shoulders of roads. In order to ensure proper delivery of the outputs by LCS, briefing and training should be given in the beginning, followed by regular supervision.

b) Growth center

The market periphery should be clarified and demarcated in the presence of all stakeholders before planning. Only then should the master plan for market development be developed with the participation of stakeholders. Situations regarding current land use and land ownership must be considered during the planning. Development of infrastructure related to the growth center, such as ghats and access roads, should also be considered. The *Participatory Planning Guidelines for Development of Growth Center* developed by RDP-24 should be followed.

If the khash land planned for development is under illegal occupation, recovery must be done well in advance of commencement of the construction work by persuading government administration, local government institutions (LGIs) and MMCs to restore the land to its legal basis so that development can go forward without harmful incidents.

Ghats should be constructed for growth centers adjacent to waterways, as boats are an important means of transport in the South-West. Ghat designs must take into account differences in the tide level, which may be as large as three meters in the South-West.

For growth centers facing water quality problems due to arsenic contamination or salinity, piped water systems may be developed. The experience of RDP-25 and initiatives of the Department of Public Health Engineering (DPHE) should be examined.

Development of WMS's should be continued. The sites for WMS construction should be carefully determined in consultation with local stakeholders. The sites should provide favorable business

environments for women shopkeepers, while unhygienic or unfrequented areas within markets should be avoided.

Shopkeepers in the WMS who do not properly utilize their shop space should be asked to give it up so that other women can get a chance to do business. Similarly, a system for graduating successful traders should be created in order to give other women opportunities to trade in the WMS.

c) Union Parishad Complex

Carefully consider whether development of UPCs should be taken up in SWBRDP, as RDP-24 experienced problems in meeting its development target. For planning, the *Participatory Planning Guidelines for Construction of Union Parishad Complex*, developed by RDP-24, should be used as a reference.

If the UPC component is to be implemented, consider changing the design of UPCs to include a separate room for female UP Members and a stockroom to preserve relief goods. Also make sure that UPCs are elevated in coastal and low-lying areas prone to cyclones and flooding, as they will be able to serve as shelters.

Do not impose the 10% contribution rule. Government policies and external interventions must be harmonized. If the UPC component is to be implemented, it should not be executed under arrangements significantly different from that of the GOB project.

d) Capacity development components

In strengthening the capacity of LGED officials, social aspects, in addition to technical aspects, should be incorporated into the training program. The approaches of RDP-24, RDP-25 and LDCP, which focused on participatory planning processes and consultation with local stakeholders, should also be applied in SWBRDP.

In order to ensure the completion of civil works within the time period specified by the project, capacity development of contractors should be undertaken.

Capacity development of UPs would also be effective in multiplying the effect of UPC development. However, LGD's position is to avoid duplication of capacity development interventions of UPs. Therefore, SWBRDP should not implement initiatives such as LDCP, since it may compete with the activities to be implemented by LGSP. LGSP has already started to allocate the expanded block grant to selected UPs, which eventually will be extended to all UPs in the country, and is preparing to provide a comprehensive training package to enhance their capacity.

MMCs and other market stakeholders, such as Banik Samity members, should be given training. They should also be instructed to prepare plans for development and maintenance of markets and be given access to funds to enhance their market management capacity. Lessees should also be given training so that they fulfill their duties, including cleaning markets, displaying the approved toll rates in markets, and collecting tolls from temporary shopkeepers and vendors. The experiences from RDP-24 and

RDP-25 should be examined in detail for considering the methods and the contents of training. For example, involvement of the concerned UNO and the Union Land Officers as resource persons in training sessions is likely to raise their commitment to the issues that may arise in relation to development and maintenance of the growth centers. Specifically, the provision to allocate 25% of the market lease revenue to market maintenance should be enforced through the involvement of concerned UNOs. Moreover, each MMC should be provided with an office within the local growth center.

Development of WMS should be continued but should be accompanied by awareness raising and capacity development activities. People's understanding of gender equality must improve, and women should be encouraged to participate in economic activities, particularly in areas where people are conservative about women doing business outside of their homes. Women should be given training on business skills. Inviting experienced women shopkeepers as resource persons may be effective in sharing business tips and experiences. Provision of space and training for women to trade would help them become more prominent in the rural markets, which in turn would promote support for women doing business and socializing outside of their houses. Study trip to markets where women are successfully doing business is another measure that may be considered for implementation.

Following examples of successful interventions by similar projects, savings activities should be encouraged to LCS members so that their livelihood can be sustained after completion of LCS work.

Training programs covering awareness issues and skill development for income generation activities for women shopkeepers and LCS members should be contracted out to capable local NGOs that are experienced in the respective professional field. Once local NGOs are selected, training of trainers should be conducted to ensure the quality of training. If qualified local NGOs are not available, qualified local consultants should be sought.

e) Cross-cutting recommendations

Allow sufficient time for start-up of the project. The time required for administrative procedures and engagement of design and supervision consultants should be realistically taken into account when deciding the project duration.

Allow slack time for paperwork and administrative procedures. Start planning for subprojects at least one year ahead of their implementation.

In order to reflect the needs of local people and to maximize the effect of the development investment, the involvement of stakeholders in planning is crucial. This is particularly true for development of growth centers. However, holding participatory stakeholder meetings and developing project appraisal reports at the Upazila level, as was done in RDP-25, is time consuming and costly. The costs could outweigh the benefits. Therefore, emphasis should be placed on collecting sufficient information on development needs to enable informed decision-making and proper explanation to stakeholders.

Develop rural roads together with market facilities. It has been found that the current approach of developing growth center connecting roads and rural markets simultaneously enhances the

development investment. Many users of developed markets suggest that the improvements in the condition of roads have enabled them to come to the market more frequently. Many users of underdeveloped markets feel that access is a problem.

Scrutinize the contractors with care during selection, paying attention to track records of past performance. Contractors, particularly those who do not have a good track record, should be supervised closely. LGED should involve local stakeholders in monitoring the work of contractors and pay close attention to their observations.

The rate schedule should be revised more frequently if price escalation continues at the current pace. Contracts should be packaged into sizes which can be completed within a short period--e.g., six months--, in order to minimize the effects of price escalation.

Ensure that contractors and LGED officials properly understand the procurement procedures in order to eliminate delays in project implementation.

4.2 Needs assessment of rural market and Union Parishad Complex development

4.2.1 Growth center and rural market[4]

(1) Summary

The need for growth center and rural market development in the Project area is clear. This argument is supported by the following three reasons. First, the field survey conducted by the SAPROF team, whose results are summarized below[5], suggests that growth centers and rural markets are used frequently by many people; yet the facilities are insufficient. Second, the outcomes of growth center development schemes implemented by similar past and ongoing projects, which are summarized in Section 4.1, reveal that upgrading of growth centers and rural markets enhances trade and generates other economic and social benefits. Such evidence indicates that underdeveloped growth centers and rural markets have high potentials to be exploited through investment. Third, there are still a considerable number of underdeveloped growth centers and rural markets in the Project area waiting for investment, as illustrated in Section 3.6 and the F/S[6].

(2) Current use of underdeveloped markets in the Project area

According to the survey conducted by the SAPROF team, the number of users during a "hat day"[7] in the six growth centers and one rural market surveyed ranges from 2,000 to 20,000 buyers and 500 to 15,000 sellers. Typically, 10,000 users visit a market on a hat day, although the numbers vary among markets. The number of permanent shops ranges from 80 to 2,000. Such figures are significant when

[4] This section is based mainly on Annex 13.
[5] Full details are given in Annex 13.
[6] See page 5-9 of the F/S.
[7] The major trading days of a market during the week are commonly referred to as hat days. Generally, growth centers and rural markets have two hat days per week.

the typical population size of a Union in the Project area, which is around 23,000, is considered, as the catchment area of a growth center is usually smaller than the size of a Union.

Moreover, although the sizes differ significantly among the markets surveyed, the number of buyers, sellers and shops, and the volume of trade are increasing in all the markets. Also, irrespective of the market size, the market users attach primary importance to the growth center or the rural market they usually use. Those who use the market do so quite frequently[8]. In sum, it can be concluded that the growth centers and the rural market surveyed are used frequently by many people, and the number of users and the trade volume are increasing. Such findings coincide with the common phrase used to describe the importance of rural markets in Bangladesh, "growth centers and rural markets are central nerves of rural economy."

(3) Development needs of underdeveloped markets in the Project area

All of the growth centers and the rural markets surveyed need improvement. The market users feel that the facilities provided and the current conditions of the markets are insufficient. Facilities such as trading sheds, water supply, sanitation, and ghats are lacking or are not functional. For instance, many traders are forced to sit in the open air, sometimes under heavy rain during the monsoon and strong sunlight during the dry season. Agricultural and fisheries products tend to perish quickly. Many parts of the markets including open spaces, internal roads, and cattle markets require pavement and adequate drainage. The market users are very dissatisfied about the drainage situation. Many respondents of the survey complained that they are forced to walk through knee-deep mud in the market during the rainy season. Water supply and sanitation are also insufficient, and toilets are lacking or in very poor condition.

In addition, space is limited in many of the markets. Land filling, accompanied by sufficient measures to prevent river erosion, is necessary. Moreover, a few respondents gave comments suggesting that the use of khash land by private individuals requires investigation so that the limited land is used more optimally.

In the markets surveyed, the number of female users was very limited. Those who did visit the markets did so less frequently than their male counterparts. The lack of appropriate facilities, e.g., clean toilets and market floors, and the difficulty of access caused by the underdevelopment of rural roads were the main reasons raised. The lack of WMS's was another reason. Moreover, the SAPROF team found that more women were present in the developed markets than the underdeveloped ones through another survey[9]. Such results imply that market upgrading is an effective means of encouraging women to visit markets and is justifiable from the viewpoint of gender equality.

It should be noted, however, that some rural markets that are not designated as growth centers are larger in size than some growth centers. Although GOB prioritizes the development of growth centers, some rural markets require the same attention.

[8] Of the 140 consumers surveyed, 127 mentioned that they visited the market more than once a week.
[9] Sample survey on rural infrastructure development (Annex 9)

On the maintenance front, the survey results clearly illustrate that maintenance of growth centers and rural markets is a problem and will continue to be a problem unless appropriate measures are taken. The development of market facilities needs to be accompanied by the enhancement of the capacity of MMCs through various interventions so that the market facilities will be well-maintained. MMCs will require training, and relevant authorities will need to be pushed to allocate sufficient budgets to MMCs.

Finally, access to the growth center or the rural market is a problem for many market users. The conditions of some roads that lead to the markets are very poor; i.e., they are not paved or lack bridges on which vehicles can pass, making it particularly difficult to transport goods. Conditions of such roads need to be improved together with the development of growth centers and rural markets.

4.2.2 Union Parishad Complex[10]

(1) Summary

The need for UPC development in the Project area is clear. This argument is supported by the following three reasons: First, the field survey conducted by the SAPROF team, whose results are summarized below,[11] suggests that people in rural areas cannot receive satisfactory services from UPs without a proper UP office. Second, the outcomes of UPC development schemes implemented by similar past and ongoing projects, which are summarized in Section 4.1, reveal that establishment of a UPC coupled with appropriate capacity building measures enhances public service provision at the Union level. Third, despite the GOB's policy to establish one UPC per Union, there are still a considerable number of Unions without a UPC in the Project area, as illustrated in Section 3.6.

As already stated in Section 3.6, however, SWBRDP should not include a UPC development component. Although the need is clear, the development need can be met by other projects and schemes. In addition, the unavailability of land and disputes over the location of the UPC, which were also observed during the field survey conducted by the SAPROF team, are increasingly becoming common. Such problems impede the timely execution of projects.

(2) Current use of UP offices in the Project area

According to the survey conducted by the SAPROF team, the number of visitors to the three selected UP offices ranges from 150-200 to 300-400 per week. Those who come to the UP office do so quite frequently, although women tend to visit less frequently than men. One third of the respondents of the sample survey revealed that they visit the UP office more than once a week. However, it is not clear how often the general population visits the UP office, as respondents were limited to people who came to the UP office on the day of the survey.

From the local residents' point of view, the most important function of the UP office is the registration of deaths and births and the issuance of relevant certificates. The second most important function is the

[10] This section is based mainly on Annex 14.

[11] Full details are given in Annex 14.

arbitration of conflicts. Residents rely on the village court and the UP Chairperson and Members to resolve local conflicts. The UP office also functions as a venue for formal meetings organized by UP, government line departments, and NGOs, as well as a gathering place for local residents to socialize. For the poor, the distressed, the old, and the disadvantaged, the UP office is a focal point for collecting allowances and relief goods.

However, service provision at the UP office tends to be poor. In all three Unions surveyed, the UP office is not open regularly, the UP Chairperson, Members, and Secretary are frequently absent, service provision by the UP is irregular, and service provision by government line departments is almost non-existent at the UP office. Sometimes services are provided from the UP Chairperson's residence. For government line departments that do provide services, they either do so from the Upazila office or by directly visiting the residents. This situation has left many UP users dissatisfied. Although more than half of the UP office visitors expressed that they are satisfied with the current services provided by the UP, 42% are dissatisfied. Discontent over service provision by government line departments is higher, with 75% dissatisfied.

(3) Development needs of underdeveloped markets in the Project area

UP offices are insufficient in space and in quality. This is one of the major reasons behind the lack of regular service provision. Among others, buildings are old and dilapidated, working space is insufficient, facilities such as toilets and tubewells are lacking or out of order, and office furniture is lacking. Particularly, there is no room for government line department officers to work in at any of the three UP offices surveyed. Moreover, nearly all those interviewed expressed the view that the current facilities were insufficient and required improvement.

Clearly, safe buildings with sufficient space and facilities are required if public service delivery is to be improved. Construction of UPCs is most likely to contribute to the improvement of service provision by UPs and government line departments and to make the UP office a more comfortable place for residents to visit.

A meeting room and workspaces for the UP Chairperson, Members, and Secretary are required in each UPC. Workspace for government line department officials who are mandated to provide services at the Union level is also required although they may not be necessary in Unions where Upazila headquarters are located. Water supply and separate sanitation facilities for men and women should be provided. A storage room is essential for stocking goods, as the Project area is particularly prone to natural calamites, and the UP office is expected to function as a relief center in case of disasters.

In addition, along with the development of facilities mentioned above, the capacity of those who are mandated to provide public services to local residents must be enhanced. This is because UPs and government line departments have insufficient capacity to deliver the expected services. For example, according to the informants, most UP Members are illiterate and are not aware of their responsibilities. Coordination is lacking within the UP and between UP and government line departments. Service provision is poor, and tax collection is almost absent.

Furthermore, in addition to the problems regarding the UP building, road access to and from the UP office is a major problem for many people. More than half of the current UP office users have difficulties reaching the office because of poor road conditions and lack of transport means. Similarly, government line department officers have difficulties reaching the residents to provide services. Thus, in addition to the development of UPCs and capacity building of public service providers, the development of rural roads is an integral element in improving access to and delivery of public services.

Finally, despite the need for UPCs, the establishment of UPCs may be challenging. Lack of suitable land and disputes over the location of UPCs are common in two of the three Unions surveyed. Both the Domain and Chitalmari UPs do not have sufficient khash land to accommodate the construction of a UPC. Furthermore, in Domain UP, the two groups headed by the present and the former UP Chairpersons are fighting over the location to establish a UPC. In Chitalmari UP, disputes over land have hampered the development of a UPC, which was initiated by RDP-25. As such, land issues may become a major obstacle to the establishment of a UPC.

CHAPTER 5 Project plan

5.1 Objectives and scope

5.1.1 Objectives of the Project

The project purpose of SWBRDP is to increase economic opportunities for the rural poor, improve their accessibility to social services, and promote recovery from damage by natural disasters in rural areas in the south-western part of Bangladesh through the construction and rehabilitation of rural infrastructure. Ultimately, the Project aims at contributing to poverty reduction in the South-West and alleviating economic disparities in Bangladesh. The logical framework for SWBRDP is given in Section 8.1.

In order to achieve the above-mentioned objectives, the following operational objectives guide the implementation of SWBRDP:

1) To improve the physical structures and safety measures of Upazila and Union roads to enhance rural communication networks;
2) To upgrade facilities of growth centers and rural markets to enhance rural trade and agricultural activities;
3) To create short-term and long-term employment opportunities for the rural poor through development, management, and maintenance of rural infrastructure;
4) To create employment opportunities for the rural poor through poverty reduction interventions;
5) To build the capacity of stakeholders for efficient and effective planning and operation and maintenance of rural infrastructure; and,
6) To develop human resources of LGED for efficient project planning and management.

5.1.2 Scope of the Project

The major components of SWBRDP are summarized in Table 5-1. The Project will improve the rural communication network and enhance rural trade and agricultural activities through the development of rural infrastructure. The Project will upgrade 88 Upazila roads, 19 Union roads, 58 growth centers, and 18 rural markets in the 14 Districts of the South-West. It will create employment opportunities for the rural poor through civil works contracted out to contractors and through mobilization of Labor Contracting Societies (LCS's), which are specifically composed of the poor, for tree-planting and caretaking on the side slopes of rural roads and for village road maintenance. In addition, the Project will enhance the capacity of LGED officials in project management and the capacity of stakeholders in operation and maintenance. Details of each component are given later.

Table 5-1 Summary of the major components of SWBRDP

Item	Content / Quantity
Component 1: Upgrading of Upazila roads	88 roads: 749 km of paved roads, 2,805 m of bridges and culverts
Component 2: Upgrading of Union roads	19 roads: 65 km of paved roads, 17 m of bridges and culverts
Component 3: Upgrading of growth centers and rural markets	58 growth centers, 18 rural markets
Component 4: Procurement of vehicles and equipment	
Component 5: Poverty reduction interventions	Mobilization of LCS: tree-planting and caretaking, village road maintenance
Component 6: Capacity development	Training of LGED officials and stakeholders
Component 7: Consultancy services	

5.2 Project rationale

(1) Target area

The target areas of the Project are the 14 Districts belonging to Barisal Division, Greater Faridpur of Dhaka Division, and Greater Khulna of Khulna Division[1]. The Project area is a poor area. The Districts in the Project area exhibit a lower GDP per capita than the national average in all but one District. The Districts of Greater Faridpur are particularly poor in terms of GDP per capita. The average GDP per capita in the Project Districts is US$ 313, whereas the national average is US$ 363[2].

In terms of poverty, of the six Divisions in Bangladesh, Barisal Division has the highest incidence of poverty in the country. Khulna Division has the third highest incidence of poverty. The number of people living in poverty in the rural areas of the two Divisions is 37.2% and 32.7% of the total population in Barisal and Khulna, respectively, using the lower poverty line. In Dhaka Division, the poverty ratio is 26.1% in the rural areas using the lower poverty line. Even in the relatively better-off parts of the Project area, more than one out of four people live in poverty. Moreover, despite the recent decline in the incidence of poverty at the national aggregate level, in the rural areas of Khulna and Barisal Divisions, almost no progress has been observed[3]. Thus the Project area can be considered a poor area that requires development interventions.

The Project area is an agrarian area. Its main economic activity is agriculture. The area is also home to the majority of export-oriented shrimp farms in the country. However, the progress of rural infrastructure development in the Project area has generally been slower than in other parts of Bangladesh[4]. The Project area as a whole shows a lesser extent of Upazila road development, Union road development, and growth center development than the national average. Conditions of rural roads and markets remain poor in many areas. As such, investing in the rural roads and markets in the Project area is justified, as it will enhance the circulation and trade of primary products, which in turn

[1] See Section 3.1.
[2] See Section 3.4.2.
[3] See Subsection 3.4.4.
[4] See Section 3.6.

is expected to boost local economies. Additionally, such an investment is required, as many parts of the Project area have limited road access, particularly during the rainy season, and many people lack access to social services. Furthermore, the Project area is prone to natural calamities, and upgrading of rural infrastructure in the area is important for enhancing its resilience against natural disasters.

There will be no major donor-assisted rural infrastructure development project in the South-West, which includes the Project area, after RDP-25 closes in 2009. In contrast, other parts of Bangladesh will have at least one donor-assisted project[5] in their respective areas.

(2) Target group

The total population of the Project area is 20 million, which is 15 % of the total population of Bangladesh. The general target group of the Project is the rural population of the 14 Project Districts. More specifically, the main target group consists of the users of infrastructure to be developed by the Project. Selection of this target group is justified, as the incidence of poverty is higher in rural areas than in urban areas, and the Project will mainly serve those yet to have adequate access to roads and markets.

Through its poverty reduction component elaborated below, the Project specifically focuses on providing livelihood options for the poorest of the poor, in particular destitute women. They are an appropriate target group as, in addition to the poverty situation of the Project area explained earlier, there is moderate income inequality between the poor and the rich in the area, and the magnitude of poverty has recently intensified in Barisal and Khulna Divisions[6].

With regards to women, the Project aims to promote the social and economic advancement of women through development of Women's Market Section (WMS) and provision of relevant training. As women's status is generally low in Bangladesh, the targeting of women is integral to equitable development.

In addition, the Project will target LGED officials and stakeholders in its capacity development component so that the Project will efficiently and effectively deliver its outputs and benefits. In particular, capacity development of growth center and rural market stakeholders is emphasized, as the markets developed by the Project must be operated and maintained by the stakeholders.

(3) Components and subcomponents

The upgrading of Upazila roads and Union roads in the Project area is justified on the following grounds. First, the Master Plan target for Upazila road and Union road development is yet to be achieved[7]. Second, the development impacts of rural roads are significant[8]. For example, according to the survey conducted by the SAPROF team, the following outcomes are expected: decrease in the costs and time required for travel; increase in the number of transport operators, traffic, and amount of

[5] See Sections 2.6 and 3.8.
[6] See Subsection 3.4.4.
[7] See Section 3.6.
[8] See Section 4.1

cargo; increase in land value and the number of shops along roads; increase in the number of roadside employment, the income of employees in roadside establishments, and the income of households along roads; and decrease in the proportion of extremely poor people. In addition, all respondents of the sample survey stated that the overall impact of the road development they experienced was positive. The above strongly justifies the upgrading of underdeveloped rural roads.

However, as Union roads generally connect fewer institutions than Upazila roads and are therefore considered less important, the Project's emphasis on Upazila roads is rational. The decision to limit investment on Village roads to maintenance performed by LCS's through the poverty reduction interventions component is also rational, given that local government institutions (LGIs) are responsible for maintaining Village roads and an increase is expected in direct fiscal transfer to Union Parishads (UPs), which will enable UPs to develop Village roads through LGSP (Local Government Support Project)[9].

