

PD-AAT-430

45165

*Library*  
388-0056

~~Handwritten signature~~

**Government of the People's Republic of Bangladesh**  
**Ministry of Local Government**  
(Local Govt. Division)

## **PROGRESS REPORT**

**ZILLA ROAD MAINTENANCE  
AND IMPROVEMENT PROJECT,  
(USAID PROJECT NO. 388-0056)**

**FOR THE MONTH OF APRIL '84**

**BY**

**Wilbur Smith and Associates**

In association with

**Bangladesh Consultants Ltd.**

and

**Public Administration Service**

PROGRESS REPORT  
FOR  
ZILA ROAD MAINTENANCE AND IMPROVEMENT PROJECT  
(USAID PROJECT NO:388- 0056)  
APRIL, 1984

1.0 GENERAL:

The emphasis during the month of April was on the preparation of two Pilot maintenance schemes in each Project districts and on monitoring construction activities for the 82/83 schemes and some new works for 83/84 construction season. In a meeting held on April 23, 1984 in the Project Manager's Office the following Pilot maintenance schemes submitted by the XENS were reviewed and given technical clearance.

<u>Name of the District.</u>	<u>Name of the Roads.</u>	<u>Length (mile).</u>
Sylhet	Sari-Gowanighat road	9.0
-ditto-	Dewan Sarak (Etinganj-Dhakadhakhin road)	6.0
Rangpur	Rangpur-Badarganj road	1.8
-ditto-	Rangpur-Mahiganj road	1.15
Faridpur	Rajbari-Baliakandi road	12.0
-ditto-	Talma-Nagarkanda road	6.5

During the month guide lines were also issued by the Project Manager with the approval of the MLG for the establishment of routine and preventive maintenance as proposed by W.S.A's O & M report.

During this month, Sylhet district was visited by Mr. Q. I. Siddique, DCE, Mr. Rubaiyat Nurul Hasan, P.M. and Project Director of SPWP Mr. Monowar Hussain. They visited the Sites of number of schemes and made productive observations. The R.E. Sylhet observed the inconsistency in bridge widths at different locations varying from 10 ft to 24 ft. A recommendation for a recommended standard bridge width of 20 ft overall, leaving 18 ft carriage way, has been adopted in the Sylhet District. This is also in line with the Planning commission standards supplied to the Consultant.

A training session on construction procedures was held in Sylhet on 12 April, 1984. It was attended by thirty two (32) persons attached to Zila Parishad and various contractor personnel.

All formalities regarding the selection of participants for three(3) weeks training course in AIT, Bangkok, completed and awaiting final clearance from the Government. It is expected that all fifteen (15) Engineers would be able to attend the course now scheduled from 21 May to 08 June, 1984.

## 2.0 ORGANISATION AND MANAGEMENT:

Considerable interest is being shown from the MLG side in having their personnel trained by the REs regarding soils analysis and mechanical maintenance. The REs in each district are presently conducting special two(2) week training courses with MLG personnel coming from outside, as well as, inside the districts of Sylhet, Rangpur and Faridpur.

With respect to monitoring the construction works, some previous problem areas (due to lack of or ineptness of MLG personnel) should be eliminated in the future due to additional personnel being assigned by the Consultant (B.C.L. field persons) along with motorcycles to make all Sites accessible to inspection.

In the interest of cooperation and because of the almost nonexistence of laboratory facilities available to MLG and BDG forces in the various districts, the Consultant has been furnishing and training personnel with the testing facilities available in the districts of Sylhet, Rangpur and Faridpur. The Zila Parishad work having priority over outside testing work.

## 3.0 ESTABLISHMENT OF MAINTENANCE AND CONSTRUCTION SYSTEM:

### 3.1 Maintenance Program.-

Until a "Pilot" maintenance program is started, no routine or preventative maintenance as defined in the O & M report has been observed in any of the districts.

**3.2 Construction Program:**

**Rangpur district:**

One more work order has been issued for the 83/84 schemes during this month. Works of twelve(12) groups have been started but they are already lagging behind the time schedule.

