Ministry of Foreign Affairs

Danida

JOINT DPHE - DANIDA REVIEW

URBAN WATER SUPPLY AND SANITATION PROJECT

BANGLADESH

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restricted information
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Ref. No. 104.Bang.174

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List of Abbreviations

ADB	Asian Development Bank
CARU	Communication and Action Research Unit
CBO	Community Based Organisation
CCU	Central Coordination Unit
CDVAT	Custom Duties and Value Added Tax
DAG	Danida Advisory Group
Danida	Danish International Development Assistance under the Danish Ministry of Foreign Affairs
DHV	Name of a Dutch consulting company
DKK	Danish Kroner
DPHE	Department of Public Health Engineering
GoB	Government of Bangladesh
JRT	Joint Review Team
LGD	Local Government Division
LGED	Local Government Engineering Department
MLGRD&C	Ministry of Local Government, Rural Development and Cooperatives
MoL	Ministry of Law
NGO	Non-Government Organisation
O&M	Operation and Maintenance
PM	Project Manager
PMU	Project Management Unit
PP	Project Proforma
PVC	Poly Vinyl Chloride
PWD	Public Works Department
QA	Quality Assurance
SPSD	Sector Programme Support Document
TOR	Terms of Reference
UNICEF	United Nations Children Fund
USD	United States Dollars
WID:	Women in Development
WATSAN	Water Supply and Sanitation

1. INTRODUCTION

During 1990-97 the Danish Government has supported the implementation of Phase I of an Urban Water Supply and Sanitation Project covering the two Pourashavas of Chaumohani and Laksmipur.

Concurrently with the implementation of Phase I, a possible Phase II was identified and appraised. Phase II includes 53 pourashavas, thana centres and growth centres in the five districts of Noakhali, Laksmipur, Feni, Patuakhali and Barguna. A Government Agreement, including a Project Document was signed in December 1996 and the Government of Bangladesh (GoB) approved the Project Proforma in June 1997.

According to the Government Agreement, annual reviews should be undertaken jointly. The present review is the first of these reviews. The review was carried out in Bangladesh in the period 11 - 25 January 1998. Terms of Reference for the review are found in Annex 1.

The composition of the Joint Review Team (JRT) is as follows:

Representing GoB:

- Mr. Sheik Khorshed Ali, Project Director, DPHE Urban Slum and Fringe Project.

Representing Danida:

- Mr. Steffen Hvam, Team Leader, water supply and sanitation engineer, external consultant to Danida.
- Mr. Lutfe Ali, hydrogeologist, external consultant to the Royal Danish Embassy.
- Mr. Hans Egerrup, urban water supply and sanitation engineer, external consultant to Danida.
- Mr. Rafiqul Haider, social scientist, external consultant to the Royal Danish Embassy.
- Mr. Lars Orio, trainee, water supply and sanitation engineer, external consultant to Danida.
- Ms. Kathleen Shordt, social scientist, external consultant to Danida.
- Mr. Sven Olaf Storm, institutional specialist, external consultant to Danida.
- Mr Jan Møller Hansen, Adviser in Water Resource Management and Water Supply, Danida Copenhagen (part-time).

The programme of the JRT is given in Annex 2.

The JRT prepared a debriefing paper dated 24th January 1998 and discussed it with the Ministry of Local Government, Rural Development and Cooperatives (MLGRD&C), the Department of Public Health Engineering (DPHE), the Royal Danish Embassy and key staff from the Project. The debriefing paper is found in Annex 3.

A review always has a tendency to concentrate on areas of difficulty. The present review is no exception. This should, however, not detract the attention from the achievements made by the project staff, which are appreciated by the JRT.

The JRT would like to express its thanks to all officials and individuals met for the kind support and valuable information which the JRT received during its stay in Bangladesh and which highly facilitated the work of the JRT.

A draft report containing the views of the JRT was in March, 1998 circulated by the Danish Embassy to relevant GOB institutions, Danida Advisory Group (DAG) and the Project Consultant (DHV) with a request for comments by 14th April, 1998. Comments have been received from MLGRD&C (incorporating the comments from DPHE), DAG, DHV, the Danish Embassy and Danida. The comments have - where considered relevant - been incorporated in this final version of the Report. The received comments have been reproduced in Annex 10. All recommendations and proposals are subject to approval by the two Governments.

2. EXECUTIVE SUMMARY

2.1 Findings

Status of Project Implementation

The Project is still in its preparatory and design phases. Implementation of physical works did not take place in 1997.

Many of the preparatory activities have been completed as scheduled, but implementation of a number of activities has been delayed by 3 - 6 months.

General Analysis

A draft national policy for drinking water and sanitation was published in December 1997. The policy contains a number of statements of importance for the implementation of the Project.

Draft "Terms of Agreement" covering project activities in Noakhali and Patuakhali Pourashavas have been formulated, but not yet signed. This may delay the start of physical activities in the two Pourashavas. The JRT has reservations regarding some of the paragraphs in the draft agreements.

Proposed new by-laws for water and sanitation covering the two Phase I Pourashavas were submitted for approval by the MLGRD&C about 1½ year ago, but are still not approved. Without the approval and implementation of the proposed by-laws with the necessary staff positions, the sustainability of such water supplies is questionable.

Acquisition of land for drilling and water works has caused considerable problems. Probably, a more active role of the DPHE Project Managers might have expedited the matter.

In thana and growth centres, the Project will be implemented through Union WATSAN Committees with the exception of piped water supplies which will be implemented by DPHE but operated and maintained by the Union WATSAN Committees assisted by DPHE staff. The existing local government system in Bangladesh is weak in regard to financial, managerial and human resources and may not have the capacity to operate and maintain piped water supplies.

After introduction of a new local government act, the local government institutions at thana level, when established, are expected to take over the responsibility for operation and maintenance of services provided to the community, including operation and maintenance of piped water supply from the existing Union WATSAN Committees.

Due to discrepancies between the Project Proforma (PP) and the Project Document, a revision of the PP is needed. A revision of the PP in June, 1998 was agreed during the first meeting of the Steering Committee on 11th November, 1997.

It is necessary to revise the Project Document, but the detailed information required for a revision of the Project Document is not yet available. Such a revision might also bring the Project in line with the Danida Sector Programme Support Document under preparation.

Project Organization and Management

The Steering Committee has only met once during the first year of implementation. There is uncertaincy about the membership of the Committee, including whether the concerned Counsellor of the Royal Danish Embassy and the Chief Project Adviser shall be members. The JRT finds it important, that the Steering Committee plays its intended role.

The organisational set-up in the DPHE staffed Central Coordination Unit with a part time Project Director is to some extent a constraint to project implementation.

The DPHE staffing of the Project Management Units has been very scarce. The Project Managers have only been in the offices occasionally and only recently a few of the planned Assistant Engineers reported to the PMUs. The DPHE employed personnel has not played a sufficiently active role in project preparation.

The Danida Advisory Group's (DAG) mandate to manage the Consultant is not clear. Does DAG have the mandate and professional capacity to approve changes in Danida's contract with the Consultant, including reducing the outputs stated in the contract, without written accept by Danida or the Royal Danish Embassy?

DAG would benefit from: i) independent quality assurance, ii) better access to needed specialized knowledge, iii) easier interaction with similar projects and colleagues with relevant experience, and iv) assistance to comment upon DHV's reports as well as the Project's own work plans, manuals, guidelines and reports.

In general, the work of the Consultant seems satisfactory. DHV and DAG have discussed to reduce/change the outputs specified in the Contract, such as reducing the number of full socio-economic baseline surveys, the number of solid waste management plans and the extent of training provided to pourashava staff. DHV has proposed an increase of the consultancy budget by approximately DKK 5 millions.

DHV has replaced the original drilling supervisor with a hydrogeologist with little practical and relevant experience. According to the Consultant's interpretation of the Contract clauses on drilling supervision, they are supposed to provide "The Superviser", but not "The Engineer". The contract is not clear on this issue.

A quality assurance plan has been prepared, but hardly been implemented. Reports have not been quality assured by professionals at the Consultant's head office, which is a normal requirement. Neither quality assurance reviews nor audits, both mentioned in the Contract, have been carried out. The JRT finds this regrettable.

DAG has drafted a number of relevant guidelines, but there is no distinction between guidelines and procedures. Some important guidelines have not yet been discussed with or approved by the Project Director.

The planning and reporting system is still under development, but the system appears too extensive and without sufficient flexibility. Till now, only one semi-annual progress report has been produced by the Project. This progress report does not compare targets with achievements. The Project has yet to establish the necessary monitoring systems. A management information system is planned to be completed by the end of April 1998 together with a financial management system. A draft monitoring guideline is under preparation. DAG is aware of the mentioned shortcomings.

Follow-up on Phase I Activities

Lessons learned from the first year of the pourashavas' own operation of the water supplies include: i) leakage and wastage of water are unacceptably high and have risen during the last year, ii) operating staff of water treatment plants is still not confident with the plant, iii) more training is required for accountancy staff, and iv) sufficient permanent staff positions are not yet approved.

In 1997, a leakage detection programme developed by a Danish consultant did not produce the desired results.

A large number of the shallow hand tubewells, installed in the fringe areas, have high arsenic contents. However, at present the Phase II Project should not be involved in drilling of deep hand tubewells in Chaumohani and Laksmipur.

Socio-Economic Analysis

Some draft reports of baseline studies have been prepared by the Consultant. The baseline studies for the first year were late for planning in Patuakhali and Noakhali Pourashavas. Useful information appears in the completed studies. There are weaknesses in the design of the baseline studies, partly because the original ToR were not particularly focused. It is also a problem that baseline studies have, for example, been undertaken for four locations where work is not scheduled to begin until 2003. At this moment, it is not possible to comment on the utility of the studies for the Project. However, some immediate changes in the study designs are required.

The Consultant has stated that only 11 full studies will be completed with some more limited information on other locations rather than completing in-depth studies of 23 towns. Apparently the two parties have solved this problem after the end of the review.

At this early point in Phase II, hygiene education activities have yet to begin. However, the groundwork has been undertaken.

It is important to ensure that the activities are of high quality and that there is ample capacity building of health personnel during the project period. Hygiene promotion is meant to reach the whole community. An area-based approach provides the opportunity for concentration and emphasis on interpersonal contacts.

The communication capacities and knowledge of participatory approaches among some project staff and collaborators are inadequate.

With respect to public mobilization, the Project plans to work with a large number of institutions and groups such as WATSAN Committees, local government health staff, health communicators, NGOs and Community Based Organisations. However, most information and education for community members will be through personal contact.

At this time, neither school hygiene education activities nor activities to reach out-of-school children do figure in the workplans.

Water Supply

The JRT supports the Consultant's proposal to omit the production test tubewells and reduce the design yield from 70 to 50 cu.m/hr. The number of production wells in the contract with the Drilling Contractor does not appear sufficient, in particular if stand-by wells shall be made in some towns. All these proposals may have considerable cost implications.

The Danish Drilling Contractor charges 30 times more for a 2" exploratory/observation well than the local contractors. There is need for a revision of the strategy for exploratory/observation wells.

In most cases, the Consultant's design criteria for piped water supply are neither well documented nor justified. The suggested choice of materials is questionable in some cases. The Consultant has admitted the shortcomings and has agreed to submit a new report.

A possible incorporation of existing Public Works Department water supplies in the future pourashava water supplies may pose problems, not the least with regard to payment for water.

The cost estimates for the water supply component prepared by the Consultant indicate that the cost of the piped water supply component for the entire Project will be approximately 2.5 times the cost estimate in the Project Document. It should be expected that the cost estimates may change considerably when the detailed design is completed.

Particularly high cost increases are seen for the proposed water supply for Noakhali Pourashava. Fringe areas cannot be supplied from hand tubewells, so a piped water scheme is the only option. The cost of these short-term rehabilitation works is such that the Project should carefully assess whether it is worthwhile to make the proposed rehabilitation.

With regard to Patuakhali Pourashava, much effort should be made to retain in operation as large parts of the existing piped water systems as possible. Firstly, the existing systems should be rehabilitated. Then repairs and elimination of wastage should continue until the combination of leakage and wastage is reduced to less than 20%. Finally, the planned extension of the schemes should take place. The fringe areas of Patuakhali are sparsely populated and well suited for deep hand tubewells. However, the Project Document does not contain a provision for such wells.

No thana centre in the entire Bangladesh is operating a piped water supply. Though the appraisal in 1993 found it feasible to have piped water supplies in the identified thana centres, the JRT has doubts as to the financial and administrative feasibility of such piped water.

The implementation of hand tubewells in growth centres and small thana centres is not scheduled to start in the near future. As compared to the pourashavas and large thana centres, the implementation in such small centres is much more simple and less risky, and could start at relatively short notice. At present, the PMUs appear to have spare capacity for initiating such tasks.

Most of the shallow aquifers within the project area will contain arsenic, while the deep aquifers are considered to be free from arsenic. The Project has so far taken some initiatives such as testing of an arsenic removal unit. The Project has also suggested to install some deep hand tubewells at central locations and recommend the population to fetch water for drinking and cooking purposes from such deep hand tubewells and water for other purposes from existing shallow hand tubewells.

Drainage and Solid Waste

Drains are often blocked and the pourashavas show limited willingness to clear the drains. There are conflicting interests associated with proper function of drains, particularly in respect of availability of water for irrigation of a second annual rice crop in fringe areas of the towns. Therefore, the benefits from constructing drains may be questioned.

In Noakhali Pourashava, the proper drainage depends on necessary improvements to the khals and canals outside the Pourashava boundaries. Drainage of Noakhali Pourashava is also covered by another project and the two projects have tentatively agreed that the Danida supported project take care of the khals and canals outside the Pourashava boundaries. The JRT doubts that the Project can make such a commitment.

In Patuakhali Pourashava, the smaller road drains are kept reasonably clean by the Pourashava and there might be advantages of improving the drainage of the densely inhabited core areas.

Solid waste management plans have only been made for Noakhali and Patuakhali Pourashavas. In general, the JRT is in agreement with the findings in the Consultant's early reports, but has reservations about, among others, the proposed waste collection

system. The possibilities for privatisation/leasing out of waste collection activities and landfill site operations have not been sufficiently evaluated. The need for expensive development of the dumping sites may also be questioned.

Sanitation

Studies show that safe water has less effect on diarrhoea than improved sanitation or better hygiene. This implies that the greatest challenge is the removal of excreta from the human environment through a high level of sanitation coverage coupled with improved hygiene practices such as washing both hands.

In general, the sketch design of the proposed public toilets, septic tanks and soak-aways is well documented.

Community latrines will only be implemented in very rare cases. It is doubtful whether community latrines for 20 households or more will work. Shared latrines for 2 to 3 families may be a feasible option.

A household latrine programme does not include construction activities only. Proper maintenance, emptying and continued use of existing sanitary latrines as well as stimulating consistent hygiene behaviours related to latrines are at least as important.

Step-by-step plans for household sanitation-with-education have yet to be developed. The plans are expected to include: i) social mapping, ii) privatized production, and iii) elimination of subsidy. Mobilization, intensive motivation activities, mapping and credit/saving organization must receive very high priority, preferably following an area-based approach.

The 1998 project activity plan for sanitary latrines does not allow sufficient time for mobilization, development of NGO capacity and, in general, reflection of the considerations noted above.

Extremely high water tables pose problems for proper function of the latrines in some towns, such as Patuakhali Pourashava. The current latrine technology (5-ring pit with slab) may not be appropriate in such cases.

The emptying of pits and tanks together with safe disposal of sludge continues to pose problems. The JRT has reservations regarding the Consultant's proposal to purchase vacuum trucks and let different towns share a truck. An alternative, and most likely feasible, option might be to use portable electrical submersible dewatering pumps.

Operation and Maintenance

Within the Pourashavas, the Parishads will ensure operation and maintenance of piped water supply and sanitation activities through a Pourashava WATSAN Committee.

As the committees in Noakhali and Patuakhali Pourashavas have not started functioning yet, it is too early to comment on the work of the committees and the interaction between the WATSAN Committee and the Pourashava Parishad.

In the Project Proforma, it is foreseen that the pourashavas will require more technical manpower than indicated in the organogramme. It will also be necessary to strengthen the accounts section. The technical ability to operate a 24-hours piped water supply is not present in the pourashava organization. The need for technical, managerial and accounts training is obvious.

At thana centre level, a Union WATSAN Committee will be responsible for operation and maintenance with the assistance of DPHE Thana Engineer. The capacity of the Union WATSAN Committees is insufficient for the operation and maintenance of piped water supply schemes. Furthermore, many thana centres are situated in two or more unions, making the proposed institutional set-up impractical.

Finance and Administration

The total financial input from the Government of Denmark for the first five year project period is Taka 911,927,000 of which Taka 241,768,000 were used in the period January - December 1997.

In the same period, the Government of Bangladesh provided a financial input of Taka 44,583,000 of which Taka 40,701,000 were used for Custom Duties and Value Added Tax. In total the GoB input amounts to Taka 138,000,000 for a project period covering 10 years.

Periodic budgets were first introduced by the Project from July 1997, but all procurement has been made according to plans and within the overall budget of the Project. At present only minor budget adjustments are needed in order to incorporate the cost of the establishment of the laboratory in Noakhali as well as its future running cost.

Accounting procedures and reporting is in accordance with Danida guidelines for Decentralised Project Accounting. A comprehensive project accounting manual with details on specific accounting procedures and responsibilities of the project components has been prepared.

2.2 Recommendations

This section contains a summary of the recommendations that are contained in the following chapters. Each recommendation has the chapter and section number notes for easy reference. It is also indicated who is responsible for implementing each recommendation.

A number of the recommendations have been prepared in close collaboration with project staff and in several cases based on their suggestions and ideas.

Accordng to Danida practice, recommendations shall be categorised under the three headings A, B and C:

A. Recommendations, which are regarded as so vital that they should be condition for the continuation of the Project.

B. Recommendations which are important for the Project to succeed.

C. General recommendations, which are not only important for the Project but for the sector as a whole.

As the review took place only one year after the start of the Project, it is not surprising that the JRT has no Category A recommendations.

The JRT has no Category C recommendations. However, some of Category B recommendations are based on lessons learnt, which can be of relevance for other projects. The most important of these are:

- piped water supplies should not be designed before an appropriate institutional and legal framework has been agreed upon;

- when projects are implemented through Danida advisers, a proper quality assurance system should be in place, for example through short-term consultancy services from a consulting company;

- at the end of an intensive sanitation promotion intervention in a particular area, a survey should be carried out to identify families, who have no latrines and the reasons for this. Subsidised latrines may then be considered for such families.

The JRT has the following Category B recommendations:

1. The draft agreements for Noakhali and Patuakhali Pourashavas should be adjusted in light of the JRT's suggestions and be signed without delay. Tendering for physical implementation should not take place before the agreements are signed (5.2.1, All).

2. No contracts should be signed for piped water supplies before a suitable framework of by-laws, rules and regulations is approved for the involved urban authorities (5.2.2, the Project).

3. DPHE should take the necessary action to ensure that access to land for drilling and construction activities is ensured in time for implementation of physical activities (5.2.3, DPHE).

4. Large scale interventions in thana and growth centres should not commence before the Local Government Act has been passed (5.3.2, the Project).

5. The first revision of the PP should be done before June 1998 in order to bring the PP in line with the Project Document (5.5.1, MLGRD&C).

6. The Project Document should be revised at latest in connection with the 1999 joint review taking into account: i) the forthcoming Local Government Act, ii) the National Policy for Drinking Water and Sanitation, iii) the Danida Sector Programme Support Document, iv) the planned Danida-assisted rural water supply and sanitation project, v) revised feasibility studies and budgets prepared by the Project, and vi) the findings of the present review (5.5.2, DPHE and Danida).

7. DPHE should play a more active role in project implementation in the future. The PMs should be present in the PMUs at least 80 - 85% of their time and actively take part in project planning, implementation and monitoring and co-ordination. Until the physical implementation gets momentum, at least four Assistant Engineers should be attached to each PMU. This number should gradually be increased as the implementation activities increase (6.2.3, DPHE).

8. Danida should urgently clarify DAG's mandate to manage the Consultant including the mandate to revise its terms of reference (6.3.1, Danida).

9. Danida should consider that a contingency of 5% of the sums given in the contracts with the Consultant and the Drilling Contractor should be administered by DAG, but the approval of the Royal Danish Embassy should be sought in each case (6.3.1, Danida).

10. DAG and Danida should as soon as possible recruit a Danish consulting company under a framework contact to provide back-up and quality assurance for DAG and the PMUs on a short term basis (6.3.2, DAG and Danida).

11. To develop their own capacity for monitoring and supervision, the Project staff should undertake a limited number of small-scale direct implementation pilot activities and should seek advice about the most suitable ways of drafting contracts with NGOs. These should be determined locally, but in consultation with DAG (6.3.3, the Project).

12. Danida should clarify the contract with the Consultant based on an assessment of the magnitude of the Consultant's contractual obligations and the outputs stated in their present contract. Danida should re-assess the Consultant's responsibility in drilling supervision. The detailed design of the piped water supplies and other engineering services should not require an increase of the consultancy budget (6.4, Danida).

13. DHV should without delay explain to Danida how the quality assurance system stipulated in the contract will be implemented. Among others it should be stated how the quality of the Consultant's draft reports will be assured (6.4, DHV).

14. DAG should as soon as possible take the initiative to get all involved parties to agree on the Procedures for Tendering (6.6.2, DAG).

15. DAG should as soon as possible, but after the clarification of the powers of the Engineering Adviser, take the initiative to get all involved parties to agree on the Procedures for Contract Management and Supervision (6.6.3, DAG).

16. A short-list of NGOs should be prepared on the basis of field visits to each NGO performed by PMU staff. The PMUs should take the lead in selecting the NGOs and in preparing draft contracts. The NGOs should be paid by the PMUs directly (6.6.4, the Project).

17. The Project should through the agreement with the pourashavas facilitate that continuous action is taken by the pourashavas on the recommendations of the 1997 JRT for Phase I, and also follow-up on apparent outstanding issues such as translation of manuals. No financial assistance for recovering cost of operation and maintenance should be given by the Project to the Phase I Pourashavas during the period of monitoring. Advice and training of staff could still be provided through the participation of Phase I operating and administrative staff in training courses for Phase II staff (7.1, the Project).

18. The MLGRD&C, the Royal Danish Embassy and DAG should make all possible efforts to influence the drafting of a framework of water supply and sanitation rules, regulations and by-laws by the Ministry of Law, by making the ministry aware of the shortcomings in the present proposal. The approval of the new by-laws should be given high priority, so the Phase I water supplies can be operated in a safe manner, and the implementation of the Phase II water supplies can proceed without further delays (7.2, MLGRD&C, the Royal Danish Embassy and DAG).

19. The Phase II staff should as part of the agreement with the Phase I Pourashavas advise the operating staff of the water supplies on leak detection and reduction of waste on a regular basis, and seek to increase the awareness of the unnecessary high operating cost caused by leakage and waste. However, the Project should not assist the Pourashavas with new tube wells or pumps as that would only lead to even higher wastage and operating cost. It is further recommended that the Project purchase one set of leakage detection equipment for use during rehabilitation of existing Phase II water supplies, and for leakage detection in the Phase I towns on a rental basis (7.3, the Project).

20. The Terms of Reference and the time schedule for the remaining socio-economic baseline surveys should be refined in accordance with the objectives for the studies to ensure optimal benefit from the studies. It should be avoided to have too big a gap between the implementation of the individual studies and the start of the physical activities. The contract with the Consultant should be reviewed on the basis of the revised Terms of Reference and an assessment of the total workload stated in the Consultant's present contract (8.1, Danida, DAG and DHV).

21. A minimum set of hygiene behaviours and knowledge should be identified and defined, where appropriate, by age, sex and economic group. Simple and verifiable indicators for each group should be defined and monitoring should be tested through local government health staff and NGOs supported by PMU staff (8.2, the Project).

22. Before drafting detailed communication plans, basic but high quality communication and participatory training should be made available to all project staff (DPHE, technical and socio-economic), partners in local government institutions and NGOs. Further in-depth training related to participatory techniques, training methods and hygiene promotion, as well as field trips, would be useful for those working in software aspects. Furthermore, useful materials prepared in other programmes and by competent sector professionals in Bangladesh should be utilised to the maximum extent (8.3, the Project).

23. At the beginning of an intervention in an area, social mapping should be done of existing water supplies, including types of sources, number of user households, households and groups of people without access to safe water sources, etc (9.1, the Project).

24. The diameter of the pump chamber could be reduced to 12" and the length may also be reduced. Establishment of stand-by production wells should only take place in towns with one or two production tubewells and if this can safely be done within the drilling budget, taking into consideration the revised list of towns to be provided with piped water (9.3.1, DHV and the Project).

25. Exploratory/observation wells should preferably be drilled by local contractors unless the drilling depth is expected to exceed 320 meters. The Project should purchase simple el- and gamma-logging equipment (9.3.2, DHV and the Project).

26. Unless data from existing wells provide the necessary information regarding spatial variations in the iron content of the ground water, some exploratory wells should be drilled for this purpose. The number of observation wells for monitoring a possible up-coning of saline water should be reduced. Additional observation wells should be drilled for optimal interpretation of pumping tests. Appropriate spacing between the wells should be ensured provided land is avilable (9.3.2, DHV and the Project).

27. The Consultant should prepare a report with well documented design criteria for piped water supply in pourashavas and thana centres. The report should be scrutinised by DAG assisted by the Danish consulting company suggested in section 6.3.2 (9.4.1, DHV).

28. The existing GoB water supplies in pourashavas and thana centres should not be incorporated in the pourashava/thana operated water supplies unless a prior agreement has been made between GoB and the relevant pourashava/thana

about payment of water charges. Such agreements are urgently required as the agreements will have implications for the ongoing drilling campaign and detailed design work (9.4.2, DHV and the Project).

29. Cost consciousness should be exercised in the development of design criteria and materials standards for piped water supplies, and revised cost estimates be worked out on the basis of such criteria, on recent tenders for supply of pipes, and on the revised population projections (9.4.3, DHV).

30. Detailed design for the water supply of fringe areas of Noakhali Pourashava should be made in a cost conscious way taking into account: i) the PMU's recent fringe area study, ii) the sociological baseline study, iii) detailed site investigations, and iv) consultations with the pourashava and PMU. Un-served population shall be advised by the Project about alternative safe water supplies (9.5, DHV and the Project).

31. In order to avoid the extensive amounts of leakage and wastage experienced in the Phase I water supplies, all existing supplies should be brought to be in such a condition that the combination of leakage and wastage is less than 20% of the water production. Only then, should the detailed design of the new scheme be completed (9.6, Patuakhali Pourashava, the Project and DHV).

32. Fringe areas of Patuakhali Pourashava should be supplied with water from deep hand tube wells (9.6, Patuakhali Pourashava and the Project).

33. Careful reconsideration of the viability of piped water supplies in thana and growth centres should be made based on an updating of the existing feasibility studies including assessment of operating costs of existing GoB piped supplies and the willingness of users of the existing GoB supplies to pay water charges to the operator of the new thana centre water supplies. In this connection the appropriateness of 24-hours water supply in thana centres should be re-assessed (9.7, the Project).

34. The Consultant should make population estimates and projections for the thana centres and the two Phase I towns in Greater Noakhali District according to the same principles as used for population data for Phase II Pourashavas and thana centres (9.7, DHV).

35. The implementation in a few thana and growth centres without piped water supplies should start earlier than envisaged. The Plan of Operation should be revised accordingly, and the necessary socio-economic activities in these centres be started soonest possible. The associated project procedures and/or guidelines should be finalised without delay (9.7, the Project and the concerned union parishads).

36. The Project should on a pilot basis install a total of up to 100 deep tubewells in areas with arsenic in the shallow aquifers in order to provide water for drinking and cooking for a number of user groups, while they continue to get

water for some other purposes from shallow hand tubewells (9.8, the Project).

37. Careful reconsideration of the viability of drainage, and solid waste interventions in thana and growth centres should be made based on an updating of the existing feasibility studies (10, the Project).

38. The Project should refrain from making any drainage work in Noakhali because such work is covered by a LGED/ADB project. Drainage work outside the pourashava boundaries is considered beyond the scope of the Project and should consequently not be embarked upon (10.1, the Project).

39. A drainage scheme aiming at lowering the ground water table in the core area of the Patuakhali Pourashava should be implemented. The system should, if possible, be kept separated from the drainage of the fringe areas, so tidal irrigation water does not affect the drainage of the core area (10.1, Patuakhali Pourashava and the Project).

40. The CCU/DAG should enter into a dialogue with the Consultant and the pourashavas with the aim of introducing community involvement and privatisation of certain elements of the solid waste management. Implementation of systems with individual household dustbins and oil drum dustbins (as proposed by PMU in Patuakhali) should only be done on a pilot basis (10.2, the Project).

41. The Consultant should in consultation with CCU/DAG reconsider whether the proposed development of the dumping sites is justified taking the actual site conditions into account (10.3, DHV).

42. In connection with the detailed design of public toilets consideration should be given to the comments by the present JRT. Specifically in siting the toilets both sociological, engineering and maintenance aspects should be considered in order to ensure satisfactory functioning of the toilets. Emphasis should also be given to ensure good workmanship during construction of the toilets (11.1, DHV).

43. Community latrines should only be built in rare cases where there is absolutely no room for household latrines and only when timely pit emptying and safe sludge dumping can be ensured. If community latrines are considered, the subsidy should be such that it does not interfere with the demand for household latrines (11.2, the Project).