The surveys conducted by the SAPROF team clearly justify the upgrading of growth centers and rural markets in the Project area. Impacts such as increases in trading volume, market lease revenue, number of shops and buyers, and presence of women in trading have been observed. Particularly, the WMS was identified as an effective measure to encourage women to visit the growth center. Moreover, almost all the respondents interviewed by the SAPROF team suggested that the overall impact of the growth center development they had experienced was positive[10].

As illustrated in Section 3.6 and the F/S, the need to upgrade underdeveloped growth centers and rural markets is evident. The needs survey conducted by the SAPROF team suggests that growth centers and rural markets are used frequently by many people; yet the facilities are insufficient. For example, 10,000 users visit a typical market on a hat day, and the number of buyers, sellers and shops, and the volume of trade are increasing in all the markets. However, facilities such as trading sheds, water supply systems, sanitation facilities, and ghats are lacking. As such, among other inconveniences, traders are forced to sit in the open air, agricultural and fisheries products tend to perish quickly, and users are forced to walk through the knee-deep mud during the rainy season[11].

In the F/S, "Market section for physically disabled people" and "Livelihood improvement of the tribal inhabitants" are proposed. For the former component, however, because of budget constraints and the lack of experience in implementing such a component, development of a separate building exclusively for physically challenged people is not feasible. Piloting is necessary before implementing such a component. As such, some shops in the WMS building may be allocated to the physically challenged if such an allocation can be justified through consultation with the local stakeholders at the subproject planning stage[12].

[9] See Annex 12.
[10] See Section 4.1.
[11] See Section 4.2.
[12] Many informants have suggested to the SAPROF team that affirmative action was necessary for the physically challenged on the grounds of realizing social justice. However, it is not clear whether there was sufficient demand to justify the construction of a separate building like the WMS, which typically houses five shops, exclusively for them (See Annex 4).

For the latter component, literature reviews and opinions given in the stakeholder meetings do not justify its implementation[13]. The number of ethnic minorities is small and some groups are considered to be relatively better-off compared to the general population, while others have been integrated with the majority group. As such, the component is abandoned. However, if the need for affirmative action for ethnic minorities is clearly identified through consultation with the local stakeholders at the subproject planning stage, some shops in the WMS building may be allocated to ethnic minorities.

As elaborated earlier, poverty reduction interventions involving LCS's is justified on the bases of the need to create employment opportunities for the poorest of the poor and the efficiency in achieving the desired outputs in side slope and earthen road maintenance[14].

The necessity of capacity development of stakeholders is highlighted in the surveys conducted by the SAPROF team[15]. For example, on the benefits side, impacts such as the enhancement of LGED officers' ability to organize participatory planning activities, the improvement of Market Management Committee (MMC) Members' and other market stakeholders' awareness regarding their responsibilities, and the subsequent appropriate maintenance of markets have been observed. On the needs side, the SAPROF team found that cleaning and maintenance were problematic in many growth centers and rural markets and required the capacity development of MMC Members and other market stakeholders. Moreover, past project experiences suggest that, in order to enhance the efficiency and effectiveness of the project and the operation and maintenance of the infrastructure developed, inclusion of a capacity development component is integral to the project. The intention of the Project to enhance the capacity of stakeholders such as LGED officials, MMC Members, and LCS members is justified on such grounds.

The Union Parishad Complex (UPC) development component, which is proposed as a GOB-financed component in the F/S, should be dropped from SWBRDP on the following grounds: First, the scope of the Project requires adjustment because of budget limitations. Second, because of the unavailability of land and the difficulty of reaching agreement among local stakeholders on the location of UPC establishment, this component is becoming increasingly time-consuming and difficult. Third, LGED intends to develop the remainder of UPCs through a GOB-funded UPC development project that is progressively constructing UPCs throughout the country and other rural development projects in the Project area[16].

(4) Approach

The Project combines civil works and capacity development components. This approach is common among projects implemented by LGED, and past experiences suggest that it has generally been successful[17]. As mentioned earlier, the capacity development component is expected to raise the efficiency of the Project and enhance the sustainability of infrastructure developed.

[13] See Subsection 3.4.1 and Annex 4.
[14] See Section 4.1.
[15] See Chapter 4 and Annex 12.
[16] See Section 3.6.
[17] See Section 4.1.

The Project will employ local contractors and labor intensive technologies in its civil work. This is also common among LGED projects and has benefited the local people, including the poor.

On the one hand, the Project will develop roads that will connect institutions such as schools, UPCs, growth centers, and rural markets. On the other, growth centers and rural markets will be developed where road upgrading has been completed or is planned to be completed. Side slope maintenance, coupled with tree-planting and caretaking, will be implemented along the roads to be developed. The Project's aim to generate synergy among various infrastructures, including those developed by other projects, through such an approach is also common among LGED projects and has proven effective. For example, the respondents of the sample survey conducted by the SAPROF team attributed the increase in trade and visits to the developed growth center to the improvement of access roads, which presumably took place simultaneously.

5.3 Project component

The proposed project components to be finalized through post-SAPROF discussions between JICA and GOB are presented in the following subsections.

5.3.1 Upgrading of Upazila roads

(1) Description of the component

This component will upgrade earthen, Herring Bone Bond (HBB), and Brick Flat Soling[18] (BFS) segments of selected unimproved Upazila roads to bituminous carpeting. Gaps equal to or less than 200 meters existing on the selected Upazila roads will be connected by bridges or culverts. The project adopts the specifications set forth in Road Design Standards 2005 to design and develop Upazila roads and bridges and culverts.

Where existing gaps exceed 200 m, the connectivity of roads is to be enhanced by the construction of ghats. The component also includes the establishment of road safety measures, which are increasingly important due to the rapid growth in traffic volume and the number of accidents and lack of road users' awareness regarding road safety. To ensure the consistent application of the design standards and higher impacts of investment, each subproject will be composed of at least one Upazila road.

From the Project area, 137 Upazila Roads, with a total length of 1,672 km, are proposed for improvement. Roads for upgrading are selected from the shortlisted roads following the process explained later.

This component is composed of the following subcomponents:

1 Pavement

1.1 Pavement of earthen roads

[18] BFS is a type of pavement commonly used for rural roads in Bangladesh. BFS uses a single layer of brick for pavement, whereas HBB employs a double layer of brick.

1.2 Pavement of HBB / BFS roads
2 Bridges, culverts, and ghats
2.1 Construction of bridges
2.2 Construction of culverts
2.3 Construction of ghats
3 Road safety measures
3.1 Construction of bus bays
3.2 Installation of guard posts
3.3 Installation of sign boards

Under "1 Pavement," only existing earthen, HBB, and BFS segments of the Upazila roads will be improved to bituminous carpeting (BC). The Project does not plan to conduct the construction of new road alignments for reasons such as the difficulty in acquiring the amount of land necessary for the alignments. Maintenance work of Upazila roads, including the maintenance of paved road segments, is to be carried out by the other government-financed projects and is excluded from the component under this Project. In localities where the bearing capacity of soils for construction work is low, upgrading to HBB will be considered instead of bituminous carpeting.

The second subcomponent, "2 Bridges, culverts, and ghats," consists of the construction of bridges at gaps wider than 6 meters, culverts at gaps equal to or less than 6 meters, and ghats if gaps are wider than 200 meters. Bridges and culverts will be built over all gaps equal to or less than 200 meters on the Upazila roads selected for upgrading in order to increase the connectivity of roads. Ghats are to be built where gaps exceed 200 m and bridge construction is too costly. To make the construction of ghats economically viable, they should be constructed if enough water traffic is present or anticipated. Ghats should be large enough so that users can get on and off safely and load and unload goods with ease. Since ghats are to be built at crossings of large rivers, the status of river erosion, sedimentation, and change in seasonal water levels should be examined carefully before their construction.

Under "3 Road safety measures," bus bays, guard posts, and sign boards will be installed on upgraded Upazila roads. Bus bays are to be constructed along roads to facilitate the safe loading and unloading of passengers and goods and to serve as turnouts in case of accidents. Bus bays will also prevent vehicles from parking on soft shoulders, which are easily damaged when vehicles park frequently on them. Guard posts are to be installed at sharp curves and approaches to bridges to prevent accidents at these high risk areas. Warning signs are to be installed around schools and hospitals to alert drivers to school children and hospital patients. They should also be installed around markets to protect their users. In addition to signs around schools, hospitals, and markets, warning signs for speed control will be installed where they are easily noticed.

(2) Specifications

a) Upazila roads

i) Road Design Standards: Rural Road 2005

LGED carries out the construction and maintenance of rural roads in accordance with the specifications of Road Design Standards: Rural Road 2005 (RDS/2005). RDS/2005 was developed

with the technical assistance of JICA and bases its provisions on Road Design Standards 2004 (RDS/2004), designed by the Planning Commission in 2004. RDS/2005 complies with the road design standards provided by the Road Pavement Design Manual (RPDM/1999), developed by the Rural Employment Sector Program-III. RPDM/1999 itself is based on the road design standards of India, Britain, and the US, and incorporates provisions adapted to the regional characteristics of Bangladesh.

Table 5-2 Recommended geometric design standards

Road class	Design type	Geometric design				Expected design life (years)
		Carriageway (m) / (ft)	Hard shoulder (m) / (ft)	Verge (m) / (ft)	Crest width (m) / (ft)	
Upazila road	4	5.5 / 18	0.0 / 0	2.15 / 7	9.8 / 32	10
	5	3.7 / 12	0.9 / 3	0.90 / 3	7.3 / 24	10
	6	3.7 / 12	0.0 / 0	1.80 / 6	7.3 / 24	10
Union road	7	3.7 / 12	0.0 / 0	0.90 / 3	5.5 / 18	10
	8	3.0 / 10	0.0 / 0	1.25 / 4	5.5 / 18	10

Source: RDS/2005

Table 5-2 lays out the design Type, geometric design, and design life that should be applied to each road class. Road design Types 4, 5, and 6 are typically applied to Upazila roads, and design Types 7 and 8 are typically applied to Union roads. Design life of 10 years is recommended for both Upazila roads and Union roads[19].

The following are key points of the standards defined in RDS/2005:

1) RDS/2005 divides the country's regions into two geographic categories, hilly areas and plain lands, and specifies different typical cross-sections of Upazila roads and Union roads for each category.
2) The application of road design Types are determined by traffic volume. Upazila roads are to take either Design Type 4, 5, or 6, while Union roads are to take either Design Type 7 or 8.
3) For Design Type 8, HBB is used for rural roads where traffic volume is typically low or where the bearing capacity of soil does not meet the standards.

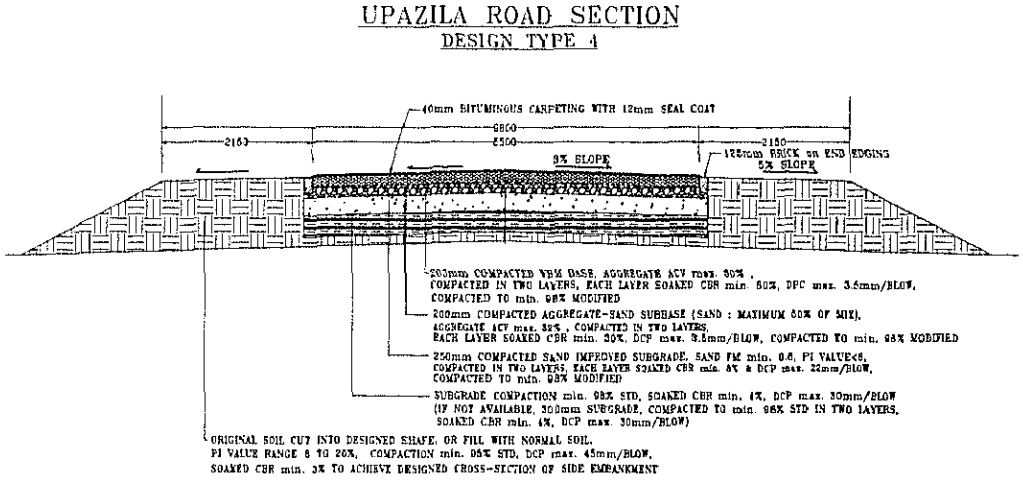
Because the Project area belongs to the "plain area" category in RDS/2005, the pavement structure stipulated for plain areas will be applied to Upazila and Union road upgrading. The pavement design standards and cross-sections to be applied to each design Type in plain areas are shown below.

Table 5-3 Pavement design standards

Road class	Design type	Sub-grade (mm)	Improved sub-grade (mm)	Sub-base (mm)	WBM-base (mm)	Bituminous Carpeting (mm)
Upazila	4	300	250	200	200	40
	5	300	250	150	150	40
	6	300	250	150	150	25
Union	7	300	250	150	150	25
	8	300	250	150	150	25

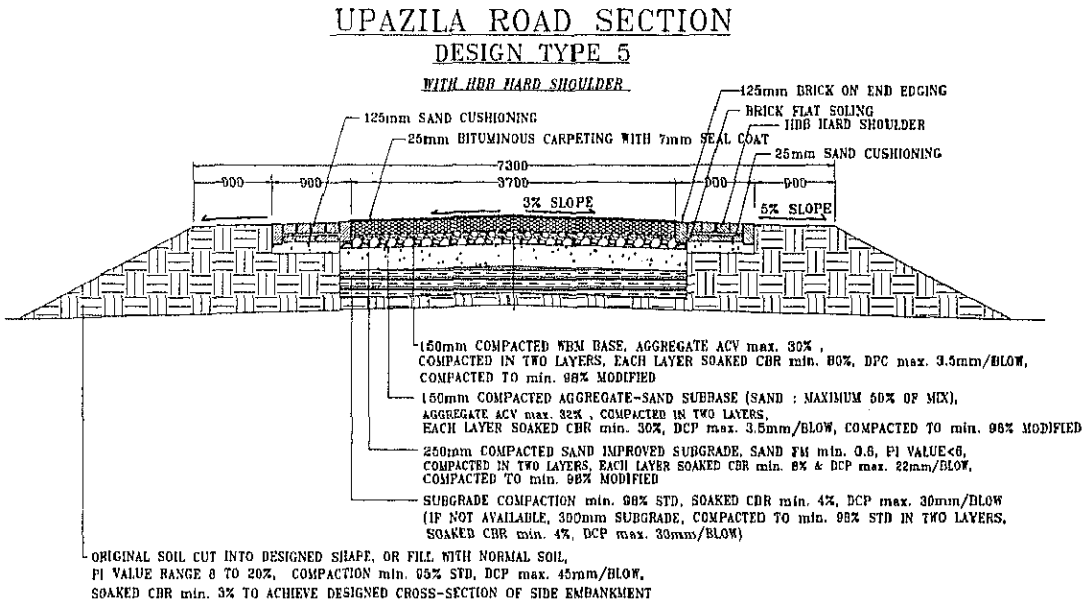
Source: RDS/2005

[19] See Annex 15 for detailed information.



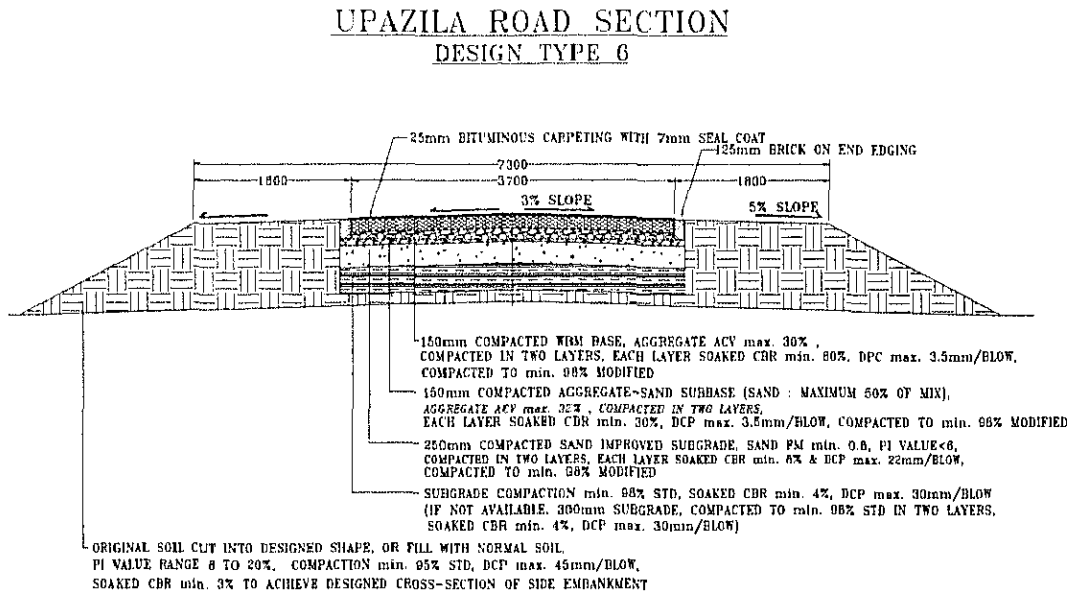
Source: RDS/2005

Figure 5-1 Road cross section of Type 4 for Upazila road



Source: RDS/2005

Figure 5-2 Road cross section of Type 5 for Upazila road



Source: RDS/2005

Figure 5-3 Road cross section of Type 6 for Upazila road

ii) Technical adequacy of RDS/2005 and issues related to its application

The SAPROF team evaluated the technical adequacy of RDS/2005 and reached the conclusion that RDS/2005 is an appropriate standard specification for road construction and maintenance. The evaluation was based on a review of the origins of RDS/2005, past experiences of its application, and field observations. Major issues examined are summarized as follows. See Annex 15 for the details of the Review on RDS/2005.

Pavement structures

RDS/2005 specifies a rectangular pavement structure, while RDS/2004 stipulates that pavement structures should be trapezoidal in shape. This modification may lead to a reduction in the durability of the road. The SAPROF team therefore examined the durability of the rectangular pavement structure and concluded that the adoption of rectangular sub-bases would be appropriate for road construction under the Project for the following reasons:

1) LGED was aware that adoption of the rectangular sub-base would reduce the durability of the road against heavy loads.
2) The decision to adopt the rectangular sub-base design was reached after consideration of the degree of reduction in road durability, expected traffic volume of rural roads, and technical and managerial capacities of local contractors. LGED concluded that this design would facilitate construction and maintenance of roads to be built under the Project. The SAPROF team supports LGED's position with regard to this point.

Brick on end edging

RDS/2005 specifies the placement of brick on end edging on cross-sections of design Types 4 through

8. The SAPROF team concluded that the Project should adhere to the RDS/2005 provision on brick on end edging for the following reasons:

1) Laying brick on end edging is an appropriate means of pavement edge treatment. Local contractors, at their current technical levels, would have difficulty constructing pavements with straight and uniform edges. When poorly treated, pavement edges crack easily and eventually fall apart. Brick on end edging would prevent such damage.
2) If all layers of the pavement structure are properly compacted, the durability of the pavement edge against erosion is higher with brick on end edging than without it.

Expected design life

RDS/2005 sets the expected design life at 10 years, which means that roads are designed based on the expected traffic volume 10 years ahead of the base year. RPDM/1999 recommends that a growth rate of 7.5% per year be used for traffic forecasts. Thus, the traffic volume is estimated to increase to more than double the present volume in 10 years. The SAPROF team concludes that the duration of 10 years is appropriate as the expected design life of roads in Bangladesh, based on the estimated traffic volume, costs of upgrading, and the evaluation results of RDP-25.

Shoulder type

RDS/2005 recommends the use of the soft shoulder for design types 4, 6, and 8. There was, however, a concern that the use of the soft shoulder might not be suitable for the Project area. Because the quality of soil in the area tends to be poor, the soft shoulder may be susceptible to damage.

However, an investigation of a number of roads constructed in compliance with RDS/2005 suggested that use of the soft shoulder would not increase the risk of damage to Upazila and Union roads in the area. It is therefore technically sound to adopt the soft shoulder within the Project.

Soil specification and quality of embankment materials in the Project area

Road construction sites within the Project area have limited access to embankment materials that meet RDS/2005 standards. In Bangladesh, if the quality of soil available near the construction sites is of insufficient quality, sand, or sand mixed with coarse river sand, is used as a countermeasure. This measure increases the Fineness Modulus (FM) value, enhances bearing capacity, and improves the California Bearing Ratio (CBR) value, and consequently makes the soil compliant with the standards. RDS/2005 also provides a measure to enhance the CBR value by increasing the thickness of the improved sub-grade.

The SAPROF team concludes that the two above-mentioned measures will be appropriate to increase the bearing capacity of the materials. The Project will not obtain embankment materials from the other areas, because the above-mentioned measures will secure the required quality of base materials, and transportation of soil from the other areas will require additional costs.

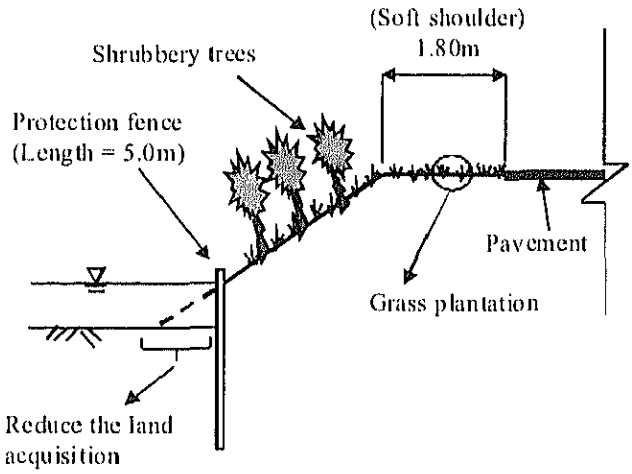
Slope gradient

Although RDS/2005 specifies the gradient levels of the embankment slope, the observed slope gradients were steeper than the recommended gradients. To prevent slope erosion, the Project will

supervise the design and construction of roads to ensure compliance to the RDS/2005 specifications.

Slope protection

The installation of palisades and retaining walls and vegetation cover on slopes are typically adopted as mitigation measures against erosion (Figure 5-4). However, damage to the inside of palisades, caused by poor embankment construction and compaction, was occasionally observed during the field visit. The Project will supervise the construction works to prevent such damage caused by poor construction works. In addition, small-sized tree species with maturity heights of approximately 10 m and high resistance to saline environments will be selected for the vegetative protection, since many of the selected roads are located in saline areas.