**Sylhet district:**

As of the date of this report, total fifteen(15) work orders have been issued for 83/84 schemes. Work for the construction of 75'-0" RCC box bridge has been retendered.

**Faridpur district:**

Out of fourteen(14) schemes of 83/84 construction year, work orders for ten(10) have been issued so far. The rest four(4) schemes had been retendered for the second time. It is reported that not a single contractor has responded to the call.

**4.0 PREPARATION OF TECHNICAL SPECIFICATIONS:**

MLG have started following the technical specification submitted in December'83 for the 83/84 construction season with minor modification.

**5.0 TRAINING:**

In line with the suggestions of Mr. RN Hasan, PM, the draft revised budget has been rewritten to more clearly reflect programs completed and programs approved and in the implementation process. It will be circulated to all interested Parties very soon. Work is in the line to complete all the preparations for audio/visual presentations by the end of July, so that those could be used in the 2nd cycle training program scheduled for August, 1984. In response to the trainee's desire of having a suitable port-folio for carrying notes and other papers in the field, a local manufacturer was contracted to fabricate plastic, zipper-closing port-folios for the ZMI Project Training Program participants. Those portfolios have been received and are ready for distribution at the Second-cycle Sessions. Similar training materials have also been prepared for the MIT Program.

All concerned have acknowledged the desirability of Project Management Course to be included as a part of the training. In anticipation of the demand for written material on the subject, a 33-page document titled "Notes on Project Management" has just been completed.

There has been some question of final approval by MDG of the fifteen(15) participants, for AIT Training Program, approved by the Consultants and USAID. However, it now appears that this problem will be resolved and the fifteen(15) will depart on schedule. The schedule incidentally has been moved back three(3) weeks to 20 May, 1984. The Course will be started on 21 May and finish on 08 June. Further, positive action on the future program will await the results of the evaluation of the AIT Course. If the AIT Course is judged to have a positive and beneficial impact, it may be desirable to arrange another session for a second group of students. Since an undesirable internal political situation now exists in India, it would probably be better to hold in abeyance any possible plans to seek an arrangement for a training course in that country. However, there may be possibilities in Malayasia, especially Sabah State, which has a rural road system quite similar to that found in Bangladesh. It has been proposed that the TA investigate this during his stay at the AIT Program in Bangkok.

The WSA home office has completed arrangements for a proposed program for the first three participants selected for training/observation in the USA. Briefly, it is a seven week course beginning with indoctrination at the Washington, D C International Center, Six week at Jofferson City, Alabama Highway Department, three days at the South Caroline Highway Department, and four days travel time. Since the tentative date for the departure of the first participants to the USA is 06 July, it is imperative that the selection and processing of the candidates be initiated early in May.

6.0 MAINTENANCE AND CONSTRUCTION SUPERVISION:

6.1 MAINTENANCE:

6.1 Technical Assistance:

Technical assistance is being continued at the district level for the preparation of Pilot maintenance schemes to be implemented in the coming months. WSA district offices have collected soil samples/material

samples from the on-going Project Sites to ascertain the quality of materials being used and to ascertain the type of soil being used as road subgrade. Districtwise activities of the laboratory peoples are as follows:-

Sylhet district:

Soil samples collected from Atgram-Zakiganj Road (near Ratanganj Bazar) tested for specific gravity, sieve/hydrometer analysis and CBR. Sp. gravity of the soil is found to be 2.55 and the value of grain-size analysis are sand 39%, silt 47% and clay 14%. Subgrade is found to be well stabilized. Sand samples for use in sand cushioning have been collected from Dhakadakhshin-Bearibazar road and tested for fineness modulus. FM of the sand is found to be 0.8 which conforms the specification. Summary sheet of the laboratory activities attached.