44. The Project should develop, in collaboration with WATSAN committees as well as implementing NGOs, step-by-step initial plans for development of household latrines (with education and mobilisation) for each sub-project. Possible elements of these plans include:

- mapping/survey and identification of target desegregated groups (poor women, out-of-school children in an area etc.) on the basis of which differentiated objectives can be set with a view to health impact;

- at the end of the intervention, survey of those not served with a view to considering some subsidy or other arrangements only for the very poorest;
- area-based programme implementation to ensure a health impact and structuring saving/credit activities among groups of poor families;
- intensive mobilisation and education with many partner groups, including a focus on hygiene behaviours;
- privatised physical implementation implying elimination of subsidies for latrines and the need to organise savings/credit/instalment payment facilities to reach poorer groups;
- gradual development of plans to reach the poorest groups;
- investigate the feasibility of two-pits or twin-pit latrines shared by 2 to 3 families (11.3, the Project).

45. The DAG should collect relevant experience concerning latrines in areas with very high water tables (both from Bangladesh and elsewhere), and applied research and small-scale trials should be carried out (11.3, DAG).

46. The Consultant should look into the feasibility of the option of using a submersible dewatering pump for emptying of septic tanks and pits and adjust the recommendations in the sanitation report accordingly. Furthermore, the operation and management of the emptying of pits shall be cost competitive, so that people are encouraged to use the service instead of dumping the sludge near the pit (11.4, DHV).

47. The Pourashavas should employ O&M key staff at the time when rehabilitation or new construction work commences. The technical personnel should then be trained on site during construction. Administrative and accounts personnel should be trained on courses with participation of the staff from several water supplies (12.4, the concerned pourashavas and the Project).

48. Piped water supplies should not be implemented in thana centres before a suitable legal institution has been established at Thana level (12.5, the Project).

49. The Project should further develop the Target and Progress Report in order to support project management in monitoring and comparing physical outputs with actual payments and link up financial data with the MIS (13.2.5, the Project).

50. Special initiatives should be taken to ensure poverty orientation. Examples of such initiatives are:
- for piped water supply: i) working towards introduction of cross-subsidy, ii) ensuring that semi-private standposts are targeted to the poor, and iii) siting public standposts off roads and in slum areas;
- for household sanitation: i) ensuring that saving/credit activities are targeted to the poor, and ii) undertaking a survey at the end of an intensive intervention to identify the needy populations who have not participated and reasons for this (14.1, the Project).

51. In continuing its efforts to involve women, special attention should continue to be given to the selection of women in WATSAN committees and sub-committees and to ensuring, as a high priority, the posts of health communicators/assistants who work with the Project in each pourashava (14.2, the Project).

52. Sensitive and participatory gender training should be carried out and include: i) distinguishing women's participation from gender concerns, and ii) identifying where the Project can fail if it does not involve women appropriately. Gender oriented planning and education should be concretised into commonly agreed activities during Phase II. This training should be mandatory for all levels of staff and management (14.2, the Project).

53. Community-based monitoring of activities should focus on specific issues such as area/site selection, applications for water points and the flow of benefits to ensure checks and balances in important Project actions (14.3, the Project).

3. SHORT DESCRIPTION OF THE PROJECT

The project area can be subdivided into:

- Patuakhali and Barguna districts, where 2 pourashavas and 8 thana centres will be covered. Since the start of the Project, the two thana centres Galachipa and Kalipara are reported to have been upgraded to pourashavas.

- Noakhali, Laksmipur and Feni districts, where 5 pourashavas, 8 thana centres and 30 growth centres will be covered.

The Project is sub-divided in two phases, each with a duration of 5 years.

With reference to DPHE, the Project will be implemented by a Central Coordination Unit (CCU) headed by a part-time DPHE Project Director and supported by a Danida Advisory Group (DAG) headed by a Chief Project Adviser. Two Project Management Units (PMU) in Patuakhali and Noakhali Pourashavas respectively will be in charge of field implementation.

The Project will provide:

- piped water supply in the core areas and hand tubewells in the fringe areas of 12 pourashavas/thana centres;

- hand tubewells in the remaining thana centres and in the growth centres;

- public toilets, communal latrines and household latrines;

- improved drainage and solid waste handling;

- socio-economic activities including community mobilisation as well as health and hygiene promotion.

Construction of piped water supplies will be the responsibility of DPHE while local government institutions, i.e. pourashavas and union parishads will be responsible for the construction of hand tubewells, toilets, drains and facilities for solid waste management. Local government institutions will be responsible for operation and maintenance of piped water supplies and drains as well as handling of solid waste. Software activities will mainly be implemented through local government institutions and NGOs.

Danida provides seven expatriate and a number of local advisers to support the project implementation. An expatriate consulting company undertakes, in collaboration with two local companies: i) socio-economic baseline surveys, ii) studies, preliminary and detailed design, and iii) supervision of drilling of production wells. A Danish drilling company will drill the production wells for the piped water schemes.

The Government of Denmark has provided a grant of Danish Kroner (DKK) 123.4 millions including a 10% contingency for the first five years of implementation.

4. STATUS OF PROJECT IMPLEMENTATION

The Plan of Operation divides the Project into a General Project and a number of Sub-Projects, one for each pourashava, thana centre or growth centre. Sub-Projects have been initiated in Noakhali and Patuakhali Pourashavas. The General Project and the Sub-Projects are still in the preparatory and design phases and thus implementation of physical works has not taken place in 1997.

A status of project implementation as per December 1997 indicates that the Project is behind implementation targets set in the General Plan of Action and the Plans of Action for the sub-projects in Noakhali and Patuakhali Pourashavas.

Brief descriptions of progress and variances on main components are given below. These are based on the status of project progress as reported by the Project and a comparison of the time schedules of the plans of action dated July 1997 and January 1998 respectively.

4.1 Preparatory Activities

Activities under this heading include among others selection of a Danish drilling contractor, recruitment of project staff, signing of agreements with Phase I towns, signing of agreements between the Project and Phase II towns, formation of (Water and Sanitation) WATSAN Committees and presentation of the Project to local authorities of the project area.

Most of the preparatory activities have been completed as scheduled. However, the agreements, comprising special preconditions, to be signed between the Project and the authorities of Noakhali and Patuakhali Pourashava have been prepared in draft and were signed on 16th April 1998 and 9th March 1998 respectively.

4.2 Implementation Activities

Project activities are sub-divided into: i) general tasks, which include general preparation activities of the sub-projects, ii) hydrological investigations and drilling work, iii) piped water supply, iv) hand tube wells, v) sanitation, vi) drainage, vii) solid waste disposal, viii) socio-economic activities, ix) institutional development, and x) human resource development.

The overall progress of the Project is largely as planned. However, a comparison between the plans of action dated respectively July 1997 and January 1998 indicates that the Project is behind planned time schedule for some activities. Variances on main components are given below.

General Tasks

Guidelines for Tendering Procedures were planned to be completed by November 1997, but have been postponed up to February 1998.

Hydrological Investigations and Drilling Work

The Project is more or less following the time schedule. However, the Drilling Contractor is 1½ month delayed in commencement of his drilling work. Siting for production tubewells has been completed in both Noakhali and Patuakhali Pourashavas, but land acquisition formalities are ongoing. The drilling work was in progress in Noakhali Pourashava during the JRT's site visit.

Piped Water Supply

Inventories of existing water supply systems in the project towns have been carried out as planned whereas the outline design of the new system in Patuakhali Pourashava, which was completed by December 1997, will be up-dated in May 1998.

Preparation of by-laws/evaluation of GoB by-laws, which was planned to be completed by the end of 1997, has been postponed by two months resulting in postponement of permission to employ staff. Finally it should be mentioned that preparation of a monitoring and evaluation manual for piped water supply has been postponed by approximately four months.

Hand Tube Wells

Water quality tests carried out in September - October 1997 induced the Project to prepare an arsenic policy and, on a pilot basis, to set up an arsenic removal unit and a laboratory in the PMU of Noakhali. During the JRT's site visit, the pilot arsenic removal unit had not yet been made operational so the monitoring had not yet started.

Sanitation

Sanitation activities include school sanitation, public toilets, community latrines and sanitary private latrines.

Evaluation of different types of private latrines was supposed to take place before September 1997, but has been postponed to February - March 1998.

In Patuakhali Pourashava public toilet activities have been delayed by approximately three months and so have community latrine activities. In Noakhali Pourashava, the picture is nearly the same.

Drainage

By and large all activities under this heading are on schedule.

Solid Waste

Solid waste management plans for Patuakhali and Noakhali Pourashavas have been developed, evaluated and approved by the local authorities. Guidelines for the solid waste management operation, including guidelines for awareness campaigns for local communities, have been finalised. Only the acquisition of a dumping site in Patuakhali, which was planned to be completed in December 1997, has been delayed by 1-2 months.

Socio-Economic Activities

The General Project has carried out most of the activities under this heading and apart from minor deviations all activities seem to be on schedule. One of the major activities of the General Project has been the development of various socio-economic guidelines. Reference is made to Annex 4.

Institutional Development

Existing organisational set-ups of participating pourashavas have been evaluated and outline design for future operation and maintenance and administration is planned to be completed by June, which is a delay compared to the original plan of operation by nearly eight months.

Human Resource Development

Two reports on organisational and human resource development, including training needs assessment and an outline training plan for existing pourashava staff, have been completed by July and September 1997.

Non-Government Organisation (NGO) selection and respective training of selected NGOs, which were assumed to be completed by November 1997, have been postponed by 4-5 months.

5. GENERAL ANALYSIS

5.1 National Policy for Drinking Water and Sanitation

A draft national policy for drinking water and sanitation was published and discussed in a workshop in December 1997. A revised draft national policy is scheduled to be prepared early 1998 for subsequent approval by the competent political authorities. The national policy is envisaged to be operationalised in a sector strategy which includes funding requirements.

The approval of a national policy is not likely to require an immediate revision of the design of the present Project. However, the draft national policy contains statements of importance for the implementation of the Project. Thus:

- The draft national policy acknowledges that past achievement in behavioral changes has been low and facilities provided are not used optimally. The need for change is, therefore recognised by the Government. This implies new institutional and financial arrangements including: i) promotion of the private sector and NGO/community based organisations, and ii) decentralisation. As the draft national policy was prepared before the text of the planned Local Government Act was known, the policy is not specific about how to decentralise.

- Mobilisation of resources from users and GoB for implementation of activities is emphasized. User contributions for hand tubewells will be doubled from year 1997 to year 2000, and subsidy on government supplied household latrines will be withdrawn "within a reasonable time".

- Urban water supply should be supplied at cost and there could be social cross subsidy to ensure a basic minimum service level to the poor. Water tariffs should cover the cost of water production, operation, maintenance, administration and depreciation for which a reasonable time frame will be adopted. In the latest version of the Policy, all reference to social cross-subsidy have been omitted.

- Pourashavas shall be empowered to set tariffs, by-laws, appointment of staff etc. in accordance with guidelines laid down by the Government.

- The policy of reducing the water losses to maximum 30% is appreciated, but in the opinion of the JRT not sufficiently ambitious. Water losses should not exceed 20%.

- Gradual contracting out of services like billing, connection, metering, maintenance and production is mentioned.

- The draft national policy does not contain any reference to thana and growth centres.

- The issues of drainage and solid waste handling are not sufficiently addressed in the draft national policy.

The JRT appreciates the efforts of the MLGRD&C to prepare the draft national policy and finds in general that the policy could be an important tool for the future development within the sector, provided there is a will among all to follow the policy.

5.2 Implementation in Noakhali and Patuakhali Pourashavas

5.2.1 Agreements between the Pourashavas and the Project

Draft "Terms of Agreement" covering project activities in Noakhali and Patuakhali Pourashavas have been formulated by the Project through a dialogue between DPHE/CCU and the DAG and consultations with the Pourashavas. Both Pourashava chairmen stated to the JRT that they are willing to sign the agreement. Apparently the agreements were held up in DPHE at the time of the mission, although the JRT was assured that DPHE had no problem in signing the agreements. The delay of signing by DPHE is causing a delayed start of physical activities in the two Pourashavas that are both eager to see progress of work.

The JRT has reservations regarding some of the paragraphs in the draft agreements. Furthermore, if the recommendations of the JRT are followed, this will have implications on the text in the agreements. The JRT's comments to the draft agreements have been handed over to CCU/DAG and are given in Annex 5.

The present JRT agrees with the recommendation of the 1997 JRT that such agreements shall not be one-sided documents only containing demands to the pourashavas, but also contain demands to the Project.

It is vital for the implementation of the Project that agreements have been signed, clearly specifying the obligations of the different parties before the implementation is started. The JRT, therefore recommends as follows:

> *The draft agreements for Noakhali and Patuakhali Pourashavas should be adjusted in light of the JRT's suggestions and be signed without delay. Tendering for physical implementation should not take place before the agreements are signed.*

Subsequently the agreement with Patualhali pourashava was signed on 7th March, 1998 and the agreement with Noakhali Pourashava on 16th April, 1998. Most of the recommended changes have been incorporated in the two agreements.

5.2.2 By-laws

Employment of permanent staff by the pourashavas is governed by the staff positions in the approved organogrammes for various grades of pourashavas. Even for staff positions in the organogrammes, employment of permanent staff needs the approval of the MLGRD&C in each case. Employment of staff not covered by the organogrammes can only be done on a daily paid basis and for short periods only. These rules have severe consequences for the operation and maintenance of piped water supplies with 24 hours supply and water treatment plant, as planned by the Project, because the staff positions in the existing organogrammes only are sufficient for the operation of small water supply systems without water treatment plants and with a few hours operation per day (see also Chapter 7 on Phase I activities). Furthermore, the existing organogrammes do not contain sufficient administrative and account staff for billing and collection of water charges and for operating independent water and sanitation accounts as desired by the Project. Proposed new by-laws for water and sanitation covering the two Phase I Pourashavas were submitted for approval by the MLGRD&C about 1½ year ago, but are still not approved. Without the approval of the by-laws with staff positions suitable for operation of 24-hours water supply, and the proper introduction of the by-laws in the pourashavas, the sustainability of such water supplies is questionable. The Project should thus not ask for tenders until reasonable assurance is obtained that a suitable framework of by-laws, rules and regulations will be approved before the expiration of tender validity. The JRT, therefore recommends as follows:

> *No contracts should be signed for piped water supplies before a suitable framework of by-laws, rules and regulations is approved for the involved urban authorities.*

5.2.3 Land Acquisition

Due to the high population density in most towns in Bangladesh, land acquisition is often a genuine problem. Furthermore, the problem may be aggravated by political disputes about the use of the limited public land available. Part of the public land belongs to Government institutions, and transfer of such land to a pourashava owned water supply apparently requires long administrative procedures. Privately owned land in pourashavas is quite costly, not the least when a foreign donor shall pay for the land. So far written agreements for the acquisition of land for the drilling only exist in the case of Noakhali Pourashava.

According to DPHE, the budgets in the Project Document and the Project Proforma are insufficient to cover purchase of private land. Furthermore, there is no budget for land acquisition during 1997/98, and there is no budget-line for payment of compensation for lost crops in connection with the drilling operation. Funds for land acquisition and compensation for crops are to be included in the ADP 1998-99.

The Danida advisers have spent considerable time on attempts to solve land acquisition problems. The JRT is convinced that a more active role of the Project Managers could have expedited the matter. If lack of land prevents the drilling contractor from drilling,

the contract entitles him to request compensation for waiting time. This compensation will have to be paid from the Danida allocation to the Project. As a consequence, some of the planned physical activities may have to be cancelled.

The JRT recommends as follows:

> *DPHE should take the necessary action to ensure that access to land for drilling and construction activities is ensured in time for implementation of physical activities.*

5.3 Implementation in Thana and Growth Centres

Project implementation in Thana and Growth Centres will, according to Project Proforma, be in co-operation with Union WATSAN Committees who will be involved in installation of hand tubewells, construction of domestic sanitary latrines, drainage and solid waste disposal while DPHE will implement all works related to piped water supply.

After completion of the Project, local government authorities will however, be responsible for operation and maintenance (O&M) of the services provided to the community. At Thana Centre level this includes O&M of piped water supply schemes, which will be the responsibility of the Union WATSAN Committees assisted by the DPHE Thana Engineer, who will provide technical assistance to the Committee.

5.3.1 Capacity of Local Government Institutions

The existing local government system in Bangladesh is weak in regard to financial, managerial and human resources. Constant changes in its form and functions by different governments have contributed to the destabilisation of the system. By way of example the government in 1982 introduced elected bodies at Upazila (Thana) level, which again were abolished in 1991. At present only the Union Parishad is an elected government body and irrespective of size, all union parishads have the same number of personnel, comprising a secretary and a few village policemen.

If the local government system in the future is to play an effective and permanent role with regard to O&M of the services provided to the community, including the O&M of piped water supply, it is necessary that it receives adequate financial, managerial and human resources to perform its functions.

5.3.2 Local Government Act

In order to strengthen local government, a Local Reform Commission has been set up to prepare a new local government act. The report of the Commission, which came in July 1997, proposes that the future structure of local government should consist of autonomous bodies operating at District, Thana and Union levels.

According to a summary of the report in English, local government institutions will be responsible for law and order, administration and public welfare, planning and implementation of development activities and provision of public services. It is therefore assumed that the coming local government institutions at thana level, when established, will take over the responsibility for O&M of services provided to the community, including O&M of piped water supply from the existing Union WATSAN Committees.

The local government act is, according to MLGRD&C, assumed to be passed by the Parliament before July 1998. It is however at present unclear to the Ministry what effect the implementation of the local government act will have on the Project.

The JRT recommends:

> *Large scale interventions in thana and growth centres should not commence before the Local Government Act has been passed.*

5.4 The Linkage Between the Project and the Planned Danida Sector Programme Support

A Danida mission has prepared a draft Sector Programme Support Document (SPSD) dated June 1997. The SPSD contains analysis of the water supply and sanitation sector in relation to Danida activities. Furthermore, the SPSD proposes objectives for Danida's sector support and identify five specific programme support components, among others the Coastal Area Urban Water Supply and Sanitation Component.

It is stated in the SPSD that "the urban project strategy needs to be reconsidered for the urban project to be a component in the Danida supported sector programme. The aim of the first annual joint review of the urban project will among others be to recommend adjustments transforming the present urban project into a genuine component in the Danida Sector Programme Support".

The above adjustment of the Project has to be done in the light of: i) the National Policy for Drinking Water and Sanitation, ii) the Local Government Act, and iii) the continued discussions between GoB and Danida about the draft SPSD. As none of the above documents at present can provide the necessary basis for such adjustments, the JRT decided to postpone the reconsideration of the strategy for the Project. Reference is made to the following section 5.5.

5.5 Need for Revision of Project Proforma and Project Document

Need for Revision of Project Proforma

The Royal Danish Embassy commented in four letters during the period July to September 1996 on the draft Project Concept Paper. The Embassy was assured that the comments would be taken into account during the preparation of the subsequent Project Proforma (PP).

The Embassy received on 23rd February 1997 a copy of the draft PP and provided its comments in a letter dated 3rd March 1997. The comments highlight discrepancies between the PP and the Project Document with regards to: i) implementation matrix, ii) budget, iii) distribution of vehicles, iv) GoB personnel for operation of the Project, and v) structure of the Steering Committee. Furthermore, the Embassy stated in its letter that the Project Document attached to the PP is a draft version and not the one signed by the two Governments on 22nd December 1996.

The above comments from the Embassy were not incorporated in the final version of the PP. The Embassy has subsequently requested for a revision of the PP incorporating the Embassy's comments in the PP. In conformity with the decision made at the first Steering Committee meeting held on 11th November 1997, the JRT recommends as follows:

> *The first revision of the PP should be done before June 1998 in order to bring the PP in line with the Project Document.*

Need for Revision of Project Document

There is a need to revise the Project Document. Among the reasons for this can be mentioned:

- The approval of a National Policy for Drinking Water and Sanitation will have implications for the implementation of the Project. Reference is made to section 5.1.

- The planned Local Government Act will have wide implications for the implementation of the Project as well as its operation and maintenance strategies. Reference is made to section 5.3.1.

- The approval of Danida's draft Sector Programme Support Document dated June 1997 will have implications for the implementation of the Project. Reference is made to section 5.4.

- The coordination of the Danida supported urban and rural projects will require adjustments of the present organisational set-up.

- There seems to be a 150% increase in the budget for piped water supplies as compared to the budget in the Project Document. Reference is made to section 9.4.3.

- The occurrence of arsenic in the shallow aquifer necessitates changes in the project strategy and budget. Thus, the planned shallow tubewells may have to be substituted by deep tubewells, which cost 10 times more. Furthermore, some of the existing shallow tubewells may have to be replaced by deep tubewells. Reference is made to section 9.8.

- GoB does not contribute directly to hardware installation which is contradictory to: i) the national policy stated in section 5.1, ii) Danida's current policy as expressed in the draft Sector Programme Support Document dated June 1997, iii) the GoB contribution to other urban projects funded by grants, and iv) the GoB contribution to hand tubewells in the DPHE/UNICEF national rural water supply and sanitation programme. Consequently the GoB contribution should be increased.

- The JRT questions the feasibility of some of the proposed piped water and drainage systems. Consequently the previously undertaken feasibility studies should be updated and the list of proposed schemes should be revised accordingly. Reference is made to section 9.7.

- The latrine production and subsidy strategy is not in accordance with Danida's current policy as expressed in the draft Sector Programme Support Document. Reference is made to section 11.3.

The detailed information required for a revision of the Project Document is not yet available. Thus: i) the national policy for drinking water and sanitation, the Local Government Act and the Danida Sector Programme Support Document have not been finalised, and ii) it is not possible at present to prepare a revised and reliable budget, in particular for the water supply component. The JRT, therefore recommends as follows:

> *The Project Document should be revised at latest in connection with the 1999 joint review taking into account: i) the forthcoming Local Government Act, ii) the National Policy for Drinking Water and Sanitation, iii) the Danida Sector Programme Support Document, iv) the planned Danida-assisted rural water supply and sanitation project, v) revised feasibility studies and budgets prepared by the Project, and vi) the findings of the present review.*

6. PROJECT ORGANISATION AND MANAGEMENT

This chapter describes the implementing organisation and the main actors of the Project.

6.1 Project Management Structure

6.1.1 General

The Local Government Division of Ministry of Local Government, Rural Development and Co-operatives (MLGRD&C) holds the overall responsibility for project implementation with the Department of Public Health Engineering (DPHE) as Executing Agency.

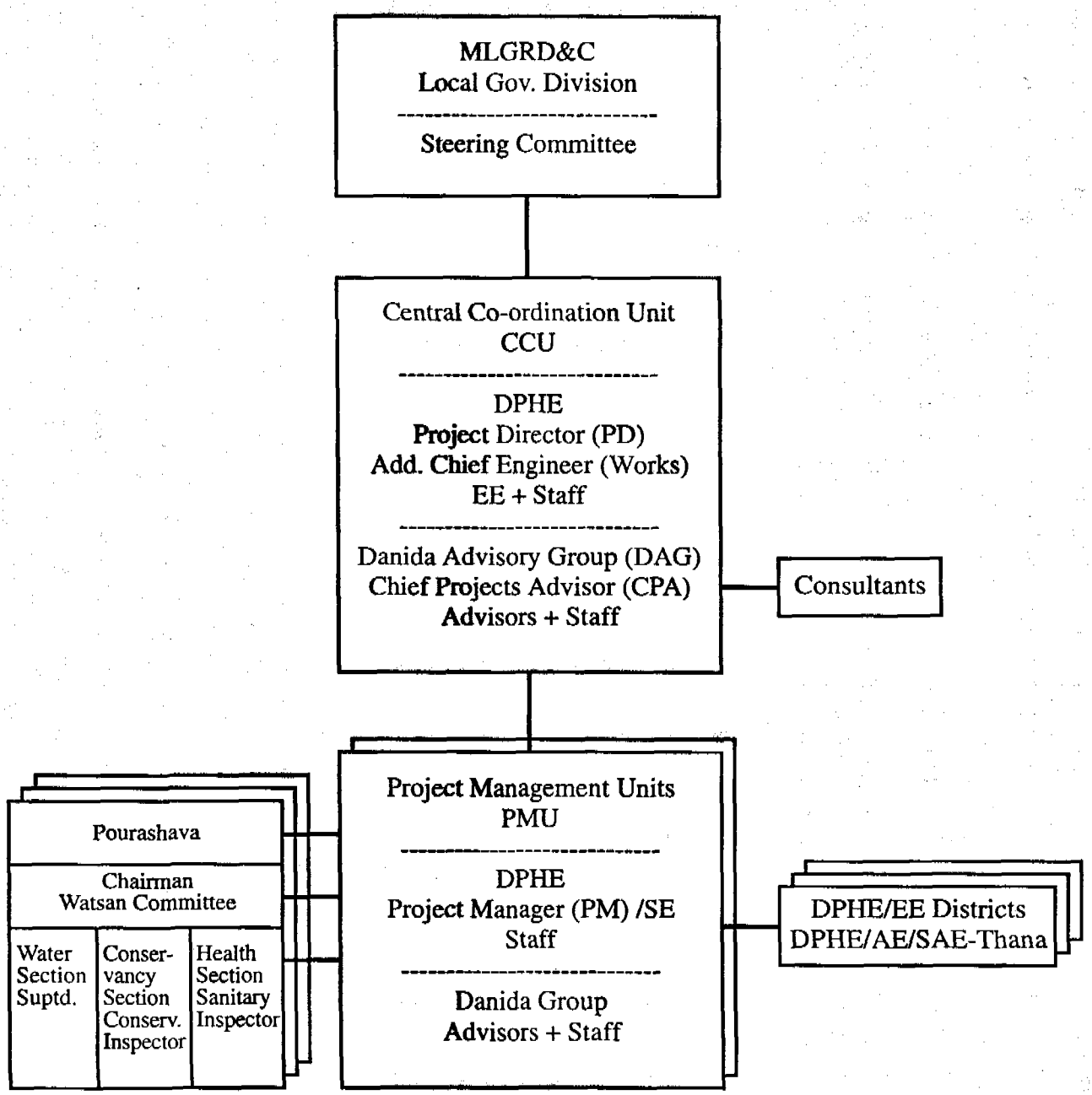
The Project Management Structure consists of a DPHE based Central Co-ordination Unit (CCU) headed by a part-time Project Director who, under the guidance of a Steering Committee and with the assistance of a Danida Advisory Group (DAG), is in charge of the co-ordination and overall management of the Project. In addition, two Project Management Units (PMU) are established, one in Patuakhali and another in Noakhali. A Project Manager who is a DPHE officer heads each PMU. The PMUs are also supported by Danida employed expatriate and local advisers as well as support staff.

The institutional framework of the Project in the Project Proforma (PP) differs slightly from the one in the Project Document, as the PP does not consider DAG a part of CCU. However, according to the Plan of Operation dated July 1997, the Project is, after consultations with DPHE and the Royal Danish Embassy, organised in accordance with the figure below, which is identical with the management structure indicated in the Project Document.

According to the Plan of Operation the organisational set-up in Thana Centres and Growth Centres will be outlined based on the Local Government Act, which is assumed to be passed by the Parliament in April 1998, whereas the PP states that 'Thana Unnayan Committees'[1] will assist project implementation in Thana Centres which are not Pourashavas.

[1] Thana Development Co-ordination Committees

Figure 1. Project Management Structure for Sub-Projects in Pourashavas



6.1.2 The Steering Committee

The number of members of the Steering Committee indicated in the Project Document differ from the number mentioned in the PP and so does the composition of the committee. Whereas the Project Document suggests a committee of five members including the concerned Counsellor of the Royal Danish Embassy and the Chief Project Advisor, the PP operates with a seven member committee without Danish representation, but states that 'Representative from Donor Agency will be specially invited to attend the meetings'[2]. The Plan of Operation however, operates with a steering committee of ten members, who include the concerned Counsellor of the Royal Danish Embassy, the Chief Project Adviser and the WID Focal Point of the Local Government Division (LGD) of MLGRD&C.

The main obligations of the Steering Committee are to monitor the Project and ensure that it is implemented according to agreed time schedules and budgets and to take proper action in case gross negligence of the Bangladeshi or Danish personnel threatens the fulfilment of the Project. Neither the Project Document nor the PP states how often the Committee should meet, but according to the Project Director, Steering Committee meetings will in future be held at least quarterly. It should be noted that the name of the committee has been changed to The Inter-ministerial Project Implementation and Co-ordination Committee.

The first meeting of the Steering Committee was held on 11 November 1997 with the Secretary of MLGRD&C in the chair. The main points of the agenda were project progress, which was discussed on the basis of the semi-annual Progress Report No. 1 of the Project, and the status of the by-laws for Laksmipur and Chaumohani Pourashavas. The concerned Counsellor of the Embassy as well as the Chief Project Adviser attended the meeting.

The JRT considers the Steering Committee of importance and finds that the broader composition of the Committee with representatives from among others the Planning Commission, the External Resources Division and the Finance Division may strengthen its role as a decision making body. Also, the JRT finds it essential that the Chief Project Adviser and the concerned Counsellor of the Royal Danish Embassy attend the meetings as members of the Committee and that the Project Proforma is brought in line with the Project Document on that issue as soon as possible. According to the minutes of the first meeting of the Inter-ministerial Project Implementation and Co-ordination Committee, it was decided that a revision of the Project Proforma should take place in June 1998. Reference is made to section 5.5.1.