Source: SAPROF Team

Figure 5-4 Slope protection measures

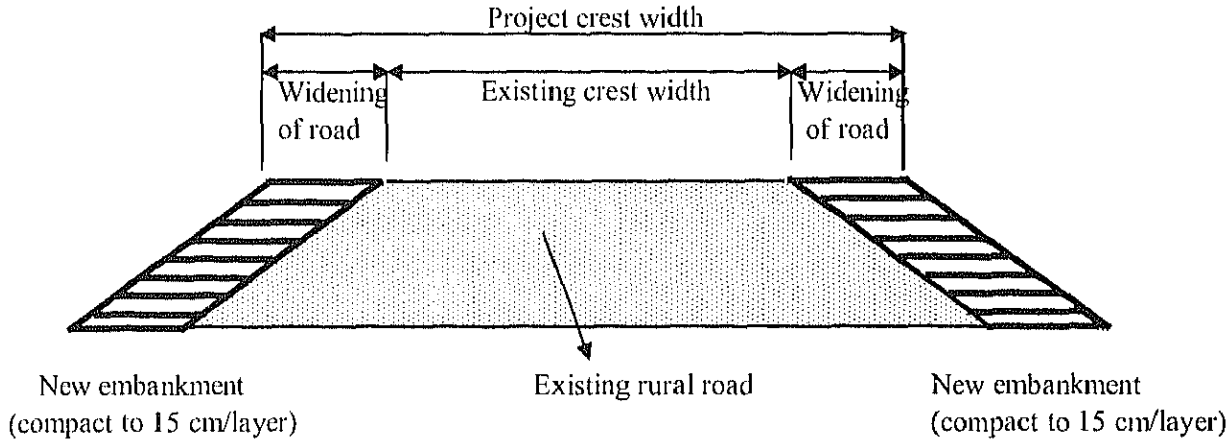
Crest width in town areas

In town and village areas, the Project will at least retain the carriageway widths in accordance with RDS/2005 specifications. Carriageway widths are specified by RDS/2005 as follows: 5.50 m for Type 4; 3.70 m for Types 5 and 7; 3.00 m for Type 8.

Crest widening works

Road widening entails the risk of erosion caused by the infiltration of rainwater into the space between the existing embankment and the new embankment. Thus, the new embankment will be sufficiently compacted, as prescribed in RDS/2005. The following steps will be taken for crest widening works:

1) Remove vegetation on embankment slopes of existing rural roads;
2) Divide the new embankment into several layers, and compact each layer with road rollers. Each layer needs to be compacted to a thickness of 15 cm.
3) Conduct soil tests at the compaction stage to assess whether the soil quality meets RDS/2005 specifications.



Source: SAPROF Team

Figure 5-5 Construction method of crest widening works

iii) Application of RDS/2005

RDS/2005 stipulates that design Types of Upazila and Union roads are to be selected in accordance with traffic volume. Traffic volume is assessed based on passenger car units (PCUs). PCU is the standard unit, and traffic volumes for each vehicle type are assessed and converted into PCUs by applying PCU factors. Table 5-4 shows the PCU factors assigned to each vehicle type.

Table 5-4 Vehicle type and passenger car unit (PCU) factor

Vehicle Type	PCU factor
Car	1.0
Bus	3.0
Truck	3.0
Auto rickshaw	0.5
Bicycle	0.3
Rickshaw	1.0
Motor Cycle	0.3
Tempo	1.0
Bullock Cart	4.0

Source: RDS/2005

According to RDS/2005, typical application of road design Types is based on measurement of peak hour maximum PCUs or Maximum Daily Commercial Vehicles (MDCV). For estimation of MDCV, only traffic PCU measurements of trucks and buses are used. The relationships among design Types, the peak hour maximum PCUs, and MDCV are shown in Table 5-5. These are used to determine the typical application of a road design Type.

Table 5-5 Traffic criteria for design purposes

Road design Type	Peak hour maximum passenger car units (for all vehicles) (PCU)	Maximum Daily Commercial Vehicles (MDCV) (for trucks and buses only) (PCU)
Type 4	291-530	301-600
Type 5	(211-290)	201-300
Type 6	(131-210)	101-200
Type 7	(91-130)	51-100
Type 8	(<=90)	<=50

Note: For road design Types 5, 6, 7, and 8, the criterion should be MDCV. For Type 4 the criterion should be peak hour PCU(s). Figures in parentheses are estimates for low-volume roads.
Source: RDS/2005

iv) Proposed design Type application for Upazila roads

Traffic forecasts of all proposed Upazila roads are calculated based on estimates of MDCV. For Type 4 roads, estimates of MDCV are substituted for Peak Hour Maximum PCUs due to the lack of data. Table 5-6 is a summary of design Types to be applied to 90 Upazila roads proposed for upgrading, based on their MDCV. MDCV values are calculated based on data provided in the F/S on traffic volume per hat day. The results reveal that there are three, two, and 16 Upazila roads that fall into Upazila road design Types 4, 5, and 6, respectively. Thirty-five and 34 Upazila roads fall into Union road design Types 7 and 8, respectively.

Table 5-6 Summary of design type for Upazila roads

Division/G. District District	Design Type					Road with no traffic data	Total
	Upazila road			Union road			
	Type 4	Type 5	Type 6	Type 7	Type 8		
Barisal Division			**6**	**15**	**18**	**27**	**66**
Barguna				2	3	3	8
Barisal			4	5	1	6	16
Bhola				2	5	1	8
Jhalokathi				1	3	3	7
Patuakhali				4	2	9	15
Pirojpur			2	1	4	5	12
Greater Faridpur	**1**		**3**	**11**	**11**	**8**	**34**
Faridpur	1		2	4	1	2	10
Gopalganj				1	4	1	6
Madaripur				2	2		4
Rajbari			1	2	1	2	6
Shariatpur				2	3	3	8
Greater Khulna	**2**	**2**	**7**	**9**	**5**	**12**	**37**
Bagerhat		2	3	2	1	6	14
Khulna	2		1	5	2	6	16
Satkhira			3	2	2		7
Total	**3**	**2**	**16**	**35**	**34**	**47**	**137**

Source: SAPROF Team

Specifications of design Type 4 and 6 will be applied to the roads categorized into Type 4 and 6, respectively. In terms of the two roads which fall into Type 5, specifications of design Type 6 will be employed. This is because the MDCVs of these two roads exceed the maximum MDCV of Type 6 specified in RDS/2005 only slightly, and design Type 6 will be able to accommodate the traffic

volume of the two roads even without hard shoulders. Specifications of design Type 6 also will be applied to the roads categorized as Type 7 and 8, taking into account the expected increase in traffic volume after upgrading. In sum, the specifications of road design Type 4 will be applied to three Upazila roads, and those of design Type 6 will be applied to the rest.

b) Bridges and culverts

i) Specifications for bridges and culverts

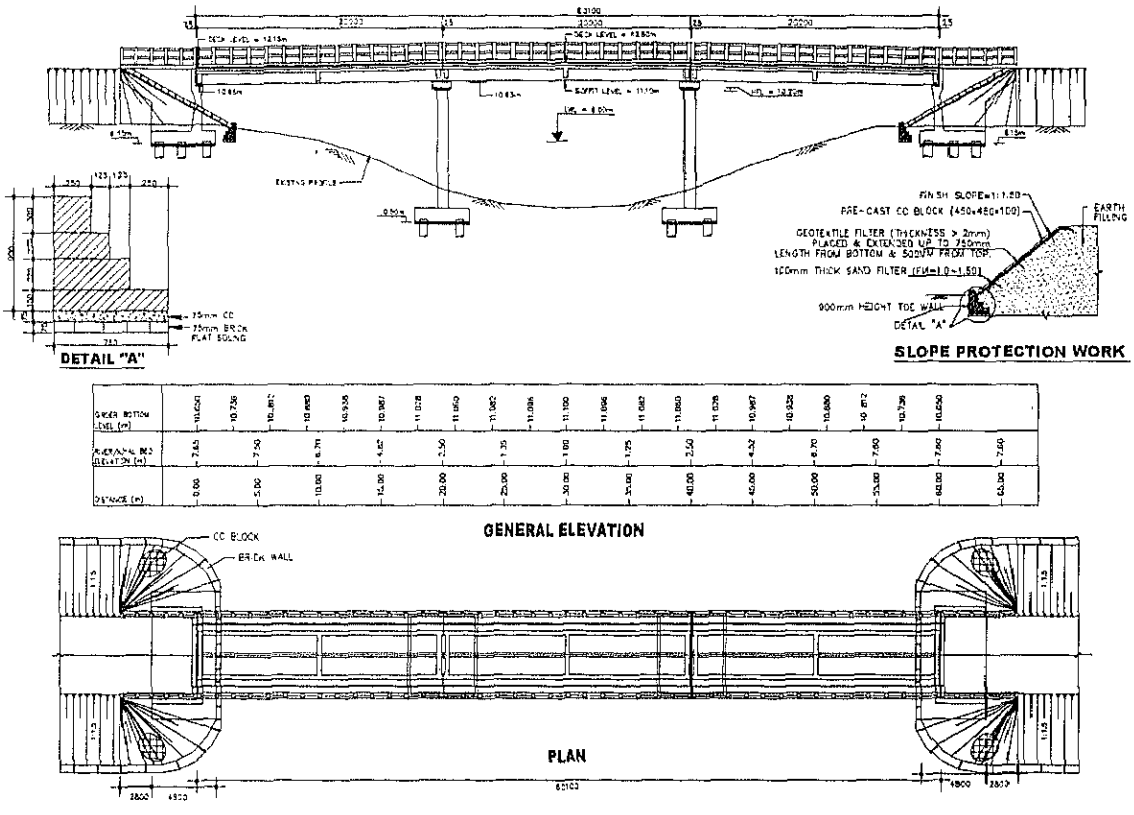
RDS/2005 specifies the carriageway widths of bridges and culverts as indicated in Table 5-7.

Table 5-7 Recommended bridge and culvert carriageway widths

Design Type	Road class	Lane Type	Length less than 30.00m (m)	Length greater than 30.00m (m)
4, 5, 6	Upazila	Double lane	5.50	5.50
7, 8	Union	Single lane	3.70	5.50

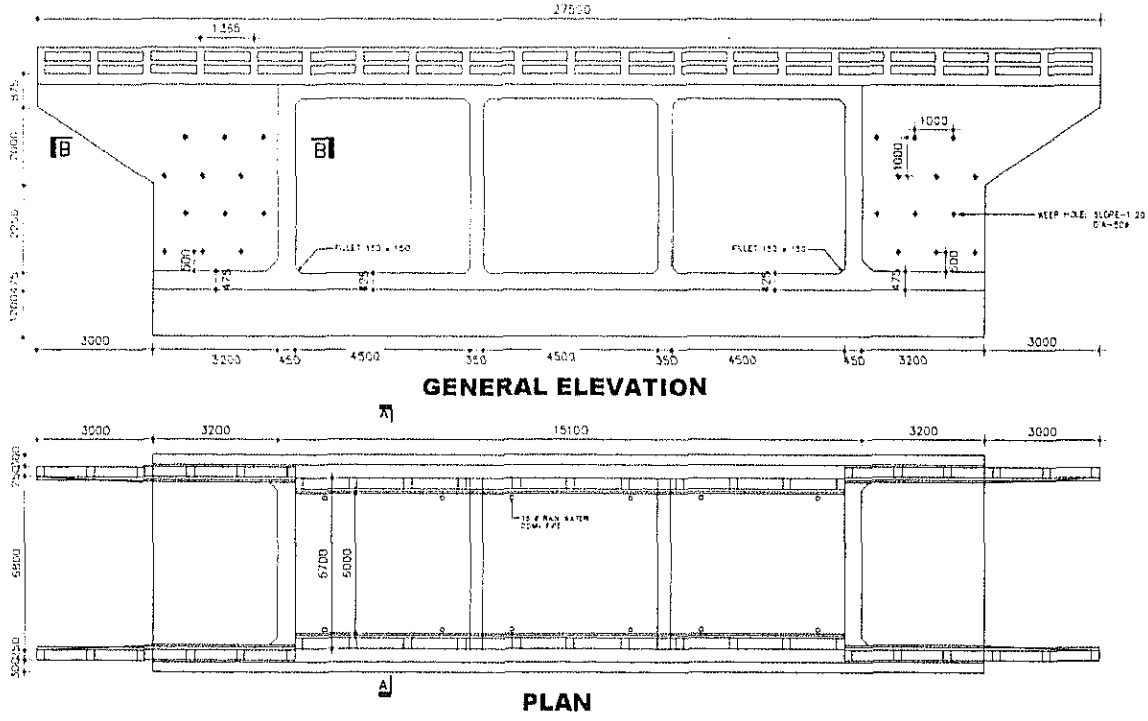
Source: RDS/2005

The typical cross-sections to be applied to bridges and culverts on Upazila roads are below.



Source: LGED

Figure 5-6 Plan of RCC bridge with double lanes (Upazila road)



Source: LGED

Figure 5-7 Plan of culvert with double lanes (Upazila road)

ii) Application of specifications for bridges and culverts

In line with RDS/2005, the box culvert structure will be used if the gap is equal to or less than 6 m, while the Reinforced Cement Concrete (RCC) bridge structure will be applied when the gap exceeds 6 m. The maximum bridge-span length will be 200 m under SWBRDP, and ghats will be constructed for gaps exceeding 200 m.

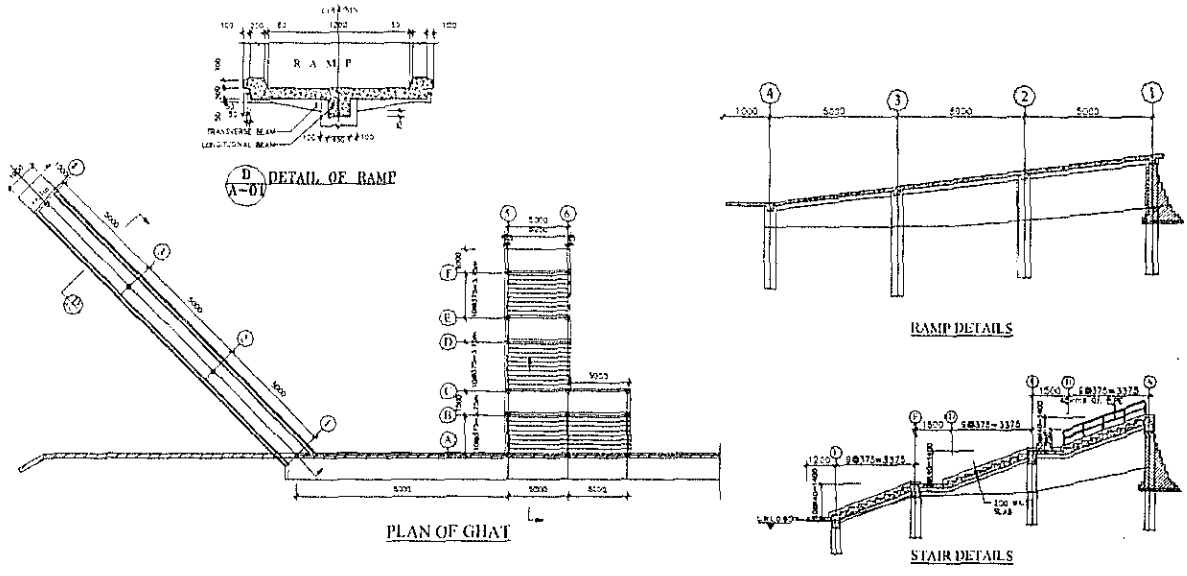
Bridges and culverts on Upazila roads will be constructed with two lanes and a carriageway width of 5.50 m to accommodate future increases in traffic volume. The compaction of embankment materials as per specifications and revetment work of the road section should be carried out to protect approach roads of bridges from erosion and subsidence.

The footpath width will be 0.90 m for bridges on Upazila roads with spans exceeding 30 m and carriageway widths of 5.50 m. Concrete revetments will be built for protecting bridge piers and approach roads from flood damage.

c) Ghats

A ghat is constructed by placing an RCC terrace as the upper structure on a foundation structure built on a bank slope. The use of ghats is classified into the following two categories: ghats for market access and ghats for gaps on roads. The former will be built near markets for the purpose of improving accessibility, and should not interrupt boat traffic, especially on hat days when traffic increases. The latter will be built where gaps exceed 200 m, and thus bridge construction is too costly, and where

there is enough water traffic for its construction to be economically viable. Both types of ghats need to be large enough so that users can get on and off safely, and load and unload goods with ease, and be sufficiently elevated to accommodate changes in water levels of rivers.

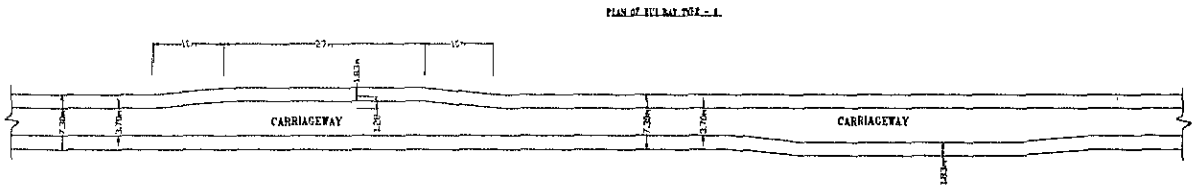


Source: LGED

Figure 5-8 Plan of ghat

d) Bus bays

RDS/2005 specifies that a bus bay is to be constructed by extending the crest widths on both sides of the road. However, the SAPROF team recommends extending the crest width and constructing the bus bay on only one side of the road in order to minimize land acquisition. Figure 5-9 shows the basic design of a bus bay. One bus bay per kilometer will be constructed on one side of the road. Each approach road extending to and from the bus bay is 10 m long and has carriageway widths of 3.7 m. The bus bay itself is 27 m long and has a 4.6 m carriageway width.



Source: LGED

Figure 5-9 Plan of bus bay

e) Guard posts

The Project will follow the standard specifications set forth in the "Rural roads and culverts maintenance activities completion manual" published by LGED in June 2008. The guard posts are to be built in RCC on the soft shoulder, 1.2 m apart from each other. They will be 2.2 m in height, with 1.00 m above ground, and have red and white stripes to make them easily-noticeable.

The following installation standards are to be applied:

- As alignment information for each route is unavailable, the number of guard posts to be installed on curved road sections is to be set at fifteen guard posts per kilometer.
- Two guard posts each are to be built to the front, back, right, and left of approach roads to RCC bridges with spans exceeding 6 m. Thus, eight guard posts will be required for every bridge.

f) Traffic signs

Since the proposed Upazila and Union roads pass through town areas, warning signs will be installed around schools and hospitals to alert drivers to school children and hospital patients. They will also be installed around markets to protect their users. In addition, warning signs for speed control will be installed where they are easily noticed.

The Project will follow the size, shape, and content of traffic signs stipulated by the "Rural roads and culverts maintenance activities completion manual." Two traffic signs will be installed at each market, school, hospital, etc.

(3) Prioritization of subprojects to be developed

The Upazila roads proposed for development have been selected through the following process:

a) Identification of the Upazila roads that require upgrading

The Upazila Engineers identified the Upazila roads that required upgrading in their respective Upazilas and sent the information to their respective Executive Engineers. They also selected Upazila roads affected by the 2007 Floods and Cyclone Sidr that were in need of upgrading and communicated the information to the Executive Engineers. The Executive Engineers compiled a list of Upazila roads that required upgrading within the District they administered and forwarded it to LGED headquarters. These roads were presented in the lists of Upazila roads proposed for upgrading in the F/S.

b) Data collection of the Upazila roads identified for upgrading

The SAPROF team obtained information on Upazila roads proposed for upgrading from the data maintained by LGED. Data include the physical features of roads, history of construction and maintenance, and socioeconomic conditions associated with each Upazila road. Data provided in the F/S, such as Economic Internal Rates of Return (EIRRs), have also been used for selection.

c) Establishment of criteria for prioritization of Upazila roads to be upgraded

Subprojects for implementation are chosen based on the ranking of subproject candidates according to a set of prioritization criteria. To establish the criteria in consultation with LGED officials, the SAPROF team first proposed a set of ranking criteria. The criteria were presented to stakeholders in the Second Stakeholders Meetings[20] to obtain feedback and were finalized based on consideration of the feedback obtained in the meetings and other available data. The finalized set of prioritization criteria are presented in Table 5-8. All Upazila roads are given a score against each of the criteria, and

[20] See Annex 4.

subsequently, the Upazila roads are ranked according to the total scores. The scoring schemes are also provided in the table.

Table 5-8 Prioritization criteria for Upazila roads

	Evaluation criteria	Weighting scheme
A. National and basic selection policy		
A1	Category given to the road: Upazila Road	N.A.
A2	Selection of at least one Upazila road per Upazila	N.A.
B. Evaluation criteria for ranking		
B1 Level of development		**35%**
B1-1	Poverty: The Headcount Index (i.e., the proportion of the population that is counted as poor) in the Upazila where the Upazila Road is located (Data source: Bangladesh Bureau of Statistics, 2005)	10%
B1-2	Education: average years of schooling of adult household members in the Upazila where the Upazila Road is located (Data source: Bangladesh Bureau of Statistics, 2005)	5%
B1-3	District-wide GDP per capita in USD (Data source: Bangladesh Bureau of Statistics, 2000)	10%
B1-4	District-wide percentage of undeveloped Upazila roads (Data source: LGED, 2008)	10%
B2. Economic potential		**45%**
B2-1	Population density in the Upazila where the Upazila Road is located (Data source: Bangladesh Bureau of Statistics, 2005)	10%
B2-2	Revised EIRR (Data source: SAPROF team)	15%
B2-3	Number of growth centers and rural markets per kilometer adjacent to the Upazila Road (Data source: LGED, 2008)	10%
B2-4	Percentage of length of earthen segments to the total length of the Upazila Road (Data source: LGED, 2008)	10%
B3. Social impact		**5%**
B3-1	Number of schools, clinics, and cyclone shelters per kilometer adjacent to the Upazila Road (Data source: LGED, 2008)	5%
B4. Cost and difficulty of construction		**15%**
B4-1	Volume of earthwork estimated from the current width and height of alignment (Data source: LGED, 2008)	10%
B4-2	Total length of gaps per kilometer (Data source: LGED, 2008)	5%
Total		**100%**

The scoring schemes for the prioritization criteria are summarized below.

B1-1 and B1-2: All Upazilas in the project area are ranked according to severity of poverty and education level. Each Upazila is given a score ranging from 4 for the poorest or least educated quartile to 1 for the wealthiest or most educated quartile.