Faridpur district:

Soil samples have been collected from Modhukhali-Baliakandi road and Sadarpur-Piajkhali road. Tests have been performed to ascertain the subgrade soil condition of the roads. The test results are as follows:-

<u>Name of the road.</u>	<u>MDD. lb/ft<sup>3</sup>.</u>	<u>CMC. (%).</u>	<u>Percent compaction in the field.</u>	<u>CBR.</u>
Modhukhali-Baliakandi road.(Group E).	115.35	15.31	86.39	12.0
Sadarpur-Piajkhali road.(Group D).	107.54	17.41	86.39	-

Summary sheet of the laboratory activities attached.

Rangpur district:

XEN Rangpur sent some sand and brick samples for test in the Project district laboratory. Our laboratory performed the following tests and the test results are as follows:-

Kandia-Choraghat road(1983-84 Schemes)-

<u>Sample</u>	<u>Fineness modulus</u>	<u>Water absorption capacity (%)</u>
Sand	1.22	
<u>Sample</u>	<u>Size (mm)</u>	
Brick	235x109x72.	16.67
Brick	222x109x67.	17.74

These bricks are irregular in shape and water absorption capacity is well above specified.

Rajarhat-Ullaghatta road (1982-83 Schemes Group D).-

<u>Sample</u>	<u>Fineness modulus</u>
Sand	0.46
Sand	0.84

Sand of F.M. 0.84 may be used for sand cushioning.

Samples sent by Mr. Nurul Amin, AE(Sadar)W.P.W.  
Baradarga- Vendabari road (1983-84 Schemes)

<u>Sample</u>	<u>Fineness modulus</u>
Sand	1.17
Sand	0.58

<u>Sample</u>	<u>Size (mm).</u>	<u>Water absorption capacity (%)</u>
Bricks	256.5x 116.84 x 73.66.	13.63
Bricks	246.38x(121.92 to 114.3) x(71.12 to 68.58).	11.60

The water absorption capacity of the bricks are within the limit but the sizes are irregular.

WSA Staff in Rangpur collected material samples from the Schemes Sites, performed laboratory tests on those samples and the test results are as follows:-

Name of the road.	Sp. gr.	Grain size distribution.			Atterberg limit			Plasticity.
		Sand (%)	Silt (%)	Clay (%)	L.L. (%)	P.L. (%)	P.I. (%)	
Barodarga-Vendabari road - (Group B).	-	48	52	-	-	-	-	Non Plastic.
-ditto- (Group C).	2.58	24	76	-	-	-	-	Non Plastic.
-ditto- (Group D).	2.59	9	76	15	30.7	22.4	8.3	Medium Plasticity with organic silt.
-ditto- (Group E).	2.47	15	76	9	31.0	23.0	8.0	Medium plasticity with organic silt.
-ditto- (Group F).	2.69	18	75	7	28.5	23.0	6.5	Low plasticity.
Rajarhat-Ullaghatta road.	2.69	42	58	-	-	-	-	Non plastic.
-ditto-	2.71	34	66	-	-	-	-	Non plastic.

6.1. 2 MONITORING MAINTENANCE ACTIVITIES:

Cut of five(5) Maintenance Schemes of Rangpur Zila Parisad, Works of two(2) schemes have been completed so far. Only the materials have been collected for the rest three(3) schemes.

In the other two districts, steps have been undertaken to take up the maintenance work very soon.

6.2 CONSTRUCTIONS:

6.2.1 Schemes Design/Review:

Preliminary bridge plans, technical report and cross-sections for the design of sixteen(16) bridges for Faridpur district were received and reviewed. Verbal comments and suggestions were given to the KEN and the Consultants representatives at a meeting on 17 April.

The WSA district offices have been working closely with the KEN (IPW) and his staff in design/review for the 84-85 years schemes.

6.2.2 Monitoring construction activities:

The WSA district offices monitored the roads under construction in the respective districts. The roadwise observations are as follows:

Sylhet district:

Works of 82/83 schemes:

Sylhet-Kamalbazar road

Under close supervision the quality of work on this road is getting better. Performance of the Road-roller is not satisfactory. MLG personnel should pay more attention to control the road-roller for the better performance, because the success/progress of this sort of work is dependent on the efficient control of the road-roller. The Contractor should be issued a change order to cover the work and materials cost of repairing the old boulder soling prior to the placing of water-bound macadam, and for the posterior realignment of a portion of the boulder soling.