[2] Project Proforma dated February 1997, Appendix - G

6.2 MLGRD&C and DPHE

6.2.1 MLGRD&C

The role of the MLGRD&C in the implementation of the Project is limited to such issues as approval of the PP, enforcement of drinking water and sanitation policies and strategies, approval of full time positions in the Pourashavas, approval of Plans of Operation, Plans of Action, the Annual Development Plans and chairing of the Inter-ministerial Project Implementation and Co-ordination Committee.

Although MLGRD&C does not exercise direct line authority over the Pourashavas, the Ministry is consulted in all vital matters of the Pourashavas. By way of example, the Ministry was consulted with regard to the formulation of the agreements to be made between the Project and the Pourashavas in Noakhali and Patuakhali and the approval of by-laws and additional staff for the piped water supply in Laksmipur and Chaumohani. This caused some delay in the process and in spite of the fact that the Steering Committee in its meeting on 11 November decided that the agreements between the Project and the Pourashavas in Noakhali and Patuakhali should be signed on the first Sunday in December, 1997[3], the agreements have not yet been signed.

At the same meeting the Committee decided that the water and sanitation staff of Laksmipur and Chaumohani should be paid their salaries, which have not been paid since June 1997 due to lack of approved by-laws. Besides, the Chairman of the Committee requested the process of approval of the by-laws to be followed up in order to avoid further delay. The JRT does however, note that neither has the concerned staff been paid nor have the by-laws been approved.

6.2.2 Central Co-ordination Unit

As executing agency DPHE is responsible for provision and implementation of GoB input and for the involvement of local government institutions in the implementation and the operation and maintenance of the Project.

The DPHE based Central Co-ordination Unit (CCU) headed by a Project Director with the status of Additional Chief Engineer (Works) is responsible for the overall management of the Project. CCU is only staffed with one Executive Engineer, one Assistant Engineer plus five supporting staff. The Additional Chief Engineer acts as Project Director in addition to his normal duties.

The main obligations of the CCU are to ensure proper planning and co-ordination of all project activities, to monitor progress and ensure that overall goals and objectives are achieved. Furthermore, CCU shall ensure that qualified staff to be provided by DPHE is designated according to plans and schedules and that funds are available to pay the

[3] Minutes of the Inter-ministerial Project Implementation and Co-ordination Committee meeting for DPHE-DANIDA Urban Water and Sanitation Project in 5 Coastal Districts, dated 26.11.97

salaries of the staff. CCU forwards progress reports, including financial statements and up-dated work plans to the Chief Engineer of DPHE on regular basis.

Traditionally DPHE has planning, design and implementation of water supply schemes as its main objective and output. The staffing of CCU underscores that engineering – or hardware – issues constitute the strength of the organisation while capacity on community participation issues is lacking. However, the DAG attached to the CCU provides that capacity and the CCU is supposed to draw upon technical assistance from DAG.

The CCU organisational set-up with a part time Project Director is to some extent a constraint to project implementation as approvals of routine work may be delayed, which has been the case with regard to development and approval of project guidelines.

6.2.3 Project Management Unit

The Project is at field level managed by two full-time Project Managers (PM) who each is in charge of a Project Management Unit: one covering Noakhali, Feni and Laksmipur Districts and one covering Patuakhali and Barguna Districts. The PM is a DPHE officer with the rank of Superintending Engineer. The PM is responsible to the Project Director.

The main responsibilities of the PMUs are: i) development of detailed design of sub-projects including implementation plans and budgets, and ii) in collaboration with relevant local government authorities to establish plans of actions, budgets and implementation schedules for each sub-project. PMUs also call for and evaluate tenders, arrange quality control for all deliveries and arrange supervision of larger works.

According to the PP, the PMUs should be staffed with ten Assistant Engineers in Noakhali and nine in Patuakhali, one estimator and four supporting staff. In addition to this, Danida advisers are attached to the PMUs. In Noakhali this group consists of two expatriate advisers (one socio-economist and one engineer), one local engineering adviser, one resident engineer, two local socio-economists, one accounts and administrative officer, two local field co-ordinators and six supporting staff. The staffing of Patuakhali PMU is the same with regard to expatriate and local advisers, but no field co-ordinators are attached to this office and the supporting staff counts only four. Additional staff (field coordinators etc.) in Patuakhali PMU will be employed when required. The expatriate advisors report directly to the Chief Project Adviser while locally employed Danida staff reports to the expatriate advisers.

The DPHE staffing of the PMU offices has been very scarce from the start of the Project. The PMs have only been in office occasionally. The day before the JRT visited the PMUs, four Assistant Engineers reported to each PMU. No guarantee was given that they would remain there after the departure of the JRT. The result of this has been that Danida employed project staff has performed all duties of the PMUs.

The JRT recognises that the PMUs does not need all the professional staff, stated in the PP, at the early stage of the Project where no physical implementation is taking place. It

is however the opinion of the JRT that DPHE employed personnel should play a much more active role in project preparation.

The JRT recommends as follows:

> *DPHE should play a more active role in project implementation in the future. The PMs should be present in the PMUs at least 80 - 85% of their time and actively take part in project planning, implementation and monitoring and co-ordination. Until the physical implementation gets momentum, at least four Assistant Engineers should be attached to each PMU. This number should gradually be increased as the implementation activities increase.*

The Danida advisers are responsible for assisting the PM in the administrative and financial management of the Project and for the software activities. The group is expected to promote an efficient co-operation between all groups involved in the Project and to achieve general acceptance of the integrated project concept from all groups involved.

The staff members have their own job descriptions indicating that the main duties of the group of engineers are to assist the PM in all activities related to proper planning, monitoring and implementation of all sub-projects in the project area including the evaluation and negotiation of tenders and the establishment of annual plans of action for all sub-projects.

The expatriate socio-economist is according to the job description responsible for the work of a Communication and Action Research Unit (CARU). The unit is not mentioned in the Project Document but is known from the institutional set-up of Phase I of the Project. The main duties of CARU are data collection and monitoring of the impact of the Project and to ensure that health education, training and other software activities are implemented in accordance with Project policies and procedures as defined by DAG. CARU maintains close collaboration with relevant pourashava staff and the participating local NGOs.

Comprehensive job descriptions exist for all Danida advisers which should ensure the division of responsibilities between DAG and PMU staff. Discussions with project staff gave however, the JRT the impression that the division of responsibilities to some extent is unclear resulting in insufficient flexibility in programming.

In the opinion of the JRT, the main obligation of the DAG personnel should be to monitor and co-ordinate overall project implementation, facilitate the field personnel in development of plans based on field experience and co-ordinate the implementation in common guidelines for the Project. Besides, DAG personnel should provide experience from sources outside the project area to enhance the capacity of PMU staff.

The PMU personnel should devote its time to facilitate local government and other partners in management and implementation of sub-project activities and to assist and support the PM in the implementation and monitoring of the Project in accordance with project policies.

It appears that the job descriptions of the Danida employed staff are organisational set-up of the Project. Whereas the Project Document at field level is headed by the DPHE employed Project Manager, th the Chief Project Adviser states that 'the two Danida engineers in c Management Units in Patuakhali and Noakhali report directly to the Adviser'. The job description of the engineers supports this stateme of the engineers is to direct the PMU staff and supervise local and in co-operation with the PM.

The inconsistency between the job descriptions and the Project Document with regard to authority may cause confusion. Revised job descriptions should be prepared in connection with recruitment of new expatriate advisers to be advertised mid-1998 for appointment in 1999.

During implementation of sub-projects the PMU will monitor progress, execute cost control and control all individual financial transactions by managing cash flow. The PMU will ensure that sub-projects not complying with plans and budget are discontinued. Thus, the PM is financially responsible for utilisation of Reimbursable Project Aid (RPA). However, due to the traditional financial management set-up within DPHE, all payments at district level must be executed by the District Executive Engineer for which reason the PM must direct all payments through his office. This may cause delays or even misunderstandings with regard to payments.

For overcoming this potential constraint it could be considered whether the Project at field level should be managed by the normal territorial set-up of DPHE. The JRT however, finds this organisational set-up inappropriate taking the volume of the Project into consideration. Thus, in order to avoid any misunderstandings with regard to payments, the PMUs should pay close attention to the existing procedures.

6.2.4 Local Government Authorities

Local Government authorities like pourashavas and union parishads are representatives of the beneficiaries of the Project. They are also responsible for operation and maintenance (O&M) when the Project is terminated.

At Pourashava level an institutional framework for O&M already exists whereas at thana and growth centre level the O&M, according to the Project Proforma, should become the responsibility of a Union WATSAN Committee with the DPHE Thana Engineer as the technical capacity.

The existing institutional framework in the Pourashavas needs to be strengthened in order to effectively and efficiently provide and maintain piped water supply schemes and sanitation services. This in turn requires a framework of by-laws, rules and regulations coherence to staffing numbers and qualifications. Also the Pourashavas should be in a position to generate sufficient revenue to meet all operational costs. This requires good realistic planning (taking into account the willingness of consumers to pay) and a well functioning accounting and financial management system including bill collection.

PMUs should assist the Pourashavas in development of piped water supply schemes and train necessary staff for operation and maintenance of the schemes.

With regard to thana centres the JRT finds the organisational set-up so weak that implementation of piped water supply schemes should be avoided until the new local government act has been implemented.

6.3 Danida Advisory Group

6.3.1 Mandate of DAG

The DAG mandate to manage the Consultant (DHV, Aqua and Devcon) is not clear, and the JRT did not come across guidelines from Danida specifying this. In the contract with the Consultant (Appendix A: Scope of Services/TOR, page 3) it is only stated: "The Consultant refers to Danida Advisory Group in the implementation of his services". The following can exemplify the issue:

- In the minute from a meeting between DAG and the Consultant on 20th January 1997, it is stated that all reporting by DHV-Dhaka is to be done to the Chief Project Adviser. It appears from subsequent minutes of meetings that DAG has accepted and/or commented upon proposals brought forward by the Consultant or on the Consultant's reports. To what extent shall DAG assess the Consultants' activities and reports, and does DAG have the necessary professional capacity to do this? If DAG shall not assess the Consultant's activities who shall then do it?

- According to the Consultant's 3rd progress report, DAG has decided that the Consultant shall prepare solid waste management plans for Noakhali and Patuakhali Pourashavas, supplemented with guidelines for a planning approach for future use by DAG in the rest of the towns. This represents a considerable reduction/change of the outputs specified in the Consultant's contract. As stated in Annex 10, DAG confirms that, except for the number of baseline surveys, adjustments of schedules and outputs have been proposed and agreed by DAG. Does DAG have the mandate to approve this without written accept by Danida or the Royal Danish Embassy? Does DAG/PMUs have time and professional capacity to prepare the remaining solid waste management plans, taking into account that they in the future also will be responsible for the Danida supported coastal area rural water supply and sanitation project?

- According to the Consultant's 3rd progress report, DAG and the Consultant have agreed that the Consultant would provide training of staff in Patuakhali only. As this represents a reduction/change of the outputs specified in the Consultant's contract, it raises the same concerns as stated above. DAG states that it has been discussed between DAG and DHV that the Consultant in addition could prepare general training materials for later use by DAG.

- According to the Consultant's 4th progress report, DAG and the Consultant have agreed to reduce the extent of the socio-economic baseline surveys specified in the Consultant's contract. Furthermore, it is stated in the 4th progress report that this decision leaves nine of the 23 project towns unstudied. In six of the towns to be studied, simplified survey methods will be used in stead of the full surveys stated in the contract. As this represents a reduction/change of the outputs specified in the Consultant's contract, it raises the same concerns as stated above. The JRT understands from DAG that the issues raised in this paragraph have been discussed and dealth with by DAG and the Consultant.

- According to the minutes from a meeting between DAG and the Consultant on 19th October 1997, DAG has requested the Consultant to prepare an outline design and cost estimate of piped water supply in the fringe areas of Noakhali. It is stated that the Consultant should keep a record of time and resources spent for this additional work for later settlement or adjustment. Does DAG have the mandate to do this?

- As stated in section 8.1, the Consultant's Terms of Reference for the socio-economic baseline surveys are not appropriate and should be adjusted. In case such an adjustment neither will have budgetary implications nor reduce the total volume of the Consultant's output, can DAG and the Consultant agree on adjustment of the Terms of Reference without prior approval by Danida or the Royal Danish Embassy?

It should be stressed that the JRT does not necessarily disagree in the above decisions taken by DAG, but the examples underline a need for clarification of DAG's mandate. The JRT, therefore recommends as follows:

> *Danida should urgently clarify DAG's mandate to manage the Consultant including the mandate to revise its Terms of Reference.*

The contracts with the Consultant and the Drilling Contractor do not contain a budgetline for contingencies to be administered by DAG.

The JRT, therefore recommends as follows:

> *Danida should consider that a contingency of 5% of the sums given in the contracts with the Consultant and the Drilling Contractor should be administered by DAG, but the approval of the Royal Danish Embassy should be sought in each case.*

6.3.2 Need for Strengthening of DAG

DAG and the PMUs have been staffed with individually recruited advisers who all may be competent professionally, but who together do not necessarily cover all the different aspects of project implementation. Furthermore, the advisers may neither have sufficient

interaction with similar projects nor have contacts to colleagues who have faced similar problems. The DAG may also have a need for assistance to comment upon DHV's reports as well as the Project's own work plans, manuals, guidelines and reports.

Whenever, a consulting company is involved in a Danida supported project, the company is responsible for the quality of the work of its staff and a formalised quality assurance (QA) system is a standard Danida requirement. Such QA is carried out by professionals who at least have the same relevant qualifications as those implementing the project and who are not directly involved in project implementation. The QA includes systematic commenting on key manuals, technical reports, planning schedules and progress reports. The QA is partly carried out at the consulting company's head office and partly in connection with QA missions. Such missions will typically take place once a year and be carried out by 2 - 3 professionals. QA systems are not automatically established in connection with projects implemented through Danida advisers. It is the firm opinion of the JRT, that quality assurance is at least as necessary in connection with projects implemented through Danida advisers as in connection with projects implemented through consulting companies.

In the opinion of the JRT, the DAG/PMUs and the Project will greatly benefit from a professional back-up and quality assurance system. Such a system should, however be flexible and neither result in further administrative delays nor detract the attention from the fact that the Project Management has the final authority to make decisions. The JRT, therefore recommends as follows:

> *DAG and Danida should as soon as possible recruit a Danish consulting company under a framework contact to provide back-up and quality assurance for DAG and the PMUs on a short term basis.*

The Danish consulting company should be employed in accordance with the provision for such services in Annex A.6.1 in the Project Document.

The support should include a senior socio-economist and a senior piped water supply engineer and/or a hydrogeologist who will provide each a maximum of two man-months input per year including one or two journeys to Bangladesh per year. In order to ensure that the support to the greatest possible extent conforms with the needs of the Project, it is suggested that DAG, in collaboration with PMUs, prepare draft Terms of Reference for this support.

6.3.3 The PMUs and the NGOs

The PMUs have limited manpower and have a mandate for capacity building. The PMUs will not be involved in direct implementation but will facilitate and monitor the work of groups such as staff of the local government health units, NGOs and CBOs. Such facilitation could include: i) organising training programmes, ii) review meetings, and iii) joint planning and monitoring of the progress of the field work. NGOs will be the key implementing agencies for software aspects. The JRT, therefore recommends as follows:

To develop their own capacity for monitoring and supervision, the Project staff should undertake a limited number of small-scale direct implementation pilot activities and should seek advice about the most suitable ways of drafting contracts with NGOs. These should be determined locally, but in consultation with DAG.

6.4 Role of Consultants

General

In general the work of the Consultant seems to be satisfactory. This particularly applies to the sanitation, solid waste management and drainage work. The collaboration between DAG and the Consultant seems to be good, although the Consultant asked for critical responses from the DAG. During the initial stages of the Consultant's field work, the PMUs did not feel sufficiently involved in and informed about the Consultant's field activities, including the contact with Pourashava chairmen and staff. However, this seems to be a teething problem which have been solved by now.

Consultant's Outputs

As stated in section 6.3.1, the Consultant and DAG have discussed to reduce/change the outputs specified in the contract, such as reducing the number of full socio-economic baseline surveys, the number of solid waste management plans and the extent of training provided to Pourashava staff. With regard to the socio-economic surveys, the Consultant and DAG have apparently agreed upon a solution after the review.

The Consultant has prepared a proposal for revisions in the contract on the request of DAG due to inconsistencies in the project design and in the revised workplans. To illustrate this, the Consultant's contract states that the detailed design of piped water supply systems will take place during the period 1998 to 2001 while the detailed design of drainage systems will take place during 1998 and 1999. According to the Project Plan of Operation, the construction of piped water supplies and drainage systems in the last five towns will take place during 2002 (2 towns) and 2003 (3 towns). Consequently, there will be a gap in these towns between the detailed design and the start of construction. This is not an ideal situation as the start of the field investigations, necessary for the detailed design, will create expectations among the population, which then cannot be met within a reasonably short time. However, the JRT is not convinced that the problems are so big that it will require a substantial rescheduling of the Consultant's inputs, which DHV has assessed to require an additional consultancy fee of DKK 4.2 millions.

The Consultant has proposed an increase in the consultancy budget for socio-economic surveys by DKK 0.9 millions. The justification for this is not obvious to the JRT. Reference is made to section 8.1.

Though DAG apparently has approved a reduction/change of the Consultant's output in relation to solid waste disposal and training, a corresponding reduction/change of the Consultant's fee has not been discussed.

DHV has replaced the original drilling supervisor with a hydrogeologist with little practical experience in drilling supervision. This replacement was done with short notice and just before the drilling should start, which made it difficult for Danida to reject the proposed substitute. The DAG expressed reservations regarding this replacement.

The contract with the Consultant states that the Consultant will mainly supervise and guide the drilling contractor in the proper implementation of the drilling programme. DHV has later stated that they do not have the responsibility to function as "the Engineer". If the Consultant should assume such a responsibility, the Consultant claimed it was necessary to provide a senior hydrogeologist at a much higher rate. It should be admitted that the Consultant's TOR were not crystalclear, as they did not state explicitely that the Consultant was supposed to be "the Engineer".

When Danish consulting companies have been involved in drilling campaigns, they have always accepted that their hydrogeologists function as both "Supervisor" and "Engineer". If DHV is correct in their interpretation of the contract, it should in future contracts be clearly stated that the consulting companies have the full responsibility for the duties of the Supervisor and the Engineer. If DHV is not correct in their interpretation of the contract, this matter should be discussed with DHV.

For the above reasons, the JRT recommends as follows:

> *Danida should clarify the contract with the Consultant based on an assessment of the magnitude of the Consultant's contractual obligations and the outputs stated in their present contract. Danida should re-assess the Consultant's responsibility in drilling supervision. The detailed design of the piped water supplies and other engineering services should not require an increase of the consultancy budget.*

The DAG Chief Project Adviser and the DHV Project Manager in Dhaka should preferably be involved in the above discussions.

Quality Assurance

In the contract with the Consultant, it is stated that a Quality Assurance (QA) Manager is based in DHV's Head Office. According to the contract he has the obligation to: i) prepare a QA plan, and ii) identify quality problems and to develop, initiate and propose solutions for these problems. He is also authorised to take corrective action when he deems this necessary. The QA Manager would prepare the QA plan within three months and hold reviews two months thereafter and again at the end of the first year.

The QA plan has been prepared by the QA Manager and forwarded to DAG for comments. Apparently, DAG never commented upon the plan. Apart from the

preparation of this QA plan, the JRT found no visible signs of the QA Manager's activities. The stated reviews have apparently not been carried out.

According to the Consultant's contract, the Project Coordinator from another DHV project would visit the present Project and undertake quality audits every three months using the guidelines provided by the QA Manager. These quality audits have never taken place.

Reports have not been quality assured by professionals at the Consultant's head office, which is a normal Danida requirement.

The JRT finds it highly critical that DHV has not performed the quality assurance as stated in the contract. As a result, the problems with the socio-economic baseline studies and the questionable quality of the piped water supply outline design report were not detected by DHV. Reference is made to sections 8.1 and 9.4.1.

In order to ensure that the quality assurance is carried out in a satisfactory manner and at least in accordance with the Consultant's contract, the JRT recommends as follows:

> *DHV should without delay explain to Danida how the quality assurance system stipulated in the contract will be implemented. Among others it should be stated how the quality of the Consultant's draft reports will be assured.*

6.5 Role of Local Government Institutions

The pourashavas and union parishads in case of thana and growth centres play a very important role in the implementation of the Project. After completion of individual sub-projects they will be the owners of the assets created by the Project. During implementation the pourashavas and thanas/union parishads are supported by the implementing agency, DPHE, but after completion the full responsibility of operation and maintenance rests with the pourashavas and union parishads. The JRT finds that the important role of the pourashavas (there is so far no implementation activities in thana and growth centres) is inadequately reflected in the plan of action for sub-projects: The responsibilities of the Steering Committee, the CCU, the DAG and the PMU are outlined in detail in chapter 9 of the plans of action, but the only responsibility of the pourashavas mentioned is the establishment of a WATSAN committee. Though the pourashavas are mentioned in the activity/time schedules, it is felt that the important role of the pourashavas is somehow forgotten in the rest of the plans of action. This could be caused by the extensive elaboration of the responsibilities of actors in Dhaka, who have little direct influence on implementation in the pourashavas. It should therefore be considered whether the contents of the Plans of Action for Sub-Projects should be changed to better reflect the duties of the three partners in implementation, the local government institutions, DPHE and PMU.

6.6 Preparation of Project Guidelines and Procedures

6.6.1 General

DAG has prepared a number of draft guidelines for subjects such as: i) selection of NGOs, ii) implementation of hand tubewell activities, iii) arsenic issues, iv) tendering, v) contract management and supervision, and vi) implementation of household sanitary latrines. With reference to the preparation of guidelines, reference is made to Annex 4.

A considerable number of the guidelines have been prepared. In several cases the guidelines have neither been discussed with the CCU/Project Director nor with the PMUs.

It appears that the procedures for development of guidelines are very time consuming and to some extent bureaucratic. Although a participatory approach has been attempted, the activity tends to be a top-down exercise.

The quality of the guidelines varies from guideline to guideline. Some are quite elaborate, such as the guideline for tendering, and have obviously been considered thoroughly, while others need further elaboration.

Another problem is that there is no distinction between guidelines and procedures. Some are genuine guidelines, such as the guideline for selection of NGOs, which shall serve as source of inspiration for the PMUs selecting the NGOs rather than as rigid description of procedures to be followed down to the minute detail. Other "guidelines", such as the one for tendering, are not really guidelines. They describe procedures to be adhered to by all. The Project should in the future make a distinction between "guidelines" and "procedures".

Furthermore, DAG should strengthen the dialogue with their DPHE colleagues in CCU and PMUs as well as with the Danida advisers in the PMUs, with a view to finalise the various guidelines and procedures.

6.6.2 Procedures for Tendering

DAG has prepared draft "Guidelines for Tendering", dated 15 December 1997, whose contents the JRT in principle agrees to. The "Guidelines" should in accordance with the above suggestions change name to "Procedures". However, the draft procedures have not yet been discussed with or approved by the Project Director. Furthermore, in connection with a revision of the Project Document described in section 5.6.2, it should be considered whether locally available materials could be purchased by the local contractors (if included in the rates approved by the "Panel of Rates"), which would relieve the Project of purchasing, storing and issuing local materials for use by the contractors. Furthermore, the JRT questions whether it is appropriate to negotiate a reduction in tender price with the lowest tenderer in cases where all tenders exceed the upper limit for variation in tender price.The JRT recommends as follows:

DAG should as soon as possible take the initiative to get all involved parties to agree on the Procedures for Tendering. The procedurs should be approved by the competent authority.

6.6.3 Procedures for Contract Management and Supervision

Like for tendering DAG has prepared draft "Outlines of Contract Management and Supervision", dated 17 December, 1997, which should be renamed to "Procedures for Contract Management and Supervision", as the document contains rules which are to be followed. The JRT also agrees in principle to the content of this document, and has, apart from editorial comments, only one issue which deserves re-consideration. Bearing in mind the executive powers of the Engineering Adviser in the document, it should be re-considered whether the approval of payments to contractors by the Technical Adviser is necessary before payments are effected through DPHE or the pourashavas. Furthermore, it should be clarified whether the Engineering Adviser has the power to approve claims which require the use of contingency funds within the contractors' contracts. The JRT, therefore recommends as follows:

DAG should as soon as possible, but after the clarification of the powers of the Engineering Adviser, take the initiative to get all involved parties to agree on the Procedures for Contract Management and Supervision. The procedures should be approved by the competent authority.

6.6.4 Guidelines for Selection of NGOs

Given the limited number of PMU staff and the Project's mandate in capacity building, the role of NGOs will be important. NGOs will have major responsibility for community mobilisation, education and sanitation. To carry out this mandate effectively, the NGOs require clear operational guidelines and contracts, but at the same time sufficient flexibility and stimulus to innovate. The work of NGOs must be flexible enough to respond to new challenges and to build on new opportunities that invariably arise in mobilisation, demand creation, education and sanitation activities. Guidelines for selection of NGOs should reflect this.

The present guidelines for selection of NGOs are very detailed and complex. It appears, for example, that three confirmations or signatures from the CCU and four from the DPHE are required for the selection of an NGO at field level. Such lengthy and bureaucratic procedures run the risk of creating delays and of resulting in irrelevant decision-making by those unfamiliar with the local situation. For example, it may not be realistic to require leaders of NGOs, who work with the Project to have a Master's degree.

The guidelines were prepared for Noakhali and Patuakhali and may not sufficiently take into account differences among the towns in which the Project operates. Some NGOs may require some other pattern of staffing than that appearing in the guidelines (13 staff loaded into three levels). This should be one of the issues considered when the project

teams revise the guidelines, as has been earlier planned, in light of experience gained from Noakhali and Patuakhali.

The PMUs should take the lead in selecting the NGOs and in preparing draft contracts. Elements to be considered in selecting and contracting the NGOs include the following:

- A personal visit should be made to observe the current field activities of short-listed NGOs. This is not suggested in the present guidelines. The NGOs should also agree to co-operate with Pourashavas, health staff and other partner organisations such as schools, school management committees, Community Based Organisations.

- It could be agreed (and included in the contract) that the NGOs will provide credit to poor families who are not in their present credit groups. This may also need to be monitored. Such credit should be provided from the NGOs' own funds.

- The NGOs will also need a good work plan, which may, of course, be changed over time in consultation with the PMU.

- Periodic payment of NGOs should be linked to achievement or completion of stated activities.

- It would be helpful to provide a statement in the contracts of minimum objectives in the form of indicators, which are linked to the baseline study done in that location. This will help the NGO to focus its activities while at the same time helping the PMU to measure the effectiveness of the interventions with 'before-and-after' indicators.

Lastly, the contract should include a clear statement on the reasons for which the contract can be terminated, including failure to abide by project accounting principles.

It is doubtful that some of the better NGOs will agree to have payment provided by the local government, given unfortunate past experience in Bangladesh of this.

The NGOs should be paid by the PMU directly. Their contract could be issued under the signature of the local government and initialled by the PMU.

As the Project is aware, experience has shown that many NGOs need technical support to ensure their capacity. This could take the form of orientation for all staff of the NGOs and selected training with follow-up, organised by the PMUs.

In some cases, the pourashavas, on advice from the PMU, may wish to make minor contracts with NGOs for a particular service, study or supply. Small contracts should not be subject to long tendering and approval procedures.

To enable this, it will be necessary for the Project to define 'small' and up-date the definition as necessary.

In summary, a short-list of NGOs be prepared on the basis of field visits to each NGO performed by PMU staff. The short-list should form the basis for selection of NGOs. Project proposals should be obtained from short-listed NGOs. The proposals must be based on ToR made by the PMU in close co-operation with the pourashava and must include detailed budgets.

The pourashavas may sign the contracts and the PMU should be authorised to negotiate and initial contracts with selected NGOs on behalf of the Project.

Minor contracts with NGOs should not be covered by the short-listing procedures, but be made in direct negotiation with a competent NGO having the capacity and capability to deliver the services required. The Project Management should determine the financial ceiling for such contracts in consultation with the PMUs.

Thus, several steps in the guidelines should be omitted and the appendices in the guidelines be considered as proposals rather than requirements.

Payment of services should be based on periodic progress reports, including financial statements and work plans for the next reporting period. Payment should flow directly from PMU to the concerned NGO. Hence, NGO services should not be considered reimbursable expenditures.

Based on the above, he JRT recommends as follows:

> *A short-list of NGOs should be prepared on the basis of field visits to each NGO performed by PMU staff. The PMUs should take the lead in selecting the NGOs and in preparing draft contracts. The NGOs should be paid by the PMUs directly.*

6.7 Planning and Reporting

This section deals with planning and reporting procedures of the Project.

Planning

The overall Project planning is based on the Plan of Operation of the Project, which will be reviewed and updated annually as per 1 July. Plans of Action for the sub-projects, which include the implementation schedule the for sub-project concerned and detailed activity plans covering an annual period, are prepared for each sub-project and will be updated semi-annually as per 1 January and 1 July. Furthermore, a general Plan of Action, which includes all outputs, activities and inputs of the total Project and operational sub-projects for the coming annual period, is prepared semi-annually. These documents make up the basis for the monthly planning of the individual Danida staff member.