B1-3 and B-4: All Districts in the project area are ranked according to GDP per capita and progress of Upazila road development by LGED. Each District is given a score ranging from 1 for the quartile with the largest GDP per capita or the highest percentage of developed Upazila roads to 4 for the quartile with the smallest GDP per capita or the lowest percentage of developed Upazila roads.

B2-2 to B2-4 and B3-1: All proposed Upazila roads are ranked from highest to lowest. Each Upazila road is given a score ranging from 1, for the lowest quartile, to 4, for the highest quartile.

B4-1 and B4-2: All proposed Upazila roads will be ranked from highest to lowest. Each Upazila road is given a score ranging from 1, for the highest quartile, to 4, for the lowest quartile.

For all criteria: If data is not available, a score of 2 is given.

In Table 5-8, two classes of criteria, "A. National and basic selection policy," and "B. Evaluation criteria for ranking" are defined to set the framework of the selection scheme. The former indicates that road selection is based on Upazila-wise ranking, and the latter defines the types of data used for ranking evaluation and the weighting scheme.

"A. National and basic selection policy" consists of two policy criteria: "A1 Category given to the road: Upazila Road," and "A2 Selection of at least one Upazila road in an Upazila." The former ensures that Upazila roads are selected for upgrading, and the latter secures at least one Upazila road per Upazila to be selected for upgrading based on the ranking. The latter criterion is proposed for the following objectives: 1) to distribute the project investment evenly across the Project area, with relatively larger investments secured for poorer areas; and 2) to lower the transaction costs expected to arise in the management of inter-Upazila political grievances during subproject preparation and implementation.

The second group of criteria, "B. Evaluation criteria for ranking," consists of four broad principles to be followed for prioritization. They are: 1) level of development; 2) economic potential; 3) social impact; and 4) cost and difficulty of construction. The first principle is followed because the project aims to reduce poverty and disparities between the poor and the rich. The second principle is followed to maximize the economic effects of project investment. The third principle is followed to maximize the positive social impacts of improving connectivity between schools, clinics, cyclone shelters, etc. The last principle is followed to ensure that the investment is economically viable and that the costs of road development are not excessively high. In prioritizing the proposed Upazila roads, a weight of 35% is given to the first set of principles, 45% to the second, 5% to the third, and 15% to the fourth. As stated earlier, the policies, criteria, and weighting scheme were proposed by the SAPROF team and decided through discussions with LGED and at stakeholder meetings[21].

For the first principle (B1 in Table 5-8), four criteria are listed. These criteria were selected to indicate the level of development among the available proxies. Criteria B1-1 and B1-3 mainly reflect the economic status of the household and region; criterion B1-2 is a proxy of the quality and productivity of the labor force; and criterion B1-4 represents the current status of rural infrastructure development in the Project area. Since each criterion can only partially reflect the level of development of the Project area, because of data collection and processing constraints, the four criteria are combined to represent more accurately the multidimensional nature of "development." For example, criterion B1-1 exhibits features specific to Barisal Division compared to other poverty indicators.

For the second principle (B2 in Table 5-8), four criteria are listed. These criteria represent the economic potentials of Upazila road development among the available data. Criteria B2-1 and B2-3 represent the expected degree of improvement in connectivity on the personal and institutional levels; i.e., the higher the density of population and economic facilities, the higher the impact expected from the improvement of connectivity among these subjects. Criterion B2-2 represents the economic

[21] See Annexes 3 and 4 for the details of the stakeholder meetings.

potential of roads, and criterion B2-4 indicates the degree of unrealized economic potential because of the presence of earthen roads; i.e., the longer the earthen segments of an Upazila road, the larger the economic potential once it is developed. In order to represent the levels of agricultural production, which is the major economic activities in the Project area, criteria B2-2 and B2-3 are employed. These proxies are selected based on the assumption that there is positive correlation among levels of agricultural production, EIRR, and density of the rural market.

The third principle (B3 in Table 5-8) is represented by criterion B3-1. The indicator is selected based on the notion that timely and enhanced communication among these facilities should generate positive social impacts.

For the fourth principle (B4 in Table 5-8), criteria B4-1, volume of earthwork, and B4-2, the total length of gaps per kilometer are selected to represent the difficulty and subsequent costliness of Upazila road development. They are introduced to lower the risk of selecting subprojects incurring excessive costs compared to the expected benefits.

In addition, preconditions for subproject implementation may be specified later, which shall dictate the approval of subprojects at the project implementation stage. Examples of such preconditions are: a) establishment of tree-planting and caretaking arrangements; b) establishment of land acquisition agreements with landowners; c) completion of a development plan; and d) approval of the development plan by stakeholders.

d) Ranking of Upazila roads

Based on the ranking policies, criteria, and weighting scheme described above, 137 proposed Upazila roads are ranked according to the data available to date. In consideration of available budgets, 88 Upazila roads have been proposed for upgrading by JICA loan, and 18 have been proposed for upgrading by GOB budget. The ranking results for Upazila roads are given in Table 5-9. The data used and scores calculated for ranking each Upazila roads are presented in Annex 17.

Table 5-9 Ranking of Upazila roads

Ranking	Division/ Greater District	District	Upazila	Road Code (Gazetted)	Name of Upazila Road	Road Type	Length (km)	Cost (mill.tk.)	Cumulative cost (mill.	Financing
1	Faridpur	Shariatpur	DAMUDDYA	386252006	Shidulkura Bazar GC-Nagerpara GC Road via Charatalia & Munsirhat.	6	6.0	25	25	Loan
2	Barisal	Pirojpur	NAZIRPUR	579762004	Sreeramkati GC-Pachpara GC Road (Up to Chalitabari)	6	3.9	21	46	Loan
3	Faridpur	Gopalganj	GOPALGANJ-S	335322008	Boultali GC-Balakair-Kathi GC Road.	6	9.5	25	72	Loan
4	Faridpur	Rajbari	RAJBARI-S	382762009	Banibaha GC-Chandani R&H	6	9.6	31	103	Loan
5	Faridpur	Faridpur	BOALMARI	329182006	Boalmari GC to BhagatGC via Gohaibari GC road(Boalmari portion).	6	12.6	40	143	Loan
6	Khulna	Bagerhat	MOLLAHAT	201562004	Singati-Chandpur-Shiali (Mollahat Portion) (UZR #427)	6	16.3	87	231	Loan
7	Barisal	Bhola	BHOLA-S	509182012	Ilisha RHD-Roder hat-Santir hat-Wapda closer bazer (UZR #583)	6	12.0	22	252	Loan
8	Faridpur	Rajbari	BALIAKANDI	382072001	Jamalpur GC-Sonapur GC Rd. via Baharpur Hat	6	17.7	56	308	Loan
9	Barisal	Barisal	UZIRPUR	506942003	SANUHAR-DHAMURA-SATLA(via-Jalla) (UZR #-522)	6	23.5	62	370	Loan
10	Faridpur	Shariatpur	NARIA	386652004	Ghaisar GC-Golar Bazar GC Road.	6	7.9	5	375	Loan
11	Barisal	Barisal	BABUGANJ	506032003	Barisal-Dhaka RHD.-Barisal Cadet Collage-Madabpasa Rd.	6	4.2	22	397	Loan
12	Faridpur	Faridpur	FARIDPUR-S	329472011	Bhakunda R&H- Bilnalia Road.(Roshulpur GC)	6	7.7	20	417	Loan
13	Faridpur	Madaripur	SHIBCHAR	354872008	Chanderchar G.C. to Bahadurpur R & H road via Dityakhanda FWC & Choto	6	9.7	48	465	Loan
14	Faridpur	Faridpur	BHANGA	329102005	Kalamirdha GC-R&H at Pulia	4	11.1	106	572	Loan
15	Barisal	Patuakhali	DASHMINA	578522003	Dasmina-Hazir hat Lauuchghat	6	3.0	13	585	Loan
16	Faridpur	Faridpur	ALFADANGA	329032006	Gopalpur GC to Boalmari GC via Berrir Hat GC Road(Alfadanga Portion)	6	14.5	65	650	Loan
17	Faridpur	Shariatpur	SHARIATPUR-S	386692008	Shariatpur-Burirhat (Town bipass road)	6	9.6	20	670	Loan
18	Faridpur	Rajbari	PANGSHA	382732014	Bagduli GC-LangolbundhGC via Tebaria-Sawrail up-Alamdamnga	6	10.9	39	709	Loan
19	Faridpur	Faridpur	SADARPUR	329842009	Piajkhali GC-Charbharason GC via Lohertek bazar-Monikotha bazar rd	6	11.6	66	775	Loan
20	Barisal	Pirojpur	BHANDARIA	579142006	Bhandaria-Gazipur-Banai-Mathbria road (upto Bhagrathpur bazar) road	6	16.5	53	828	Loan
21	Faridpur	Gopalganj	KOTWALIPARA	335512004	Nagra R & H-Bandabari-Ramshil-Shashikor GC Road. (UZR #633)	6	14.3	57	885	Loan
22	Barisal	Pirojpur	ZIANAGAR	579882004	Zia nagor-Telikhali GC via Darul huda Kheyaghat	6	5.5	21	906	Loan
23	Faridpur	Shariatpur	BHEDARGANJ	386142003	Mollarhat GC-Balarhat GC Road.	6	6.1	45	951	Loan
24	Barisal	Barisal	BAKERGANJ	506072006	Halta GC-Charamaddi Mia Bari GC via Ranir hat.	6	8.8	50	1,001	Loan
25	Khulna	Satkhira	KALAROA	287432008	Sona baria GC (UP Office)-Gopinathpur	6	10.9	60	1,061	Loan
26	Barisal	Pirojpur	SWARUPKATHI	579872008	Chandkati GC-Sreramkati G.C	6	4.1	20	1,081	Loan
27	Barisal	Barisal	AGAILJHARA	506022005	Agailjhara H/Q to Illa Bus stand (NHW) via Rajhihar bazar & Bashail hat (UZR	6	9.0	29	1,110	Loan
28	Barisal	Jhalakati	JHALOKATHI-S	542402003	Panjiputhipara GC-Manpasha GC via Chamta bazar	6	17.7	97	1,208	Loan
29	Barisal	Barisal	MEHENDIGANJ	506622005 & 506622002	Paterhat GC-Kazirhat GC. and Kazirhat GC-Khasherhat GC (Muladi).	6	18.0	104	1,311	Loan

Table 5-9 Ranking of Upazila roads (continued)

Ranking	Division/ Greater District	District	Upazila	Road Code (Gazetted)	Name of Upazila Road	Road Type	Length (km)	Cost (mill.tk.)	Cumulative cost (mill.	Financing
30	Barisal	Barguna	AMTALI	504092001	Amtali-Gazipur	6	12.9	28	1,339	Loan
31	Barisal	Pirojpur	KAWKHALI	579472001	Kawkhali GC to Pangasia GC	6	8.6	30	1,369	Loan
32	Barisal	Pirojpur	PEROJPUR-S	579802006	Hularhat GC-Panchpara GC.	6	8.1	38	1,408	Loan
33	Barisal	Jhalakati	NALCHITY	542732003	Manpasha GC-Taltala-Bhabanipur via Nachanmohal UP(Fultala-Taltala-Nachonmohal road)	6	12.5	65	1,472	Loan
34	Barisal	Patuakhali	MIRJAGANJ	578762005	Subidkhali H/Q-Chatra-Deuli Bazar-Kakrabunia GC-HRS at Malkerbari Rd.	6	15.5	69	1,541	Loan
35	Khulna	Satkhira	SHYAMNAGAR	287862004	Noabenki-Garez Hat-Harinagar Hat	6	16.1	74	1,615	Loan
36	Faridpur	Faridpur	NAGARKANDA	329622020	Chandibardi R&H-Kalinagar GC Via Baushkhali Bazar,Jadunandi College road.	6	13.1	79	1,694	Loan
37	Khulna	Satkhira	ASSASUNI	287042008	Kadakati-Protapnagar via Goaldanga	6	33.2	165	1,859	Loan
38	Barisal	Barguna	PATHARGHATA	504852002	Patharghata-Kalmegha	6	4.7	8	1,867	Loan
39	Khulna	Bagerhat	BAGERHAT-S	201082008	Jattrapur GC-Fakirhat-Chitalmari RHD.	6	15.5	8	1,876	Loan
40	Barisal	Patuakhali	GALACHIPA	578572002	Galachipa-Char Biswas Rd.	6	20.3	22	1,898	Loan
41	Faridpur	Gopalganj	MUKSUDPUR	335582011	Batikamari UP Office-Pererchar GC via Haldiaviata Bazer	6	7.2	25	1,923	Loan
42	Faridpur	Gopalganj	TUNGIPARA	335912005	Bashbaria GC to Chowmohoni GC via Karfa	6	8.5	34	1,957	Loan
43	Barisal	Barisal	BARISAL-S	506512004	Taltali Kheya Ghat to Sayestabad Bazar(Fakir Bari Road) (UZR #515)	6	11.0	40	1,997	Loan
44	Barisal	Barisal	HIZLA	506362001	Taker Bazar-Aligong bazar.	6	9.3	51	2,048	Loan
45	Khulna	Satkhira	SATKHIRA-S	287822005	Satkhira R&H(Narkeltala)-Jhawdanga via Akhrakhola bazar Balli UP Raipur Bazar & Pathorghata road	6	18.5	10	2,057	Loan
46	Khulna	Khulna	RUPSA	247752006	Rupsha Thana H/Q-Mausa GC	6	2.3	11	2,069	Loan
47	Khulna	Bagerhat	SHARANKHOLA	201772001	Rayenda GC-Rasulpur GC Road	6	9.2	12	2,080	Loan
48	Barisal	Bhola	TAZUMUDDIN	509912004	Shasigonj Bazer to Chatta dowri via Godown	6	5.8	25	2,105	Loan
49	Khulna	Satkhira	TALA	287902006	Dalua G.C.-Kadakati GC(Ashasuni) Road.	6	9.0	30	2,136	Loan
50	Faridpur	Madaripur	RAJOIR	354802008	Kadambari GC-Hizalbari-Tatul Bari-KaliGonj GC (Kotalipara)	6	7.3	53	2,189	Loan
51	Khulna	Khulna	KOIRA	247532004	Upazila HQ (Dighirpar)-Golkhali Road (UZR #375)	6	14.0	68	2,257	Loan
52	Faridpur	Gopalganj	KASIANI	335432008	Ramdia-Satpar R&H Road (UZR #650)	6	10.4	105	2,362	Loan
53	Barisal	Barisal	GOURANADI	506322006	Illah Bus stand (NHW) to Agailjhara H/Q via Bakai bazar and Rajhihar bazar(including Notun bazar connecting	6	10.4	10	2,372	Loan
54	Barisal	Jhalakati	RAJAPUR	542842009	Mirer hat-Nizamia-Boroia-Niamoti (Included Kacharibari Hat Connection)	6	7.0	38	2,409	Loan
55	Khulna	Satkhira	DEBHATA	287252006 & 287822008 & 287042006	Gazirhat GC-Budhata GC via Badartala and Budhata R&H-Bangdah GC road (Sadar portion) and Budhata-Gazirhat GC	6	28.1	116	2,525	Loan
56	Barisal	Pirojpur	MOTHBARIA	579582003	Tuskhali GC-Sapleza GC Via Barromasua Bazar-Betmore Bazar & Amragachia Bazar	6	22.2	120	2,645	Loan
57	Khulna	Satkhira	KALIGANJ	287472007	Nazimgonj GC-Debhata Via Khanjia Bazaar	6	9.3	16	2,661	Loan
58	Faridpur	Madaripur	MADARIPUR-S	354542005	Trivagdi GC-Mithapur Hat-Habiganj hat-Mollahat-Shekhpur RHD	6	11.7	164	2,825	Loan
59	Barisal	Bhola	MONPURA	509652001	Hazirhat-Koralia Road	6	18.4	28	2,853	Loan

Table 5-9 Ranking of Upazila roads (continued)

Ranking	Division/ Greater District	District	Upazila	Road Code (Gazetted)	Name of Upazila Road	Road Type	Length (km)	Cost (mill.tk.)	Cumulative cost (mill.	Financing
60	Barisal	Bhola	LALMOHAN	509542002	Dawri Bazer-Raychand Bazer.	6	15.4	52	2,905	Loan
61	Barisal	Bhola	CHARFASSION	509252007	Chairman Bazar G.C.-Char Aicha Bazar G.C.	6	13.4	74	2,979	Loan
62	Faridpur	Rajbari	GOALANDA	382292007	Uttar Daulotdia at NHW-Ujanchar G.C.Via chardaulotdia	6	8.1	75	3,054	Loan
63	Barisal	Barguna	BARGUNA-S	504282001	Barguna-Ayla GC-Chandukhali GC Road	6	15.2	78	3,133	Loan
64	Faridpur	Madaripur	KALKINI	354402005	Khoajpur Takerhat R&H-Khasherhat GC via Laxmipur up & Surjamoni hat	6	16.4	215	3,348	Loan
65	Barisal	Barguna	BETAGI	504472004	Badnikhali GC-Fuljhuri GC	6	17.7	15	3,363	Loan
66	Barisal	Patuakhali	DUMKI	578962002	Moukoron GC-khataltali GC Via Hazirhat Rd.	6	4.3	21	3,384	Loan
67	Khulna	Bagerhat	MONGLA	201582010	DhalirKhanda Bridge-Geodhara Bazar	6	8.0	39	3,423	Loan
68	Barisal	Patuakhali	PATUAKHALI-S	578952010	Patuakhali H/Q to Badura GC	6	13.6	81	3,503	Loan
69	Khulna	Khulna	DUMURIA	247302005 & 247642008	Kathaltola-Magurkhali-Kapilmuni GC and Kapilmuni GC-Kathaltala R&H via Taltala (Paikgacha portion)	4	32.3	281	3,784	Loan
70	Khulna	Bagerhat	CHITALMARI	201142003	Durgapur RHD-Khaserhat GC-Kaligonj GC-Gazalia GC(CHT. Part)	6	7.5	20	3,804	Loan
71	Faridpur	Shariatpur	JANJIRA	386942004	Khalek SeritiShangha (R & H)-Joynagar G.C.	6	9.4	31	3,835	Loan
72	Barisal	Barisal	MULADI	506692003	Muladi to Kutubpur via Nazirpur GC & Mollar hat GC.	6	21.0	44	3,879	Loan
73	Khulna	Khulna	DACOPE	247172010	Dacope Upazila H/Q (Achuva)-Batbunia GC Road.	6	11.3	85	3,964	Loan
74	Faridpur	Faridpur	MADHUKHALI	329562009	Madhukhali R&H-Bhimpur GC Road via Makrail Bazar Starting from Mesordia	6	9.7	19	3,983	Loan
75	Faridpur	Faridpur	CHARBHADRASAN	329212004	Gozaria R&H to Krishnapur GC via Azzadha high school road	6	3.9	20	4,003	Loan
76	Khulna	Khulna	TEROKHADA	247942008	Chagladah Bazar-Nagarkandi G C via	6	9.0	27	4,029	Loan
77	Barisal	Patuakhali	BAUPHAL	578382004	Boga GC (Shaplakhali R&H)-Kanakdia hat-Surjamoni-Kalisuri GC	6	18.0	54	4,083	Loan
78	Khulna	Khulna	DIGHALIA	247402004	Mazirgati-Bamondanga-Katenga GC	6	4.5	24	4,107	Loan
79	Barisal	Patuakhali	KALAPARA	578662001	Kalapara-Dhankhali Hat	6	18.5	33	4,139	Loan
80	Barisal	Bhola	BORHANUDDIN	509212004	Mirzakalu GC (Near Chowdhury Bari)-Fakirhat Dalal Bazar R&H Road	6	10.1	38	4,178	Loan
81	Barisal	Jhalakati	KATHALIA	542432009	Amua UP office-Battala Bazer via Amribunia Bazer Road. (UZR #544)	6	8.7	39	4,217	Loan
82	Khulna	Khulna	PAIKGACHA	247642009	Dacope-Batbunia-Jhalbunia-Garaikhali-Hatiardanga-Koyra Road (Paikgacha	6	8.5	43	4,260	Loan
83	Khulna	Khulna	BATIAGHATA	247122007	Katianangla-Roypur via Sukdara Bazar , Baro Bhuiyan & Kechrabad Road	6	16.2	63	4,323	Loan
84	Khulna	Bagerhat	FAKIRHAT	201342009	Lockpur-Betaga	6	8.0	41	4,365	Loan
85	Barisal	Barisal	BANARIPARA	506102001	Chowmohana GC to Banaripara H/Q via Biserkandi Umarerper Baitakghata Wazedia Baisari.	6	19.3	295	4,659	Loan
86	Khulna	Bagerhat	MORRELGANJ	201602008	Morrelganj-Tetulbaria hat-Dewatala-Mithakhali GC (Morel Part)	6	21.0	109	4,769	Loan
87	Khulna	Bagerhat	RAMPAL	201732005	Ronsen-Gouromba bazar Road	6	8.5	41	4,810	Loan

Table 5-9 Ranking of Upazila roads (continued)