Dhakadakhin-Beanibazar road(Bituminous carpeting and placing RCC.pipes as culvert)

Pavement work has been relatively idle although some shoulder work, side drainage and spreading of the water-bound macadam could be executed during the reporting month. The possible reason for this lack of activity which could be attributed to the placement of pipe culverts, and the nonavailability of a road-roller.

There have been four(4) RCC pipe Culverts placed and constructed during the reporting month. Method followed in back-filling the soil in each of the pipe culverts are not acceptable. Back-fill material to be re-excavated down to the bottom of the pipe, and then the material replaced and compacted in layers as described in the specification.

Atgram-Zakiganj road (Bituminous carpeting)

Quality of work on this road has not improved much, which has also been expressed in a letter dated 02 April to the KEN(WPW). Instructions regarding the compaction of WEM have yet to be followed. The Contractor's representatives once again advised that this type of work could not be accepted.

Shahbandar-Shamsherganj road(Bituminous carpeting - 3937' rft)

This Project was tendered in June, 1983. To date the Contractor has completed the entire Section with boulder soling, however the shoulder material has not been placed uniformly and many gaps of uncompleted shoulder can be found. WEM work has been completed for 2133 rft, with an additional 820 rft of loose aggregate spreaded. The Contractor has been advised to follow up the proper sequence of work.

Tajpur-Goalbazar- Khadimur road( 10 Nos.RCC Pipe Culvert)

The Contractor has been fabricating RCC Pipe in the area behind the Zila Parishad office. He will require approximately 70 pieces of this Pipe to complete the Culverts under his contract. He may be advised to cure this pipe with burlap wetted by water after the removal of the steel-form.

Works of 83/84 Schemes:

Tajpur-Goalbazar- Khadimur road(Bituminous carpeting - 1148 rft and 2 nos RCC Box Culvert)

Work for the bituminous carpeting has not been started. Work on both of the Culverts is progressing well. Concreting the base slab of both the Culverts have been completed before the idea for the adoption of standardised bridge width was finalized.

Nabiganj-Baniyachong road(Construction of multi vent box culvert)

Contractor should use vibrator while concreting the elements of the structure to avoid occurrence of honey-comb, which is not acceptable.

The Contractors have just mobilized in some Culvert Site of 83/84 Schemes. Work of building up of earth shoulders in some Scheme Sites have just begun. Contractors have been advised to follow a proper sequence in doing the work.

RANGPUR DISTRICT:

Work of 82/83 Schemes:

Mirganj- Juldhaka road (Bituminous carpeting)

Except the work of one group, the work of other three groups have almost completed. Progress of work for the group lagging far behind the schedule is 10%.

Chatra- Khalashpir- Barodarga- Bhendabari road (Bituminous carpeting)

Only WBM work have been completed in all the six groups. Work of carpeting have just initiated in some sections. In some sections preparation for the initiation of the carpeting work is going on.

Kandia- Choraghat road (HBB work)

Only small earth-work have been executed in one Section. The progress of this Section is 05%. Works in other three sections have been completed.

Rajarhat- Ullaghatta road (HBB work)

Work progress in three groups is 15% and the progress in the remaining group is only 05%. Building/widening of earth shoulder, box-cutting for the HBB, carrying bricks to the work site are the only activities found at the Site.

Work order for one group of 83/84 Schemes has yet to be issued. Six groups have not yet started their work. Carrying materials at Site, earth-work for reshaping the embankment are the only activities in the remaining work Sites.

FARIDPUR DISTRICT:

Work of 82/83 Schemes:

Badarpur- Saltha road (Bituminous Carpeting)

The RE, Faridpur, visited several times to the Scheme Sites during the month and the observations are as follows:-

1. Benching of existing fill slope, stripping of vegetation, breaking of clods, placing fill materials in layer and compacting the fill materials are still to be followed while widening the road embankment.