The Project is still in the process of developing an appropriate planning and reporting system. At this stage, the system appears to be too extensive without providing the flexibility needed for effective project development. The challenge is for planning and reporting procedures to support the management of project implementation. This would imply limiting document production and emphasising revision and utilisation of key materials. For example, the periodic reports from PMUs to DAG could be prepared on a quarterly rather than on a monthly basis as at present.

Reporting

According to the Plan of Operation, progress reporting of the Project is based on: i) monthly review meetings held at sub-project level with participation of the Project Manager, PMU Advisers and concerned local government representatives, and ii) progress meetings held in the Central Coordination Unit with participation of Project Director, Chief Project Adviser and key staff. Furthermore, monthly physical and financial statements are submitted to higher authorities from PMU and DAG respectively and in addition PMUs forward monthly progress reports to DAG. Progress reports of the Project are supposed to be produced by DAG on a semi-annual basis. Till now, only one semi-annual progress report has been produced by the Project.

The progress report made by DAG shows what has been achieved during the period of reporting, but does neither show what should have been achieved nor the implications of the delays.

It appears, taking the Plans of Action dated January 1998 as examples, that some activities planned for 1998 do not seem to take the proper and necessary sequence of activities into account. By way of example, acquisition of land for 5 production tubewells in Noakhali is planned to be completed by June, whereas construction is planned to be completed by March (Activity 2.15). Outline manuals for O&M and administration are, by DAG, planned to be completed by June 98, whereas evaluation of the said outline manuals should be completed by April and approval is expected to take place by May. Approval of sites for new toilets in Patuakhali Pourashava should be completed at the end of July whereas preparation of tender documents should be completed by the end of April.

Besides, the Project has yet to establish a monitoring system for assessment of implementation and operational performance and a monitoring system including simple community based monitoring systems to control implementation and to assess to what extent the objectives of the Project are being achieved. Nevertheless, such a management information system is planned to be completed by the end of April 1998 together with a financial management system. On the date of departure the JRT received a draft of the monitoring guidelines under preparation. The draft is structured in a logical and pedagogical way. It is the impression of the JRT that the guidelines may become a useful tool for field implementation. The final version of the guidelines for Monitoring and Evaluation of Project Outputs is expected to be ready by May 1998 according to the Plan of Action.

The Project is aware about present shortcomings of the planning and reporting system and is in the process of improving the system so that coherence between activities planned and progress achieved will appear in the Plans of Action. In this context serious consideration should be given to three elements:

- Plans of Action should specify activities which local government institutions are responsible for. Thus community mobilisation and consultation and other software activities should be inserted at the appropriate point in each section of the Plan of Action.

- Progress reports from PMU to CCU/DAG should be forwarded on a quarterly basis rather than as now on a monthly basis and include achieved progress in relation to plans as well as comments on variances.

- Simple step-by-step plans for implementation of some project components do not exist, for example, for implementation of household sanitation, public latrines etc. Such plans, of a few pages, would be very useful as checklists ensuring that the proper sequence of actions is followed.

7. FOLLOW-UP ON PHASE I ACTIVITIES

7.1 Status of Phase I Project, Agreements and Continuation of Support

Though action has been taken on most of the recommendations from the 1997 review pertaining to Phase II, activities proposed to be carried out during the last half year of Phase I appear not all to have been completed in a satisfactory manner (for instance recommendations Nos. 9 and 12: Leakage detection and elimination of illegal connections, recommendation No. 13: On the job training of operating personnel, and recommendation No. 15: Emptying of pits with hand tools).

Agreements have been made with the two Pourashavas of Phase I concerning the permission of the Phase II Project to monitor the operation of the piped water supplies in particular (recommendation No. 38). However, the present JRT finds it unfortunate that the two Pourashavas in the agreements have been named "Model Towns", and that a staff bonus system with bonuses paid by the Project was made part of the agreement, which by the Pourashavas is understood as a possibility for requesting financial assistance. However, the agreements do not contain any provisions for assisting the Pourashavas financially, which also would be unnecessary, as it has been established that water supply and sanitation operations are self supporting through water tariffs and leasing of public toilets. Furthermore, financial support by the present Project to the two Phase I Pourashavas would jeopardise the opportunity of the present Project to monitor the Pourashavas' ability to maintain and operate the water supply.

Some of the lessons learned from the first year of the Pourashavas' own operation of the water supplies are:

- Unaccounted-for water (leakage and waste measured during night) has risen from about 30% to close to 40% of daily water production during the last year.

- Operating staff of water treatment plants is still not confident with the operation of the chlorination equipment and with the recording of operational data. The "constant level" dosage equipment in one town was out of order and nothing seemed to be done to repair it.

- Intermittent supply was given for a period of about 2 months in one of the Pourashavas despite sufficient pumping capacity being available (one high lift pump can cope with the demand, so the break-down of one of the two pumps is no reason for reducing the hours of supply). Water meter recordings show that the amount of water supplied during a period with intermittent supply is less than during 24-hours supply. The higher consumption during 24 hours supply is probably due to the above mentioned leakage and waste. It is, however, very important to supply water continuously i.e. to keep 24-hours supply, because supply interruptions may cause infiltration of contaminated surface water through "leaks" into the supply system.

- The report on leak detection, May 1997 states: "As built drawings are not up-to-date, operating manuals are not translated into the Bangla language". It appears that more tools have been supplied subsequently.

- The administrative system for purchase of spare parts and repair work is cumbersome, time consuming, and not entirely under the control of the Pourashavas, so break-downs may take longer than necessary to rectify.

- Sufficient permanent staff positions not yet approved (see section 7.2 on By-laws below).

The JRT recommends as follows:

> *The Project should through the agreement with the Pourashavas facilitate that continuous action is taken by the Pourashavas on the recommendations of the 1997 JRT for Phase I, and also follow-up on apparent outstanding issues such as translation of manuals. No financial assistance for recovering cost of operation and maintenance should be given by the Project to the Phase I Pourashavas during the period of monitoring. Advice and training of staff could still be provided through the participation of Phase I operating and administrative staff in training courses for Phase II staff.*

7.2 Status of proposed By-laws for Phase I Pourashavas

As described in section 5.2.2, the proposed new by-laws for the Phase I Pourashavas have not yet been approved by the Government of Bangladesh. The lack of approved by-laws has, despite the continuous efforts of the Royal Danish Embassy and the chairmen of the two Phase I Pourashavas, caused severe problems in the two Pourashavas, because not all staff necessary for operating the water supplies are listed in the present Pourashava organogrammes. The consequence is that the Pourashavas, despite the agreement of the Secretary of MLGRD&C to having the unapproved staff be paid from the Pourashava water supply account, from time to time receive orders from the same ministry to lay off the non-permanent staff immediately.

Pourashavas included in the present phase of the Project are also in need of such water supply and sanitation by-laws to facilitate proper operation and maintenance and cost recovery (see Section 5.2.2).

The proposed by-laws for Chaumohani and Laksmipur, which are to give the legal framework for the Pourashavas for operating the piped water supplies and sanitary installations, were submitted to MLGRD&C for approval in 1996. The Dutch supported 18 District Towns Project submitted similar by-laws to the ministry for approval also in 1996. To the best of the knowledge of the JRT, the MLGRD&C forwarded the proposed by-laws to the Ministry of Law (MoL) in 1997, and MoL has subsequently in January 1998 prepared an alternative proposal for new by-laws. A copy of this MoL proposal was given to the Project during the time of review, but it is not known to the JRT whether the present MoL version is the final proposal from the ministry. The

MLGRD&C has on other occasions stated that it intended to make by-laws which are common for all pourashavas, and it appears that the model chosen for this common by-law is the one submitted for the 18 District Towns Project in 1996. It is therefore advisable that the DAG make a thorough comparison between the by-laws proposed for the Danida supported projects with the ones submitted by the 18 District Towns Project, and the present alternative proposal from MoL. A major difference from the point of view of the JRT is that the alternative by-laws under consideration at present only covers water supply, whereas the ones submitted by the Phase I Project cover both water supply and sanitation. It is not the responsibility of the JRT to scrutinise the alternative by-law proposed by the MoL, but the JRT wants to mention the following subjects of concern:

- It is important that the pourashavas have the powers to make important decisions concerning their water supply without the need of obtaining approvals from the MLGRD&C or other ministries. Whether the proposed Supervisory Board will be given all the powers mentioned in the by-laws proposed by the 18 District Towns Project or not is not of much concern to the JRT, as long as the Pourashava Council has the powers.

- A major concern of the JRT is that the alternative by-law proposed by MoL does not solve the problem with insufficient staff positions in the existing pourashava organogrammes. This issue must be dealt with in the new by-laws, otherwise little benefit is achieved by the introduction of new by-laws.

- Another issue of concern is that MoL proposes to fix connection fees in the by-law (no mechanism for regulation of such fees is given). This is not advisable as such fees are likely to be out-dated very soon. Furthermore, water tariffs (flat rates, tariffs for metered supply, etc.) cannot be set or adjusted by the pourashava without the prior approval of the Government. In the opinion of the JRT all fees and tariffs should be set by the pourashava alone, otherwise the cost recovery, and thereby the financial sustainability of the water supplies, is at stake.

The above issues of concern of the JRT are further not in compliance with the proposed National Policy for Drinking Water and Sanitation (see Section 5.1). The JRT, therefore recommends as follows:

> *The MLGRD&C, the Royal Danish Embassy and DAG should make all possible efforts to influence the drafting of a framework of water supply and sanitation rules, regulations and by-laws by the Ministry of Law, by making the ministry aware of the shortcomings in the present proposal. The approval of the new by-laws should be given high priority, so the Phase I water supplies can be operated in a safe manner, and the implementation of the Phase II water supplies can proceed without further delays.*

7.3 Report on Leak Detection

One of the recommendations of the 1997 JRT was that a leakage detection programme should be carried out with the assistance from an external Danish consultant (recommendation No. 9). The programme was carried out in April 1997. The consultant demonstrated how leaks can be found through measuring of night flows and zoning of the distribution system. One of the zones was found to have a significant amount of leakage, but the consultant failed to localise the leakage, so it could not be repaired (not a very convincing demonstration). It was the intention of the 1997 JRT that the consultant should have demonstrated the use of leakage detection equipment, so it could be assessed whether it was advisable to procure such equipment by the Project. For reasons not known to the present JRT, no leakage detection equipment was brought along by the consultant which probably is the main reason for the poor result of the demonstration.

The outcome of the leak detection programme has consequently been very meagre and has unfortunately neither resulted in increased awareness of the magnitude of the problem of leakage and waste of water, nor in subsequent serious efforts by the Pourashavas for finding and repairing leaks. The result is that the two water supply systems at present have an amount of leakage and wastage approaching 40% of the water production, an unacceptably high figure. At the same time one of the Pourashavas told the JRT that about 200 applications for house connections are not honoured for fear that the production capacity would be insufficient. The same Pourashava does not see reduction of leakage and waste as a solution, but asks for one more production tube well to be drilled and more pumps to be installed.

Reference is made to Annex 6 which contains an investigation of the water consumption in Chaumohani and Laksmipur.

The JRT recommends as follows:

> *The Phase II staff should as part of the agreement with the Phase I Pourashavas advise the operating staff of the water supplies on leak detection and reduction of waste on a regular basis, and seek to increase the awareness of the unnecessary high operating cost caused by leakage and waste. However, the Project should not assist the Pourashavas with new tube wells or pumps as that would only lead to even higher wastage and operating cost. It is further recommended that the Project purchase one set of leakage detection equipment for use during rehabilitation of existing Phase II water supplies, and for leakage detection in the Phase I towns on a rental basis.*

7.4 Arsenic Contamination in Phase I Pourashavas

A total of 914 shallow hand tubewells have been installed by the Phase I Project in the fringe areas of Chaumohani and Laksmipur.

54 water samples from shallow hand tubewells in Chaumohani have been analysed for arsenic, and all had concentrations higher than the maximum permissible level of 0.05 mg/l. In the short run, the only way to rectify this is to drill deep boreholes, which cost ten times more than shallow boreholes. Reference is made to section 9.8. Even if this is done for the Phase I shallow wells, the problems in the two towns are not solved, as a there also exists a large number of shallow wells drilled by others.

With regard to construction work, Phase I has been completed, and replacement of shallow wells in the two towns is neither included in the Government Agreement nor in the budget for Phase II. In the opinion of the JRT, the Phase II project organisation should, therefore not at present involve itself in drilling of deep hand tubewells in Chaumohani and Laksmipur. However, this does not prevent that the issue could be considered upon specific requests from the two pourashavas to the Royal Danish Embassy.

8. SOCIO-ECONOMIC ANALYSIS

8.1 Baseline Studies

During the third week of January 1998, baseline studies draft reports were submitted by the Consultant to DAG consisting of in-depth surveys of 5 towns, a marketing survey of one town and rapid assessments in 8 other towns. It was the intention of the Project to use the baseline studies in Phase II for planning of both hardware and software aspects. Unfortunately, the baseline studies for the first year of Phase II were too late for planning usage in Patuakhali and Noakhali Pourashavas.

The Consultant has stated that, due to overspending on the baseline studies, rather than completing in-depth studies of 23 towns, only 11 full studies will be completed with some more limited information on 6 other locations.

Useful information appears in the completed studies. A rapid reading of some of the draft materials for two Pourashavas provides the following type of information which could be useful for socio-economic inputs:

- Site selection has been a problem for some existing water points. As project staff know from Phase I, special attention to this will be needed.

- Sharing water sources and standposts can be problematic for users. This includes arguments over sharing sources and weakness of committees in managing sources. There appears to be some "committee fatigue" among the population, implying that special efforts are needed to set up representative committees which operate following clear rules.

- Water from wells with handpumps is used for only a limited number of purposes, specifically for drinking. The majority use unsafe water for other domestic needs. Source utilisation should continue, as in Phase I, to be an important indicator of project effectiveness.

- There is a fairly high coverage with latrines. If these are indeed sanitary latrines, then pit emptying and safe sludge disposal should feature as another important objective for the Project.

- Among some people there is knowledge and some practice of disinfecting drinking water by using alum, lime or copper sulphate (non-bacterial cleaning measures).

- Reasons for wanting improved water sources include: convenience, status, economic activities, fear of arsenic, and no more fights. These reasons should be used for public motivation.

- Pourashava records identifying slums are not always accurate.

- The proportion of renters seems to be very low which can make sanitation interventions easier.

According to the ToR of the Consultant the objectives of the baseline studies are to: i) provide socio-economic data on which the detailed design and planning can be based, and ii) provide a profile of the present health situation and sanitation practices as the basis for future project monitoring and evaluation.

With respect to the first objective, it would have been useful if a clear list of data necessary for detailed design and planning (including the way in which they would be used) had been developed between the Project and the Consultant. This would ensure that the project staff and the Consultant's engineers receive the data they need in the form which is most useful (e.g. the scale of maps, way of aggregating specific data that is most useful).

The second objective needs to be handled carefully to avoid collecting too much data while ensuring a clear focus of the studies. One approach to this would have been to begin by working backwards, that is, beginning with an identification of indicators for monitoring and evaluation. This identification would then be used to limit the data collection activities. This should be developed by DAG, PMU and the Consultant before the study continues during 1998. A suggestive list of indicators, although lacking some technical aspects, is shown in the impact study for Phase I.

It is not possible to comment at this moment on the usefulness of the study for the Project. A good point of departure for an internal assessment of the baseline studies would be for the PMUs and DAGs to write comments in the current texts about Noakhali and Patuakhali, including marking those items which they intend to use. This should lead to some immediate changes in the study designs for the future. In addition, in the baseline studies, indicators should be listed on a summary page for each pourashava and thana centre. A map should be provided. Definitions used in the baseline study should match those used in the Project, e.g. functionality and hygienic latrines.

The ToR in the Consultant's contract detailed the methodologies to be followed. Some of the methodologies were not implemented, however. Specifically, those omitted seem to have been the most participatory approaches (undertaking with community members social mapping, participatory resource profiles using matrices). Another element apparently omitted is the production of digitised maps. Very importantly, although included in the ToR, the review and feedback of significant findings from the baseline studies to community members have not been planned or undertaken. Such structured feedback can be an important means for stimulating community participation. Feedback to the community and relevant local government organizations of significant information should be ensured. Unfortunately the original ToR were not particularly focused, too extensive and included some protocols which are more suitable for rural areas.

The Consultant did develop several of the other data collection methodologies stipulated in the contract, specifically, household survey, knowledge-attitude-practice (KAP), focus group discussions, rapid assessment (but not participatory rapid appraisal). The household survey was expanded considerably beyond initial plans. The Project reported

that it did not entirely agree with the application of the extended questionnaire. The JRT agrees with the Project. It is questionable whether a questionnaire, which takes up to one and a half hours to administer, will provide information of sufficient validity and reliability. If the present work continues then items which could be omitted completely or shortened significantly include: waste disposal, media access, health data (and typhoid data to be checked).

Thus, there should have been formal revision of the rather confusing ToR. By the time this report was finalised, discussions among all parties (Royal Danish Embassy, Danida, the Project, the Consultant) have result in a more clear, step-by-step approach for revisions of the ToR.

In principle, the Consultant should carry out complete baseline surveys in all 23 towns as stipulated in the contract with Danida. However, there is one further consideration. The in-depth surveys and shorter studies on "level of interest" have stimulated towns to think about piped water schemes, building demand and expectations many years before the Project will begin work in each location. Baseline studies have, for example, been undertaken for locations where work is not scheduled to begin until 2003 (Kaoapara Thana, Betagi Thana and Patharghara Pourashava). In some cases piped water supply may not, in fact, be implemented. It is politically untenable to stimulate demand years in advance of implementation, particularly where technologies may be changed.

The Consultant's contract does not include baseline studies in the growth centres.

For the above reasons the JRT recommends as follows:

> *The Terms of Reference and the time schedule for the remaining socio-economic baseline surveys should be refined in accordance with the objectives for the studies to ensure optimal benefit from the studies. It should be avoided to have too big a gap between the implementation of the individual studies and the start of the physical activities. The contract with the Consultant should be reviewed on the basis of the revised Terms of Reference and an assessment of the total workload stated in the Consultant's present contract.*

8.2 Hygiene Promotion

At this early point in Phase II, hygiene education activities have yet to begin. However the groundwork has been undertaken for hygiene promotion, mobilisation and communication activities. Some interesting case studies have been developed in Patuakhali Pourashava, which may be useful in identifying and monitoring key behavioral indicators. In Noakhali Pourashava, the fringe area survey is completed and a survey is starting in the core area. These two studies are complementary to the baseline studies. They provide, in the one case, more in-depth qualitative information and, in the other case, a 100% sample of fringe areas which will be used to plan activities with NGOs. The baseline studies of the two Pourashavas provide useful information for hygiene education which is congruent with the impact study from Phase I.

The Project is seeking to ensure that two staff members attached to the pourashavas health departments will work as health promoters or health assistants within the Project. It has proved difficult, for bureaucratic reasons, to finalise these arrangements and this is a high priority for the PMUs. Lastly, the selection procedures have started for NGOs which will work with the Project in the two Pourashavas.

Unlike water and sanitation, there is usually little demand for hygiene promotion from user groups or local government. The sustainability of intensive hygiene education activities beyond the life of most projects is low. Thus it is important to ensure that these activities are of high quality during the project intervention, and to ensure that there is ample capacity building of health personnel during the project period.

In view of the large number of hygiene behaviours which can be promoted, it may also be useful for the Project to identify a minimum set of objectives/behaviours and knowledge, differentiated for men, women and children. Research has demonstrated that programme impact tends to be greater when hygiene promotion is focused and when easily verifiable indicators are developed. Prioritization should combine the most significant behaviours/knowledge with their feasibility. For example, a key behaviour is the use of safe water for all domestic purposes. However, it might be more feasible to begin with drinking water and target initially those uses of safe water which are easier to change such as washing utensils, cleaning beetle mixes, etc. An example is given in Appendix 7 of a small set of indicators/behaviours which might be a useful reference point for the Project in developing its own priorities.

Hygiene promotion is, of course, meant to reach beyond users of new water sources to the whole community. Furthermore, the area-based approach discussed in section 11.3 provides the opportunity for concentrating in greater depth on a large proportion of the population in each area. Success in hygiene promotion is, in part, derived from the amount of personal contact. An area-based concentration will include personal contact through, for example, NGO staff, members of sub-WATSAN committees, CBOs such as youth groups, women health communicators, water point caretakers and staff from the pourashava health departments.

In terms of methodology, there is a tendency in hygiene promotion in many projects to focus on delivering a fixed set of messages without sufficient regard for whether these are appropriate, acceptable or feasible. Ensuring that enabling conditions are present is important. For example, if the household is not organized so that handwashing is easy (the enabling factor) with water and a friction agent nearby, then handwashing after defecation will not take place. If the mother has received information about handwashing, but not the father, then the idea of washing both hands may not be practised by children. Another enabling factor is the real and perceived quality of well water. The fact that people state that they drink water which is unsuitable for cooking is not an uncommon phenomenon. Given the great variability in taste of well water, however, promotional activities may be useful if they are tailored to suit local situations, rather than being fixed stereotyped messages.

Other important aspects of hygiene promotion which were also noted by some PMU members include: the importance of building on the benefits that are valued by users in undertaking a new behaviour (for example, privacy in latrine use), the need for people to understand the reasons for new behaviours, being sensitive to gender-specific education (focusing on men as well as women in hygiene promotion), linking school to home (what children learn and adult education in community should be similar).

In terms of methodology, the PMU in Noakhali has been inspired by the methodology of the SAFE/CARE hygiene promotion programme. Training related to the SAFE approach could be very useful.

The JRT recommends as follows:

> *A minimum set of hygiene behaviours and knowledge should be identified and defined, where appropriate, by age, sex and economic group. Simple and verifiable indicators for each group should be defined and monitoring should be tested through local government health staff and NGOs supported by PMU staff.*

8.3 Communication Capacity

The communicators in the Project are, in essence, all those who have contact with the public. This would include: technical staff, including DPHE, software staff, local government staff and councils, NGOs, operators, clerks and caretakers. Communication relates to personal skills as well as specific strategies. Communication goes beyond trying to convince people with messages and should begin by listening and making information available with transparency. It involves negotiation, building on benefits which are perceived by the audience for changing a behaviour or reinforcing existing beliefs and behaviours. Good communication should be gender and poverty-sensitive. It was observed that the communication skills of some staff are excellent. The capacity and committment to effective communication (and participatory approaches) among some other project staff and collaborators need to be strengthened. As the DAG has observed, some sensitive pre-training and advocacy may be useful to built committment in certain cases.

The JRT recommends as follows:

> *Before drafting detailed communication plans, basic but high quality communication and participatory training should be made available to all project staff (DPHE, technical and socio-economic), partners in local government institutions and NGOs. Further in-depth training related to participatory techniques, training methods and hygiene promotion, as well as field trips, would be useful for those working in software aspects. Furthermore, useful materials prepared in other programmes and by competent sector professionals in Bangladesh should be utilised to the maximum extent.*

The health communicators are volunteer women living in the community. Health communicators have been developed in Phase I, and 40 were trained and supervised. This good initiative, which has empowered the first community-based animators, should be replicated in Phase II towns. However the two days of training is too short for the contents outlined in the proposal. It may be necessary to add a day or have a refresher. The training should, of course, be coupled with supervision (in Phase I this was done by the field worker).

Where the ground water is contaminated with arsenic, the staff and NGOs are being approached with questions from well users. All communicators related to the Project should provide responses which are honest and which do not drive people to drink less safe water. Furthermore, the answers should be feasible. (In the Phase I towns, the local government has apparently instructed field workers to provide suggestions which can often not be carried out). It is suggested that the Project addresses this challenge. It may be useful to involve a well-known Bangladeshi authority to whom reference can also be made if this issue is raised for public debate.

With respect to public mobilisation, the Project plans to work with a larger number of institutions and groups such as WATSAN committees, local government health staff, health communicators, NGOs and CBOs. This multi-dimension input conforms to best practice as has been experienced in Bangladesh.

In the Patuakhali Pourashava baseline, as reported by the PMU, only 12% of the males and 4% of the females over ten years were members of some local organization or association (credit association, mosque committee, school committee, political party, etc.). While these groups should be involved in mobilization, the finding implies, as was the case in Phase I, that much information and education for community members will come from personal contact.

8.4 School Hygiene

The women field workers active in Phase I enjoyed their work in schools. Among other things, they initiated mothers' meetings which reportedly were successful. They also convinced vendors not to sell dirty food to children. They have also been concerned to have school funds established for sanitation and operation and maintenance of school water supplies.

School hygiene education does not at this time figure in the workplans for Noakhali and Patuakhali Pourashavas. However, a very high coverage of schools with water and sanitation facilities has been achieved through a UNICEF-supported programme in Noakhali. UNICEF staff and the Phase I project field workers reported that maintenance and good use of the facilities have presented problems. Teachers and students apparently expect someone else to clean and repair the facilities. When money is not available for this, the basic organization has been lacking in the schools to maintain and use the new services correctly. This is a common problem with school programmes that have given insufficient emphasis to teacher training and mobilization of pupils.

UNICEF is apparently continuing to work in Patuakhali. The PMU in Patuakhali (if requested by UNICEF) and the PMU in Noakhali may wish to consider developing some activities for school hygiene. This could focus on maintenance and use of school facilities and linking education of the children to hygiene promotion in the neighbourhood.

Experience has shown that good use and maintenance of school facilities requires: i) orientation for appropriate education supervisors, ii) orientation for head-teachers, and iii) school-based planning of hygiene activities with school health teachers (usually 1 school health teacher for every 10 to 15 teachers in the school) about rosters, organization of children to clean rooms, yard and latrines, and teach younger children the use of facilities. Training is very helpful, particularly when school teachers prepare with 6-monthly or annual lesson-planning and share these with each other during the training sessions. A school hygiene programme can be organized as a pilot activity.

Compared to the school hygiene activities, there is less experience, though perhaps greater need, for programmes to reach out-of-school children. The PMU in Patuakhali has expressed an interest in this which. The JRT supports this idea. A programme for out-of-school children would be innovative and could be useful, as well, to other organisations outside the project area.

9. WATER SUPPLY

9.1 Social Mapping of Existing Water Supply

In the Phase I Pourashavas it is not possible to identify with clarity the real coverage of the water supplies, or the number and types of households without access to safe water and sanitation. For example, it was variously repeated to the JRT that 33%, 50% and 60% of the core population in the Phase I Pourashavas are served by piped water.

The recently completed mapping of fringe areas in Noakhali Pourashava is a useful project initiative.

The JRT recommends as follows:

> *At the beginning of an intervention in an area, social mapping should be done of existing water supplies, including types of sources, number of user households, households and groups of people without access to safe water sources, etc.*

9.2 Hydrogeological Activities

The Coastal Belt has in general a good groundwater potential for development for piped water schemes. However, the deep aquifers to be tapped are under- and overlaid by saline aquifers, so too big draw-downs in production wells may disturb the salt-freshwater balance in the area. Furthermore, the iron content varies from place to place, maybe also as a function of the drilling depth at a specific location. Careful investigations may, therefore in some cases enable identification of the place and the depth with the lowest iron content, and hereby result in saving a water treatment plant. In general, the iron content is low in the Patuakhali - Barguna area, while it is considerably higher in the Greater Noakhali area. It may be possible to find groundwater with low iron content below 260 metres in Raipur and below 200 metres in Feni. After the preparation of the draft review report, fresh groundwater with low iron content has been found in Raipur Pourashava at a depth of 350 -375 meters. This means that no treatment plants will be required in Raipur.

In Pathargata town, available data indicate saline groundwater down to 300 metres, but deeper aquifers may contain fresh water. Furthermore fresh water is available at some distance east of the town. The Consultant has proposed hydrogeological investigations to be carried out in due course.

The Consultant has carried out preliminary hydrogeological investigations and submitted a report in June 1997. Although all activities stated in the contract with the Consultant have not been carried out, the hydrogeological activities have in general been carried out in a satisfactory manner. As examples of activities not carried out by the Consultant can be mentioned: i) long term and recovery pumping tests including step drawdown pumping tests on existing production wells, and ii) geophysical logging on existing production wells. The JRT accepts that the Consultant did not carry out these

investigations. In the hydrogeological report the Consultant did not present any general hydrogeological cross-section, well hydrographs, regional transmissivity distribution etc. though such information is available from existing reports.

The inventory of existing wells initiated by the Patuakhali PMU is appreciated. The Project has decided to stop analyses of arsenic content from existing hand tubewells as long as the Project does not have an approved strategy for handling this issue. The JRT accepts this; however, it should not apply for hydrogeological investigations in connection with siting of deep tubewells.

9.3 Tubewell Drilling

9.3.1 Production Wells

Design of Production wells

In accordance with the contract with the drilling contractor, genuine production wells (14"/6") and production test wells (8"/4") will be drilled by the Project.

In the Project Document, a yield of 70 cu.m/hr is recommended for the preliminary design of production wells. For safety against saline intrusion, the Consultant proposes to reduce the design yield to 50 cu.m/hr. The JRT supports this. However, the final yield has to be determined from the pumping tests. As a result, the number of production wells will increase in some of the larger towns.

The Consultant has proposed to omit the production test wells (8"/4") as the 4" hydraulic intake is inefficient and the friction loss in the riser pipe is too high. Thus, the Consultant recommends to drill 14"/6" production wells only. The JRT agrees that 8"/4" production test wells should not be drilled. However, some 8" and 4" pipes have already been purchased. Such pipes may be used for production wells for small piped schemes.