Ranking	Division/ Greater District	District	Upazila	Road Code (Gazetted)	Name of Upazila Road	Road Type	Length (km)	Cost (mill.tk.)	Cumulative cost (mill.	Financing
88	Barisal	Barguna	BAMNA	504192004	Kholpatua G.C (Ramna Launchghat)-Fuljhuri G.C	6	4.7	28	4,837	Loan
89	Barisal	Pirojpur	NAZIRPUR	579762005	Digirgan GC-Matabanga GC	6	8.5	21	4,859	GOB
90	Faridpur	Faridpur	FARIDPUR-S	329472012	Bakunda GC- Hazigonj GC via Hat Gazaria GC Road.	6	12.5	61	4,920	GOB
91	Faridpur	Rajbari	BALIAKANDI	382072007	Narua GC.-Sonapur GC.Rd. Via Kamardha	6	9.9	25	4,945	GOB
92	Khulna	Khulna	DUMURIA	247302003	Kharnia GC-Boruna GC-Jamira GC	6	19.3	19	4,963	GOB
93	Barisal	Barisal	UZIRPUR	506942004	Dhamra GC-Harta GC-Satla GC Paisarhat GC(Upto Agailjhara Upazila Start from Dhamura College)	6	27.4	32	4,995	GOB
94	Barisal	Patuakhali	DASHMINA	578522006	Alipur GC-Ulania GC	6	8.5	53	5,048	GOB
95	Faridpur	Gopalganj	GOPALGANJ-S	335322015	Satpar-Patkel bari-Boultali GC Rd.	6	9.5	57	5,105	GOB
96	Faridpur	Shariatpur	SHARIATPUR-S	386692006	Chandrapur GC-Gonga Nagar GC road.	6	8.2	74	5,179	GOB
97	Khulna	Khulna	PAIKGACHA	247642007	Chandkhali G.C-Gazalia Club Bazar-Alamtala Bazar-Baintala Bazar-Minaz bazar-Garaikhali G.C.	6	22.0	111	5,290	GOB
98	Barisal	Pirojpur	SWARUPKATHI	579872004	Jaganathkati-Juluhar via Jalabari, Sashid, Sagorkanda	6	20.6	148	5,438	GOB
99	Barisal	Jhalakati	NALCHITY	542732004	Sarkarbari-Chowrangi-Sikdarhat-Polashpur-Ranapasha Road (UZR #000)	6	8.6	39	5,477	GOB
100	Barisal	Pirojpur	BHANDARIA	579142009	Bhandaria Purbo Dhawa Road (Dhawa Bazar-Rajpasha Sadrarhat) Manikmia College-Meddarshi RHD	6	17.6	37	5,514	GOB
101	Khulna	Khulna	KOIRA	247532002	R&H (Deara)-Hoglahat GC-Ghugrakati GC Road.	6	9.1	24	5,538	GOB
102	Barisal	Barisal	MEHENDIGANJ	506622006	Patar hat GC-Aliganj Gc (Hizla).	6	7.7	39	5,577	GOB
103	Barisal	Jhalakati	RAJAPUR	542842005	Bagri GC-Mirer Hat GC via Badnikathi Hat & Baroia UP Comp	6	11.4	55	5,632	GOB
104	Faridpur	Rajbari	PANGSHA	382732012	Habaspur G.C.-Arungong G.C. Road	6	14.8	93	5,725	GOB
105	Barisal	Patuakhali	DUMKI	578962003	Muradia UP Office & GC-Patuakhali (laukhati) GC. Via Muradha High School,	6	10.7	50	5,775	GOB
106	Barisal	Jhalakati	JHALOKATHI-S	542402004	Jhalokati R&H-Panjiputhipara GC via Kirtipasa, Bhimruli bazar	6	13.2	116	5,891	GOB
107	Khulna	Khulna	DACOPE	247172005	Kalinagar GC-Mongla port (Banisanta Bazar) Road.	4	19.6	197	6,088	
108	Khulna	Bagerhat	BAGERHAT-S	201082009	Depara R&H-Kachua GC via Taleswar hat	6	6.7	12	6,100	
109	Khulna	Khulna	TEROKHADA	247942009	Terokhada R & H to Chagladah Bazar G C via Upazila H/Q via Nachunia ghat Road.	6	9.2	29	6,129	
110	Khulna	Bagerhat	SHARANKHOLA	201772007	Tafalbari GC-Rasulpur GC-Rajapur GC-Pollanbari RHD	6	14.5	56	6,185	
111	Barisal	Patuakhali	BAUPHAL	578382003	Mominpur GC-Kalaiya GC.	6	14.6	81	6,266	
112	Barisal	Barguna	BETAGI	504472002	Niamoti-Dasantorkati Via DC Hat	6	6.9	21	6,287	
113	Barisal	Barguna	AMTALI	504092007	Gazipur GC-Dhankhali GC via Tepura Hat & H/O Kanai Mridha	6	15.7	76	6,363	
114	Barisal	Barisal	HIZLA	506362004	Memania Taker Hat-Aligong bazar.	6	12.0	111	6,474	
115	Barisal	Patuakhali	GALACHIPA	578572004	Kalagachia G.c.-Alipur G.C.	6	15.0	82	6,555	
116	Barisal	Patuakhali	KALAPARA	578662002	Kalapara-Chapli Bazar.	6	21.2	6	6,561	
117	Barisal	Barguna	BARGUNA-S	504282007	Barguna-Lakurtala-Dhupati-Chandukhali GC.	6	11.9	57	6,618	

Note: Double line in the table indicates cutoff line based on the maximum cumulative costs allocated to Upazila road upgrading component to be financed by JICA loan and GOB budget.

Table 5-9 Ranking of Upazila roads (continued)

Ranking	Division/ Greater District	District	Upazila	Road Code (Gazetted)	Name of Upazila Road	Road Type	Length (km)	Cost (mill.tk.)	Cumulative cost (mill.	Financing
118	Barisal	Barisal	BAKERGANJ	506072010	Barisal-Patuakhali RHD to Baherchar GC Kalaskati Hat, Chairman Hat &Kastoganj	6	14.4	96	6,715	
119	Khulna	Bagerhat	MONGLA	201582009	Mongla Paurasova-Shalabunia-Baiddamary Bazar	6	9.0	72	6,787	
120	Khulna	Bagerhat	RAMPAL	201732007	Bhaga RHD-Kapasdanga-Kaigardashkati-Chalnahat GC (Rampal portion) (UZR #395)	6	12.5	55	6,842	
121	Barisal	Pirojpur	NAZIRPUR	579762006	Nazirpur H/Q-Gazalia GC (Nazirpur Part)	6	12.8	0	6,842	
122	Barisal	Barisal	UZIRPUR	506942011	Jaysree-Chowmohoni-Barakotha Central Road-Otra Road. (UZR #530)	6	10.7	56	6,897	
123	Barisal	Patuakhali	DASHMINA	578522005	Dashmina H.Q.-Rangopaldi hat-Ulania GC. (UZR #574)	6	15.1	75	6,972	
124	Faridpur	Faridpur	FARIDPUR-S	329472013	Khalil Mondoler Hat GC to KhanKhanapur GC via Laxmidasher hat-Boshantapur bazar road (Sadar Part)	6	15.5	58	7,031	
125	Khulna	Khulna	PAIKGACHA	247642006	kopilmuni GC-Samukputa bazer-Katamari bazer-Jamtala bazer-Baraitala G.C.(paikgacha portion) (UZR #376)	6	18.2	74	7,104	
126	Barisal	Patuakhali	DUMKI	578962004	Dumki Upazila HQ(janata Collage)-Muradia GC Via Ahamad Shisu Sadon , Nissi mondal,Kodamtala Bazar ,Basiria	6	9.9	46	7,150	
127	Khulna	Khulna	DUMURIA	247302004	Baniakhali GC-Sharafpur-Kaiya GC	6	17.8	73	7,223	
128	Khulna	Bagerhat	BAGERHAT-S	201082012	Chulkathi-Ranjeetpur Guchchagram road.	6	7.2	19	7,242	
129	Barisal	Patuakhali	KALAPARA	578662004	Kalapara-Tarikata R&H	6	9.4	23	7,265	
130	Barisal	Barisal	UZIRPUR	506942005 & 506322011	Dhamura-Sholak-Batajore(UptoGournadiUpazila boarder) and Batazore GC(NHW) to Dhamura GC	6	6.8	30	7,294	
131	Khulna	Khulna	PAIKGACHA	247642011	Batiaghata(Hatbatihat)-Baroaria-Latar Hat-Paikgacha Road(Paikgacha Portion) (UZR #384)	6	14.1	233	7,527	
132	Faridpur	Shariatpur	DAMUDDYA	386252003	Subachani-Nagerpara Raod.	6	5.7		7,527	
133	Faridpur	Shariatpur	BHEDARGANJ	386142001	Bhedorgonj-Shakhipur-Kasempur Rd.	6	16.5		7,527	
134	Barisal	Pirojpur	BHANDARIA	579142005	Telikhali GC-Tushkhali GC Road (with Harinpala kotcha connected)	6	14.4		7,527	
135	Barisal	Bhola	DAULATKHAN	509292006	Azad Nagar-Noormiar hat Daulatkhan shibpur (miar hat-Mridher hat). (UZR #584)(Daulatkhan 3rd Part) (Mridhar	6	1.6		7,527	
136	Khulna	Bagerhat	BAGERHAT-S	201082014	Daratana-Gotapara road.	6	12.0		7,527	
137	Barisal	Bhola	MONPURA	509652002	Hazirhat HQ-Ramnawaj GC Rd.	6	9.2		7,527	

(4) Subprojects to be developed

In consideration of the budget ceiling of tk. 4,837 million for Component 1, 88 Upazila roads in 88 Upazilas have been selected from the 137 proposed roads. Of the 89 Upazilas that lined up Upazila roads as candidates, one withdrew a candidate road because its development will be financed by other projects. For Component 7 18 Upazila roads have been selected for upgrading by GOB funds.

A summary of the numbers of selected Upazila roads by Division and District are shown in Table 5-10, and a list of selected Upazila roads are shown in Table 5-11. The characteristics of the selected Upazila roads are shown in Annex 17. Within Component 1 and 7, approximately 881 km of Upazila roads are to be upgraded to BC, and 3,020 m of bridges and 415 m of culverts will be constructed. Only one gap more than 200 m wide is identified as a candidate site for the installation of a pair of ghats. There will be 881 bus bays, 14,260 guard posts, and 1,362 sign boards to be installed.

Table 5-10 Summary of quantities of selected Upazila roads by District

Division/ Greater District District	No upgrade	Road to be upgraded			Total length of Upazila Road	Structures			Safety measures		
	BC/CC /RCC/ WBM	Earthen road	HBB/ BFS	Upgrade total		Bridge	Culvert	Ghats	Bus bay	Guard post	Sign board
	a (km)	b (km)	c (km)	d=b+c (km)	e=a+d (km)	(m)	(m)	(nos)	(nos)	(nos)	(nos)
Project total	**412.449**	**578.971**	**301.835**	**880.806**	**1,293.255**	**3,020**	**415**	**2**	**881**	**14,260**	**1,362**
Upazila Roads to be upgraded by loan											
Sub-total	**330.746**	**481.031**	**241.989**	**723.020**	**1,053.766**	**2,424**	**306**	**2**	**723**	**11,649**	**1,123**
Barisal Division	**175.226**	**197.941**	**99.358**	**297.299**	**472.525**	**882**	**197**		**297**	**4,881**	**408**
Barguna	25.150	13.378	16.610	29.988	55.138		6		30	448	34
Barisal	57.432	49.428	27.475	76.903	134.335	845	51		77	1,553	101
Bhola	32.834	42.166		42.166	75.000		19		42	632	53
Jhalakati	3.635	18.825	23.440	42.265	45.900		66		42	633	53
Patuakhali	40.358	41.698	11.196	52.894	93.252	10	13		53	801	78
Pirojpur	15.817	32.446	20.637	53.083	68.900	27	42		53	814	89
Greater Faridpur	**72.227**	**146.298**	**45.746**	**192.044**	**264.271**	**1,242**	**64**	**2**	**192**	**3,210**	**331**
Faridpur	21.932	36.090	26.178	62.268	84.200	171	4		62	998	120
Gopalganj	13.510	30.230	6.120	36.350	49.860	167	5		36	594	73
Madaripur	2.500	35.463	6.968	42.431	44.931	754	30		42	804	42
Rajbari	14.675	29.625	1.950	31.575	46.250	108			32	498	54
Shariatpur	19.610	14.890	4.530	19.420	39.030	42	25	2	19	316	41
Greater Khulna	**83.293**	**136.792**	**96.885**	**233.677**	**316.970**	**300**	**45**		**234**	**3,558**	**384**
Bagerhat	27.819	46.023	20.138	66.161	93.980	25	15		66	1,002	117
Khulna	15.908	45.119	37.071	82.190	98.098	190	11		82	1,259	124
Satkhira	39.566	45.650	39.676	85.326	124.892	85	20		85	1,297	143
Upazila roads to be upgraded by GOB											
Sub-total	**81.703**	**97.940**	**59.846**	**157.786**	**239.489**	**596**	**109**		**158**	**2,611**	**239**
Barisal Division	**48.991**	**49.370**	**35.808**	**85.178**	**134.169**	**324**	**109**		**85**	**1,432**	**110**
Barisal	21.450	6.420	7.200	13.620	35.070				14	205	4
Jhalakati	2.320	8.095	22.725	30.820	33.140	133	30		31	550	31
Patuakhali	2.128	15.868	1.236	17.104	19.232	10	20		17	266	36
Pirojpur	23.093	18.987	4.647	23.634	46.727	181	60		24	411	39
Greater Faridpur	**12.630**	**35.740**	**6.550**	**42.290**	**54.920**	**272**			**42**	**723**	**76**
Faridpur	0.500	8.150	3.850	12.000	12.500				12	180	13
Gopalganj	1.000	6.800	1.700	8.500	9.500	39			9	152	21
Rajbari	11.130	12.590	1.000	13.590	24.720	140			14	220	23
Shariatpur		8.200		8.200	8.200	93			8	171	18
Greater Khulna	**20.082**	**12.830**	**17.488**	**30.318**	**50.400**				**30**	**456**	**54**
Khulna	20.082	12.830	17.488	30.318	50.400				30	456	54

Table 5-11 Upazila roads selected for upgrading

Loan/GOB financing Division/Greater District District UPAZILA	Road Code (Gazetted)	Road Code (Old)	Name of Upazila Road	Ranking	Road Type	Length (km)	Cost (mill.tk)
Project Area Total						**1,293.3**	**5,891.4**
Total of Upazila road upgrading to be financed by loan						**1,053.8**	**4,837.3**
Barisal Division						**472.5**	**1,937.7**
Barguna						**55.1**	**157.4**
AMTALI	504092001	504092001	Amtali-Gazipur	30	6	12.9	28.0
BAMNA	504192004	504192005	Kholpatua G.C (Ramna Launchghat)-Fuljhuri G.C	88	6	4.7	27.8
BARGUNA-S	504282001	504282001	Barguna-Ayla GC-Chandukhali GC Road	63	6	15.2	78.4
BETAGI	504472004	504472007	Badnikhali GC-Fuljhuri GC	65	6	17.7	15.2
PATHARGHATA	504852002	504852002	Patharghata-Kalmegha	38	6	4.7	7.9
Barisal						**134.3**	**706.4**
AGAILJHARA	506022005	506022005	Agailjhara H/Q to Illa Bus stand (NHW) via Rajhihar bazar & Bashail hat (UZR	27	6	9.0	29.1
BABUGANJ	506032003	506032003	Barisal-Dhaka RHD.-Barisal Cadet Collage-Madaboasa Rd.	11	6	4.2	21.8
BAKERGANJ	506072006	506072007	Halta GC-Charamaddi Mia Bari GC via Ranir hat.	24	6	8.8	50.4
BANARIPARA	506102001	506102001	Chowmohana GC to Banaripara H/Q via Biserkandi Umarerper Baitakghata *Wazedia Baisari.*	85	6	19.3	294.5
BARISAL-S	506512004	506512005	Taltali Kheya Ghat to Sayestabad Bazar(Fakir Bari Road) (UZR #515)	43	6	11.0	40.2
GOURANADI	506322006	506322006	Illah Bus stand (NHW) to Agailjhara H/Q via Bakai bazar and Rajhihar bazar(including Notun bazar connecting road) (UZR #508)	53	6	10.4	9.8
HIZLA	506362001	506362001	Taker Bazar-Aligong bazar.	44	6	9.3	50.6
MEHENDIGANJ	506622005 & 506622002	506622005 & 506622002	Paterhat GC-Kazirhat GC. and Kazirhat GC-Khasherhat GC (Muladi).	29	6	18.0	103.8
MULADI	506692003	506692003	Muladi to Kutubpur via Nazirpur GC & Mollar hat GC.	72	6	21.0	44.3
UZIRPUR	506942003	506942003	SANUHAR-DHAMURA-SATLA(via-Jalla) (UZR #-522)	9	6	23.5	61.9
Bhola						**75.0**	**238.9**
BHOLA-S	509182012	509182015	Ilisha RHD-Roder hat-Santir hat-Wapda closer bazer (UZR #583)	7	6	12.0	21.6
BORHANUDDIN	509212004	509212005	Mirzakalu GC (Near Chowdhury Bari)-Fakirhat Dalal Bazar R&H Road	80	6	10.1	38.3
CHARFASSION	509252007	509252011	Chairman Bazar G.C.-Char Aicha Bazar G.C.	61	6	13.4	74.1
LALMOHAN	509542002	509542006	Dawri Bazer-Raychand Bazer.	60	6	15.4	51.7
MONPURA	509652001	509652002	Hazirhat-Koralia Road	59	6	18.4	28.0
TAZUMUDDIN	509912004	509912004	*Shasigonj Bazer to Chatta dowri via* Godown	48	6	5.8	25.3
Jhalakati						**45.9**	**239.3**
JHALOKATHI-S	542402003	542402003	Panjiputhipara GC-Manpasha GC via Chamta bazar	28	6	17.7	97.5
KATHALIA	542432009	542432010	Amua UP office-Battala Bazer via Amribunia Bazer Road. (UZR #544)	81	6	8.7	39.5
NALCHITY	542732003	542732004	Manpasha GC-Taltala-Bhabanipur via Nachanmohal UP(Fultala-Taltala-Nachonmohal road)	33	6	12.5	64.7
RAJAPUR	542842009	542842010	Mirer hat-Nizamia-Boroia-Niamoti (Included Kacharibari Hat Connection)	54	6	7.0	37.6

Table 5-11 Upazila roads selected for improvement (continued)

Loan/GOB financing Division/Greater District District UPAZILA	Road Code (Gazetted)	Road Code (Old)	Name of Upazila Road	Ranking	Road Type	Length (km)	Cost (mill.tk)
Patuakhali						**93.3**	**292.9**
BAUPHAL	578382004	578382005	Boga GC (Shaplakhali R&H)-Kanakdia hat-Surjamoni-Kalisuri GC	77	6	18.0	53.8
DASHMINA	578522003	578522003	Dasmina-Hazir hat Launchghat	15	6	3.0	13.3
DUMKI	578962002	578962005	Moukoron GC-khataltali GC Via Hazirhat Rd.	66	6	4.3	21.3
GALACHIPA	578572002	578572003	Galachipa-Char Biswas Rd.	40	6	20.3	22.2
KALAPARA	578662001	578662001	Kalapara-Dhankhali Hat	79	6	18.5	32.6
MIRJAGANJ	578762005	578762007	Subidkhali H/Q-Chatra-Deuli Bazar-Kakrabunia GC-HRS at Malkerbari Rd.	34	6	15.5	69.0
PATUAKHALI-S	578952010	578952015	Patuakhali H/Q to Badura GC	68	6	13.6	80.6
Pirojpur						**68.9**	**302.8**
BHANDARIA	579142006	579142011	Bhandaria-Gazipur-Banai-Mathbria road (upto Bhagrathpur bazar) road	20	6	16.5	52.8
KAWKHALI	579472001	579472001	Kawkhali GC to Pangasia GC	31	6	8.6	29.8
MOTHBARIA	579582003	579582003	Tuskhali GC-Sapleza GC Via Barromasua Bazar-Betmore Bazar & Amragachia Bazar	56	6	22.2	119.7
NAZIRPUR	579762004	579762007	Sreeramkati GC-Pachpara GC Road (Up to Chalitabari)	2	6	3.9	21.3
PEROJPUR-S	579802006	579802008	Hularhat GC-Panchpara GC.	32	6	8.1	38.3
SWARUPKATHI	579872008	579872008	Chandkati GC-Sreramkati G.C	26	6	4.1	19.9
ZIANAGAR	579882004	579882004	Zia nagor-Telikhali GC via Darul huda	22	6	5.5	20.9
Greater Faridpur						**264.3**	**1,469.9**
Faridpur						**84.2**	**415.3**
ALFADANGA	329032006	329032008	Gopalpur GC to Boalmari GC via Berrir Hat GC Road(Alfadanga Portion)	16	6	14.5	65.5
BHANGA	329102005	329102005	Kalamirdha GC-R&H at Pulia	14	4	11.1	106.4
BOALMARI	329182006	329182008	Boalmari GC to BhagatGC via Gohaibari GC road(Boalmari portion) .	5	6	12.6	40.3
CHARBHADRASAN	329212004	329212006	Gozaria R&H to Krishnapur GC via Azzadha high school road	75	6	3.9	19.7
FARIDPUR-S	329472011	329472015	Bhakunda R&H- Bilnalia Road.(Roshulpur GC)	12	6	7.7	20.4
MADHUKHALI	329562009	329562012	Madhukhali R&H-Bhimpur GC Road via Makrail Bazar Starting from Mesordia	74	6	9.7	18.7
NAGARKANDA	329622020	329622021	Chandibardi R&H-Kalinagar GC Via Baushkhali Bazar,Jadunandi College road.	36	6	13.1	78.5
SADARPUR	329842009	329842011	Piajkhali GC-Charbharason GC via Lohertek bazar-Monikotha bazar rd	19	6	11.6	65.8
Gopalganj						**49.9**	**245.7**
GOPALGANJ-S	335322008	335322010	Boultali GC-Balakair-Kathi GC Road.	3	6	9.5	25.1
KASIANI	335432008	335432010	Ramdia-Satpar R&H Road (UZR #650)	52	6	10.4	104.8
KOTWALIPARA	335512004	335512010	Nagra R & H-Bandabari-Ramshil-Shashikor GC Road. (UZR #633)	21	6	14.3	56.8
MUKSUDPUR	335582011	335582013	Batikamari UP Office-Pererchar GC via Haldiaviata Bazer	41	6	7.2	24.8
TUNGIPARA	335912005	335912006	Bashbaria GC to Chowmohoni GC via Karfa	42	6	8.5	34.3
Madaripur						**44.9**	**480.4**
KALKINI	354402005	354402009	Khoajpur Takerhat R&H-Khasherhat GC via Laxmipur up & Surjamoni hat	64	6	16.4	215.1

Table 5-11 Upazila roads selected for improvement (continued)