2. Box cut areas were saturated due to recent rains. Enough passage should be kept in the shoulder for the lateral drainage of rain water. Traffic using the road is destroying the stability of the saturated subgrade.
3. Sand blanket was not adequately compacted and was not maintained true to camber.
4. Tests on the bitumen indicate that the 80 - 100 penetration asphalt being used is actually 100 - 120. This grade is not suitable for the climate in Bangladesh. Uniform temperatures of bitumen and aggregates are not being maintained. Temperatures between 200°F and on fire (past the flash point) have been observed. The bitumen should be maintained between 300°F and 350°F and the temperatures of the aggregate at the time of mixing should be within 25° of the bitumen.
5. A Roller should be available at all times when hot mix is being placed.

Modhukhali- Baliakandi road (Bituminous carpeting)

The WSA, Faridpur office, made the following observations during the visit to the work sites:-

1. Shoulders should be compacted and sloped immediately to drain water away from road way. Box cutting areas should be uniformly cambered and drains placed at sufficient intervals to ensure drainage of rain water during the monsoon.
2. Camber of subgrade and Sand blanket is not being maintained. More care should be maintained in controlling the uniformity of the subgrade, base, soling and surface.
3. More care should be maintained in controlling the temperature of bitumen and aggregate during the hot mix paving operations.

Hatkishnanpur- Sadarnur- Pajkhali road

Observations are as follows:-

1. Earth-work continues without benefit of clearing trees and vegetation, not benching existing fill, new fill material is not placed in layers, nor the clods are broken and no compaction is being performed. Earth shoulders are left high than the carriage way. Box cutting is being performed

without sufficient side drains and camber to provide for rain water to drain off.

2. Adequate control of profile and cross fall (camber) is not being maintained on the subgrade, sand cushioning, soling etc.
3. Borrow pits are being excavated immediately adjacent to the toe of the fill without a berm being left.

#### 7.0 PROCUREMENT OF EQUIPMENT:

##### 7.1 Local procurement:

1. The purchase of 18 motorcycles have been made and 6 each have been sent to the districts of Sylhet, Rangpur and Faridpur.
2. Concrete Mixers have been ordered as per price quote but Manufacturer asking additional high cost for transport of mixers to Sites. Should be settled in the coming month of May.
3. Having prototype of water tank made up by original low Bidder, should be completed in May, if satisfactory, will have him complete order.
4. Water Pump - Still trying to locate on local market, a pump that can be purchased as per AID regulations ( as to country of origin) and within a reasonable price range.

##### 7.2 INTERNATIONAL PROCUREMENT:

The M.L.G. has completed their review of the I.F.B. documents, for which a detailed discussion will be held between the concerning Parties A.S.A.P. Meanwhile, no international procurement has been made to date.

#### 8.0 PROBLEMS ENCOUNTERED AFFECTING THE EFFICIENCY OF THE PROJECT:

To further alleviate the problem of slow work performance by the Contractors, meetings have been held in Sylhet and Rangpur, whereby the Deputy Commissioners along with MLC and the Consultants personnel are insisting the various contractors must put forth a greater effort to complete their work within the time frame they contracted for.

Should no meaningful improvement come from the contractors side, when it is possible to do so, the MLC and the Consultant are giving serious consideration for implementing ways and means for imposing monetary fines relating to slow progress and incompletion of works within prescribed time limits.