Though this is a standard practice for DPHE, the JRT has reservations regarding the proposed 14" pump chamber. With the recommended yields, a 12" pump chamber should be sufficient for submersible pumps with discharges of 90 cu.m/hr. The drilling contractor informed the JRT that a 14" pump chamber in their opinion was too much.

In the contract with the drilling contractor, 50 metres length of pump chamber have been provided for each well, while the Consultant recommends 35 metres only (though without supporting calculations). With reference to the calculations in Annex 8, the JRT finds even such a length rather high. The matters should be discussed with the Consultant before a final decision is taken.

Number of Production Wells

In accordance with the contract with the drilling contractor, 28 production wells will be sunk for the proposed 12 piped water schemes. Of these 28, the 12 are genuine

production wells (14"/6") and 16 are named production test wells (8"/4"). In addition, 8 production test wells will be carried out as investigation wells, but not converted to production wells.

The Consultant has calculated the demand for production wells to be 32 - 34 wells plus 12 stand-by wells, which is considerably higher than foreseen. This calculation is based upon yields of 50 m3/hr, but the final safe yield may exceed this figure. Though some saving can be made on changing the pump chamber, as suggested above, the unit cost per well may be higher, as no production test wells will be made.

If a piped scheme in a town only requires one production well, a stand-by well should be provided to prevent disruption of water supply due to breakdown of the pump or damage of the well. In case two production wells are required, it may be argued whether or not a stand-by well is required. In piped schemes supplied from three or more production wells, it may not be required to establish stand-by wells.

Though no justification is provided, the Project Document is based upon the assumption that local drilling contractors are not capable of drilling production wells with proper saline sealing to the required depth. As a consequence, it could be argued that it would be desirable to drill one extra well per piped scheme, as this will enable a future increase in the production when the demand for this arises.

As stated in section 9.7, the JRT questions the feasibility of some of the proposed piped schemes and recommends that the previously undertaken feasibility studies should be updated. As a result the total number of required production wells is likely to be reduced.

Based upon the above analysis, the JRT recommends as follows:

> *The diameter of the pump chamber could be reduced to 12" and the length may also be reduced. Establishment of stand-by production wells should only take place in towns with one or two production tubewells and if this can safely be done within the drilling budget, taking into consideration the revised list of towns to be provided with piped water.*

9.3.2 Exploratory and Observation Wells

Selection of Drilling Contractor

The contract with the Danish Drilling Contractor provides for 16 numbers of 2" observation tubewells and 8 numbers of 8"/4" production test wells. The Danish Drilling Contractor charges 30 times more for a 2" exploratory/observation well than the local contractors.

The Project has successfully applied a local hand drilling contractor to carry out four exploratory/observation wells for Noakhali Pourashava. Local hand drilling contractors can drill a maximum of 300 - 350 metres while the Danish Drilling Contractor can drill

deeper. In several cases, however, 300 - 350 metres drilling depth will be sufficient. Drilling of exploratory/observation wells by local contractors will increase the supervisory workload.

The Project does not have the necessary gamma and electric logging equipment. So far the Project has utilised the logging equipment of DPHE's Research & Development Division.

Based on the above observations, the JRT recommends as follows:

> *Exploratory/observation wells should preferably be drilled by local contractors unless the drilling depth is expected to exceed 320 meters. The Project should purchase simple el- and gamma-logging equipment.*

Exploratory Wells to Identify Aquifers with Low Iron Content

Neither in the contract with the Drilling Contractor nor in the Consultant's hydrogeological report it has been foreseen to carry out exploratory wells to assess spatial variations in the groundwater's iron content. However, as stated in section 9.2, if the iron content in the different aquifers is mapped carefully, it may be possible to avoid the construction of water treatment plants. Consequently, such a mapping is likely to be a very feasible exercise. The mapping should mainly be based upon water samples from existing wells, but in some cases it may be necessary to drill additional small diameter exploratory wells.

Observation Wells for Monitoring Up-coning of Saline Water

The Consultant has recommended that every production well should be equipped with an observation well with screen setting 20 metres below the screen of the production well for monitoring of up-coning of saline water. According to the Consultant, such observation wells should be placed in the same borehole as the production well.

Though the JRT in principle supports the idea of monitoring up-coning of saline water, the JRT has some reservations to the Consultant's proposal:

- down-coning from the above lying saline layers could as well be a problem, which cannot be monitored through the proposed observation wells;
- it may not be necessary to sink an observation well for each production well. Rather one such observation well, located at the central well in the well field where the expected drawdown will be greatest, should be sufficient;
- it does not appear to be a good idea to use the same borehole for the installation of the production well and the observation well, as it then will be necessary to make a saline sealing between the two screen levels. This can be done, but will take some time and is likely to be costly. Alternatively, when

technically possible the observation well could advantageously be made by a local contractor a few metres from the production well.

Observation Wells for Pumping Tests

In accordance with the specifications in the drilling contract, the Consultant has proposed a total of 16 observation wells for pumping tests of at total of 32-34 production wells located in 12 different towns.

When tapping an aquifer sandwiched between two saline layers, it is of utmost importance to detect correctly the hydraulic characteristics of the aquifer, such as transmissivity, coefficient of storage and possible negative hydraulic boundaries. For optimal interpretation of pumping tests, there should preferably be a total of four observation wells located in two directions perpendicular to each others. Though this may far from always be necessary, the JRT questions the rationale behind recommending a total of 16 observation wells only. The Consultant should be requested to give a proper rationale for this recommendation.

All wells in the Project will be partially penetrating wells and as such the required distance between the production well and the observation well(s) should be at least equal to the thickness of the aquifer and preferably twice that thickness. The observation well drilled at the well field for Noakhali Pourashava is located 40 metres from the first production tubewell as compared to a thickness of the aquifer of approximately 70 metres. The Consultant should be requested to justify such a siting.

In order to avoid excessive composite cone of depressions and hereby increasing the risk of saline intrusion, the Consultant has recommended minimum distances between the production wells. In the case of the well field for Noakhali Pourashava a minimum spacing of 100 metres is recommended. Further details are given in Annex 8. It is important that the Consultant's recommendations with regard to minimum spacing are adhered to.

The lack of availability of land can pose problems for the siting of exploratory/observation wells, in particlar when such wells have to be drilled by mechanised rigs.

In the opinion of the JRT, there is a need for a revision of the strategy for exploratory/observation wells. The JRT, therefore recommends as follows:

> *Unless data from existing wells provide the necessary information regarding spatial variations in the iron content of the ground water, some exploratory wells should be drilled for this purpose. The number of observation wells for monitoring a possible up-coning of saline water should be reduced. Additional observation wells should be drilled for optimal interpretation of pumping tests. Appropriate spacing between the wells should be ensured, provided land is available.*

9.3.3 Performance of the Drilling Contractor and the Consultant

At the time of the JRT's visit to the drilling site, the Danish Drilling Contractor had just started the drilling, had only completed two observation wells and was preparing for the drilling of the first production well. The performance of the Drilling Contractor can, therefore not be assessed at present, but the JRT has no reason to doubt the Contractor's ability to carry out the task.

As it appears from section 9.3.2, the JRT is somewhat concerned about elements in the Consultant's design of the drilling campaign. It is of importance that the Consultant ensure sufficient quality of such inputs. Reference is made to section 6.4.

9.4 Piped Water Supply

9.4.1 Design Criteria and Outline Design

The Consultant has in connection with submission of the "Outline Design" for piped water supplies presented design criteria to be used for detailed design work. The chosen design criteria are not well documented, and are in most cases not justified through an evaluation of data from existing schemes (in particular the Phase I schemes in Chaumohani and Laksmipur being the only pourashavas in Bangladesh with 24-hours water supply), or by data from other water supplies in Bangladesh. Furthermore, neither design criteria nor outline design have been submitted for the proposed water treatment plants. Similarly, the choice of materials suggested by the Consultant is questionable in some cases, for instance the use of expensive Ductile Iron pipes with polythene sleeves does not appear justified. However, the JRT supports the recommendation of both the Consultant and the previous Phase I JRTs that PVC pipes shall be with rubber ring joints to prevent leakage. The present JRT also advises that the choice of materials for house connections be thoroughly discussed. Should house connections implemented by the Project be with good quality and easily assembled imported materials, or would it be better to train the staff of the contractors and the future operating staff of the pourashavas to make good house connections with locally available materials? It should be borne in mind that it is assumed that the pourashavas continue to make house connections after they have taken over the water supplies, and at that time they will only have access to locally available materials.

In meetings between the JRT and the Consultant, the Consultant admitted that there are shortcomings in what has been submitted so far on the water supply component, and the Consultant has therefore agreed to submit a new report with well documented and justified design criteria to DAG for approval before detailed design work is commenced. The JRT, therefore recommends as follows:

> *The Consultant should prepare a report with well documented design criteria for piped water supply in pourashavas and thana centres. The report should be scrutinised by DAG assisted by the Danish consulting company suggested in section 6.3.2.*

9.4.2 Integration of Existing GoB Schemes

In most, if not all, pourashavas and thana centres GoB operates a piped water supply covering government institutions and staff quarters. The supply is operated by Public Works Department (PWD) and supplies water for some hours per day. Some of these water supplies are very extensive both in area covered and in respect of number of users (e.g. the existing Patuakhali GoB water supply). The intention of the present Project is to construct water supplies with 24-hours service covering the core areas of pourashavas and selected thana centres, and to strengthen the local administrations to enable them to operate and maintain the water supplies. Recovery of operating cost shall be through water charges imposed on the consumers. PWD is at present bearing the cost of operating the existing GoB water supplies, so government institutions and personnel are not paying water charges at present. If these GoB water supplies shall be an integral part of the future pourashava water supplies, it will be necessary to make an agreement between the pourashavas and the relevant ministries of GoB about the taking over of assets of the existing water supplies and about the future payment of water charges. Without such an agreement the financial sustainability of the pourashava operated water supply will be at stake.

The JRT recommends as follows:

> *The existing GoB water supplies in pourashavas and thana centres should not be incorporated in the pourashava/thana operated water supplies unless a prior agreement has been made between GoB and the relevant pourashava/thana about payment of water charges. Such agreements are urgently required as the agreements will have implications on the ongoing drilling campaign and detailed design work.*

9.4.3 Cost Aspects

The cost estimates for the water supply component prepared by the Consultant are based on: i) the outline design made at an early stage of project implementation, ii) the less documented design criteria and materials standards, iii) unit costs for pipes which are not based on most recent tenders for pipes imported into Bangladesh, and iv) preliminary population criteria which later have been revised considerably. These cost estimates indicate that the cost of the water supply component for the entire Project will be approximately 2.5 times the cost estimate in the Project Document, which forms the basis for the Project Proforma and the Government Agreement. Major cost increases are seen for equipping production tube wells (drilling not included), pipelines and overhead storage reservoirs, which to some extent are due to less use of existing facilities than anticipated in the Project Document, but also due to the recommended use of PVC pipes with rubber ring joints. It should be expected that the cost estimates can change considerably when the detailed design is completed.

The JRT recommends as follows:

> *Cost consciousness should be exercised in the development of design criteria and materials standards for piped water supplies, and revised cost estimates be worked out on the basis of such criteria, on recent tenders for supply of pipes, and on the revised population projections.*

9.5 Water Supply in Noakhali Pourashava

Particularly high cost increases are seen for the proposed water supply for Noakhali Pourashava owing to the apparent very poor condition of the existing water supply, the arsenic contamination of the shallow aquifer so shallow hand tube wells cannot be used in the fringe areas, and the lack of a deep fresh water aquifer. Cost estimates have therefore been prepared for a piped water supply also covering fringe areas, which increases the area coverage from about 10 sq. km to 17 sq. km. Sporadic visits to the fringe areas by the JRT have revealed that considerable parts of the fringe areas are sparsely populated and would result in exorbitant per capita cost if a piped supply is made, whereas some pocket areas with higher habitation within reason could be supplied by the piped water supply (see also section 8.1).

The Consultant recommends that some short-term rehabilitation should be carried out, i.e. only what is needed to keep the system in operation until the proposed new system is completed. The cost of these short-term rehabilitation works is such that the JRT suggests that the Project carefully assess whether it is worthwhile to make the proposed rehabilitation.

The JRT recommends as follows:

> *Detailed design for the water supply of fringe areas of Noakhali Pourashava should be made in a cost conscious way taking into account: i) the PMU's recent fringe area study, ii) the sociological baseline study, iii) detailed site investigations, and iv) consultations with the pourashava and PMU. Un-served population shall be advised by the Project about alternative safe water supplies.*

9.6 Water Supply in Patuakhali Pourashava

Core Area

In Patuakhali, the Pourashava operates two water supplies with direct pumping from the boreholes into the distribution systems (i.e. no water towers). The supplies only operate intermittently, but are quite extensive with more than 2,000 house connections in total. Furthermore, PWD operates a GoB owned water supply with a water tower and 71 connections to roof tanks on various government buildings such as offices, staff quarters, etc. The water quality of the GoB supply is salty and not suitable for human consumption.

Iron removal is not likely to be required and production tubewells do not have to be sited in well fields, and no provision for future extension of the piped water supply into the fringe areas needs to be made, as such extensions can be based on new production tube wells and separate distribution networks. This reduces cost of the immediate investment considerably, as it only to a limited extent needs to take population increases into account. Another important aspect of the development of the Patuakhali water supply is the quite extensive area coverage of the existing intermittent water supplies.

Owing to the extensive coverage of the existing water supplies in Patuakhali and the narrow streets in the old centre of the town, much effort should be made to retain as large parts of the existing systems as possible in operation. In order to avoid extensive leakage and waste from the existing systems when they are connected to the proposed new 24-hour water supply, the first step of physical implementation should be thorough rehabilitation of the existing systems, including inspection of house connections and the fitting of float valves on all tanks. When the inspection/rehabilitation of all house connections and repairs of visible leaks are completed, master meters and manometers should be installed in the pump houses at the production boreholes and at controlled outlets from the two distribution systems without water towers. The master meters should be with reed contact, or a similar system, so it is possible to connect them to a data logger. The controlled outlets are necessary to avoid too high pressure in the distribution systems during pumping. Pumps should then be operated for 24 hours, and repairs and elimination of wastage continue until the combination of leakage and wastage is reduced to less than 20% of the water production (measured through monitoring of night flows). The leakage detection equipment recommended in section 7.3 can be used in this process. If the detailed design of the piped water system is started before the above demand to leakage and waste is fulfilled, this may lead to design which is not cost-efficient. The JRT, therefore recommends as follows:

> *In order to avoid the extensive amounts of leakage and wastage experienced in the Phase I water supplies, all existing supplies should be brought to be in such a condition that the combination of leakage and wastage is less than 20% of the water production. Only then, should the detailed design of the new scheme be completed.*

Fringe Area

In the sparcely populated fringe areas of Patuakhali, it would be unfeasible to provide piped water supply for these areas for many years. The Patuakhali PMU has through a survey of existing deep tube wells verified that under the Patuakhali Pourashava there is a deep fresh water aquifer with low iron content, which could be used for water supply of the fringe areas through the drilling of small bore deep tubewells fitted with handpumps. However, the Project Document does not contain a provision for such wells.

The JRT recommends as follows:

> *Fringe areas of Patuakhali Pourashava should be supplied with water from deep hand tube wells.*

9.7 Water Supply in Other Towns and Centres

Feasibility of Piped Water Supply

To the best of JRT's knowledge no thana centre in the entire Bangladesh is operating a piped water supply. However, some thana centres have a GoB/PWD operated intermittent water supply covering government institutions and staff quarters.

The JRT visited Baupal Thana Centre in Patuakhali District, which is planned to be the first thana centre to receive a piped water supply under the Project. The centre has a small existing GoB piped water supply which is operated for about 1½ hours per day and approximately 30 deep hand tubewells used by the general population. The centre is the second largest thana centre in Patuakhali District but has a projected core area population of 5,400 only by year 2020 (reference is made to the Consultant's Population Estimates and Growth Forecasts in 12 Towns, December 1997). Based on the JRT's brief site visit and on interviews of the Thana Nirbahi Officer and local DPHE staff, the JRT has serious doubts as to the financial and administrative feasibility of a piped water supply in Baupal. The situation is likely to be similar in many other relatively small thana centres. The most obvious choice for water supply for the centres is thus deep hand tubewells. Further analyses and investigations are therefore needed before piped schemes are planned and implemented in thana centres.

Under the proposed Local Government Reform Thana/Upazila Parishads will be formed and may be able to operate and maintain piped water supply systems. If the administrative and ownership constraints can be settled it might be worthwhile to construct a water supply in a thana centre as a pilot scheme. In connection with such a pilot scheme the Project may not necessarily aim at the same high level of service as in the pourashavas, but that will depend on housing standard, economic activity and other local aspects of the thana centre in question. The growth centres seen by the JRT are not sufficiently established to warrant a piped water supply.

It should be mentioned that GoB intends gradually to upgrade all thana centres to Pourashavas. Thus, two thana centres within the project area are reported to have been upgraded to pourashavas since the start of the Project.

The JRT recommends as follows:

> *Careful reconsideration of the viability of piped water supplies in thana and growth centres should be made based on an updating of the existing feasibility studies including assessment of operating costs of existing GoB piped supplies and the willingness of users of the existing GoB supplies to pay water charges to the operator of the new thana centre water supplies. In this connection the appropriateness of 24-hours water supply in thana centres should be re-assessed.*

Population Estimates and Projections

The Consultant has prepared a report containing population estimates and projections for those towns and centres proposed for piped water supplies and has also made assessments of the proportion of the population residing in core areas. The report appears well suited for the purpose, but the JRT questions whether the population figures for Feni are correct. As a supplementary exercise to the up-dating of the feasibility studies recommended above, it would be good for the sake of comparison to make population estimates and projections for the thana centres of Greater Noakhali District, based on the same principles. Furthermore, such population projections would facilitate better projections of water demands in the Phase II towns (coverage, number of house connections, etc.), if similar population estimates for the two Phase I pourashavas could be made at the same time. The work involved is estimated at 1½ to 2 man-months for the local consultant and about 2 to 3 weeks for the expatriate consultant involved in the first Phase II report on population.

The JRT recommends as follows:

> *The Consultant should be asked to make population estimates and projections for the thana centres and the two Phase I Pourashavas in Greater Noakhali District according to the same principles as used for population data for Phase II pourashavas and thana centres.*

Hand Tubewells

The Project as well as the involved pourashavas, thana centres and growth centres are all eager to see the Project materialise in the field. The JRT fully understands this.

As per the project implementation schedule, physical implementation activities will be undertaken only in Patuakhali and Noakhali Pourashavas during 1998, and activities in other towns and centres will begin only mid-1999. The piped water schemes in Noakhali and Patuakhali Pourashavas are by far the most complex physical activities in the Project, not the least with regard to the planning of the operation and maintenance of the future schemes.

The implementation in growth centres and small thana centres is much more simple. Installation of hand tubewells is a simple and well known technology. The maintenance of the handpumps will entirely be the responsibility of the users, the knowledge about their maintenance is well known and spare parts are readily available through the private sector. The public toilets, drainage and solid waste components in such centres are small and relatively simple, and there is already a well established tradition for leasing out the maintenance of such facilities, for example to local market committees.

It is the impression of the JRT that the PMUs at present have spare capacity which could be utilised to start activities in growth and small thana centres without piped water schemes. However, before such activities can be started the necessary socio-economic activities have to be initiated. Furthermore, procedures and/or guidelines for tendering,

contract management and supervision, and implementation of hand tubewell activities have to be finalised and approved. The JRT recommends as follows:

> *The implementation in a few thana and growth centres without proposed piped water supplies should start earlier than envisaged. The Plan of Operation should be revised accordingly, and the necessary socio-economic activities in these centres be started soonest possible. The associated project procedures and/or guidelines should be finalised without delay.*

9.8 Arsenic Issues

A number of water samples from shallow tubewells in the coastal area have been analysed for arsenic. These analyses have confirmed that the shallow aquifers in most cases contain arsenic beyond the maximum permissible level of 0.05 mg/l. According to the Project Document, approximately 80% of the hand tubewells to be installed by the Project in Noakhali, Feni and Laksmipur Districts will be shallow tubewells. In Patuakhali and Barguna districts, all the planned hand tubewells will be deep tubewells.

It must be expected that most of the shallow aquifers within the project area will contain arsenic, while the deep aquifers are considered to be free from arsenic. This will have wide implications for the Project and require substantial adjustment of the project strategy and budget. The Project has so far taken a number of initiatives: i) prepared a discussion paper about the implication of the high arsenic content, ii) established a laboratory in Noakhali PMU, iii) constructed two pilot schemes for removal of arsenic from water from hand tubewells, and iv) decided to postpone large scale mapping of the arsenic content in the project towns. In principle the JRT supports these initiatives and agrees with the Project that an arsenic strategy has to be prepared, including an estimate of the extra cost incurred.

The main elements in a project arsenic strategy could be:

- The Project has developed an arsenic removal unit for hand tubewells, and two such units were under construction when the JRT visited the sites. The JRT appreciates the initiative to develop and test arsenic removal units. However, the JRT questions whether the users can and will operate and maintain the units. Thus, it remains to be verified whether the users are willing to pay 10 taka/day/unit for chemicals (aluminium sulphate) to an arsenic removal unit when they have been accustomed to pay typically 5 taka/month/pump for the maintenance of a handpump. For proper function of the units the chemicals have to be mixed with water in a bucket for 20 minutes before poured into the dosage chamber of the unit. Project staff informed the JRT that the chemicals are readily available at the local market, but the same does not seem to apply for some of the required spare parts. The units require careful handling, and it remains to be verified whether a caretaker from the community will be willing to do this without some remuneration. The risks involved in handling and disposing sludge from the arsenic removal units have also to be carefully assessed.

Though the JRT doubts that the units are appropriate for large scale application, the JRT acknowledges that nobody can predict to what extent the users will be motivated to maintain such units. The JRT, therefore in principle supports the Project's attempt to test the developed unit. It is, however important to stress that the testing should be done in a professional manner and not detract too much attention from other project tasks. It could be considered to involve the International Training Network (ITN) Centre at Bangladesh University of Engineering and Technology (BUET) in the testing.

Experience from other treatment plants in connection with handpumps, such as DPHE/UNICEF's iron removal units and pond sand filters, has shown that development and testing under field conditions will require several years of careful work. If the developed units are found feasible for large scale implementation, such an implementation should take place gradually and with much care.

For the above reasons, the JRT concludes that, even if the proposed arsenic removal units will be found feasible, they do not represent a solution to the arsenic problem in the short run.

- In Noakhali Pourashava there is no deep freshwater aquifer, so the fringe areas have to be supplied through extensions of the piped water supply for the core area. Reference is made to section 9.5.

- In other towns, where it is planned to supply the core area with piped water, it seems to be more feasible to supply the fringe areas from deep hand tubewells than to extend the piped scheme to the fringe areas. Extension of the piped schemes to the fringe areas is therefore not recommended.

- The water quality analysis made so far seems to confirm that water in the deep aquifers does not contain arsenic. However, a deep hand tubewell costs 10 times more than a shallow hand tubewell, so the financial implications of replacing existing shallow tubewells by deep tubewells are overwhelming. The Project has suggested as a possible solution to install some deep hand tubewells at central locations and to recommend the population to fetch water for drinking and cooking purposes from such deep tubewells and water for some other purposes from existing shallow tubewells. The JRT finds this idea interesting. However, in the prevailing complex socio-cultural environment such a solution may not be without problems. Thus, will women go to a deep tubewell located at quite some distance from their home? Who will take care of the maintenance of such a deep tubewell? Will an influential person exercise control over the use of the well or will it be possible to establish a user group in connection with such a deep tubewell serving several minor user groups? Will people make the envisaged distinction between the water quality from the deep and the shallow well and use the water accordingly? However, in spite of the above reservations, the JRT finds it worthwhile to test the concept on a small scale. The JRT, therefore recommends as follows:

The Project should on a pilot basis install a total of up to 100 deep tubewells in areas with arsenic in the shallow aquifers in order to provide water for drinking and cooking purposes for a number of user groups, while they continue to get water for other purposes from shallow hand tubewells.

The above pilot activity should be preceded by appropriate socio-economic studies and the effect of the installation of deep hand tubewells should be carefully monitored. The monitoring should include all the issues referred to in the previous sub-para and should also include use and quality of the water. The monitoring could take place every six months. However, as the operation and maintenance entirely will be the responsibility of the owners, the implementation of this pilot activity is not much dependent on local government institutional arrangements. Therefore, the activity does not have to await the approval and implementation of the Local Government Act.

10. DRAINAGE AND SOLID WASTE

The present chapter deals with drainage and solid waste interventions, and in particular with the situation in the two Pourashavas for which plans are already developed.

Whether drainage and solid waste management plans should be made for other pourashavas and thana centres needs careful reconsideration taking into account technical, administrative and financial constraints. The JRT, therefore recommends as follows:

> *Careful reconsideration of the viability of drainage, and solid waste interventions in thana and growth centres should be made based on an updating of the existing feasibility studies.*

10.1 Strategy for Implementation of Drainage Schemes

The 1997 review of Phase I resulted among others in a recommendation to carefully evaluate the benefits of constructing drains in the Phase II towns before investing in such construction. This recommendation was based on findings in the Phase I towns where drains were completely blocked after a short time, and the Pourashavas showed no willingness to clean the drains. Findings of the current JRT in Noakhali and Patuakhali Pourashavas have revealed that in addition to the concern of the 1997 JRT there are also conflicting interests associated with the cleaning up or construction of drains, particularly in respect of availability of water for irrigation of a second annual rice crop in fringe areas of the towns.

In **Noakhali Pourashava** irrigation water is retained during the dry season by blocking the khals and drains every year, which unfortunately also leads to siltation of the drains to such an extent that the silt is not flushed out during the monsoon. This results in increasingly higher bottom levels of drains and khals year by year. Furthermore, the proper drainage of Noakhali also depends on necessary improvements to the khals and canals outside the Pourashava boundaries due to very low gradients of canals leading to the outfall to the sea. Other aspects to consider are that drainage of Noakhali Pourashava also is covered by a Local Government Engineering Department (LGED) project financed by Asian Development Bank (ADB), and that the Pourashava so far has been unable to exercise its powers to prevent blockage of drains inside the town by access roads to plots and by the dumping of waste. Consultations between the LGED/ADB project, DPHE, the Pourashava, and the Danida Project have resulted in a tentative agreement to the effect that the LGED/ADB project takes care of the drainage inside the Pourashava boundaries and that the Danida Project takes care of the khals and canals outside the Pourashava boundaries. The JRT has serious doubts whether the Project can make such a commitment due to: i) the work is outside the physical boundaries of the Project; ii) these khals and canals are not the responsibility of DPHE, but of the Water Development Authority; and iii) the cost is likely by far to exceed the provision in the Project Document for drainage in Noakhali Pourashava. Even if all work is implemented by the concerned parties, the JRT doubts that the effect will be worth the effort due to the need for irrigation water described above.

The JRT recommends as follows:

> *The Project should refrain from making any drainage work in Noakhali because such work is covered by a LGED/ADB project. Drainage work outside the Pourashava boundaries is considered beyond the scope of the Project and should consequently not be embarked upon.*

In **Patuakhali Pourashava** the situation is different from the one in Noakhali Pourashava as at least smaller road drains are kept reasonably clean by the Pourashava, so some willingness to keep the town clean is shown. Irrigation water for a dry season crop in Patuakhali is obtained by making flap gates through the dikes inoperative so irrigation water is available in the fringe areas during high tide. Despite this there might be advantages of improving the drainage of the densely inhabited core areas because the high ground water table impedes the function of pit latrines.

The JRT recommends as follows:

> *A drainage scheme aiming at lowering the ground water table in the core area of the Patuakhali Pourashava should be implemented. The system should, if possible, be kept separated from the drainage of the fringe areas, so tidal irrigation water does not affect the drainage of the core area.*

10.2 Solid Waste Management Plans

So far solid waste management plans have only been made for Noakhali and Patuakhali Pourashavas. While the JRT is in general agreement with the findings in the Consultant's early reports on solid waste management, it is doubtful whether all recommendations in the detailed solid waste management plans are operational. The JRT has serious doubts as to the feasibility of the proposed collection system with project purchased plastic dustbins at each household, to the safety of handling of hospital waste, and to the separation of cleaning of drains from the solid waste handling.

The JRT is further of the opinion that the Consultant has not to sufficient degree evaluated the possibilities for privatisation/leasing out of waste collection activities and landfill site operations. It should also be evaluated whether possible private operators should be paid in full by the pourashavas, or part of their payment could be directly from the waste producers.

The JRT recommends as follows:

> *The CCU/DAG should enter into a dialogue with the Consultant and the pourashavas with the aim of introducing community involvement and privatisation of certain elements of the solid waste management. Implementation of systems with individual household dustbins and oil drum dustbins (as proposed by PMU in Patuakhali) should only be done on a pilot basis.*

10.3 Dumping Sites for Solid Waste and Sludge

Dumping sites for solid waste have been identified both in Noakhali and Patuakhali Pourashavas. In Noakhali the site is on government land, whereas it in Patuakhali is on private land, so the final acquisition of the land is still outstanding. The JRT agrees to the selection procedures developed by the Consultant, but questions the need for expensive development of the sites with earth filling and drains. At both sites there is no shallow aquifer with a water quality suitable for human consumption, and the underlying deep aquifer is protected by a thick sequence of clay layers. Contamination of the aquifer by leachate from the dumping sites is therefore highly unlikely.