Loan/GOB financing Division/Greater District District UPAZILA	Road Code (Gazetted)	Road Code (Old)	Name of Upazila Road	Ranking	Road Type	Length (km)	Cost (mill.tk)
MADARIPUR-S	354542005	354542006	Trivagdi GC-Mithapur Hat-Habiganj hat-Mollahat-Shekhpur RHD	58	6	11.7	164.3
RAJOIR	354802008	354802010	Kadambari GC-Hizalbari-Tatul Bari-KaliGonj GC (Kotalipara)	50	6	7.3	53.2
SHIBCHAR	354872008	354872009	Chanderchar G.C. to Bahadurpur R & H road via Dityakhanda FWC & Choto Kutubpur Hat.	13	6	9.7	47.7
Rajbari						**46.3**	**201.5**
BALIAKANDI	382072001	382072001	Jamalpur GC-Sonapur GC Rd. via Baharpur Hat	8	6	17.7	55.9
GOALANDA	382292007	382292008	Uttar Daulotdia at NHW-Ujanchar G.C.Via chardaulotdia	62	6	8.1	75.2
PANGSHA	382732014	382732019	Bagduli GC-LangolbundhGC via Tebaria-Sawrail up-Alamdamnga	18	6	10.9	39.1
RAJBARI-S	382762009	382762017	Banibaha GC-Chandani R&H	4	6	9.6	31.4
Shariatpur						**39.0**	**127.0**
BHEDARGANJ	386142003	386142009	Moltarhat GC-Balarhat GC Road.	23	6	6.1	45.3
DAMUDDYA	386252006	386252013	Shidulkura Bazar GC-Nagerpara GC Road via Charatalia & Munsirhat.	1	6	6.0	25.1
JANJIRA	386942004	386942005	Khalek SeritiShangha (R & H)-Joynagar G.C.	71	6	9.4	31.4
NARIA	386652004	386652007	Ghaisar GC-Golar Bazar GC Road.	10	6	7.9	5.3
SHARIATPUR-S	386692008	386692011	Shariatpur-Burirhat (Town bipass road)	17	6	9.6	20.0
Greater Khulna						**317.0**	**1,429.7**
Bagerhat						**94.0**	**357.4**
BAGERHAT-S	201082008	201082010	Jattrapur GC-Fakirhat-Chitalmari RHD.	39	6	15.5	8.4
CHITALMARI	201142003	201142003	Durgapur RHD-Khaserhat GC-Kaligonj	70	6	7.5	19.8
FAKIRHAT	201342009	201342009	Lockpur-Betaga	84	6	8.0	41.1
MOLLAHAT	201562004	201562004	Singati-Chandpur-Shiali (Mollahat Portion) (UZR #427)	6	6	16.3	87.5
MONGLA	201582010	201582010	DhalirKhanda Bridge-Geodhara Bazar	67	6	8.0	38.5
MORRELGANJ	201602008	201602008	Morrelganj-Tetulbaria hat-Dewatala-Mithakhali GC (Morel Part)	86	6	21.0	109.5
RAMPAL	201732005	201732006	Ronsen-Gouromba bazar Road	87	6	8.5	41.0
SHARANKHOLA	201772001	201772001	Rayenda GC-Rasulpur GC Road	47	6	9.2	11.6
Khulna						**98.1**	**601.5**
BATIAGHATA	247122007	247122013	Katianangla-Roypur via Sukdara Bazar , Baro Bhuiyan & Kechrabad Road	83	6	16.2	63.3
DACOPE	247172010	247172017	Dacope Upazila H/Q (Achuva)-Batbunia GC Road.	73	6	11.3	84.9
DIGHALIA	247402004	247402007	Mazirgati-Bamondanga-Katenga GC	78	6	4.5	23.5
DUMURIA	247302005 & 247642008	247302013 & 247642012	Kathaltola-Magurkhali-Kapilmuni GC and Kapilmuni GC-Kathaltala R&H via Taltala (Paikgacha portion)	69	4	32.3	280.7
KOIRA	247532004	247532004	Upazila HQ (Dighirpar)-Golkhali Road (UZR #375)	51	6	14.0	68.2
PAIKGACHA	247642009	247642013	Dacope-Batbunia-Jhalbunia-Garaikhali-Hatiardanga-Koyra Road (Paikgacha Portion) (UZR #371)	82	6	8.5	43.0
RUPSA	247752006	247752007	Rupsha Thana H/Q-Mansa GC	46	6	2.3	11.2

Table 5-11 Upazila roads selected for improvement (continued)

Loan/GOB financing Division/Greater District District UPAZILA	Road Code (Gazetted)	Road Code (Old)	Name of Upazila Road	Ranking	Road Type	Length (km)	Cost (mill.tk)
TEROKHADA	247942008	247942008	Chagladah Bazar-Nagarkandi G C via Kushla Road.	76	6	9.0	26.7
Satkhira						**124.9**	**470.8**
ASSASUNI	287042008	287042009	Kadakati-Protapnagar via Goaldanga	37	6	33.2	165.3
DEBHATA	287252006 & 287822008 & 287042006	287252006 & 287822012 & 287042007	Gazirhat GC-Budhata GC via Badartala and Budhata R&H-Bangdah GC road (Sadar portion) and Budhata-Gazirhat GC via Bangdah GC.	55	6	28.1	116.2
KALAROA	287432008	287432008	Sona baria GC (UP Office)-Gopinathpur R&H (via Boalia-Goalchator bazar) road	25	6	10.9	59.7
KALIGANJ	287472007	287472009	Nazimgonj GC-Debhata Via Khanjia Bazaar	57	6	9.3	15.6
SATKHIRA-S	287822005	287822009	Satkhira R&H(Narkeltala)-Jhawdanga via Akhirakhola bazar Balli UP Raipur Bazar & Pathorghata road	45	6	18.5	9.6
SHYAMNAGAR	287862004	287862007	Noabenki-Garez Hat-Harinagar Hat	35	6	16.1	74.1
TALA	287902006	287902006	Dalua G.C.-Kadakati GC(Ashasuni) Road.	49	6	9.0	30.1
Total of Upazila road upgrading to be financed by GOB budget						**239.5**	**1,054.1**
Barisal Division						**134.2**	**590.6**
Barisal						**35.1**	**70.8**
MEHENDIGANJ	506622006	506622006	Patar hat GC-Aliganj Gc (Hizla).	102	6	7.7	38.9
UZIRPUR	506942004	506942004	Dhamra GC-Harta GC-Satla GC Paisarhat GC(Upto Agailjhara Upazila Start from Dhamura College)	93	6	27.4	32.0
Jhalakati						**33.1**	**210.2**
JHALOKATHI-S	542402004	542402004	Jhalokati R&H-Panjiputhipara GC via Kirtipasa, Bhimruli bazar	106	6	13.2	116.1
NALCHITY	542732004	542732005	Sarkarbari-Chowrangi-Sikdarhat-Polashpur-Ranapasha Road (UZR #000)	99	6	8.6	38.9
RAJAPUR	542842005	542842005	Bagri GC-Mirer Hat GC via Badnikathi Hat & Baroia UP Comp	103	6	11.4	55.2
Patuakhali						**19.2**	**103.1**
DASHMINA	578522006	578522007	Alipur GC-Ulania GC	94	6	8.5	52.7
DUMKI	578962003	578962006	Muradia UP Office & GC-Patuakhali (laukhati) GC. Via Muradha High School, South Khali G.P.S. & Vak-bari .	105	6	10.7	50.5
Pirojpur						**46.7**	**206.4**
BHANDARIA	579142009	579142014	Bhandaria Purbo Dhawa Road (Dhawa Bazar-Rajpasha Sadrarhat) Manikmia College-Meddarshi RHD	100	6	17.6	37.1
NAZIRPUR	579762005	579762008	Digirgan GC-Matabanga GC	89	6	8.5	21.2
SWARUPKATHI	579872004	579872004	Jaganathkati-Juluhar via Jalabari, Sashid, Sagorkanda	98	6	20.6	148.2
Greater Faridpur						**54.9**	**310.3**
Faridpur						**12.5**	**61.2**
FARIDPUR-S	329472012	329472016	Bakunda GC- Hazigonj GC via Hat Gazaria GC Road.	90	6	12.5	61.2
Gopalganj						**9.5**	**57.0**
GOPALGANJ-S	335322015	335322017	Satpar-Patkel bari-Boultali GC Rd.	95	6	9.5	57.0

Table 5-11 Upazila roads selected for improvement (continued)

Loan/GOB financing Division/Greater District District UPAZILA	Road Code (Gazetted)	Road Code (Old)	Name of Upazila Road	Ranking	Road Type	Length (km)	Cost (mill.tk)
Rajbari						**24.7**	**117.8**
BALIAKANDI	382072007	382072009	Narua GC.-Sonapur GC.Rd. Via Kamardha	91	6	9.9	25.0
PANGSHA	382732012	382732017	Habaspur G.C.-Arungong G.C. Road	104	6	14.8	92.8
Shariatpur						**8.2**	**74.3**
SHARIATPUR-S	386692006	386692008	Chandrapur GC-Gonga Nagar GC road.	96	6	8.2	74.3
Greater Khulna						**50.4**	**153.2**
Khulna						**50.4**	**153.2**
DUMURIA	247302003	247302006	Kharnia GC-Boruna GC-Jamira GC	92	6	19.3	18.7
KOIRA	247532002	247532002	R&H (Deara)-Hoglahat GC-Ghugrakati GC Road.	101	6	9.1	23.8
PAIKGACHA	247642007	247642011	Chandkhali G.C-Gazalia Club Bazar-Alamtala Bazar-Baintala Bazar-Minaz bazar-Garaikhali G.C.	97	6	22.0	110.7

5.3.2 Upgrading of Union roads

(1) Description of the component

This component will upgrade earthen, HBB, and BFS segments of selected unimproved Union roads to bituminous carpeting. Gaps equal to or less than 200 meters existing on the selected Upazila roads will be connected by bridges or culverts. The project will employ the specifications set forth in Road Design Standards 2005 to design and develop Union roads and bridges and culverts.

This component is composed of the following subcomponents:

1 Pavement
  1.1 Pavement of earthen roads
  1.2 Pavement of HBB/BFS roads
2 Bridges and culverts
  2.1 Construction of bridges
  2.2 Construction of culverts

Under "1 Pavement," only existing earthen, HBB, and BFS segments of Union roads will be upgraded to BC. As with Upazila road development, no new road alignments are to be constructed. Maintenance work on Union roads is to be carried out by the other government-financed projects and is excluded from the component under this Project. Instead of BC, HBB will be considered in localities where bearing capacity of soils for construction work is low.

The "2 Bridges and culvert" subcomponent consists of the construction of bridges at gaps wider than 6 m and culverts at gaps which are equal to or less than 6 m.

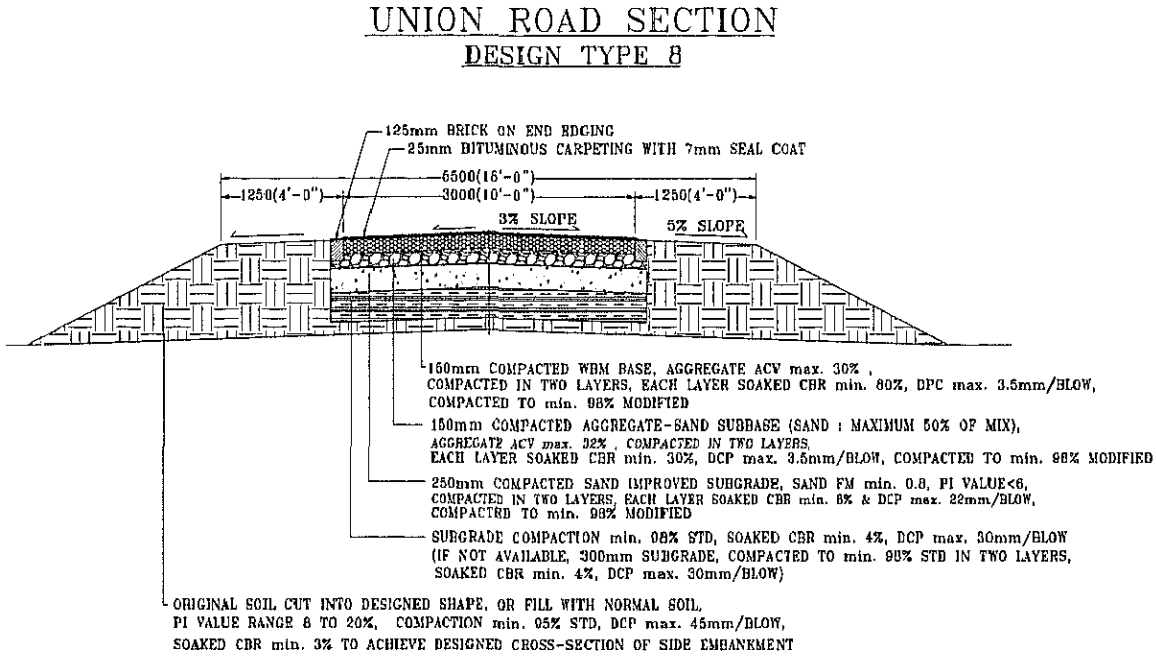
(2) Specifications

a) Union roads

i) RDS/2005 and related issues to be considered

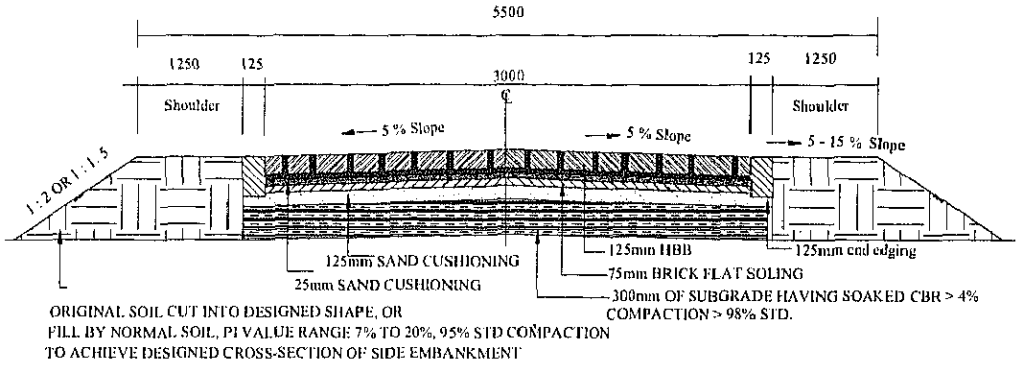
As indicated in Table 5-2 design types 7 and 8 are applied to Union roads. The pavement design standards to be applied to Union roads are shown in Table 5-3. The typical cross-sections are indicated in Figure 5-10 and 5-11.

As with Upazila road upgrading, the SAPROF team first examined the issues related to the technical adequacy of RDS/2005 and other issues to judge whether its adoption would be appropriate under the Project. Issues included those related to pavement structure, brick on end edging, expected design life, shoulder type, soil specifications and the quality of embankment materials, slope gradients, slope protection, crest widths in town areas, and crest widening works. Based on examination of these issues, the team reached the same conclusion as in the case of Upazila road upgrading; i.e., the RDS/2005 specifications are appropriate for upgrading Union roads.



Source: RDS/2005

Figure 5-10 Road cross section of Type 8 for Union roads



Source: RDS/2005

Figure 5-11 Road cross section of Type 8 (HBB version)

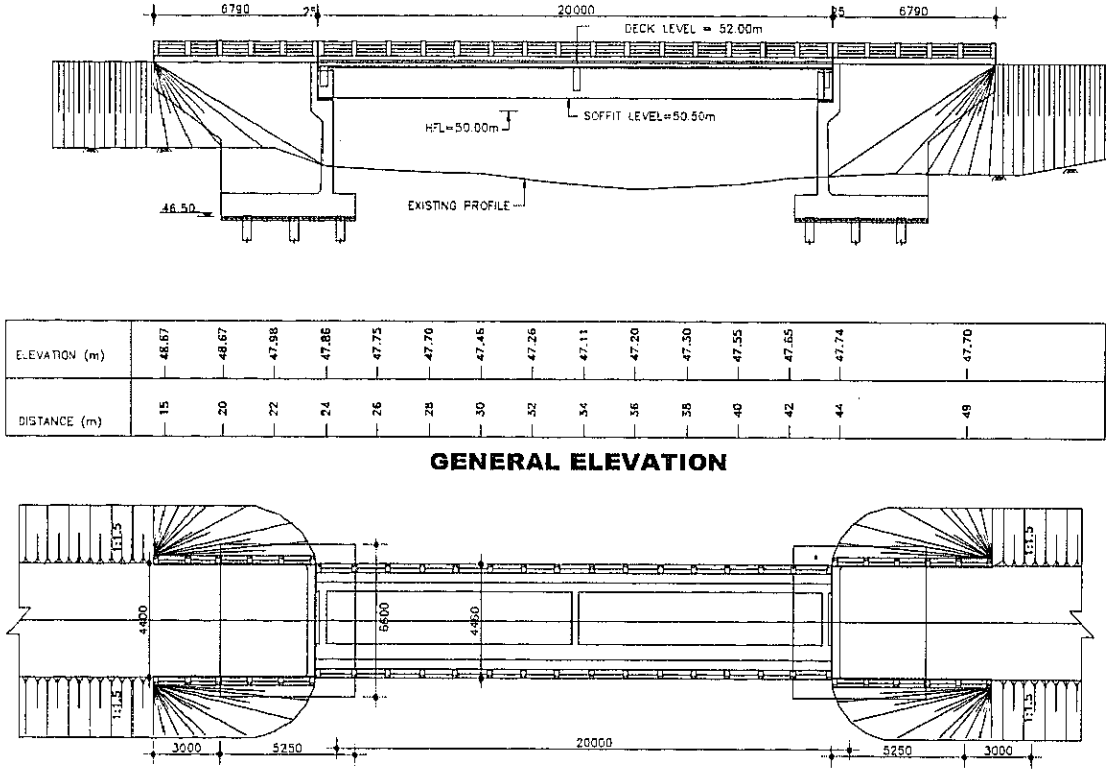
ii) Application of RDS/2005

RDS/2005 stipulates that design types for Union roads should be determined based on MDCV values, expressed in PCUs. The SAPROF team conducted field observations and simple measurement and found that the MDCV of the sample Union roads were less than 50. Thus, design type 8 will be applied to Union road upgrading.

Type 8, which specifies HBB pavements, will be adopted in areas where soil bearing capacity is too low to meet the required standards, where low traffic volume is forecasted, or where quality control of earthwork is expected to be difficult. It will be applied to Upazila and Union roads where one of these conditions is met.

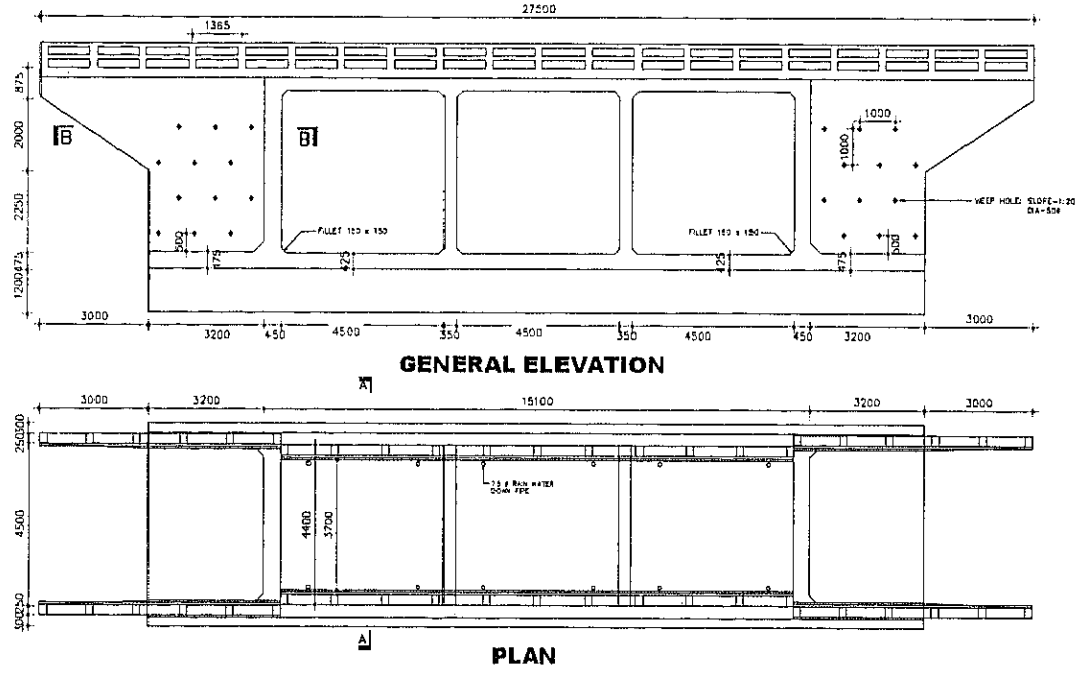
b) Bridges and culverts

The carriageway width of bridges and culverts specified in RDS/2005 are as indicated in Table 5-7. The typical cross-sections to be applied to bridges and culverts on Union roads are shown in Figure 5-12 and 5-13.



Source: LGED

Figure 5-12 Plan of RCC bridge with single lane (Union road)



Source: LGED

Figure 5-13 Plan of culvert with single lane (Union road)

The carriageway width of most existing bridges is set at 3.70 m. However, bridges will be built with wider carriageways if an increase in traffic volume is expected. In line with RDS/2005, the Box Culvert structure will be installed where the gap is equal to or less than 6 m, while the RCC bridge structure will be applied when the gap exceeds 6 m.

The footpath will be 0.45 m wide for bridges on Union roads with spans exceeding 30 m and carriageway widths of 5.50 m.

Concrete revetments will be built for protecting bridge piers and approach roads from flood damage, which is the measure also adopted on bridges and culverts on Upazila roads.

c) Road safety measures and ghats

Bus bays, guard posts, traffic signs, and ghats will not be installed on Union roads, as they experience limited traffic of heavy vehicles such as trucks and buses.

(3) Prioritization of subprojects to be developed

From the Project area, 120 Union Roads connected to Union Parishad Complexes with a total length of 796 km are proposed for improvement. The selection and ranking system applied to Upazila roads is used for Union roads as well. Ranking results for Union roads are given in Table 5-12. Data used and scores calculated for ranking each Union road are shown in Annex 17.