9.0 PERSONNEL:Dhaka office:

<u>Title</u>	<u>Name</u>	<u>Status</u>	<u>Date</u>
Chief of Party	F L Barnes	on duty	1/4 - 30/4
Training Spl.	G E Rogers	"	"
Assoc COP	K M Huque	"	1/4 - 30/4
			(Total 8 working days)
Soil/Materials Lab. Training Specialist	M Majid	"	1/4 - 30/4
			(Total 16 working days)
Project Engr/Training Co-ordinator	A H M Abdullah	"	1/4 - 30/4
Office Engr.	G S M Habibur Rahman	"	1/4 - 30/4
Asstt. Design Engr.	A Rashid	Joined on 30 April '84	
Lab. Engr.	S Arefin	on duty	1/4 - 30/4
Draftsman	M A Baten	"	"
Draftsman	M Gias Uddin	"	1/4 - 30/4
			(working in Sylhot)
Admn. Asstt.	Md Harun	"	1/4 - 30/4
Accountant	A K M A Taher	"	"
Secretary	Fahmida Chowdhury	"	"
Typist	M A Kashem	Resigned on 23/4	
Typist	Andre Sarkor	Joined on 11/4	
Driver	E Hossain	on duty	1/4 - 30/4
Driver	F Rahman	"	"
Messenger	A Majid	"	"
Guard	S A Khalifa	"	"
Guard	A Rashid	"	"
Carotaker	Mokfaruddin Skr	"	"
Cleaner	Anwara	"	"
Gardener	N Zaman	"	"

Foxidour:

Resident Engr.	H D Correll	on duty	1/4 - 30/4
Asstt. R. Engr.	A H M R Habib	"	"
Inventory Engr.	Kh I Uddin	"	"
Lab. Technician	Mizamur Rahman	"	"
Surveyor	Tajul Islam	"	"
Office Manager/ Accountant	Ben Gomez	"	"
Driver	B A Mollah	"	"
Driver	N Ali	"	"
Gardener	G Folia	"	"
Guard	M Khan	"	"
Guard	I Ali	"	"

Rangpur:

Resident Engr.	R A Tavel	Joined on 3rd April '84 after leave to USA.	
Asstt. R.Engr.	S A Ahmed	on duty	1/4 - 30/4
Inventory Engr.	Aminul Islam	"	"
Lab. Technician	B Hossain	"	"
Surveyor	J Abedin	"	"
Office Manager/ Accountant	A H Majumder	"	"
Typist	R Kabir	Joined on 15th April '84	
Messenger	A F M M Haque	on duty	1/4 - 30/4
Driver	Mahbubur Rahman	"	"
Guard	A Rahman	"	"
Guard	M Hossain	"	"
Caretaker	G C Das	"	"
Cleaner	Rashida Begum	"	"

Sylhet district:

Resident Engr.	Alex E Nielson	on duty	1/4 - 30/4
Asstt. R.Engr.	K H Hasan	"	"
Surveyor	Aminul Karim	"	"
Surveyor	Abu Musa Mia	"	"
Lab. Technician	H M Siddique	"	"
Lab. Technician	Amjadul Haque	"	"
Office Manager/ Accountant	Azizul Haque	"	"
Typist	A K M Munir Ahmed	"	"
Driver	Fakrul Islam	"	"
Messenger	Elias Ali	"	"
Guard	N R Sarker	"	"
Guard	Rafiqul Islam	"	"
Cleaner/Gardener			
Caretaker	Ahmed Mian	"	"

9.1 Proposed Work Program:

In the coming month WSA district offices will continue monitoring of the on-going construction schemes and give general recommendation as to the quality of workmanship and materials being used on recommended specifications. The district offices will work, closely with the XEN's (MPH) office for the preparation of schemes 84/85 and also will engage themselves in collecting materials sample from the Site and conduct laboratory test on them.

10.0 Miscellaneous:

No comment.

11.0 Appendix:

Financial status of the Project attached.