The JRT recommends as follows:

> *The Consultant should in consultation with CCU/DAG reconsider whether the proposed development of the dumping sites is justified taking the actual site conditions into account.*

11. SANITATION

The importance of sanitation has been emphasised by several studies in the 1990s which revealed that safe water has less effect on diarrhoea than improved sanitation or better hygiene. For example, a review of epidemiological studies in 1991 by Stephen Esrey revealed that the greatest improvements (a 35% reduction in diarrhoea) was achieved through sanitation, while safe water alone was associated with only a 15% reduction.

This implies that the greatest challenge is the removal of excreta from the human environment through a high level of sanitation coverage coupled with improved hygiene practices such as washing both hands.

11.1 Standard Design of Public Toilets

The public toilets of the Phase I have been the subject of many discussions, surveys and considerations. However, the JRT finds that the Consultant has made good use of the experiences of Phase I and that the sketch design of the proposed public toilets, septic tanks and soak-aways is well documented. At meetings both with DAG and the Consultant, minor comments to the design have been brought forward by the JRT such as: i) the possibility to reduce the size of individual toilet compartments by placing the whole toilet building in a north-south direction instead of turning toilet pans inside the building, ii) the necessity to increase the slope of drainage pipes to 2 - 3% due to the small water quantities used for flushing, iii) whether the use of the applied formula for septic tank design is correct, and iv) the acceptance of the questionable practice of draining soak-away overflows to road side drains.

The PMU completed a study in December 1997 titled: "Investigation into the public toilets in Noakhali Pourashava". The study identified and prioritised the public toilets which will be renovated or constructed (new ones). It noted, among other things:

- 4 of the 16 facilities inspected were abandoned and most of the remaining public toilets suffer from design and/or technical faults. In most of the cases septic tanks and soak aways leak or overflow, and connecting pipes are either broken or missing (6 out of 10).

- The sizes of the septic tanks and soak aways appear to be too small. This problem is exacerbated by the fact that the Pourashavas are not well equipped to empty the filled up septic tanks, and leasing agreements are not clear on the issue of emptying.

The JRT agrees with project staff that before construction of public toilets, the location of dumping sites and procedures for emptying the tanks should be assured with the pourashavas. These procedures could be specified in the contract with the lessees/operators of the public toilets.

The pourashavas can gain considerable income from leasing public toilets to operators. Some questions were raised by project staff about the use of funds from the sanitation

account into which this income is deposited. Consideration could be given to clearer guidelines for the use of funds from this account and accordingly reaching agreement with the pourashavas before construction of items for which the account is to be used. The aspects which might be considered include: i) subsidies for household latrines for the poorest people at the very end of a sanitation programme in an area, ii) repair/renovation of public latrines as needed later, and iii) maintenance of the town dumping sites. The Project has a right or obligation to negotiate on the use of the sanitation account as public latrines are being renovated and constructed free of charge for the pourashavas.

The PMU in Patuakhali had interesting observations about access for poor people to public latrines where payment is required. Specifically, the poor may still have adequate access to public latrines because the attendants may not require the poorest users to pay. This observation could be checked through some simple monitoring.

The JRT recommends as follows:

> *In connection with the detailed design of public toilets consideration should be given to the comments by the present JRT. Specifically in siting the toilets both sociological, engineering and maintenance aspects should be considered in order to ensure satisfactory functioning of the toilets. Emphasis should also be given to ensure good workmanship during construction of the toilets.*

11.2 Community Latrines

The 1997 JRT recommended that community latrines should only be implemented in very rare cases. The present JRT supports this. Furthermore, the JRT doubts that community latrines for 20 households or more will work given the present technology. The community latrines visited by the 1998 JRT had pits which were full and overflowing. There are too many users, usually more than 20 families, for the current multiple-pit system. Furthermore, the users did not know about the function of the junction boxes which had, in any case, not been well constructed. Where to dump the sludge and how to organize payment for this appeared to be another problem. For the latrines visited, the construction quality was doubtful, specifically: the types of pans in some latrines, connections to pipes, too flat slope of pipes, quality of tanks, heavy and expensive roofs, etc. Furthermore, the subsidy system seemed to skew demand so that households pay about 150 Taka per family assuming 20 user families, compared to 600 Taka or more for the household latrine. Furthermore, for the community latrines visited, there was, in fact, enough space to install household latrines in most cases.

Cleaning and above-ground maintenance of the community latrines visited seemed quite good, as was also noted in the impact study. However, the Phase I final report, recommended that the Project in Phase II should discontinue construction of community latrines until a sustainable maintenance system has been established. It should also be added that the technology, construction and subsidy issues noted above should be resolved before construction.

It is useful to distinguish between community latrines, used by more than 10 families, and shared latrines for 2 to 3 families. In fact, it appears that some household latrines is already shared in towns, as indicated in the baseline study. Where space is a problem, it might be useful for the Project first to focus on latrines shared by 2 to 3 households rather than constructing community latrines. The JRT recommends as follows:

> *Community latrines should only be built in rare cases where there is absolutely no room for household latrines and only when timely pit emptying and safe sludge dumping can be ensured. If community latrines are considered, the subsidy should be such that it does not interfere with the demand for household latrines.*

11.3 Household Latrines and Mobilisation and Education Campaigns

Objectives

An urban household latrine programme differs from a rural programme in at least three respects. Firstly, poor urban people often do not have the option of simply digging a pit and then moving to another site when the pit fills, as they lack space for this. Secondly, the problem of low-cost emptying and safe disposal of sludge from pits is a great challenge to address. Thirdly, privacy for women is more difficult to achieve in urban areas, with the result that poorer urban women appear to be controlling their diets so that they defecate or urinate only before sunrise and after or at sunset. A good toilet provides a special advantage to women.

The overall objective of a household latrine programme is usually to improve health by removing human excreta from human or animal contact. Specifically, the household latrine programme could focus on:

- maintenance of sanitary latrines which already exist, including safe pit emptying and dumping;
- achieving a high coverage with sanitary latrines;
- stimulating consistent hygiene behaviours related to latrines including the use by all family members, safe disposal of children's excreta and the washing of both hands. These behaviours are essential for a sanitation programme to have health impact.

Thus, a household latrine programme is not only nor largely a construction programme.

Implementing of the Household Latrine Programme

In some towns, according to the baseline study, about half the households may have access to sanitary latrines. For these it is necessary to have safe and inexpensive procedures for emptying pits and disposing of the waste. This is addressed in section

11.4 below. Keeping the cost low and ensuring that the sludge is deposited at public dumping sites will be challenging. For wealthier households in places where the water table remains below the bottom of the pit for parts of the year, a septic tank with a safe soak-away overflow, or a double-pit pour-flush latrine might be good options as the emptying problem is not so severe.

Step-by-step plans for household-sanitation-with-education have yet to be developed by the Project in collaboration with WATSAN committees and implementing NGOs. The plans should among others be based on experience from Phase I and the experience from the NGOs and private latrine vendors. The plans may differ from one location to another and should be updated as experience is gained. However, the plans should include:

- Mapping/survey and identification of target desegregated groups (poor women, out-of-school children in an area etc.) on the basis of which differentiated objectives can be set with a view to health impact and, at the end of the intervention, survey of those not served with a view to considering some subsidy or other arrangements only for the very poorest.

- Latrine production should be privatised. In the towns, thanas and growth centres there seems to be a sufficient number of private producers of latrine parts. New production centres may therefore not be needed. Implementation through the private sector will help ensure sustainability in the longer-term. Some training of private producers may be needed, however. For example, one private producer who was visited did not know how to make a curved water-seal pipe correctly. At the private producers visited by the JRT, the sale price of latrine parts was Taka 550 to 650 for a platform and 5 rings. The finish of the pan tended to be better among the private producers visited than in those seen in Phase I latrines. A smooth finish offers a big advantage for cleaning. The rings made by some private producers tended to be of smaller diameter than those used in Phase I.

- Subsidies to households should be eliminated. However, if there is no subsidy on latrines, it will be necessary to make it attractive for families to pay and construct their own latrines. For example, the Project could offer mobilisation and education activities, organise group transport for latrine parts, supervision for construction, organising the CBOs to help the indigent, and negotiating discounts by volume of materials purchased. Another obvious advantage will be achieved by the NGO (or other groups) organising advanced instalment payments and/or post-construction credit facilities financed from the NGOs' own funds. The amount of down payment, the amount of each instalment and length of pay-back periods should be determined by the implementing NGO. At the very end of the Project in a town, it may be useful to consider a subsidised campaign meant to reach only the poorest. In other programmes this last campaign of construction for the poorest is financed in all or part by the local government.

Basing a revolving fund for credit on accounts operated by the Pourashavas does not offer sufficient accountability.

Mobilization and Communication

Mobilisation, intensive motivation activities, mapping and saving/credit organisation must receive very high priority. This includes working with many partner institutions. It includes not only top-down delivery of "messages" but also consulting with and listening to potential acceptors as well as providing hygiene education in various forms.

Stimulating safe hygiene behaviours requires personal contact. For this, and for mobilising groups to achieve high coverage, an area-based approach is suggested. This was first suggested by the PMU in Noakhali. An area-based approach usually begins with strong mobilisation including local animators, sub-WATSAN committees, local manufacturers of latrine parts, health communicators, local clubs, schools and staff of NGOs, etc. Basic information activities are planned for all; while more attention is given to higher health risk areas and areas with technical problems. It is possible to organise special activities such as mutual-support groups for digging pits and making super-structures, savings groups and credit groups. Often two (or more) cycles of activities (mobilisation-construction-follow up) are needed in an area which might contain between 400 and 1000 households.

Monitoring is a major function of the PMUs. This would include monitoring of change in coverage and access, consistent use and maintenance (including dumping), as well as indicators of latrine use and hand washing.

The 1998 project activity plan for sanitary latrines does not allow sufficient time for mobilisation, development of NGO capacity and, in general, reflecting the considerations noted above.

In the Project's draft strategy, it was suggested that the latrines would be designed by the DAG advisers. Perhaps this should be done with PMU colleagues and/or with selected local people who have considerable experience with latrine technologies in a particular location. Furthermore, the implementing NGOs could have a sanitary latrine supervisor (not necessarily an engineer) who has experience with latrines and checking of construction quality and looking for the lowest-cost possibilities.

The JRT recommends as follows:

> *The Project should develop, in collaboration with WATSAN committees as well as implementing NGOs, step-by-step initial plans for development of household latrines (with education and mobilisation) for each sub-project. Possible elements of these plans include:*
>
> - *mapping/survey and identification of target desegregated groups (poor women, out-of-school children in an area etc.) on the basis of which differentiated objectives can be set with a view to health impact;*
>
> - *at the end of the intervention, survey of those not served with a view to considering some subsidy or other arrangements only for the very poorest;*

- *area-based programme implementation to ensure a health impact and structuring saving/credit activities among groups of poor families;*

- *intensive mobilisation and education with many partner groups, including a focus on hygiene behaviours;*

- *privatised physical implementation implying elimination of subsidies for latrines and the need to organise savings/credit/instalment payment facilities to reach poorer groups;*

- *gradual development of plans to reach the poorest groups;*

- *investigate the feasibility of two-pits or twin-pit latrines shared by 2 to 3 families.*

Very High Water Table Areas

Some towns such as Patuakhali Pourashava appear to have a large number of sanitary latrines. But this is not, in fact, the case. Many, if not most of the household latrines in the core area of Patuakhali Pourashava, empty directly into small canals at the back of the houses. The extremely high water table means that pits will not leach for several months during the rainy season. In such extremely high water table areas, current latrine technology (5-ring pit with slab) may not always be appropriate. It should be noted that the standard technical solution to design of latrines in very high water table areas is to raise the latrine and create a mound around the rings. This has met with mixed success in other projects and is expensive. The JRT, therefore recommends as follows:

> *The DAG should collect relevant experience concerning latrines in areas with very high water tables (both from Bangladesh and elsewhere), and applied research and small-scale trials should be carried out.*

11.4 Emptying of Pits and Disposal of Sludge

The emptying of pits and tanks together with safe disposal of sludge continues to be a significant challenge. In the two Phase I Pourashavas, pits from community latrines and soak-aways from public latrines were seen to be overflowing. Pits from household latrines in the towns visited are emptied by sweepers who then dump the sludge nearby in fields, canals and ponds. However, the JRT observed that many latrines in Patuakhali Pourashava often empty directly into open canals to the back of the houses.

The JRT has not been informed whether the sample hand tools delivered to the Phase I Pourashavas have been useful, but in addition to these hand tools it is probably warranted to supply more effective emptying equipment. The Consultant proposes to purchase vacuum trucks and let 2 or more pourashavas share a truck due to the high cost of both procurement and operation and maintenance. There are many problems associated with the use of vacuum trucks in towns like the ones covered by the Project,

so the JRT suggests that the option of using a portable electrical submersible dewatering pump instead be evaluated.

Such a pump can easily be transported on a wheel barrow and can pump the sludge over relatively long distances, so the problem of access is overcome with this technology. If there is already an electric installation at the toilet, a socket for electricity supply to the pump should be included in the design of the public toilets and the manholes in septic tanks and soak-aways should be big enough for the pump. A small generator shall be bought for use in areas with no electricity supply, and the pourashava shall control that the pump is not misused for irrigation. The sludge shall be pumped to a plastic or fibre glass tank which can be temporarily fitted on the pourashava truck for solid waste collection and the sludge dumped in holes dug at the solid waste dumping sites as proposed by the Consultant. Such a system is less vulnerable to break-downs than the vacuum truck, easier to operate, and so much more cost effective that one or two pumps can be bought for each pourashava, which would also make it easier to administer.

In addition to the technology issues, are issues of mobilisation and economics. The JRT was informed that it costs around 200 Taka to have a sweeper empty a household latrine pit and dispose of the sludge. Thus an improved technology, which will also render the job safer for sweepers, should not cost much more. This may be difficult given the fact that the sludge from pits should be deposited in safe dumping sites which will usually be further away from households than the present sites. Solutions to these issues should be coupled with strong public information and mobilisation to ensure that newer, safe practices are adapted on a large scale.

While it would be worthwhile investigating experience in other urban and semi-urban areas in Bangladesh, it is doubtful whether current practice elsewhere will be very different from that in the present Project sites. If this is true, then the Project can add significantly to practice and knowledge in Bangladesh by addressing and solving the emptying and dumping challenges. The JRT, therefore recommends as follows:

> *The Consultant should look into the feasibility of the option of using a submersible dewatering pump for emptying of septic tanks and pits and adjust the recommendations in the sanitation report accordingly. Furthermore, the operation and management of the emptying of pits shall be organised in such a way and at costs competitive with current practices, so that people are encouraged to use the service instead of dumping the sludge near the pit.*

12. OPERATION AND MAINTENANCE

This chapter deals with responsibility of the management of operation and maintenance (O&M) of piped water supply and sanitation.

12.1 Institutional Arrangements

Within the Pourashavas, the Parishads will ensure O&M of piped water supply and sanitation activities.

The overall responsibility for policy decisions for water supply and sanitation activities will be vested in a Pourashava Water Supply and Sanitation (WATSAN) Committee being formed by the Pourashava Parishad. The area of responsibility will include planning, implementation, O&M and evaluation of hardware and software activities as for example customer relations, hygiene education, development of water supply, construction of public toilets, distribution of sanitary latrines and cleanliness of drains, streets and roads.

12.2 Composition of WATSAN Committees

The WATSAN Committee will at Pourashava level consist of 11 members with the Pourashava Chairman appointed as chairman. The other 10 members will be as follows:

Pourashava Engineer	Socio-Economic Advisor PMU
DPHE Executive Engineer	Female Commissioner
Technical Advisor PMU	3 elected Commissioners
User Representative	Representative from selected NGO

A Pourashava is divided into three wards. Each ward has a WATSAN Committee consisting of 11 members. The Ward Commissioner is the Chairperson of the Committee while the rest of the members represent the consumers and the civil surgeon's office and will be selected among NGOs, religious leaders, school teachers, etc.

WATSAN Committees should, according to the guidelines for Formation of the Pourashava Committee and Ward Level WATSAN Committee meet once in every 2 months for Pourashava WATSAN Committee and once a month for the Ward level WATSAN Committee.

WATSAN Committees have recently been formed and regular meeting schedules established in Noakhali and Patuakhali Pourashavas. The composition of the committees is identical to the one described in the Guidelines for Formation of the Pourashava WATSAN Committee & Ward Level WATSAN Committee.

Men are dominating in all committees except in ward number 3 of Patuakhali Pourashava where women make up 60% of the Committee. The guidelines do no give any direction on how the members of the WARD committees should be selected or by

whom. It appears that this results in imbalanced committees with regard to gender and political observance.

Many Project staff members have seriously tackled the issue of participation and involvement of women in project activities by stimulating the participation of more women in committees. However, the number of women and their position in, for example, the WATSAN Committees require further attention.

12.3 Power and Responsibility of WATSAN Committee

The WATSAN Committees holds power in accordance to existing rules and regulation for Pourashavas. As the policy making body of the Pourashava the committee is in charge of approval of issues like:

- annual budget for water supply, sanitation and health education activities;
- selection and appointment of water supply, conservancy and health section staff in accordance to rules and by-laws of the Pourashava
- disciplinary actions against the said staff in accordance with the Pourashava rules;
- punishment for defaulters, illegal connection holders and water wasters in accordance with the Pourashava rules.

The Ward level WATSAN Committee is responsible for the promotion and awareness raising of the water supply and sanitation activities including social mobilisation and health education to the wider community.

An important role of the ward level WATSAN Committee will be to act as communication link between the Pourashava WATSAN Committee and the customers as well as potential customers.

As the committees in Noakhali and Patuakhali Pourashavas have not started functioning yet it is too early to comment on the work of the committees and the interaction between the WATSAN Committee and the Pourashava Parishad.

12.4 Institutional Set-Up in Relation to a Sustainable O&M for Piped Water Supply Schemes

According to their organisation, the Pourashavas are in charge of O&M of piped water supply schemes and sanitation activities. However, in the Project Proforma it is foreseen that Pourashavas participating in the Project will require more technical manpower than indicated in the organogram.

The JRT had meetings with the Chairmen of Noakhali and Patuakhali Pourashavas on the management of services operated by the Pourashavas. Most of the revenues for financing such services come from the holding tax. It will therefore be necessary to strengthen the accounts section in particular in administration of infrastructure services. Furthermore, the administration of separate accounts for different services is not normal for the Pourashava administration.

The technical ability to operate a 24-hours piped water supply is not present in the Pourashava organisation. Both Chairmen had an open mind towards privatisation of parts of the services, but, as mentioned by the Chairman of Noakhali Pourashava, no private enterprise has at present the capacity to maintain a piped water supply scheme.

Training programmes for the relevant Pourashava staff should be developed and structured training be given to the concerned staff. The training should comprise preparation of budgets and closing and opening of annual accounts. Furthermore, the account system developed under Phase I of the Project should be introduced in the two Pourashavas.

The experience from Phase I proves that the training of O&M staff for piped water supplies in particular needs careful planning and considerable time. The training of the Pourashavas' present administrative and accounts staff can be done for several water supplies at a time, whereas the training of the technical O&M staff can take place during construction of the particular water supply. Training of treatment plant operators can initially take place at the treatment plants of Chaumohani and Laksmipur followed by training at their 'own' treatment plant when construction is completed. The JRT, therefore recommends:

> *The Pourashavas should employ O&M key staff at the time when rehabilitation or new construction work commences. The technical personnel should then be trained on site during construction. Administrative and accounts personnel should be trained on courses with participation of the staff from several water supplies.*

12.5 Operation and Maintenance in Thana Centres

At Thana Centre level a Union WATSAN Committee will be responsible O&M of all the facilities with the assistance of DPHE Thana Engineer. The exceptions are the hand tubewells and the household latrines, for which the users will be entirely responsible.

The Union WATSAN Committee is chaired by the Union Parishad Chairman and consists of additional 8 members representing the Thana Administration, School Teachers, Religious Leaders and NGOs.

The capacity of this local government institution is however, insufficient for the O&M of a piped water supply schemes. Furthermore, many Thana Centres are situated in two or more unions making the proposed institutional set-up impractical. Under the proposed Local Government Reform, Thana/Upazila Parishads will be formed and may be able to operate and maintain piped water supply systems.

The JRT therefore recommends:

Piped water supplies should not be implemented in thana centres before a suitable legal institution has been established at Thana level.

13. FINANCE AND ADMINISTRATION

13.1 Overall Financial Status

Financial inputs from the Government of Denmark comprise reimbursed project aid (RPA) and Direct Project Aid (DPA), which amounts to Taka 911,927,000 for the first five year project period.

Total utilisation of Danida funds as per 31 December 1997 was Taka 241,768,000 leaving a balance of Taka 670,159,000. The expenditures include procurement of vehicles, boat and operation expenses of PMU and DAG as well as payment of the Drilling Contractor and the Consultant who are paid directly from Danida Copenhagen.

The Project operated without a separate budget for the period January - June 1997, but from July annual budgets (July - June) were introduced.

So far all expenditures have been met as Direct Project Aid and it is the impression of the JRT that only minor budget adjustments should be made in order to accommodate the cost of the laboratory established in Noakhali and the additional staff of PMU Noakhali.

The financial status of the Project including Annex 9 shows the total Danida grant for the first five years of the Project and utilisation of Danida funds up to 31 December 1997. A detailed breakdown of Project expenditures, 'Statement of Expenditure' is also included in Annex 9.

Financial inputs provided by the Government of Bangladesh are in the form of funds for land acquisition, provision of project staff, various kinds of services and provision for Custom Duty and Value Added Tax (CDVAT). The Bangladeshi inputs amount for a project period covering 10 years to Taka 138,000,000. The accumulative GoB expenditures as per December 1997 are Taka 44,583,000 of which Taka 40,701,000 is used for CDVAT.

13.2 Flow of Funds and Accounting Procedures

This section describes in brief the flow of funds and the accounting procedures of the Project including procurement and control of fixed assets. The description is based on interviews of the Chief Accountant of the Project and the accounting manual of the Project, which was completed and handed over to the JRT one day before departure from Bangladesh.

It is the impression of the JRT that the procedures as described in the manual are appropriate for as well the control of funds and assets of the Project as for the financial monitoring of the Project. Minor adjustments may however, improve the financial monitoring of the Project.

13.2.1 Flow of Funds

The flow of funds follows the normal procedures for Danida sponsored projects. Money is transferred from Danida Copenhagen to the Royal Danish Embassy's project account from where funds are transferred via an interim account to the Project's bank account. Funds may however, also be transferred in the form of procurement or payment of services made on behalf of the Project. In such cases original invoices are forwarded to the Project from the Royal Danish Embassy.

The Consultant and the Danish drilling contractor are paid directly from Copenhagen under contracts signed with Danida (StS.1).

Transfer of funds from the Royal Danish Embassy to the Project is made on request of the Chief Project Adviser and, according to the Chief Accountant of the Project, it takes place 'if and when money is needed'.

Funds are transferred by cheque from the DAG to the PMUs on request, preferably on a quarterly basis in order to avoid too many transfers.

The JRT finds this procedure appropriate and suggests it to be followed by the Project too.
The Project maintains an external interim account for transfers between the Royal Danish Embassy and DAG and internal interim accounts for transfers between PMUs and DAG. The accounts are reconciled with the books of the Project on monthly basis by the Accounts and Administrative Officers at PMU level and at DAG level by the Chief Accountant.

13.2.2 Accounting Procedures

The accounting principles of the Project is decentralised project accounting, which, in Danida terms, means that the Project maintains its own accounts and reports its expenditures on a monthly basis to the Royal Danish Embassy. The report to the Royal Danish Embassy is made on budget line level and follows the Danida standard report named FORB2. All vouchers and other supporting documents remain with the Project. A copy of the FORB2 format is included in Annex 9.

The Project is operating on a cash based accounting principle, i.e. expenditures are accounted for at the time of payment. The Project does not maintain balance sheets on fixed assets, accrued expenses or accounts payable.

The Chief Project Adviser has the overall responsibility of the financial management of the Project. This includes the responsibility for cash and bank holdings and other assets recorded in the books, current control of the budget of the Project and establishment of rules for authorization of signatories.

The following project staff is at present authorised to sign for payments on behalf of the Chief Project Adviser:

- At PMU level: Expatriate Advisors (max Taka 100,000).
- At DAG level: Expatriate Advisors and the Chief Accountant.

The Project as well as the PMUs operate bank accounts and to the extent possible payment should be made by cheque. For security reasons cash-in-hand should be kept at a minimum, and a maximum of Taka 50,000.

A local chartered accountant company audits the accounts of the Project.

13.2.3 Procurement

The Project does not collect quotations for procurement under Taka 20,000 whereas quotations from at least three bidders are required for procurement above Taka 20,000.

Quotations may be collected over telephone or called for as sealed quotations. Quotations along with comparative statements must be submitted to the Chief Project Adviser or an expatriate advisor for approval before procurement takes place.

13.2.4 Fixed Assets

Fixed assets are defined as vehicles, equipment, furniture and fixtures used by the Project in its day-to-day operations. Items handed over to beneficiaries as part of project outputs are not considered fixed assets.

The Project maintains a fixed assets register and a computer based data management inventory at DAG as well as at PMU, in which the individual items are registered with reference to location, date of procurement, invoice number and value. Following the cash based accounting principle, fixed assets are expended at the time of purchase and consequently the Project does not operate any depreciation accounts.

However, revenue of any sales of fixed assets will be credited to the respective accounts of expenses and be reflected in the fixed assets register with reference to sales invoice, receipt or other documents of the disposal.

Physical inventory of assets will be based on an annual reconciliation of the assets register and the expense accounts of the Project in which all purchases of fixed assets shall be reflected.

13.2.5 Financial Reporting

The Project operates with two reporting periods: the calendar year January - December with respect to reporting to Danida and the financial year of Bangladesh July - June with respect to reporting to GoB.

The reports to Danida follow normal Danida procedures and consist on the FORB2 format including trial balances of DAG and PMUs offices, ledger cards of interim accounts, bank reconciliation statements and a consolidated financial statement. The reports are forwarded on a monthly basis.

Financial reports to GoB will, per budget line and in total, show the total grant for the 5-year project period, total expenses to date and the total balance of the grant. Furthermore, it will show the current year's (July - June) budget, expenses of the current month and expenses of the financial year to date.

Apart from the above mentioned financial reports, a Target and Progress Report showing physical and financial details of accumulated progress in relation to targets for current year and accumulated progress up to reporting date in relation to the PP. The report will be prepared in a prescribed format supplied by GoB and will serve the reporting requirements to the Annual Development Plan.

The JRT recommends as follows:

> *The Project should further develop the Target and Progress Report in order to support project management in monitoring and comparing physical outputs with actual payments and link up financial data with the Management Information System (MIS).*

14. CROSS CUTTING ASPECTS

14.1 Poverty

The baseline studies seem to have indicated that up to one-half of the population in the towns studied could be classified as poor. Roughly, this seems to refer to two groups:

- the poor who have some small disposable income comprising perhaps about 20 to 35% of the population;

- the very poor without excess disposable income and often without land (roughly 10% to 20% of the population).

Operational definitions of 'poor' and 'very poor' can usually be determined on the basis of local knowledge, for example, through discussions with NGOs and local informants. One project in Asia developed the following definitions:

> 'poor' households have a stated income less than 'X', do not have major electric appliances, own less than 'Y' land, have 2 or less grown males in residence, and usually have a nipa-rooved house. Priority should be given to poor families headed by women or having a handicapped person. No family with a relative working in another country or having 3 or more grown males is eligile. The 'very poor' will be difined as landless families living in 1 room or less.

As the Phase II field implementation activities have yet to begin, the following comments focus on issues which can help ensure a consistent focus on the poor in the future. In the present report, poverty orientation refers to three issues from a systemic point of view: i) is the Project planned with a clear vision of how to ensure that the poor have access to the project benefits? ii) does the Project have the capacity and skills to reach poor groups? and iii) are these capacities and skills applied to ensure that a high proportion of the group is reached?

Systemic Issues

Many programmes in the sector have found it difficult to rationalise a demand-based approach on the one hand, with a poverty orientation on the other. Many development projects set up on a sectoral basis (water, agriculture, health) have found it difficult to reach the poorest sections of the population. In the present Project, a piped water system with mainly household connections tends to serve middle income groups. Eliminating the subsidy for household latrines and having charges for public latrines tends to have the same effect. At least some of the poor, if well-organized, can pay for these services; the very poor probably not. Thus, demand-based services requiring full user payment are indeed more sustainable; however, special plans are needed to ensure their poverty orientation.

Capacity to Reach the Poor

In Phase I and during the first year of Phase II, several initiatives have been implemented to identify and serve poor groups. These include, among others: in-depth hygiene promotion in poor baris, development of health communicators, work with an NGO (ASA) to provide latrines to low income groups such as sweepers and shoemakers. In Phase II, the case studies among the poor in Patuakhali and the fringe area study in Noakhali are good planning initiatives that can also be used to monitor the impact of the Project on the poor at a later stage. In Phase II as well, the baseline studies have shown a relatively low proportion of renters who are usually among the poorest groups. This is an interesting result which, if correct, can have immediate programming implications, for example, in targeting some semi-private connections.

The commitment of the present main project partner - pourashava governments - to serve the poor was not always obvious. For both of these issues, further planning and advocacy are needed.

Ensuring that a Large Proportion of the Poor is Involved.