Table 5-12 Ranking result of Union roads

Ranking	Division/ Greater District	District	Upazila	Road Code (Gazetted)	Name of Upazila Road	Length (km)	Cost (mill.tk)	Cumulative cost (mill. tk)	Financing
1	Faridpur	Madaripur	MADARIPUR-S	354543010	Madaripur Puran Bazar Rasti UP-Charmuguria Bazar	3.5	15	15	Loan
2	Faridpur	Rajbari	PANGSHA	382733017	Nichntopur bazzar-Kolimohor UP via Dursundia	5.9	21	36	Loan
3	Faridpur	Faridpur	NAGARKANDA	329623006	Ballovdi UPHQ (Fulbari Bazar)-Purapara G.C Road.	6.2	1	37	Loan
4	Faridpur	Shariatpur	DAMUDDYA	386253003	Damudya-Bhedarganj UZR to H/of Malek Member Road.	1.5	6	43	Loan
5	Barisal	Bhola	BORHANUDDIN	509213003	School bari-Char Titia(Daurihat) via Deula UP	4.1	17	59	Loan
6	Faridpur	Shariatpur	BHEDARGANJ	386143006	Shakhipur UP-Monaihawlader Bazar Rd. (Dularchar)	6.1	21	81	Loan
7	Faridpur	Faridpur	BHANGA	329103004	R&H at Hamirdi Bazar-Hamirdi UP.	2.3	9	90	Loan
8	Barisal	Bhola	MONPURA	509653003	Hazirhat UP-Nayeberhat Road	4.0	15	105	Loan
9	Barisal	Bhola	DAULATKHAN	509293008	Banglabazaar-Daulatkhan RHD to (Miar hat) to Charpata UP office via Naymuddin	5.2	15	120	Loan
10	Barisal	Patuakhali	PATUAKHALI-S	578953018	Jainkathi UP-M.DharandiBazer(College)-Bhuria Bazer.	7.0	30	150	Loan
11	Khulna	Satkhira	KALAROA	287433001	Damdam Bazar-Baliadanga bazar Via Keragachi UP	6.2	11	161	Loan
12	Faridpur	Rajbari	BALIAKANDI	382073004	Islampur UP Office-Ramdia Hat Road	5.2	21	183	Loan
13	Faridpur	Gopalganj	KOTWALIPARA	335513008	Suagram UPC-Narayankhana bazar Road	3.0	9	191	Loan
14	Barisal	Jhalakati	RAJAPUR	542843006	Baroia Up Comp-Shamabay Hat	3.1	14	205	Loan
15	Faridpur	Faridpur	MADHUKHALI	329563008	Modhukhali Upazila HQ (Mesordia)-Jahanpur (Jahapur UP) Road	12.3	18	223	Loan
16	Barisal	Bhola	CHARFASSION	509253004	Charfassion(Forest Office)-Aminabad UP via Kuchimora GPS.	6.6	21	245	Loan
17	Khulna	Satkhira	SATKHIRA-S	287823016	Madhopkati Bazar-Akrakhola Bazar road	3.6	7	251	Loan
18	Barisal	Bhola	BHOLA-S	509183010	Bheduria UP-Ananda Bazer rd.	4.0	10	261	Loan
19	Barisal	Patuakhali	GALACHIPA	578573014	Koralia Bazar-Chottobaisdia UP.	7.6	32	293	Loan
20	Barisal	Patuakhali	DUMKI	578963008	Angaria UP-Dumki Upazila HQ (pirtala Bazer) via Jatra Govt. Pry. School	2.0	9	302	
21	Barisal	Patuakhali	BAUPHAL	578383024	Nurainpur Bazar-Mirdhar hat-Akbaria Dhakhil Madrasha-Surjamoni UP	4.2	13	314	
22	Faridpur	Faridpur	BOALMARI	329183003	Tamarhazi Bazar-Rupapath U.P.Office.	3.5	20	334	
23	Barisal	Patuakhali	DASHMINA	578523005	Alipura UP-Kapuriakatchari Hat	5.0	25	358	
24	Barisal	Bhola	TAZUMUDDIN	509913006	Bara Maloncharа UP to Putaron Bazar Via Polic Camp	6.0	27	385	
25	Khulna	Satkhira	KALIGANJ	287473001	Pawkhali ZR-Mothureshpur UP	2.0	8	393	
26	Faridpur	Shariatpur	GOSHAIRHAT	386363011	Kuachaipotty UP-Kodalpur GC via Shayka Bazar	2.4	10	403	
27	Khulna	Satkhira	SHYAMNAGAR	287863004	Iswaripur UP-Harinagar hat via Dhumkali	9.2	39	443	
28	Barisal	Jhalakati	JHALOKATHI-S	542403001	Mahadipur Kheyaghat-Kistakati via Ponabalia UP & Chandpura bazar	14.3	60	503	
29	Barisal	Barguna	BETAGI	504473012	Bibichini UP office-SantirHat	4.0	18	521	
30	Barisal	Jhalakati	KATHALIA	542433009	Patikhalghata UP Office-Joorkhali Nutun hat.	4.7	19	540	
31	Barisal	Jhalakati	NALCHITY	542733003	Simultala-Kulkati UP via Akhorpara	4.7	19	559	

Note: Double line in the table indicates cutoff line based on the maximum cumulative costs allocated to Upazila road upgrading component.

Table 5-12 Ranking result of Union roads (continued)

Ranking	Division/ Greater District	District	Upazila	Road Code (Gazetted)	Name of Upazila Road	Length (km)	Cost (mill. tk)	Cumulative cost (mill. tk)	Financing
32	Barisal	Barguna	BARGUNA-S	504283016	Badarkhali UP-Tatulbaria H/S.-Gulishakhali Bazar	5.6	25	584	
33	Khulna	Bagerhat	MORRELGANJ	201603003	Mazhibari RHD at Badsharhat-Nishanbaria U.P office	6.6	28	613	
34	Khulna	Satkhira	TALA	287903013	Khesra UP-Dakshin Sahjadpur Bazar	5.3	23	635	
35	Khulna	Bagerhat	CHITALMARI	201143001	Chitalmari-Hizla UP-Kalatola UP	10.6	25	661	
36	Barisal	Barguna	BAMNA	504193003	Bamna UP Office-Upazila H/Q via Safipur Bazar.	3.0	4	664	
37	Khulna	Bagerhat	MONGLA	201583006	Burirdanga UP office-Burirdanga hat	3.5	15	679	
38	Faridpur	Faridpur	SADARPUR	329843001	Dhewkhali UP Office-Baliahati via Chandrapara high school road	7.6	31	710	
39	Faridpur	Gopalganj	KASIANI	335433002	Ratoil UP-Kalna R&H	5.0		710	
40	Barisal	Bhola	LALMOHAN	509543007	Mongal Skder Bazer-Fatemabad Sulice gate Bazer.	14.3	1	711	
41	Barisal	Patuakhali	MIRJAGANJ	578763007	Kakrabunia UP office-Kaunia Bazar via Gazipurhat Rd.	8.5	44	755	
42	Faridpur	Shariatpur	JANJIRA	386943005	Kazirhat-Durgarhat.	7.8	68	824	
43	Barisal	Barguna	PATHARGHATA	504853009	Kakchira UP-Haridra Bazar	6.0	27	850	
44	Faridpur	Shariatpur	NARIA	386653007	Bhumkhara-Gulmaiz Road.	8.9	34	884	
45	Khulna	Bagerhat	MOLLAHAT	201563006	Gaula UP-Chanderhat-Faltita Bazar	9.0	52	937	
46	Khulna	Satkhira	DEBHATA	287253002	Sakhipur UP Office-Nangla Bazar Via Eidgah Chandipur	7.6	15	951	
47	Faridpur	Faridpur	FARIDPUR-S	329473014	Gerda UP office to Aliabda UP office	8.3	49	1,000	
48	Barisal	Patuakhali	KALAPARA	578663004	Lalua UP-Nilgonj UP Via Mithagong UP.	16.8	127	1,127	
49	Faridpur	Gopalganj	TUNGIPARA	335913002	Gopalpur UP-Guadhana Silna GC Road	7.7	24	1,151	
50	Khulna	Satkhira	ASSASUNI	287043001	Kadakati UP-Gabtola hat-Kadakati GC	8.8	57	1,209	
51	Barisal	Barguna	AMTALI	504093006	Gulishakhali UP-Kukua Hat via Chunakhali Bazar & Hazar takar Bath	9.9	36	1,244	
52	Khulna	Bagerhat	KACHUA	201384004	Goalmath-Raripara Palpara	3.5	6	1,250	
53	Khulna	Bagerhat	RAMPAL	201733005	Perikhali G.C-Bhojpatia U.P office	9.8	66	1,316	
54	Faridpur	Rajbari	PANGSHA	382733028	Laribari hat-Sawrail UP	8.5	36	1,352	
55	Barisal	Bhola	BORHANUDDIN	509213004	Moulabirhat-Gangapur UP	4.0	18	1,370	
56	Faridpur	Madaripur	MADARIPUR-S	354543017	Dudkhali Up (Housdi Bazar) to Char Nachna Hat	6.5	27	1,397	
57	Faridpur	Rajbari	BALIAKANDI	382073022	Ramdia Hat-Nawabpur UP Office Rd. via Kamardha	6.8	10	1,407	
58	Barisal	Jhalakati	RAJAPUR	542843008	Suctagarh UP comp-Jogerhat	3.1	14	1,421	
59	Barisal	Bhola	BHOLA-S	509183017	Majir hat-Mazidpur-koralia-Rajapur UP	10.0	45	1,466	
60	Khulna	Satkhira	SATKHIRA-S	287823013	Kadamtala bazar-Rajnagor Bazar via Labsha UP Office road	5.7	8	1,474	
61	Faridpur	Faridpur	MADHUKHALI	329563004	Hat Ghata R&H (near Raipur UP)-Dastordia Road (Kazir Road)	4.5	11	1,485	
62	Khulna	Satkhira	SHYAMNAGAR	287863003	Nakipur-Sirajpur Hat	6.2	21	1,506	
63	Barisal	Bhola	TAZUMUDDIN	509913004	Chandpur UP(Shashigonj Bazar)-Badlipur Natunbazar via Baliakandi	6.0	27	1,533	
64	Barisal	Patuakhali	BAUPHAL	578383026	Madanpura UP (East side of Bilbilas bazar Rhd)-Ramnagar board bazar-East Indrakul Chowmohoni bazar	6.3	28	1,561	
65	Barisal	Jhalakati	NALCHITY	542733015	Subidpur UP-Mollarhat UP via Soner Vita GPS & Khatib Bari.	4.1	18	1,580	

Table 5-12 Ranking result of Union roads (continued)

Ranking	Division/ Greater District	District	Upazila	Road Code (Gazetted)	Name of Upazila Road	Length (km)	Cost (mill.tk)	Cumulative cost (mill. tk)	Financing
66	Barisal	Barguna	BARGUNA-S	504283014	Kadamtala UP office-Baikalin Hat-Naya Hat	4.8	21	1,601	
67	Barisal	Bhola	CHARFASSION	509253014	Aslampur U.P.(Bhuiyar hat)-Sultanmiar	3.8	22	1,623	
68	Khulna	Satkhira	TALA	287903010	Kumira UP Office (R&H)-Vanderkhola bazar road.	5.8	25	1,648	
69	Faridpur	Shariatpur	BHEDARGANJ	386143008	Uttar Tarabonia UP.-Balarhat GC road.	7.1	74	1,722	
70	Barisal	Patuakhali	DUMKI	578963009	Angaria UP-Batuabunia Bazer Via West Jhatra Pry. School.	1.3	6	1,728	
71	Khulna	Bagerhat	MONGLA	201583005	Sundarban UP-Madurpalta Bazar	4.2	18	1,746	
72	Barisal	Barguna	BAMNA	504193004	Bukabunia UP H/Q-Amua G.C via Laxmipura Madrasha.	5.0	20	1,766	
73	Barisal	Bhola	LALMOHAN	509543011	Ramagonj U.P to Miarhat.	7.9	49	1,815	
74	Faridpur	Shariatpur	JANJIRA	386943004	Janjira Masque-Kunder Char.	7.7	85	1,900	
75	Barisal	Barguna	PATHARGHATA	504853010	Kathaltali UP-Shaptagram-Kathaltali Bazar via Burjugpur GPS	7.2	32	1,932	
76	Barisal	Jhalakati	JHALOKATHI-S	542403011	Sharengalhat Shangramnila via Keora UP	9.0	37	1,969	
77	Barisal	Bhola	MONPURA	509653004	Sakuchia UP-Koralia GC Road	5.0	5	1,974	
78	Barisal	Patuakhali	DASHMINA	578523004	Ranagopali Up-Rabibaria hat	6.0	37	2,010	
79	Barisal	Jhalakati	KATHALIA	542433013	Cheerirampur UP Office-Battala via Zomadderhat Bazer	5.1	33	2,043	
80	Faridpur	Faridpur	BOALMARI	329183009	Boalmari UP.-Dadpur Via Razapur Bazar Road.	7.1	40	2,083	
81	Khulna	Satkhira	KALIGANJ	287473012	Mautala UP-Sankarkati Hat via Krishnahagar UP	9.2	36	2,119	
82	Barisal	Patuakhali	PATUAKHALI-S	578953016	Lohalia UP Office-Miar hat-Patuakhali-KalayaUZR-Vhuria Bazer.	8.6	53	2,173	
83	Barisal	Barguna	BETAGI	504473014	Hosnabad UP-Kazir Hat	7.7	56	2,229	
84	Faridpur	Shariatpur	GOSHAIRHAT	386363010	Haturia GC-Kuchaipotty UP via Basakati Market	3.7	92	2,320	
85	Barisal	Patuakhali	KALAPARA	578663010	RHD at Kalanka-Chakamya U.P-Karibaria U.P	13.9	73	2,393	
86	Barisal	Patuakhali	GALACHIPA	578573003	Amkhola U.P.office-Kalagachia GC.	6.1	34	2,428	
87	Barisal	Barguna	AMTALI	504093008	Amtali Bus stand-Haldia UP via Jolekhar Sluice gate	7.2	61	2,489	
88	Khulna	Bagerhat	MORRELGANJ	201603009	Morrelgonj-Upazila H.Q.to Baharbunia Union H.Q.	10.7	66	2,555	
89	Barisal	Patuakhali	MIRJAGANJ	578763015	Mazidbaria UP office-Hossania GPS-Habib bazar Rd.	6.7	46	2,601	
90	Khulna	Bagerhat	RAMPAL	201733002	Gilatale G.C-Bhospatia UP	9.9	91	2,692	
91	Faridpur	Rajbari	PANGSHA	382733016	Sawrail UP-Mrigi GC. Via Naduria,Pathuria road.	8.0	30	2,721	
92	Faridpur	Madaripur	MADARIPUR-S	354543008	Angulkata Hat(R&H)-Pachkhola UP-Arial Kha Ghat	6.9	16	2,737	
93	Barisal	Bhola	BORHANUDDIN	509213005	Hakimuddin Bazar-Fakirhat via Hassan Nagar UP Kazirhat & Bhoyrobgonj	6.0	28	2,765	
94	Khulna	Satkhira	SATKHIRA-S	287823002	Rasulpur R&H (Circket House)-Baikari UP via Pairadanga-Aruakhali via Mirgidanga	15.3	20	2,785	
95	Barisal	Jhalakati	RAJAPUR	542843004	Baroia UP Comp-Kacharibari Hat via Challishkahnia LG	6.2	28	2,813	
96	Faridpur	Rajbari	BALIAKANDI	382073005	Jamalpur UP Office-Megchami hat Rd.Via Khalkula	4.2	33	2,847	

Table 5-12 Ranking result of Union roads (continued)

Ranking	Division/ Greater District	District	Upazila	Road Code (Gazetted)	Name of Upazila Road	Length (km)	Cost (mill.tk)	Cummunive cost (mill. tk)	Financing
97	Barisal	Bhola	CHARFASSION	509253016	Nilkamal UP(Ghosherhat)-Hajirhat(Maya river)	9.8	44	2,890	
98	Khulna	Satkhira	SHYAMNAGAR	287863007	Burigoalini U.P-Durgabati hat	5.3	20	2,911	
99	Barisal	Patuakhali	BAUPHAL	578383027	Keshobpur UP-Dhulia UP	8.9	35	2,946	
100	Barisal	Bhola	BHOLA-S	509183012	Pashim Ilisha up-Maler hat Road	6.3	6	2,952	
101	Barisal	Bhola	TAZUMUDDIN	509913003	Chanchra UP Office-Khasherhat	5.8	10	2,962	
102	Barisal	Barguna	BARGUNA-S	504283015	Aylapatakata UP (Kadamtala)-Tulatala-Kotbaria Hat-Baikalin Hat	7.3	45	3,007	
103	Barisal	Patuakhali	DUMKI	578963011	Angaria UP-Upzila HQ(Labukhali UP).	2.5	12	3,019	
104	Khulna	Satkhira	TALA	287903009	Tentulia UP office R&H Road-Tentulia Bazar R&H	2.7	12	3,031	
105	Barisal	Patuakhali	PATUAKHALI-S	578953005	Lohalia UP-Pratabpur bazar-Imandir	15.0	81	3,112	
106	Khulna	Satkhira	KALIGANJ	287473010	Ratanpur UP-Bagmari Bazar via Kadamtala Bazar	6.3	26	3,138	
107	Barisal	Bhola	LALMOHAN	509543012	Nazirpur Bazar-Paschim Char Umed Via Farazganj UP	13.2	52	3,190	
108	Khulna	Bagerhat	MONGLA	201583004	Chaterhat GC-Sonailtala UP	5.5	39	3,229	
109	Faridpur	Rajbari	PANGSHA	382733012	Kasbamajail UP.-Langalbandh G.C. Road	7.5	32	3,261	
110	Barisal	Bhola	BORHANUDDIN	509213007	Dargha (Hakimuddin bazar)-Tobgi UP office via Dalalbari	6.2	12	3,272	
111	Khulna	Satkhira	SATKHIRA-S	287823008	Kushkhali UP Office-Ghona Bazar Road	6.3	13	3,285	
112	Barisal	Bhola	BHOLA-S	509183013	Dania UP office road-Abohowa office road	5.5	9	3,294	
113	Barisal	Bhola	CHARFASSION	509253007	Kukrimukri Launchghat-Char KukriMukri UP via Asryan	5.0	23	3,317	
114	Barisal	Barguna	BARGUNA-S	504283006	Nali GC-Abiabdullah GPS-Roybhog Hat-Dhalua UP office	8.8	46	3,364	
115	Khulna	Satkhira	KALIGANJ	287473009	Nalta UP-Khanzia bazar via Ghorapota	7.3	29	3,392	
116	Khulna	Satkhira	SATKHIRA-S	287823001	Itagacha R & H (Upazilla H/Q)-Ghona UP office Road	11.4	19	3,411	
117	Khulna	Satkhira	KALIGANJ	287473013	Bishnupur UP-Jerongacha Hat via Kushlia GC	3.0	8	3,419	
118	Khulna	Satkhira	KALIGANJ	287473011	Moutala UP-Bhadrakhali bazar	6.3	28	3,447	
119	Faridpur	Faridpur	FARIDPUR-S	329473010	Kanaipur UP office -Kaijuri UP office road	5.0	21	3,468	
120	Barisal	Bhola	DAULATKHAN	509293003	South Joynagar UP Office(Bhola-Charfession RHD) to Miar hat via Box Ali	9.5	17	3,485	

(4) Subprojects to be developed

In consideration of the budget ceiling of tk. 293 million, 19 Union roads in 19 Upazilas are selected from the 120 proposed Union roads. A summary of the numbers of selected Union roads per Division and District is shown in Table 5-13, and a list of the selected Union roads is shown in Table 5-14. The characteristics of selected Upazila roads are shown in Annex 17. Within this component, approximately 69 km of Union roads are to be upgraded to BC, and 0 m of bridges and 2 m of culverts are to be constructed.

Table 5-13 Summary of quantities of selected Union roads by District

Division/Greater District District UPAZILA	Road					Structures		
	BC/CC /RCC/ WBM	Road to be upgraded			Total lengh of Road	Bridge	Culvert	Total
		Earthen road	HBB/ BFS	Upgrade total				
	a (km)	b (km)	c (km)	d=b+c (km)	e=a+d (km)	f (m)	g (m)	h=f+g (m)
Project total	**28.6**	**50.2**	**18.3**	**68.6**	**97.1**		**2.1**	**2.1**
Barisal Division	**6.3**	**28.3**	**6.8**	**35.1**	**41.4**		**1.5**	**1.5**
Bhola	6.3	17.4		17.4	23.8		1.5	1.5
Jhalakati		3.0	0.1	3.1	3.1			
Patuakhali		7.9	6.7	14.6	14.6			
Greater Faridpur	**16.7**	**19.3**	**10.0**	**29.3**	**45.9**			
Faridpur	14.1	4.3	2.5	6.7	20.8			
Gopalganj	1.0	2.0		2.0	3.0			
Madaripur		3.5		3.5	3.5			
Rajbari	1.0	8.1	2.0	10.1	11.1			
Shariatpur	0.6	1.5	5.5	7.0	7.6			
Greater Khulna	**5.6**	**2.7**	**1.5**	**4.2**	**9.8**		**0.6**	**0.6**
Satkhira	5.6	2.7	1.5	4.2	9.8		0.6	0.6

Table 5-14 Union roads selected for upgrading

Division / Greater District District UPAZILA	Road Code (Gazetted)	Name of Upazila Road	Ranking	Length (km)	Cost (mill.tk)
Project total				**97.1**	**292.6**
Barisal Division				**41.4**	**153.9**
Bhola				**23.8**	**78.3**
BHOLA-S	509183010	Bheduria UP-Ananda Bazer rd.	18	4.0	9.8
BORHANUDDIN	509213003	School bari-Char Titia(Daurihat) via Deula	5	4.1	16.6
CHARFASSION	509253004	Charfassion(Forest Office)-Aminabad UP via Kuchimora GPS.	16	6.6	21.3
DAULATKHAN	509293008	Banglabazaar-Daulatkhan RHD to (Miar hat) to Charpata UP office via Naymuddin Hat	9	5.2	15.4
MONPURA	509653003	Hazirhat UP-Nayeberhat Road	8	4.0	15.3
Jhalakati				**3.1**	**13.8**
RAJAPUR	542843006	Baroia Up Comp-Shamabay Hat	14	3.1	13.8
Patuakhali				**14.6**	**61.7**
GALACHIPA	578573014	Koralia Bazar-Chottobaisdia UP.	19	7.6	31.6
PATUAKHALI-S	578953018	Jainkathi UP-M.DharandiBazer(College)-	10	7.0	30.1
Greater Faridpur				**45.9**	**120.9**
Faridpur				20.8	27.6
BHANGA	329103004	R&H at Hamirdi Bazar-Hamirdi UP.	7	2.3	8.9
MADHUKHALI	329563008	Modhukhali Upazila HQ (Mesordia)-Jahanpur (Jahapur UP) Road	15	12.3	18.1
NAGARKANDA	329623006	Ballovdi UPHQ (Fulbari Bazar)-Purapara G.C Road.	3	6.2	0.7
Gopalganj				**3.0**	**8.6**
KOTWALIPARA	335513008	Suagram UPC-Narayankhana bazar Road	13	3.0	8.6
Madaripur				**3.5**	**15.0**
MADARIPUR-S	354543010	Madaripur Puran Bazar Rasti UP-Charmuguria Bazar	1	3.5	15.0
Rajbari				**11.1**	**42.4**
BALIAKANDI	382073004	Islampur UP Office-Ramdia Hat Road	12	5.2	21.4
PANGSHA	382733017	Nichntopur bazzar-Kolimohor UP via Dursundia	2	5.9	21.0
Shariatpur				**7.6**	**27.4**
BHEDARGANJ	386143006	Shakhipur UP-Monaihawlader Bazar Rd. (Dularchar)	6	6.1	21.2
DAMUDDYA	386253003	Damudya-Bhedarganj UZR to H/of Malek Member Road.	4	1.5	6.2
Greater Khulna				**9.8**	**17.7**
Satkhira				**9.8**	**17.7**
KALAROA	287433001	Damdam Bazar-Baliadanga bazar Via Keragachi UP	11	6.2	11.2
SATKHIRA-S	287823016	Madhopkati Bazar-Akrakhola Bazar road	17	3.6	6.6

5.3.3 Upgrading of growth centers and rural markets

(1) Description of the component

This component will develop facilities in and around the selected growth centers and rural markets through engineering work. Within the Project area, a total of 411 rural markets have been designated by the Planning Commission as growth centers. Of the 411 growth centers, 221 have already been developed to date or are programmed for development under ongoing projects[22]. Therefore, there are still 190 growth centers to be developed. In addition, there are rural markets without sufficient infrastructure that are not designated as growth centers but contribute greatly to the local economy. Growth centers and rural markets to be upgraded are selected following the process explained later.