11.1 Meeting:

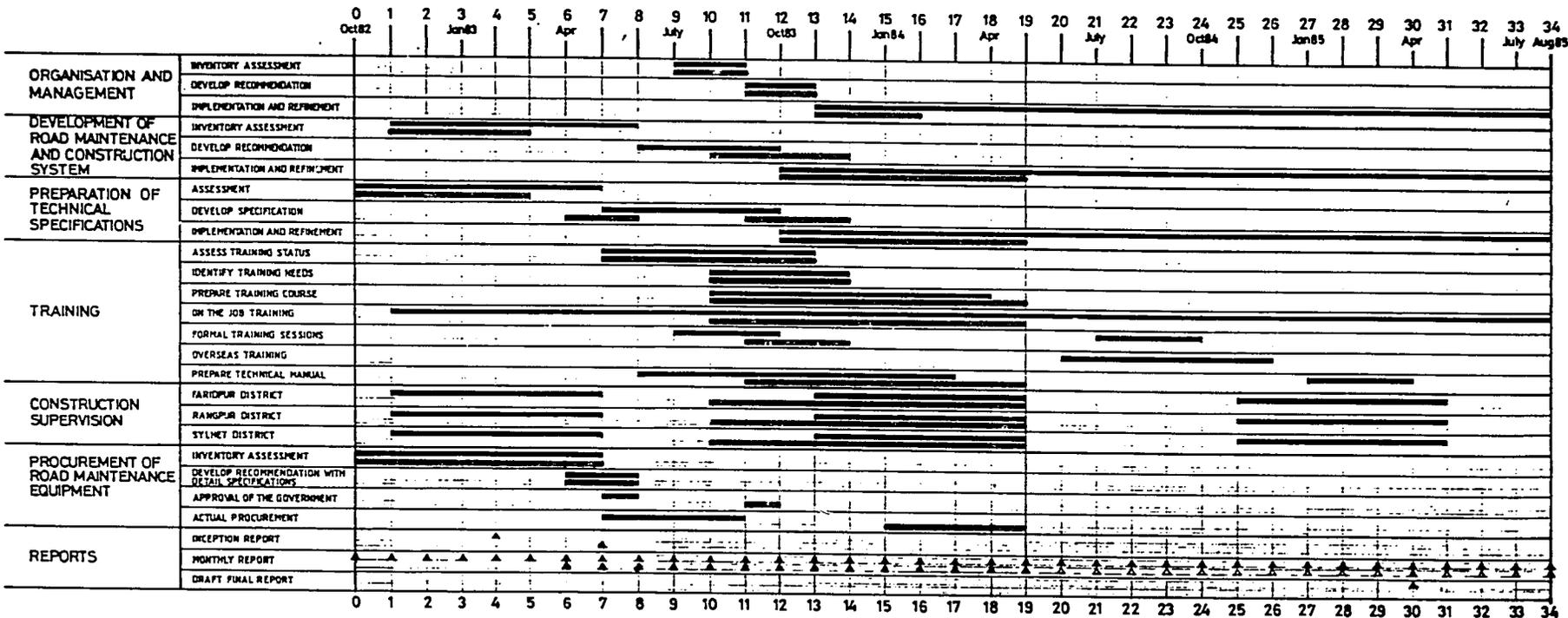
No comment.

11.2 Visitors:

No comment.

  
FRED L. BATES  
CHIEF OF PARTY

**WORK FLOW DIAGRAM**  
**ZILA ROADS MAINTENANCE AND IMPROVEMENT PROJECT**  
 ( USAID PROJECT NO 388-0056 )



LEGEND :   
 ANTICIPATED PROGRESS   
 ACTUAL PROGRESS

15

SUMMARY FISCAL REPORT  
WILBUR SMITH AND ASSOCIATES INC  
ZILLA ROADS MAINTENANCE AND IMPROVEMENT PROJECT  
US-AID CONTRACT NO. 388-0056-02 HCC.

Project components.	Budget amount.		Previous Expenditures.		Expenditures-current reporting/APRIL, 1984.		Cumulative expenditure.		Remarks.
	\$	Taka.	\$	Taka.	\$	Taka.	\$	Taka.	
			*						
1. Technical Assistance. ...	2,563,990	19,390,930	1,196,636	8,480,582	51,480	704,325	1,248,116	9,184,907	
2. Equipment. ...	785,000	--	112,976	48,989	--	--	112,976	48,989	
3. Training <u>US-AID</u> <u>HDC</u>	300,000	<u>462,500</u> 657,500	10,209	32,423	938	48,537	11,147	80,960	
4. Road Maintenance Financing by Districts.	--	23,095,000	--	--	--	--	--	--	
5. Road Development Fund. <u>US-AID</u> By Districts	4,000,000	--	--	--	--	--	--	--	
	--	34,305,000	--	--	--	--	--	--	

\* Corrected in April, 1984.