Many projects reach some of the poor; too few reach a significant proportion of them. The social mapping activities mentioned in section 9.1 can provide clear information about what proportion of the poor is being reached. If, as it appears in some cases, the poorer groups are located in fringe areas, then the current strategy of targeting poor clusters for in-depth hygiene promotion and sanitation should continue. Mapping will also reveal the extent of poor residents in mixed areas and in the town centres. This information can also be an important advocacy tool. Together with this, practical strategies need to be applied.

The JRT agrees with the finding of the Phase I impact study: "a clear poverty targeting is recommended to identify the poor groups and to assess the most feasible facilities". There is, however, probably no single strategy, no magic bullet, but a combination of concrete approaches. For example, cross-subsidies are useful for reaching poorer families with piped water. However, cross-subsidies take some time to implement, particularly when coupled to new metering systems. Working to ensure good penetration of semi-private connections and good site selection for wells in fringe areas will be useful initial efforts in reaching poorer groups. Similarly, the site selection criteria for public standposts could be changed to favour poor households. This deserves some thought as there is suggestions that current site selection criteria for public standposts may lead to misuse of water (for vendors, car washing and so on). Personal counselling with house-to-house visits was used to encourage people to be connected to the piped water supply. Applications were also distributed. This is a service to middle income families requiring about one-fourth to one-third of the time of the field workers at some periods. This should be reviewed as the time could be used better in other ways for targeting poorer groups. Project personnel should perhaps not be involved in this.

While many project staff are committed to poverty orientation, the local government seems to require further advocacy together with joint planning. NGOs may be good partners for ensuring poverty orientation.

Experience in many sanitation programmes is that certain needy groups can not afford to participate, particularly in high water table areas where the cost of technologies increase. Very poor families also need latrines. Furthermore, to achieve health objectives in towns, a high level of coverage is required with latrines that are used and maintained appropriately. In locations where intensive household latrines activities have been carried out, it would therefore be useful to undertake a survey to identify the number and proportion of deserving (poor) households which do not have or use sanitary latrines. The results of this survey could be reviewed from a policy perspective ans could have implications beyond the project area.

The JRT recommends as follows:

> *Special initiatives should be taken to ensure poverty orientation. Examples of such initiatives are:*
> - *for piped water supply: i) working towards introduction of cross-subsidy, ii) ensuring that semi-private standposts are targeted to the poor, and iii) siting public standposts off roads and in slum areas;*
> - *for household sanitation: i) ensuring that saving/credit activities are targeted to the poor, and ii) undertaking a survey at the end of an intensive intervention to identify the needy populations who have not participated and reasons for this.*

The problem of reaching squatters and renters requires further innovative thinking. These are groups who are not usually in a position to invest in their households and whom the local government is not usually willing to serve directly.

14.2 Gender and Participation of Women

Many project staff have seriously tackled the issue of participation and involvement of women in the project activities.

The Project has also stimulated the selection of women for WATSAN committees. Project staff are aware, however, that the number of women, their position and the quality of their participation in some WATSAN committees require further attention. The attitude of some pourashava officials is reported not to be conducive to greater participation of women in committees and in other aspects of the Project. Further advocacy, particularly by male professionals, may be useful. If WATSAN sub-committees are to be organised for sanitation, hygiene, helping to organize applications and site selection for water points/outlets, then some thought should be given to ensuring a quota of women (and poor people) in such sub-committees. For example, the NGO could nominate half the members of the sub-committee, emphasising female participation and committee seats for poor people. The ward WATSAN committees could nominate the remainder of the members, once again with a guideline that the members be chosen

for their representativeness of all the various groups in the area. Based on the above, the JRT recommends as follows:

> *In continuing its efforts to involve women, special attention should continue to be given to the selection of women in WATSAN committees and sub-committees and to ensuring, as a high priority, the posts of health communicators/assistants who work with the Project in each pourashava.*

It has been suggested by some project staff that one or more groups of women masons be established. This has met with success in some other countries when there are not enough locally-trained masons, so that the women are not competing with already established masons. Such plans should be pursued only where the women masons will not compete with existing service providers - a situation which is not likely to occur in any of the project towns and centres.

No matter how good-willed the intervenor, it can be very difficult to involve women or even to talk with them. Often even fairly large groups of women are interrupted by men standing near by. This can interfere with site selection, hygiene promotion, monitoring and just simple conversations. It was observed that some project staff are aware and very capable of dealing with such situations. They could profitably provide short orientation for hardware (and software) staff who are less comfortable or skilled in dealing with such situations.

Gender

At this early stage in Phase II, the understanding and conviction about gender issues appears uneven among staff and project partners. Gender is, of course, about men and women - not only about women. For example, the tea-shop promotion effort tried out in Phase I is a gender-sensitive way of reaching men within the project area. Another example is the attention given to design and location of public latrines to extend the service to women. The JRT supports the DAG suggestion that such training should be mandatory.

Sensitive and participatory gender training should be carried out and include: i) distinguishing women's participation from gender concerns, and ii) identifying where the Project can fail if it does not involve women appropriately. Gender-oriented planning and education should be concretised into commonly agreed activities during Phase II.

The JRT recommends as follows:

> ***Sensitive and participatory gender training should be carried out and include: i) distinguishing women's participation from gender concerns, and ii) identifying where the Project can fail if it does not involve women appropriately. Gender oriented planning and education should be concretised into commonly agreed activities during Phase II. This training should be mandatory for all levels of staff and management.***

14.3 Good Governance

Danida and some DPHE project staff expressed concerns relating to good governance. Good governance refers, among other things, to ensuring the flow of benefits to those intended, transparency, reducing corruption, reducing costs and increasing implementation efficiently. Doubts were expressed in one or another connection about concrete issues such as area and site selection, selection of committee members who are representative (rather than being from one political grouping), and reducing costs of physical implementation. Good governance is a serious issue insofar it affects the local credibility of the Project, as well as its ability to carry out its expressed objectives.

The JRT recommends as follows:

> *Community-based monitoring of activities should focus on specific issues such as area/site selection, applications for water points and the flow of benefits to ensure checks and balances in important Project actions.*

14.4 Environment

Several components of the Project have been designed with the specific aim of improving the environment. This applies directly to the sanitation, drainage and solid waste components. Furthermore, the hygiene promotion component is also envisaged to improve peoples' environmental behaviour.

As stated in chapter 10 the JRT questions whether there is the necessary will among the decision makers at pourashava level to ensure the proper function of the drainage and solid waste activities. The experiences from the two Phase I towns have not been very encouraging in this respect. This issue should be discussed in connection with the revision of the Project Document, recommended in Section 5.5.2.

It is at present premature to assess the environmental effect of the Project's planned sanitation activities.

ANNEXES

ANNEX 1

Danida ref.no. 104.Bang.174
9 January 1998

TERMS OF REFERENCE

FOR

JOINT REVIEW OF THE DPHE - DANIDA URBAN WATER SUPPLY & SANITATION PROJECT, BANGLADESH.

11 – 25 JANUARY 1998

1. BACKGROUND

1.1 General

During 1990-97 the Danish Government has supported the implementation of a first phase Urban Water Supply and Sanitation Project covering the two pourashavas of Chaumohani and Laksmipur. This project aimed at improving the health conditions through water supply systems in core areas, tubewells with handpumps in fringe areas, private and public latrines, drainage, solid waste management system and health promotion campaigns. The first phase project was completed as planned on 30 June 1997.

In August 1992 the Government of Denmark (GoD) and the Government of Bangladesh (GoB) agreed to consider the implementation of two urban water supply and sanitation projects, one in Noakhali, Feni and Laksmipur districts and another in Patuakhali and Barguna districts.

Based on a Preliminary Project Concept Paper (PPCP) for the Phase I Project prepared by the Department of Public Health Engineering (DPHE) in April 1993 and Project Preparation Studies for each of the two project areas prepared by two local consultants engaged by the Royal Danish Embassy in Dhaka, an appraisal was carried out by Danida in September 1993. The appraisal team prepared two draft appraisal reports, one for each project area, which later were combined into one Final Appraisal Report in June 1995.

In August 1996 the GOB prepared a Project Concept Paper (PCP) in line with the recommendations of the Final Appraisal Report, which was approved by ECNEC on 19th December 1996.

A Government Agreement, including a Project Document of December 1996, was signed by the two Governments on 22nd December 1996. A Project Proforma (PP) prepared by DPHE in April 1997 was approved by Local Government Division of

Ministry of Local Government, Rural Development & Cooperatives in June 1997.

A revised version of the Annual Plan of Operation for the Phase II Project, hereafter referred to as the Project, was prepared as per July 1997.

A Plan of Action – General (PLAC-GEN) which covers all project activities for the current year with a detailed activity planning for the first half year and a less detailed planning for the second half year has been prepared covering the period 1st January to 31st December 1998. The PLAC-GEN will be reviewed and updated semi-annually next time as per 1st July 1998.

For each Sub-Project a Plan of Action – Sub-Project (PLAC-SUB) will be prepared in the beginning of the preparation phase of the Sub-Project in accordance with the Implementation Schedule. The PLAC-SUB will include detailed annual activity plans. The annual activity plans for on-going Sub-Projects will be included in the PLAC-GEN. Till now PLAC-SUBs have been prepared for Noakhali and Patuakhali Pourashavas. The latest versions cover the period 1st January to 31st December 1998.

The immediate objectives of the Phase II Project are:

- to ensure availability of functioning water supply and sanitation systems,
- improved behavioural pattern of the beneficiaries with respect to water use and environmental hygiene, and
- financial, technical and administrative sustainability of the involved local authorities, i.e. pourashavas and thana centres.

According to the Government Agreement annual reviews should be undertaken jointly, and the present is the first review of the Phase II Project.

2. OBJECTIVES

The objectives of the Review are:

- to review the project strategy and principles as well as the need and capability of the Project to become an integrated component in the future Danida-assisted Sector Programme Support (SPS) to the Water and Sanitation Sector in Bangladesh,
- to review the project strategy and principles and to assess the need for changes in the organisational set-up required to include the Coastal Belt Rural Water Supply and Sanitation Component,
- to assess the Project's ability to adjust to the changing policy, institutional and economic environment in Bangladesh,

- to assess the capacity and capability of the various project actors to take up their role and responsibilities as envisaged in the Project Document and Draft SPS Document,

- to review the project implementation and especially the extent to which the activities as specified in the Project Document are being planned, implemented and monitored,

- to assess any possible inconsistencies between the Project Document, the Project Concept Paper and the Project Proforma,

- to assess the progress and achievements made since January 1997, including a review of the workplans and budgets given in the Project Document and in the Plan of Operation, and

- to identify general areas and important implementation strategies and modalities where further attention is required, and if necessary, recommend appropriate actions to be taken.

3. OUTPUT

The output of the Review will be a report presenting the Review Team's findings, conclusions and recommendations, and consisting of chapters as reflected in the activities outlined below. The expected output of the Review shall be a report containing among others the following:

a) An assessment of the role, responsibilities and performance of the actors involved in the project, i.e. DPHE, local government authorities in pourashavas, thana centres and growth centres, DAG, PMUs, DHV Consultants BV in association with Aqua and Devcon, Pihl & Søn and the private sector.

b) An assessment of the collaboration between the various actors in the project, i.e. DPHE, DAG, PMUs, Pourashavas, DHV Consultants BV in association with Aqua and Devcon, the Danish drilling contractor and the private sector.

c) An assessment of the requirements for an integration of the urban and rural components into a single Danida-assisted organisation, including the linkages to the existing government institutional setting.

d) An assessment of the Plan of Operation, various plans of actions, semi-annual progress reports, and other technical and specialised project reports.

e) An assessment of budgets and financial management procedures and an update of the overall project budget.

f) A quantitative listing of achievements since the start of the project in January 1997.

g) A qualitative evaluation of the achievements made since the start of the Project in January 1997.

h) An assessment of the follow-up activities from the Joint Review of the Phase I Project undertaken in January 1997.

i) Recommendations for how to solve specific issues as identified under Activities.

4. ACTIVITIES

The work of the Review Team must be based on a study of relevant project documentation combined with field visits to the PMUs in the project areas, consultations with the Royal Danish Embassy in Dhaka, DPHE and other Bangladeshi authorities, the Danida Advisory Group, PMUs, DHV Consultants BV in association with Aqua and Devcon, and Pihl & Søn a/s.

The Review shall be carried out in accordance with Danida Guidelines for Project Review, and shall comprise but not necessarily be limited to the activities and tasks outlined below:

4.1 General Aspects

- assess whether the obligations and commitments made by Government of Bangladesh (GoB) and by Government of Denmark (GoD) are being followed as stipulated in the Government Agreement,

- assess the fulfillment of obligations by DHV Consultants BV in association with Aqua and Devcon and by Pihl & Søn a/s,

- describe and assess possible implications to the project due to an expected introduction of a National Drinking Water Supply and Sanitation Sector Policy and Strategy and the new Local Government Act,

- review the project organisation taking into account the planned Coastal Belt Rural Water Supply and Sanitation Component, and make recommendations for linking the urban and rural components,

- assess whether Growth Centres should be covered under the Urban or Rural Project,

- review the need for revisions of the Project Concept Paper, Project Proforma and Project Document,

- assess whether the risks and assumptions made in the Project Document are still valid, and in case new risks have occured since the Appraisal these could be described,

- assess the coordination with other relevant programmes and projects, and

- any other subject that might appear relevant.

4.2 Project Organisation and Management Aspects

- assess the role and functioning of the Steering Committee,

- describe and assess the role and division of responsibilities of the actors in the Project, including the role of the Engineer, and if relevant make recommendations for improved adjustments,

- assess the capacity and capability of the DAG and PMUs to play the role as envisaged in the Project Document and make recommendations for changes required in the context of the planned SPS,

- assess the project organisation, in particular with regards to the role and responsibilities of the Danida advisers, and if relevant make recommendations for adjustments in line with the planned SPS,

- assess the project planning, reporting and quality assurance,

- assess the performance of DHV Consultants BV in association with Aqua and Devcon, including the provision of services and utilization of long- and short-term consultant inputs,

- assess the justification of any changes made to the contract between Danida and DHV Consultants BV in association with Aqua and Devcon since the start of the Project,

- assess the performance of Pihl & Søn a/s, including the provision of services and utilization of long- and short-term manpower inputs,

- assess the need for additional changes in the contracts between Danida and DHV Consultants BV and E.Pihl & Søn a/s, respectively, and if relevant make recommendations regarding the authority to issue such changes,

- assess the justification of any changes made to the contract between Danida and Pihl & Søn a/s since the start of the Project,

- assess the coordination between DPHE, DAG, DHV Consultants BV in association with Aqua and Devcon and Pihl & Søn a/s, including the timing and phasing of various implementation activities,

- assess the monitoring system and procedures, including indicators, applied by the Project, i.e. bi-annual progress reports, specialised case studies etc., and

if necessary, make suggestions for improvements,

- assess the roles and responsibilities of DAG and PMU, in particular with regard to direct involvement in implementation of handpumps, sanitation, hygiene promotion and other socio-economic activities,

- assess the distribution of work between the consultants, DAG and PMUs, and if relevant, make recommendations for improvements, and

- any other subject that might appear relevant.

4.3 Follow-up on Phase I Activities

- review the status and implementation of water supply and sanitation by-laws,

- assess the follow-up agreements signed with Phase I Pourashavas,

- assess how, and if relevant recommend to which extent, the Project should be involved in tackling the problems caused by arsenic contaminated aquifers in the Phase I Project Area,

- assess the lessons learned from the existing institutional arrangements for sustaining O&M in Phase I Pourashavas which are relevant for Phase II activities,

- assess the performance and state of Phase I piped water supply schemes,

- assess to which extent the Project should be engaged in follow-up activities remaining from Phase I, i.e. repair of poorly constructed public toilets and iron removal plants,

- assess the Leak Detection Report prepared by the Phase I Project, and identify whether any findings and recommendations are relevent for the design, implementation, supervision and operation and maintenance of the future piped water supply schemes to be implemented during Phase II, and

- any other subject that might appear relevant.

4.4 Technical Aspects

4.4.1 Water Supply

- assess and review the detailed designs and cost estimates of the piped water supply schemes made so far by DHV Consultants BV in association with Aqua and Devcon,

- assess the rationale for installing piped water supply in all Thana Centres except

one in Patuakhali and Barguna and hand tube wells in Thana Centres in Greater Noakhali,

- assess and review the hydrogeological planning and its usefulness in the general project implementation,

- assess the hydrogeological investigations carried out by the consultants,

- assess the planning, execution and documentation of the pilot drillings of observation boreholes made by local contractors,

- assess the supervision during hydrogeological investigations and drillings of observation and production boreholes,

- assess the proposed model for achieving sustainable O&M within the authorities responsible for piped water supply in Thana and Growth Centres, and if relevant make reommendations for improvements,

- assess the likelihood of achieving a sustainable management of piped water supply in Thana and Growth Centres, and if relevant recommend meaures for how this can be strengthened,

- assess the appropriateness of extending piped water supply schemes into fringe areas which presently is planned to be supplied by shallow hand tube wells with special consideration given to the situation of arsenic contaminated shallow aquifers,

- assess possibilities for implementing small-scale piped water supply systems in Thana or Growth Centres as an alternative to the proposed hand tube wells with special consideration given to the situation of arsenic contaminated shallow aquifers,

- assess the possibility of using coils of smaller diameter PEL pipes to connect isolated located users to a piped water supply scheme,

- assess the need for handpump tubewells considering the present coverage as compared to the national target in the five-year plan,

- assess the proposed caretaker training, and if relevant make recommendations for improvements,

- review and assess the strategy and guidelines for the project-assisted activities in arsenic contaminated areas,

- review and assess the guidelines for implementation of hand tube wells,

- assess and make recommendations for material standards to be used by the

Project, i.e. British or ISO standards,

- recommend an appropriate timing for the introduction of by-laws for water supply and sanitation, and

- any other subject that might appear relevant.

4.4.2 Drainage and Solid Waste Management

- review the strategy for drainage and solid waste management as formulated in the Project Document and in the January 1997 Review Report as well as the recommendations from DHV Consultants BV, and if relevant make recommendations for improvements,

- assess whether drainage and solid waste management activities should be postponed,

- assess the drainage outline design for Noakhali Pourashava as prepared by the consultants,

- assess the relevance for the Project to implement drainage activities outside the Pourashavas, and

- any other subject that might appear relevant.

4.4.3 Sanitation

- assess the standard design for public toilets prepared by the DHV Consultants BV compared with the Project Document and the recommendations from the 1997 Joint Review Mission, with emphasis on functionality, the lessons learned from Phase I and the suitability of design and siting as viewed by female users,

- review the feasibility of installing community latrines as an alternative to household latrines,

- review the Project's role in promotion and implementation of household latrines, and if relevant make recommendations for improvements,

- assess the involvement of NGOs, and if relevant make recommendations for improvements,

- assess the proposed measures for emptying of septic tanks and latrine pits, and if relevant make recommendations for improvements,

- assess the linkages and coordination with other related sanitation programmes, i.e. the DPHE/Unicef School Sanitation Programme, and

- any other subject that might appear relevant.

4.5 Operation and Maintenance

- assess the formation of the Pourashava and Ward level WATSAN Committees, its composition, power, meetings and functionality, and in particular assess to what extent women are involved in the committees' work,

- assess the institutional set-up in the Pourashavas and Thana Centres and their capacity for sustaining O&M of piped water supply schemes,

- assess the possibility of leasing out O&M and/or billing system of piped water supply schemes to the private sector and NGOs,

- assess the financial and technical ability of pourashavas to operate and maintain solid waste management and drainage systems,

- make recommendations for when health and O&M personel should be employed by the local authorities, and

- any other subject that might appear relevant.

4.6 Socio-economic Aspects

- assess and review the base-line studies and data collected with particular attention to whether these provide quantitative and qualitative information on the needs, priorities and conditions of women,

- assess the strategy for communication, health and hygiene education, and awareness raising activities, and if relevant make recommendations for how these can be improved,

- assess the strategy for ensuring user involvement, including women's involvement in decision making for planning, designing and management of water supply and sanitation facilities,

- assess the involvement of NGOs, and if relevant make recommendations for improvements,

- assess the procedures and practices for selecting sites for handpumps and standposts with special emphasis on poor families and women, and if relevant make recommendations for improvement, and

- any other subject that might appear relevant.

4.7 Role of DPHE and Pourashavas

- assess and review the agreements made between Pourashavas and the Project, and if relevant make recommendations for improvements,

- assess the involvement of the two Pourashavas in Noakhali and Patuakhali while planning for piped water supply schemes, sanitation and hygiene promotion, and if relevant make recommendations for improvements,
- assess to which extent the present model for planning of piped water supply schemes should be continued,

- assess and review the role of DPHE and local government authorities during planning, implementation and operation and maintenance of piped water supply schemes, and

- any other subject that might appear relevant.

4.8 Financial and Administrative Aspects

- provide an update of the overall financial position of the Project, including expenditures compared to progress of work and time schedule,

- suggest, if necessary, revision of budgetlines within the overall budget allocation,

- assess the flow of funds and accounting procedures,

- assess the appropriateness of procedures for control of funds and assets, and

- any other subject that might appear relevant.

4.9 Other Cross-cutting Aspects

- assess to which extent a gender-balanced development process is being promoted by the Project, and if necessary make recommendations for how this can be strengthened,

- assess the participation and involvement of women in the project activities, i.e. female representation in committees, staffing, and if relevant make recommendations for improvements,

- assess poverty orientation and the Project's ability to target poor people and women, including a strategy for slum areas, and if relevant, make recommendations for improvements,

- assess to which extent good governance is being promoted by the Project,

- assess whether any environmental impact assessments are needed before implementation of the project activities, and

- any other subject that might appear relevant.

5. COMPOSITION OF THE REVIEW TEAM

The composition of the Review Team is as follows:

* Mr. Steffen Hvam, Team Leader, Water Supply and Sanitation Engineer, External Consultant to Danida.

* Mr. Sheik Khorshed Ali, Project Director, DPHE Urban Slum and Fringe Project.

* Mr. Sven Olaf Storm, Institutional Specialist, External Consultant to Danida.

* Mr. Hans Egerrup, Urban Water Supply and Sanitation Engineer, External Consultant to Danida.

* Ms. Kathleen Shordt , Social Scientist, External Consultant to Danida.

* Mr. Lars Orio, Trainee, Water Supply and Sanitation Engineer, External Consultant to Danida.

* Mr. Rafiqul Haider, Social Scientist, External Consultant to the Royal Danish Embassy.

* Mr. Luthfe Ali, Hydrogeologist, External Consultant to the Royal Danish Embassy.

* Mr. Jan Møller Hansen, Adviser in Water Resources Management and Water Supply, Danida Copenhagen. (part-time)

The work of the Team will be facilitated by the local authorities and the Counsellor Development, Royal Danish Embassy.

6. TIMING AND REPORTING

The Review shall be carried out in Bangladesh in the period 11 - 25 January 1998 during which the Review Team is expected to visit relevant authorities and project organisations in Bangladesh as well as to carry out field visits in the project areas.

At the beginning of its stay in Bangladesh, the Review Team will have consultations with the Royal Danish Embassy, the Danida Advisory Group (DAG), the consultant DHV and relevant authorities in Dhaka. The Review Team will afterwards visit the Project Management Units (PMU) in Maijdee and Patuakhali and also meet local

authorities, DPHE staff and local beneficiaries.

The Review Team will present its preliminary findings and recommendations to the Royal Danish Embassy, the Ministry of Local Government, Rural Development and Cooperatives, External Resources Division and DPHE before leaving Bangladesh.

The Draft Review Report made by the Review Team shall be submitted to Danida Copenhagen not later than 23 February 1998. The Draft Review Report will subsequently be sent to Dhaka for comments from the authorities of Bangladesh and the Royal Danish Embassy before the Final Review Report is edited. The report language is English.

The Royal Danish Embassy shall produce a Follow-up Memorandum of Understanding, stating recommendations and actions to be taken - by whom and when - in accordance with the Danida Guidelines.

9 January 1998
Danida Copenhagen, S.6

Jan Møller Hansen

List of selected and relevant documents

1. Government Agreement & Project Document.
2. Project Proforma.
3. Joint Review of Water Supply, Sanitation and Drainage Scheme in District and Thana Centres, Phase-1, Chaumohani and Laksmipur Pourashavas, Bangladesh, January 1997.
4. Semi-annual Project Progress Report.
5. Plan of Operation.
6. Plan of Action General.
7. Plan of Action Noakhali.
8. Plan of Action Patuakhali.
9. DHV Progress reports 1-3.
10. DHV report on Water Supply.
11. DHV report on Drainage.
12. DHV report on Sanitation.
13. DHV report on Training.
14. DHV report on Financial Aspects.
15. Various strategies and guidelines prepared by the Project.
16. Leak Detection Report.
17. Danida: Draft Sector Programme Support Document: Water Supply and Sanitation. 1997.
18. Contract: Danida & DHV.
19. Contract: Danida & Pihl & Søn.
20. Report on Observation Tubewells.
21. Report on Hydrogeological Investigations.

ANNEX 2

PROGRAMME OF THE JOINT REVIEW TEAM

10/1 98:	Arrival of the expatriate team members.
11/1 98:	Briefing with Royal Danish Embassy
	Briefing with the Project Director and key DAG staff
	Briefing with DPHE Chief Engineer and relevant key senior staff.
12/1 98:	Briefing with the Joint Secretary and relevant key senior staff, Local Government Division, Ministry of Local Government, Rural Development and Cooperatives.
	Meeting with UNDP/World Bank: Regional Water and Sanitation Group - South Asia, Bangladesh Office.
	Meetings with DHV.
	Meetings with DAG staff.
	Meeting with Project Director.
13/1 98:	Meetings with DAG staff.
	Meeting with Project Director
	Meeting with the Counsellor at the Royal Danish Embassy
	Meetings with DHV.
	Departure for Noakhali.
14/1 98:	Meetings with PMU, Noakhali.
	Meeting with DPHE Executive Engineer, Noakhali.
	Field visits to sites in Noakhali Pourashava.
15/1 98:	Field visits to the Phase I Pourashavas Chaumohani and Laksmipur.
	Field visits to Raipur Pourashava.
	Meetings with PMU staff.
	Meeting with Noakhali Pourashava Chairman.
16/1 98:	Winding-up meeting with PMU staff.

	Short field visits to thana centres between Noakhali and Feni Pourashavas and to Feni Pourashava.
	Departure for Dhaka.
17/1 98:	Meetings with DAG staff.
18/1 98:	Meetings with DAG staff.
	Meeting with team appraising the coastal belt rural water supply and sanitation project.
	Departure for Patuakhali.
19/1 98:	Meetings with PMU staff.
	Meeting with Patuakhali Pourashava Chairman.
	Field visits to Patuakhali Pourashava.
	Field visit to Baupal thana centre and Patuakhali Pourashava.
20/1 98	Meetings with PMU staff.
	Departure for Dhaka.
21/1 98:	Internal JRT meetings and report writing.
22/1 98:	Internal JRT meetings.
	Meeting with Project Director and key DAG staff.
	Meeting with DHV.
23/1 98:	Meeting with Surface Water Modelling Centre.
	Report writing.
24/1 98:	Meeting with Royal Danish Embassy.
	Internal team meetings and report writing.
25/1 98:	Debriefing with the Royal Danish Embassy.
	Debriefing with: i) Joint Secretary and relevant key senior staff, Local Government Division, Ministry of Local Government, Rural Development and Cooperatives, and ii) relevant key DPHE senior staff.
	Debriefing with key DAG staff.

ANNEX 3

Danida ref.no.104.Bang.174
Dhaka, 24 January 1998

DEBRIEFING PAPER

Joint Review from 11 - 25 January 1998

DPHE - Danida Urban Water Supply and Sanitation Project Bangladesh

1. INTRODUCTION

During 1990-97 the Danish Government has supported the implementation of Phase I of an Urban Water Supply and Sanitation Project covering the two pourashavas of Chaumohani and Laksmipur.

Concurrently with the implementation of Phase I, a possible Phase II was identified and appraised. Phase II includes 53 pourashavas, thana centres and growth centres in the five districts of Noakhali, Laksmipur, Feni, Patuakhali and Barguna. A Government Agreement, including a Project Document was signed in December 1996 and the Government of Bangladesh (GoB) approved the Project Proforma in June 1997.

According to the Government Agreement, annual reviews should be undertaken jointly. The present review is the first of these reviews. The review was carried out in Bangladesh in the period 11 - 25 January 1998.

The composition of the Joint Review Team (JRT) is as follows:

Representing GoB:

- Mr. Sheik Khorshed Ali, Project Director, DPHE Urban Slum and Fringe Project.

Representing Danida:

- Mr Jan Møller Hansen, Adviser in Water Resource Management and Water Supply, Danida Copenhagen (part-time).
- Mr. Steffen Hvam, Team Leader, water supply and sanitation engineer, external consultant to Danida.
- Mr. Lutfe Ali, hydrogeologist, external consultant to the Royal Danish Embassy.
- Mr. Hans Egerrup, urban water supply and sanitation engineer, external consultant to Danida.
- Mr. Rafiqul Haider, social scientist, external consultant to the Royal Danish Embassy.
- Mr. Lars Orio, trainee, water supply and sanitation engineer, external consultant to Danida.
- Ms. Kathleen Shordt, social scientist, external consultant to Danida.
- Mr. Sven Olaf Storm, institutional specialist, external consultant to Danida.