This component is composed of the following subcomponents:

1 Improvement of growth centers
  1.1 Upgrading of growth center facilities
  1.2 Establishment of women's market sections
  1.3 Establishment of cyclone-resistant multipurpose market sheds
  1.4 Establishment of ghats
2 Improvement of rural markets
  2.1 Upgrading of rural market facilities
  2.2 Establishment of ghats

Under "1.1 Upgrading of growth center facilities" and "2.1 Upgrading of rural market facilities,"--including facilities such as multipurpose sheds, drainage systems, parking areas, paved internal roads, waste disposal facilities, water supply facilities, sanitation facilities, and MMC offices--will be accomplished. The subcomponent aims to enhance rural trade by improving the necessary infrastructure and amenities. The facilities to be developed in each growth center or rural market will be decided based on the local needs identified through participatory planning sessions organized after commencement of the project. There will be a budget limitation of tk. 3 million per growth center and tk. 2 million per rural market.

Under "1.2 Establishment of women's market section," a building that will accommodate permanent shops exclusively targeting female shopkeepers will be constructed in the selected growth centers. This facility is mainly aimed at increasing business opportunities for women and encouraging women to utilize the growth center. Shops for physically challenged people and shops for ethnic minorities may be included in the WMS building if the allocation of shops to these two groups can be justified through consultation with the local stakeholders at the subproject planning stage.

Under "1.3 Establishment of cyclone-resistant multipurpose market shed," a two-storied market shed will be developed in the selected growth centers. The first and second floors of the shed will serve as trading areas, but during severe floods, when the first floor submerges under water, the second floor will be used as a shelter for local residents. However, as development of this type of facility is a

[22] See Section 3.6.

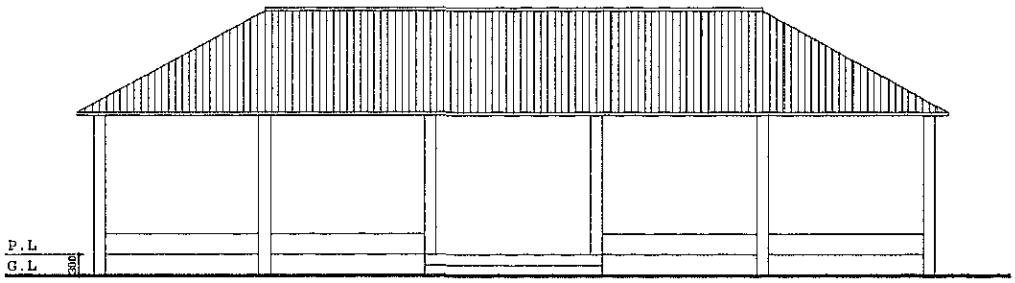
relatively new initiative, one shed will be developed on a pilot basis in each of the nine coastal Districts under the project. Site selection will be made after the commencement of the project.

Under "1.4 Establishment of ghat" and "2.2 Establishment of ghat," boat landing facilities will be constructed in the vicinity of selected growth centers and rural markets. The facility will ease the loading and unloading of goods transported to and from growth centers and rural markets by boat. The growth centers and rural markets where ghats will be installed will be decided based on the local needs identified through participatory planning sessions organized after commencement of the project.

(2) Specifications[23]

a) Multipurpose sheds

Multipurpose sheds will be established for trading of food products such as rice, milk, vegetables, fish, and meat. Multipurpose sheds will be built with concrete foundation structures and tin roofs (Figure 5-14).



Source: LGED

Figure 5-14 Typical design of multipurpose shed

b) Drainage systems

Drainage systems will be installed to enable efficient drainage of rainwater during the rainy season. The drainage structure will have a concrete finish and a suitable cross-sectional area and gradient.

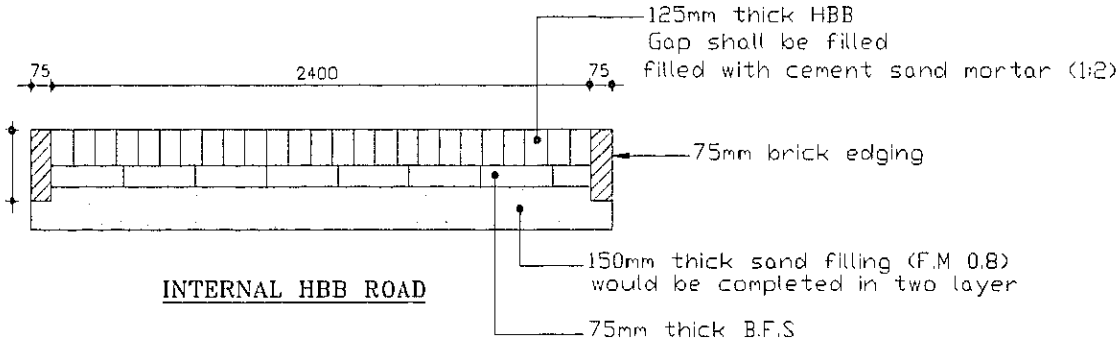
c) Parking areas

Parking areas will be constructed for loading and unloading trucks and cars. They should be built adjacent to a main road near the market entrance where they would not obstruct passage within the market.

d) Paved internal roads

Internal earthen roads will be upgraded to HBB to ease the passage of market users, especially on hat days and during the rainy season.

[23] See Annex 16 for the basis of the recommended specifications.

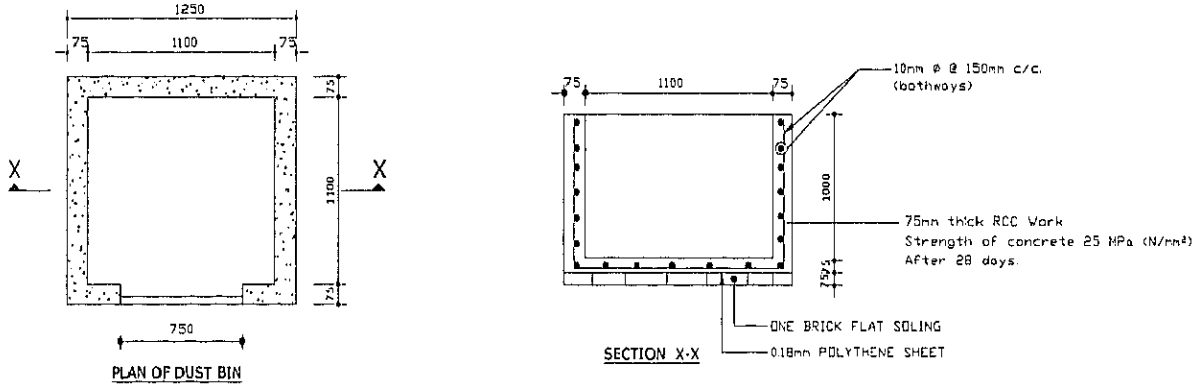


Source: LGED

Figure 5-15 Typical design of internal road with HBB

e) Waste disposal facilities

To improve sanitation within the market, waste dumps made of concrete blocks will be installed in several locations. The locations should be selected where they would not negatively affect the market during incineration.

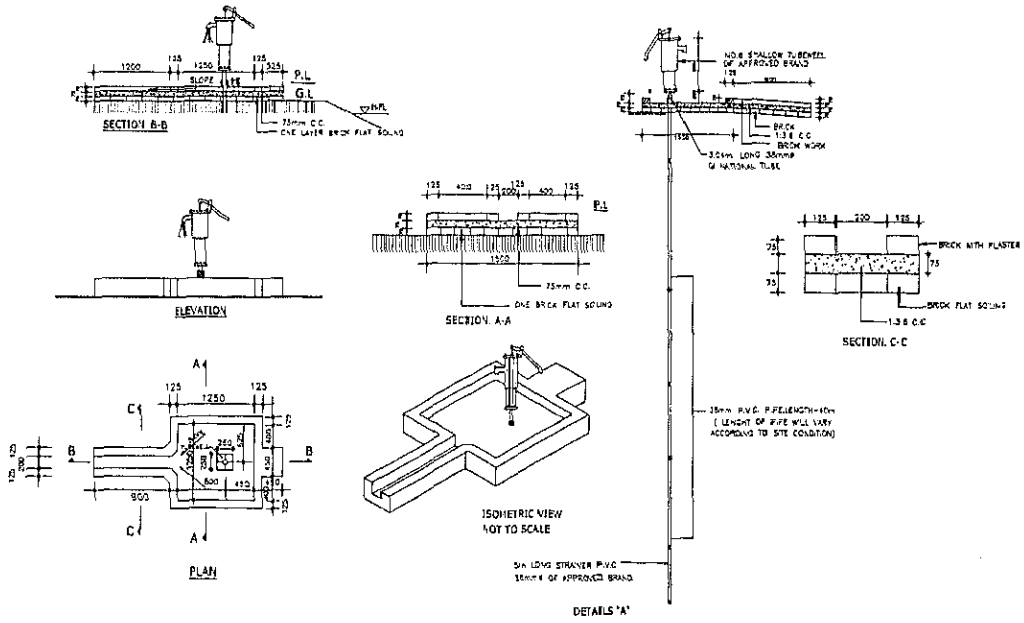


Source: LGED

Figure 5-16 Typical design of waste disposal facilities

f) Water supply facilities

Water supply facilities with hand pumps will be built to supply market users and nearby residents with safe water. Although piped water supply systems can provide better-quality water, the Project is not able to fund the necessary construction and maintenance costs within the tk. 3 million budget limit. Therefore, hand pumps are to be installed to supply water in markets.

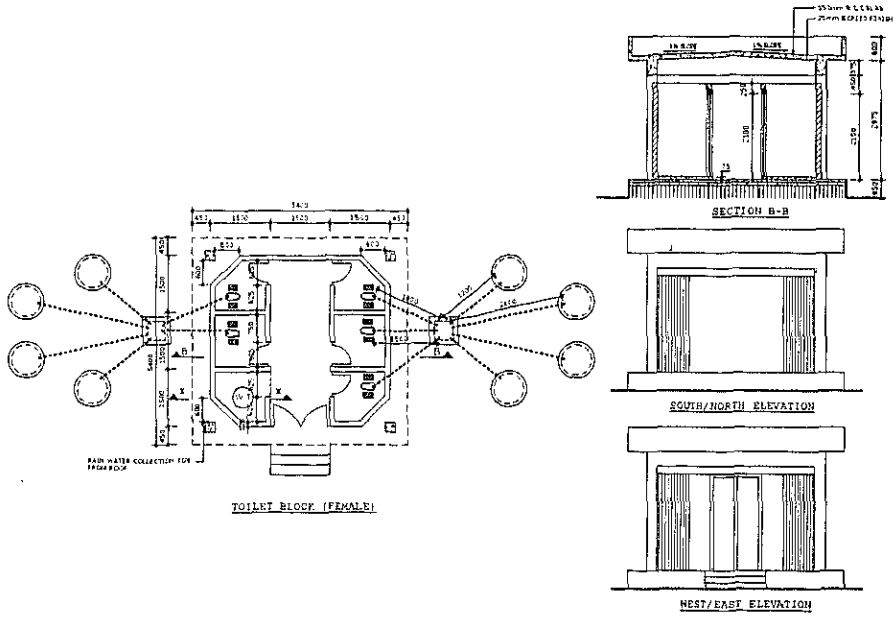


Source: LGED

Figure 5-17 Typical design of water supply facilities

g) Sanitation facilities

Toilet facilities will have flush toilets with storage tanks, and be partitioned by stalls with doors. Separate facilities will be installed for men and women. Water-supply pumps will be built nearby for hand-washing.

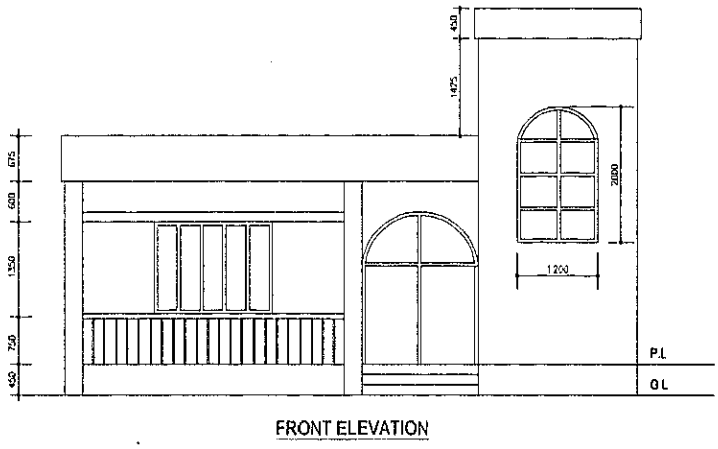


Source: LGED

Figure 5-18 Typical design of female toilet facilities

h) MMC offices

An MMC office will be built in each market to facilitate and stimulate the activities of MMC. Each office should be accompanied by a storage room, meeting room, and toilet facility.

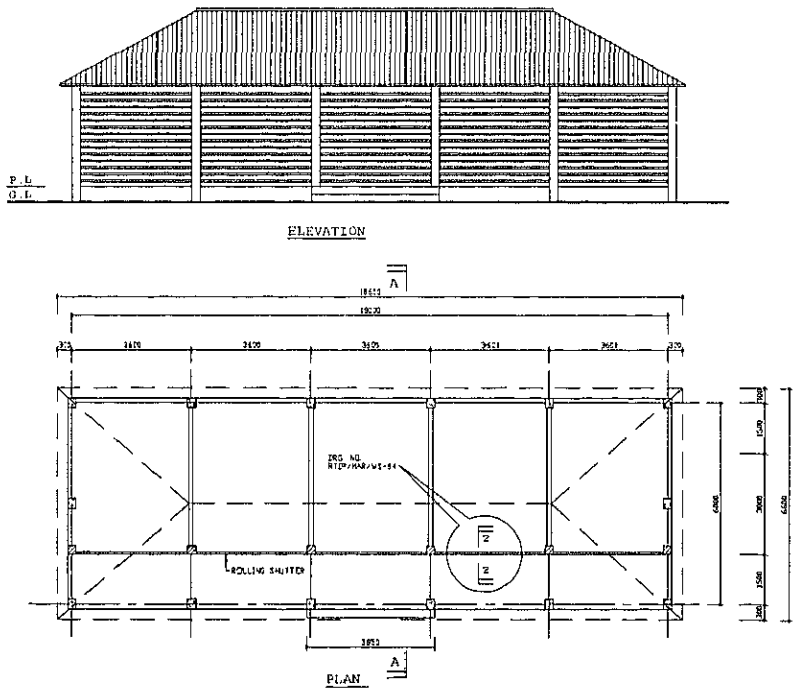


Source: LGED

Figure 5-19 Typical design of MMC office

i) Women's market sections

WMS's will be built following the structure of multipurpose sheds with concrete foundation structures and tin roofs. Electricity and shutters will be installed for convenience and safety. Toilet facilities for women should be built nearby.

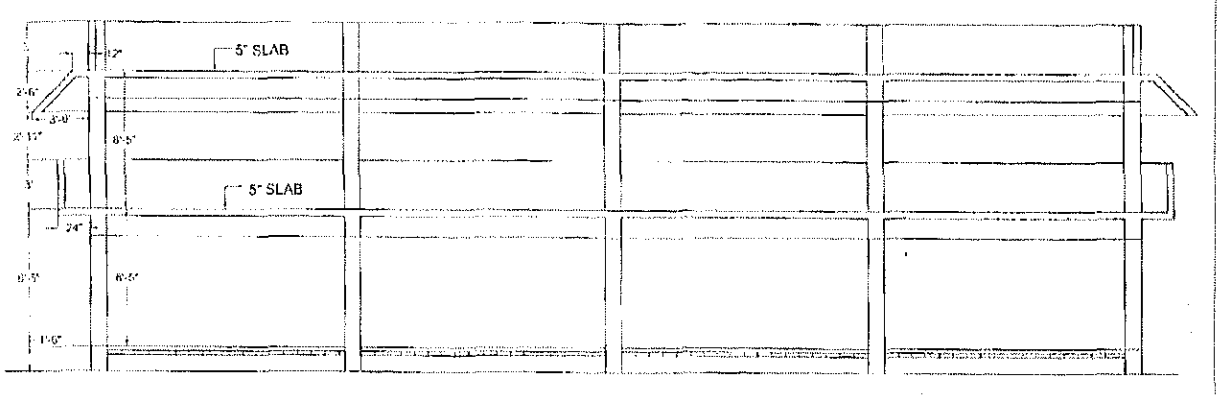


Source: LGED

Figure 5-20 Typical design of women's shed

j) Cyclone-resistant multipurpose market sheds

Cyclone-resistant multipurpose market sheds will be built with reinforced concrete to ensure sufficient stability against flood water. They should be spacious enough to accommodate traders when markets are operating and local residents during severe floods.



Source: LGED

Figure 5-21 Typical design of cyclone-resistant multipurpose market shed

k) Ghats

Ghats will be built on rivers close to markets to improve the efficiency and safety of water transport. They will be built on gentle slopes for the safe loading and unloading of goods and passengers.[24]

(3) Prioritization of subprojects to be developed

The growth centers and the rural markets proposed for development have been selected through the following process:

a) Identification of the growth centers and the rural markets which require upgrading

The Upazila Engineers in the Project area identified the growth centers and rural markets that require upgrading in their respective Upazilas and sent the information to their respective Executive Engineers. The Executive Engineers compiled a list of growth centers and rural markets that require upgrading within the District under their jurisdiction and forwarded it to the LGED headquarters. Subsequently, the lists of growth centers and rural markets proposed for upgrading presented in the F/S was created. Similar procedures were carried out in developing the list of growth centers where WMS's are to be established.

b) Confirmation of the growth centers and the rural markets which require upgrading

The SAPROF team requested LGED to collect data regarding the development needs and current conditions of the growth centers and the rural markets proposed for upgrading in the F/S. Of the 175 growth centers and rural markets proposed, no data was provided for 41. As a result, these 41 growth centers and rural markets were dropped, and 62 growth centers and 72 rural markets remained on the lists from which subprojects to be implemented will be chosen.

[24] See Figure 5-8 for a cross-section.

c) Setting of criteria for prioritization of growth centers and rural markets to be upgraded

Two sets of criteria have been determined in order to select the subprojects for implementation. For subproject candidates to qualify for selection, they must comply with all of the "eligibility criteria." Subprojects for implementation will be chosen based on the ranking of subproject candidates according to the "prioritization criteria."

Table 5-15 Examination result of prioritization criteria in the Guidelines

The prioritization criteria in the Guidelines[1]		Criteria for SWBRDP	
		Adoption	Remarks
1	The GC[2] is connected with a paved road or a road that has a definite plan of being paved for easy access to Upazila HQ[3]. The GC is thus connected to all-weather access to the arterial road network	Yes	Included in the eligibility criteria.
2	The trading volume of agriculture, fishery and industrial products at the proposed GC is bigger than that of GCs or markets near by	No	Data on trading volume not available in some markets. Comparison with "GCs or markets nearby" technically difficult. Alternatively, current lease value per year is adopted.
3	The market covering more catchments area is given priority	No	No reliable data. Precise definition of catchment area is difficult.
4	The visitors per one hat day is more than 2000	No	Reliable data not available in many markets. Alternatively, the numbers of hat day buyers and sellers are adopted.
5	The GC is opened periodically at least once a week preferably two days a week	Yes	Included in the eligibility criteria.
6	The GC is located at least a distance of 5 km from an improved GC/market	No	The criterion is technically difficult to quantify.
7	The GC is not subject to serious risk of erosion by the river action	No	No reliable data.
8	The lease value of the GC will increase	No	No reliable data. The criterion is largely irrelevant as lease value generally increases after upgrading of markets.
9	Availability of khash land for construction of proposed facilities/infrastructures	No	At the subproject selection stage, facilities to be developed are not finalized. Land is not always necessary as existing facilities may be improved.
10	Existing management of GC	Yes	Status of MMC is considered.
11	Present O&M[4] status	No	No reliable data. The criterion is too vague.
12	No.[5] of permanent shops	Yes	

Notes: 1) The criteria are presented exactly as they appear in the *Participatory Planning Guidelines for Development of Growth Centers*. 2) GC: growth center. 3) HQ: headquarters. 4) O&M: operation and maintenance. 5) No.: number.

The two sets of criteria are based on the *Participatory Planning Guidelines for Development of Growth Centers* (Greater Faridpur Rural Infrastructure Development Project, 2003). First, the "Prioritization criteria for Growth Center development" in the Guidelines were examined by the SAPROF team to determine which ones should be adopted as criteria for SWBRDP. The result is shown in Table 5-15. Second, discussions were held between the SAPROF team and LGED officials to draft the two sets of criteria[25]. As the criteria in the Guidelines do not include the development status

[25] The two relevant criteria for upgrading growth centers and rural markets listed in the Detailed Terms of Reference of the SAPROF team were also considered. They are "(5) Economic efficiency of each subproject including EIRR" and "(6) Geographical linkage among subprojects to be complementary for each other and have synergetic impacts." The essence of the latter criterion is included in the prioritization criteria in the Guidelines. However, EIRR, which is referred to in the former