LABORATORY ACTIVITIES OF SYLHET DISTRICT FOR THE  
MONTH OF APRIL '84

Name of road/khal and location.	Test Result	Sieve /Hydro-meter analysis.			Atterberg limits.			Field density.		Compaction test.		% Compaction.		C.B.R. (%)		Remarks.	
		Sand (%)	Silt (%)	Clay (%)	L.L. (%)	P.L. (%)	P.I. (%)	Yd kg/m <sup>3</sup>	W (%)	M.D.D. (kg/m <sup>3</sup> )	O.M.C (%)	Modified.	Standard.	Unsoaked.	Soaked.		
Dhaka dakshin-Beanibazar road.	F.M. =0.8	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Tested F.M. for sand cushioning.
Churkhali-Zakiganj road.	F.M. =0.8	92.2	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	Sand sample supplied by R&H through Zila Parisad for F.M.
Itgram- Zakiganj road(Near Ratanganj Bazar).	Sp.Gr. =2.55	39	47	14	-	-	-	15.78	1942.23	12.81	-	-	.40	-	-	-	This is the 6th sample collected from the Sub-grade.High C.B.R.well stabilized.
hurkhali- Zaki-anj road.	F.M. =0.87.	95.57	4.43	-	-	-	-	-	-	-	-	-	-	-	-	-	Sand sample supplied by R&H through Zila Parisad for F.M.

Yd = Dry density.  
W = Water content.  
MDD = Max dry density.  
OMC = Optimum water content.

12

LABORATORY ACTIVITIES OF FARIDPUR DISTRICT FOR THE  
MONTH OF APRIL '84

Name of road/khal and location.	Test Result	Sieve /Hydro-meter analysis.			Atterberg limits.			Field density.		Compaction test.		% Compaction.		C.B.R. (%)		Remarks.
		Sand (%)	Silt (%)	Clay (%)	L.L. (%)	P.L. (%)	P.I. (%)	$\gamma_d$ kg/m <sup>3</sup>	W (%)	M.D.D. (kg/m <sup>3</sup> )	O.M.C (%)	Modified.	Standard.	Unsoaked.	Soaked.	
Mandartola Khal (near Bakundia).	S <sub>p</sub> .Gr. =2.66.	8.0	80.0	12.0	-	-	-	-	-	-	-	-	-	-	-	at 5 ft.
-ditto-	S <sub>p</sub> .Gr. =2.695.	10.0	81.0	9.0	-	-	-	-	-	-	-	-	-	-	-	15 ft.
-ditto-	S <sub>p</sub> .Gr. =2.697.	12.0	84.0	4.0	-	-	-	-	-	-	-	-	-	-	-	25 ft.
-ditto-	S <sub>p</sub> .Gr. =2.665.	37.0	52.0	11.0	-	-	-	-	-	-	-	-	-	-	-	35 ft.
-ditto-	S <sub>p</sub> .Gr. =2.637.	50.0	48.0	2.0	-	-	-	-	-	-	-	-	-	-	-	55 ft.
Badarpur-Saltha road(7.5 km from Starting pt.)	-	-	-	-	-	-	-	-	-	1558.6	13.5	-	-	-	-	-
Modhukhali-Baliakandi road(Group E).	SpGr. =2.69	-	-	-	-	-	14.5	-	-	1848.5	15.31	-	85.4	12.0	-	-
S. darpur- Piajkhali road.	-	-	-	-	-	-	-	-	-	1723.39	17.41	-	86.4	-	-	-

$\gamma_d$  = Dry density.  
 W = Water content.  
 MDD = Max dry density.  
 OMC = Optimum water content.

12