A review always has a tendency to concentrate on areas of difficulty. The present review is no exception. This should, however, not detract the attention from the achievements made by the project staff, which are appreciated by the JRT.

The present debriefing paper contains the views of the JRT, which do not necessarily correspond to the

views of the Governments of Bangladesh or Denmark.

2. GENERAL ASPECTS

2.1 **Finding:** Though action has been taken on most of the recommendations from the 1997 review pertaining to Phase II, activities proposed to be carried out during the last half year of Phase I appears not to have been completed in a satisfactory manner (leakage detection, elimination of illegal connections, on the job training of operating personnel, and emptying of pits with hand tools).

Recommendation: The Project should ensure that continuous action is taken on the recommendations of the 1997 JRT for Phase II, and also follow-up on the those recommendations for Phase I which are covered by the present agreement between the pourashavas and the Project.

2.2 **Finding:** The agreements with Noakhali and Patuakhali Pourashavas have not yet been signed. The JRT has comments to some of the paragraphs in the draft agreements. The comments will be handed over to CCU/DAG before the departure of the expatriate team-members.

Recommendation: The draft agreements for Noakhali and Patuakhali Pourashavas should be adjusted in light of the JRT's suggestions and be signed without delay. Tendering for physical implementation should not take place before the agreements are signed.

2.3 **Finding:** Land acquisition has caused problems for the implementation of physical activities, and written agreements for the acquisition of land for the drilling only exist in the case of Noakhali Pourashava.

Recommendation: DPHE should take the necessary action to ensure that access to land for drilling and construction activities is ensured in time for implementation of physical activities.

2.4 **Finding:** Pourashava by-laws on water and sanitation submitted under Phase I is not yet approved by the authorities. Draft by-laws have been commented by Ministry of Law who suggests a number of changes. Until such time when the by-laws are approved and properly introduced in the Pourashavas the staff situation for operation and maintenance of a water supply will remain unsure.

Recommendation: Tendering for construction work should not take place before approved by-laws on water and sanitation for the Pourashavas have been introduced.

2.5 **Finding:** DAG has prepared "Guidelines for Tendering", dated 15 December 1997, which the JRT agrees to in principle. However, the guidelines have not been discussed with or approved by the Project Director. Furthermore, in connection with a revision of the PD and the PP it should be considered whether locally available materials could be purchased by the local contractors (if included in panel of rates), which would relieve the Project of purchasing, storing and issuing local materials. Furthermore, the JRT questions that it is appropriate to negotiate a reduction in tender price with the lowest tenderer in cases where all tenders exceed the upper limit for variation in tender price.

Recommendation: DAG should as soon as possible take the initiative to get all involved parties to agree on a set of guidelines for tender procedures.

2.6 **Finding:** The Local Government Act which is assumed to be placed for the Parliament later this year will introduce thana parishads as local gevernment at thana level and strengthen the capacity of local government at union level.

Recommendation: Intenventions in thana and growth centres should not commence before the Local Government Act has been passed.

2.7 **Finding**: Operation and maintenance of piped water supplies of Thana centres is in the Project Proforma foreseen to be done by the Union WATSAN committees with assistance of the DPHE Thana engineers. The capacity of this local government level is however, insufficient for the operation and maintenance of a piped water supply. Furthermore, many Thana centres are situated in two or more unions making the proposed institutional set-up impracticable. Moreover, some of the Thana centres to be covered by the Project may not be feasible for a piped water scheme from the point of view of social, institutional and economic aspects.

Recommendation: When a suitable institution has been introduced at Thana level it should be reconsidered which of the 17 Thana centres have the capacity, the need and an existing demand for a piped water system. Thus a revision of the existing feasibility study should be carried out soonest possible and before a revision of the Project Proforma and the Project Document takes place.

2.8 **Finding**: There is a need to revise the Project Document and the Project Proforma. Thus: i) there seems to be a 80% overall increase in the budget for hardware implementation, ii) the occurrence of arsenic in the shallow aquifer necessitates changes in the project strategy and budget, iii) the GoB contribution should be increased, iv) the feasibility of piped water and drainage systems should be reconsidered, v) the latrine production and subsidy strategy should be reconsidered, vi) the Local Government Act will have implications on implementation, operation and maintenance strategies, and vi) the coordination of the Danida supported urban and rural projects will require organisational adjustments. However, the detailed information required for such a revision is not yet available.

Recommendation: The first revision of the PP should be done before June 1998 in order to bring the PP in line with the PD. Furthermore, the PD should be revised in connection with the 1999 joint review taking into account: i) the forthcoming Local Government Act, ii) the National Policy for Drinking Water and Sanitation, iii) the Danida Sector Programme Support Document, iv) the planned Danida-assisted rural water supply and sanitation project, and v) the finding of the present review.

3. PROJECT ORGANISATION AND MANAGEMENT

3.1 **Finding**: At PMU level the presence of DPHE Staff has been scarce so far. The full-time Project Managers have only been in office occasionally and assistant engineers have recently been stationed at PMU level leaving the duties of the PMUs to Danida employed project staff only.

Recommendation: DPHE should play a more active role in project implementation in the future. In order to ensure proper management of the Project, the Project Managers should be present in the field at least 80 - 85 % of their time and actively take part in project planning, implementation and monitoring. Until the physical implementation gains momentum, at least four assistants engineers should be attached to each PMU and be gradually increased as the implementation activities increase.

3.2 **Finding**: The DAG mandate to manage the Consultant (DHV, Aqua and Devcon) is not clear. The following questions seem particularly relevant in the present situation: i) can DAG change the outputs specified in the contract, in cases where this has direct or indirect budgetary implication or where it has no budgetary implications, and ii) shall DAG assess the Consultant's activities, including approval of reports?

Recommendation: Danida should clarify DAG's mandate to manage the Consultant.

3.3 **Finding**: DAG and the PMUs have neither a professional back-up nor an independent quality assurance system. Based on the first year of operation, the JRT questions the capacity of the DAG and the PMUs to implement the Project optimally without such a back-up.

Recommendation: DAG and Danida should as soon as possible consider to recruit a Danish consulting company to provide back-up and quality assurance for DAG and the PMUs on a short term basis.

3.4 **Finding**: With the exception of the outline design of piped water supplies and the socio-economic baseline surveys, the work of the Consultant seems in general satisfactory. DHV's quality assurance does not conform to the contract, however.

Recommendation: DHV should without delay explain to Danida how the quality assurance system stipulated in the contract will be implemented. Among others it should be stated how the quality of the Consultant's draft reports will be assured.

3.5 **Finding**: DHV's replacement of the drilling supervisor and the DHV statement that they do not have the full responsibility for supervision of drilling does not appear obvious. DHV intends, with the consent of DAG, to reduce the outputs specified in the contract, such as reducing the number of full socio-economic baseline surveys and the number of solid waste management plans. DHV has further stressed the need to revise the contract due to inconsistencies in the project design and in the revised workplans. Thus, in spite of the reduction of the Consultant's outputs, DHV has proposed an increase of the consultancy budget by DKK 5.2 millions out of which the DKK 3.9 millions pertains to a revised schedule for detailed design of the piped water supplies.

Recommendation: Danida should re-negotiate the contract with the Consultant. The assessment of the magnitude of the Consultant's contractual obligations should be based on the outputs stated in their present contract. Danida should re-assess the Consultant's responsibility in drilling supervision. The detailed design of the piped water supplies should not require an increase of the consultancy budget.

3.6 **Finding**: The approved guidelines for selection of NGOs to assist in project implementation are too complex and detailed and the methodology of contracting NGOs and do not provide adequate flexibility for effective project operation in the field. Nor do the guidelines take into account differences among the towns in which the project operates.

Recommendation: Project Proposals including a detailed budget obtained from short listed NGOs together with field visits to each NGO performed by PMU staff should form the basis for selection of NGOs. The proposals must be based on a TOR made by the PMU in close co-operation with the Pourashava. PMU should be authorised to negotiate and sign contracts with selected NGOs on behalf of the project. Minor contracts with NGOs should not be covered by the shortlisting procedures but be made in direct negotiation with a competent NGO having the capacity and capability to deliver the services required. The project management should determine the financial upper level for such contracts in consultation with PMU. Thus step 3 in the guidelines should be omitted and the appendices in the guide lines be considered as proposals rather than requirements. Payment of services should be based on periodic progress reports including financial statements and work plans for the next reporting period and flow directly from PMU to the NGO concerned. Hence NGO services should not be as considered reimbursable expenditures. Monitoring and review of the activities of the NGOs should form part of the work of PMU.

3.7 **Finding**: The Project is still in the process of developing an appropriate planning and reporting system which at this stage to some extent is too comprehensive and does not provide the flexibility needed for effective project development. Simple step-by-step plans for

implementation of some project components do not exist and software and hardware activities are not linked in all project components. Besides, the Project has yet to establish a monitoring system for assessment of implementation and operational performance (MIS) and to what extent the objectives of the Project are being achieved.

Recommendation: Plan of Action (PLAC) should specify activities which local government institutions are responsible for. Community consultation and mobilisation should be included. Progress reports should be forwarded from PMU to CCU/DAG on a quarterly basis rather than as now on a monthly basis and include achieved progress in relation to plans as well as comments on variances. The number of guidelines should be limited and new ones developed gradually by the PMUs based on field experience with appropriate partners allowing a bottom-up approach. A monitoring system consisting of a MIS system and community based monitoring tools for a very small number of indicators such as: i) use of safe water sources for drinking water, ii) hand washing, and iii) site selection should be developed and tested.

3.8 **Finding:** The Project Proforma and the Project Document differ with regard to the composition of the Project Steering Committee. The Committee, now called the Interministerial Project Implementation and Co-ordination Committee, had its first meeting on 11 November 1997 in which the Royal Danish Embassy and DAG were represented.

Recommendation: The CPA as well as a representative of the Royal Danish Embassy should become members of the Interministerial Project Implementation and Co-ordination Committee which should be reflected in revision of the PP scheduled to take place in June 1998.

3.9 **Finding:** CCU/DAG has the role of reporting to higher level authorities, control the flow of funds and to provide experience to enhance the capacity of project staff. The division of responsibilities between CCU/DAG and PMU are somewhat unclear and do not appear to provide sufficient flexibility in programming.

Recommendation: The CCU/DAG should monitor and co-ordinate overall project implementation, facilitate PMU in developing plans based on field experience and co-ordinate these outputs in common guidelines for the project if and when feasible. Besides, CCU/DAG should provide experience from sources outside the project area to enhance the capacity of PMU staff. The PMU should devote its time to planning and monitoring project activities and to facilitate local government and other partners in management and implementation of project activities.

4. FOLLOW-UP ON PHASE 1 ACTIVITIES

4.1 **Finding:** The by-laws for Chaumohani and Laksmipur giving the legal framework for the pourashavas for operating the piped water supplies and sanitary installations were submitted to MLGRD&C for approval in 1996. MLGRD&C has forwarded the by-laws to the Ministry of Law in 1997, from where comments were received late January 1998. The lack of approved by-laws has, despite the efforts of the Royal Danish Embassy and the chairmen of the two pourashavas, caused severe problems in the two pourashavas because not all staff necessary for operating the water supplies are listed in the present by-laws.

Recommendation: The MLGRD&C and DAG should make all possible efforts to attend to the comments from the Ministry of Law and have the new by-laws approved immediately, so the water supplies can be operated in a safe manner.

4.2 **Finding:** An agreement has been made between the two pourashavas of Phase I and the Project concerning monitoring and advise to be provided by the Project in respect of technical and financial operations of the water supply. The agreement does not contain any provisions for assisting the pourashavas financially, which also would be unnecessary, as it has been

established that water supply and sanitation operations are self supporting through water tariffs and leasing of public toilets. Furthermore, financial support by the Project to the two Phase I pourashavas would jeopardize the opportunity of the Project to monitor the pourashavas ability to maintain and operate the water supply.

Recommendation: No financial assistance for recovering cost of operation and maintenance should be given by the Project to the Phase I pourashavas during the period of monitoring. Advise and training of staff could still be provided through the participation of Phase I operating and administrative staff in training courses for Phase II staff.

4.3 **Finding:** The performance and state of the Phase I piped water supplies are seriously hampered by the high wastage of water. Recent water consumption figures reveal that the wastage and leakage correspond to approximately 40 % of the total water consumption (approx. 700 m3/day for each town). In one occasion during the visit of the JRT the night flow emptied the overhead storage tank before the high lift pump was started and supply could be resumed. Various problems with the motors of the production tube wells have occurred and water supply has been ceased for up to two weeks. Approx. 200 applications for house connections in Laksmipur are pending because it is feared that the capacity of the scheme will not suffice. The leak detection programme carried out in March 1997 has not resulted in greater awareness in the Pourashavas regarding the magnitude of the problem, nor has it resulted in serious work to find and repair leaks in the supply pipes. The Pourashavas only see delivery of spare motors and construction of a new production tube wells as the solution to the problem. The effect of the huge wastage and leaks will most likely have the result that the Pourashavas will have to abandon 24 hour supply in the near future.

Recommendation: The Phase II staff should advice the operating staff for the water works on a regular basis i.e. on a bimonthly basis and promote leak detection and repair activities. Furthermore, the awareness regarding increased running cost due to leakage and waste should be raised. It is not recommended that the project assists the pourashavas with new production boreholes as that would only lead to even higher wastage and operating cost.

5. WATER SUPPLY

5.1 **Finding:** The Consultant has in connection with submission of the "Outline Design" for piped water supplies presented design criteria to be used for detailed design work. The chosen design criteria are not very well documented and are not justified through evaluation of data from existing schemes (in particular the Phase I schemes in Chaumohani and Laksmipur being the only pourashavas in Bangladesh with 24-hours water supply). Furthermore, neither design criteria nor outline design have been submitted for water treatment plants. Similarly, the choice of materials suggested by the Consultant is questionable in some cases, however the JRT supports the recommendation of previous JRTs for Phase I that PVC pipes shall be with rubber ring joints. In meetings between the JRT and the Consultant, the Consultant has admitted that there are shortcomings in what has been submitted so far for the water supply component, and has agreed to submit a new report with well documented and discussed design criteria to DAG for approval before detailed design is started.

Recommendation: The Consultant should prepare a report with well documented design criteria for water supply in pourashavas and thana centres. The report should be scrutinised by DAG assisted by the Danish consulting company suggested in recommendation 3.3.

5.2 **Finding:** In most, if not all, pourashavas and thana centres the GOB operates a piped water scheme supplying government institutions and staff quarters. The supply is operated by Public Works Department and supplies water for some hours per day. Some of these water supplies are very extensive both in area covered and in respect of number of users (e.g. the existing Patuakhali GOB water supply). The intention of the Project is to construct water supplies with

24-hours service covering the core areas of pourashavas and thana centres, and to strengthen the pourashavas to enable them to operate and maintain these water supplies. Recovery of operating cost shall be through water charges imposed on the consumers. PWD is at present bearing the cost of operating the existing GOB water supplies, so government institutions and personnel are not paying water charges. If these GOB water supplies shall be an integral part of the future pourashava water supplies, it will be necessary to make an agreement between the pourashavas and the relevant sections of GOB about the taking over of assets of the existing water supplies and the future payment of water charges. Without such an agreement the financial sustainability of the pourashava operated water supply will be at stake.

Recommendation: The existing GOB water supplies in pourashavas and thana centres should not be incorporated in the pourashava water supplies unless a prior agreement has been made between GOB and the relevant pourashava/thana about payment of water charges. Such agreements are urgently required as the agreements will have implications for the drilling campaign and detailed design work.

5.3 **Finding:** In the Phase I towns it is not possible to identify with clarity the real coverage of the water supplies, or the number and types of households without access to safe water and sanitation. For example, it was variously repeated to the JRT that 33%, 50% and 60% of the core population in the Phase I pourashavas are served by piped water. The recently completed mapping of fringe areas in Noakhali is therefore a useful project initiative.

Recommendation: At the beginning of an intervention in an area, social mapping should be done of existing water supplies, including types of sources, number of user households, households and groups of people without access to safe water sources, etc.

5.4 **Finding:** The present cost estimates for the water supply component which are based on: i) the outline design made at an early stage of project implementation, ii) not very well documented design criteria and materials standards, iii) unit costs for pipes which are not based on most recent tenders for pipes imported into Bangladesh, and iv) preliminary population criteria which later have been revised considerably, indicates that the cost of the water supply component for the entire Project will be 2.5 times the cost estimate in the Project Document. Major cost increases are seen for equipping production tube wells (drilling not included), pipelines and overhead storage reservoirs, which to some extent are partly due to less use of existing facilities than anticipated in the Project Document.

Recommendation: Cost consciousness should be exercised in the development of design criteria and materials standards, and revised cost estimates should be worked out on the basis of such criteria and on recent tenders and population projections.

5.5 **Findings:** Particularly high cost increases are seen for the water supply for Noakhali pourashava owing to the very poor condition of the existing water supply, the arsenic contamination of the shallow aquifer in the fringe area, and the lack of a deep fresh water aquifer. Cost estimates have therefore been prepared for a piped supply also covering fringe areas, which increase the area coverage from about 10 sq. km to 17 sq. km. Sporadic visits to the fringe areas by the JRT have revealed that considerable parts of the fringe areas are very sparsely populated and would result in exorbitant per capita cost if a piped supply is made, whereas some pockets of habitated areas within reason could be supplied by the piped water supply.

Recommendation: The detailed design of the water supply for the fringe areas of Noakhali should be made in a cost-conscious way taking into account: i) the PMU's recent fringe area study, ii) the sociological baseline study, iii) detailed site investigations, and iv) consultations with the pourashava and PMU. Un-served population shall be advised by the Project about alternative safe water supplies such as roof catchment and supply of drinking water from the pourashava water supply through water vendors.

5.6 **Finding**: The fringe areas of Patuakhali are also very sparsely populated, and it would therefore be unfeasible to provide piped water supply for these areas for many years. In Patuakhali the PMU has through a survey of existing deep tube wells (DTWs) verified that there under the Patuakhali pourashava is a deep fresh water aquifer with low iron content, which could be used for water supply of the fringe areas through the drilling of small bore DTWs fitted with handpumps. The Project Document does not contain a provision for such wells. Due to the apparent good water quality of the deep aquifer, siting of deep production tube wells (PTWs) can be done based on the assumption that no iron removal plant is needed, which in turn means that no provision for future extension of the piped water supply into the fringe areas needs to be made, as such extensions can be based on new PTWs and separate distribution networks. This reduces cost of the immediate investment considerably. Another important aspect of the development of the Patuakhali water supply is the quite extensive area coverage of the existing intermittent water supplies. Careful rehabilitation work with the particular aim of reducing leakage and wastage to an acceptable level (less than 20%) need to be carried out before the existing systems are either disregarded due to too poor condition, or connected to the new 24-hours water supply.

Recommendation: Fringe areas of Patuakhali should be supplied with water from deep hand tubewells. The incorporation of the existing piped water supplies into the pourashava supply should be subject to a prior rehabilitation aiming at reducing leakage and wastage to an acceptable level.

5.7 **Finding**: The JRT visited Baupal thana centre which is planned to be the first thana centre to receive a piped water supply. The centre has a small existing GOB piped water supply which is operated for about 1½ hours per day and approximately 30 DTWs used by the general population. The centre is the second largest thana centre in Patuakhali and Barguna districts but has a projected core area population of 5,400 only (by year 2020). Based on the JRT's not very detailed site visit and on interviews of the Thana Nirbana Officer and local DPHE staff, the JRT has serious doubts as to the financial feasibility of a piped water supply in Baupal. Also bearing in mind finding no. 2.6, further analyses and investigations are needed before piped schemes are implemented in thana centres.

Recommendation: Careful reconsideration of the viability of piped water supplies in thana centres should be made based on updating of previous feasibility studies including assessing operating cost of existing GOB piped supplies and the willingness of users of the existing GOB supplies to pay water charges to the operator of the new thana centre water supplies. In this connection the appropriateness of 24-hours supply in thana centres should be re-evaluated.

5.8 **Finding**: Though all the activities stated in the contract with the Consultant have not been carried out, the hydrogeological activities have in general been carried out in a satisfactory manner. The inventory of existing wells initiated by the Patuakhali PMU is appreciated.

5.9 **Finding**: The Consultant proposes to reduce the maximum yield of a production well from 70 to 50 cu.m/hr, which will require more production wells. As a consequence, it is no longer required to install 14" casing as pump chambers. The Consultant have also proposed to establish one stand-by tubewell for each piped water scheme.

Recommendation: The maximum yield of a production well should be 50 cu.m/hr, unless the pumping tests clearly justify a higher yield. The diameter of the pump chamber could be reduced to 12". Establishment of stand-by production wells should only take place if this can safely be done within the budget in the contract with the Drilling Contractor (Phil & Søn).

5.10 **Finding**: The Drilling Contractor charges 30 times more for an exploratory/observation well than the local contractors. The experience with applying local contractors has so far been good,

but the Project does not have the necessary borehole logging equipment to log such wells.

Recommendation: Exploratory/observation wells should preferably be drilled by local contractors. The Project should purchase simple el- and gamma-logging equipment.

5.11 Finding: It has not been foreseen to carry out exploratory wells to assess spatial variations in the groundwater's iron content. The Consultant has proposed 16 observation wells for pumping tests, which may not be adequate for proper pumping test analyses. Furthermore, the Consultant has suggested one observation well per production well to monitor a possible up-coning of saline water. The JRT finds such a number too high.

Recommendation: Unless data from existing wells provide the necessary information regarding spatial variations in the ground water's iron content, some exploratory wells should be drilled for this purpose. The number of observation wells for monitoring a possible up-coning of saline water should be reduced. Additional observation wells should be drilled for optimal interpretation of pumping tests. The proposed change in strategy for drilling of exploratory/observation wells can be done within the present budget for such wells.

5.11 Finding: Though the Project has not yet analysed for arsenic in the existing shallow wells, a large number of these are expected to contain arsenic. Deep aquifers are considered to be free for arsenic. The Project has: i) established a laboratory in Noakhali PMU, ii) constructed two pilot schemes for removal of arsenic from water from hand tubewells, and iii) decided to postpone large scale mapping of the arsenic content in the project towns. In principle the JRT supports these initiatives.

5.12 Finding: The Arsenic issue can be dealt with in the following manner:

- in Noakhali Pourashava there is no deep freshwater aquifer, so the fringe areas have to be supplied through extensions of the piped water supply for the core area;
- in other towns with piped water supplies in core areas, it is more feasible to supply the fringe areas from deep hand tubewells than to extend the piped scheme;
- a deep hand tubewell costs 10 times more than a shallow hand tubewell, so rather than providing safe water from deep tubewells for all purposes, it could be considered providing drinking water from a few centrally located deep tubewells and using shallow tubewells for other purposes;
- the arsenic removal units to be tested by the Project are not considered an option in the short run.

Recommendation: The Project should on a pilot basis install a total of 20 deep tubewells to provide drinking water for a number of user groups, while they continue to get water for some other purposes from shallow hand tubewells.

6. DRAINAGE AND SOLID WASTE

6.1 Finding: The 1997 JRT recommended to carefully evaluate the benefits of constructing drains in the Phase II towns before investing in construction of drains. This recommendation was based on findings in the Phase I towns where drains were completely blocked after a short time, and the pourashavas showed no willingness to clean the drains. Observations of the current JRT in Noakhali and Patuakhali have revealed that in addition to the concern of the 1997 JRT there are also conflicting interests associated with the cleaning up or construction of drains, particularly in respect of availability of water for irrigation of a second annual rice crop in the fringe areas of the towns.

6.2 Finding: In Noakhali, irrigation water is ensured by blocking the khals and drains every year which unfortunately also leads to siltation of the drains to such an extent that the silt is not flushed out during the monsoon. Furthermore, the proper drainage of Noakhali also depends on

necessary improvements to the khals and canals outside the pourashava boundaries due to very low gradients of canals leading to the outfall to the sea. Other aspects to consider are that drainage of Noakhali pourashava is covered by a LGED project financed by ADB, and that the pourashava so far has been unable to exercise its powers to prevent blockage of drains inside the town by access roads to plots and the dumping of waste. Consultations between the LGED/ADB project, DPHE, the pourashava, and the present Project have resulted in a tentative agreement that the LGED/ADB project takes care of the drainage inside the pourashava boundaries and that the present Project takes care of the khals and canals outside the pourashava boundaries. The JRT has serious doubts whether that is possible at all due to: i) the work is outside the physical boundaries of the Project, ii) these khals and canals are not the responsibility of DPHE but of the Water Development Authority, and iii) the cost is likely to by far exceeding the provision in the Project Document for drainage in Noakhali pourashava. Even if all work is implemented the JRT doubts that the effect will be worth the effort due to the conflicting interests described above.

Recommendation: The Project should refrain from making any drainage work in Noakhali pourashava because such work is covered by a LGED/ADB project. Drainage work outside the pourashava boundaries are considered beyond the scope of the Project.

6.3 **Finding:** In Patuakhali pourashava the situation is different from the one in Noakhali pourashava as at least smaller road drains are kept reasonably clean by the pourashava, so some willingness to keep the town clean is shown. However, irrigation water is in Patuakhali obtained by making flap gates through the dikes inoperative so irrigation water is available in the fringe areas during high tide. Despite this there might be advantages of improving the drainage of the densely habitated core areas because the high ground water table impedes the function of pit latrines.

Recommendation: A drainage scheme aiming at lowering the ground water table in the core area of the Patuakhali pourashava should be implemented. The system should if possible be kept separated from the drainage of the fringe areas, so tidal irrigation water is not affecting the drainage of the core area.

6.4 **Finding:** Drainage of thana and growth centres needs to take into account constraints as the ones described under finding 2.6, and also needs to be assessed with due regard to organisation and financing of maintenance of the drains. Similar considerations should be made in respect of solid waste management in thana centres.

Recommendation: The feasibility studies for thana centres mentioned in recommendation 5.7 should be expanded to cover drainage and solid waste management too. Design work and implementation should be postponed until the viability of the investments has been documented.

6.5 **Finding:** So far solid waste management plans have only been made for Noakhali and Patuakhali pourashavas. While the JRT is in general agreement with the findings in the Consultant's early reports on solid waste management, it is doubtful whether all recommendations in the solid waste management plans are operational. The JRT has serious doubts as to the feasibility of the proposed collection system with Project purchased plastic dustbins at each household, to the safety of handling of hospital waste, and to the separation of cleaning of drains from the solid waste handling.

Recommendation: The DAG should enter into a dialogue with the Consultant and the pourashavas with the aim of introducing community involvement and privatisation of certain elements of the solid waste management. Implementation of systems with individual household dustbins and oil drum dustbins (as proposed by PMU in Patuakhali) should only be done on a pilot basis.

6.6 **Finding:** Dumping sites for solid waste have been identified both in Noakhali and Patuakhali. In Noakhali pourashava the site is on government land, whereas it in Patuakhali pourashava is on

private land, so the final acquisition of the land is still outstanding. The JRT agrees to the selection procedures developed by the Consultant but questions the need for expensive development of the sites with earth filling and drains. At both sites there is no shallow aquifer with a water quality suitable for water supply, and the deep aquifer is protected by a thick sequence of clayey layers. Contamination of the aquifer by leachate from the dumping sites is therefore highly unlikely.

Recommendation: The Consultant should in consultation with CCU/DAG reconsider whether the proposed development of the dumping sites is justified taking the actual site conditions into account.

7. SANITATION

7.1 **Finding:** The public toilets of the Phase I have been the subject for many discussions, surveys and considerations. The JRT finds that the Consultant has made good use of the experiences of Phase I and that the sketch design of the proposed public toilets, septic tanks and soak-aways is well documented. At meetings both with DAG and the Consultant minor comments to the design have been brought up by the JRT such as: i) the possibility to reduce the size of individual toilet compartments by placing the whole toilet building in a north-south direction instead of turning toilet pans inside the building, ii) the necessity to increase the slope of drainage pipes to 2 - 3% due to the small water quantities used for flushing, iii) the use of the applied formulae for septic tank design, and iv) the draining of soak-away overflows to road side drains.

Recommendation: In connection with the detailed design of public toilets consideration should be given to the comments by the JRT, and in siting the toilets both sociological, engineering and maintenance aspects should be considered in order to ensure satisfactory functioning of the toilets. Emphasis should be given to ensure good workmanship of the toilets.

7.2 **Finding:** The 1997 JRT recommended that community latrines should not be implemented. The present JRT supports this. The JRT doubts that community latrines for 20 households or more will work.

Recommendation: Community latrines should only be built in very rare cases where there is absolutely no room for household latrines and only when timely pit emptying and safe sludge dumping can be ensured. If community latrines are considered, the subsidy should be such that it does not interfere with the demand for household latrines.

7.3 **Finding:** Step-by-step plans for household sanitation-with-education have yet to be developed. It should be noted that unlike rural areas, many households can not just dig simple pits at various locations on their land plots. Furthermore, tenant groups and squatters are usually unwilling or unable to invest much in latrines.

Recommendation: The Project should develop, in collaboration with WATSAN committees as well as implementing NGOs, step-by-step initial plans for development of household latrines (with education and mobilization) for each sub-project. Possible elements of these plans include:

- mapping or survey and identification of special target groups on the basis of which realistic targets can be set with a view to health impact;
- intensive mobilization and education with many partner groups, including a focus on hygiene behaviours;
- area-based programme implementation with a view to ensuring a health impact and structuring saving/credit activities among groups of poor families;
- elimination of subsidies for latrines;
- organisation of savings/credit;
- privatized physical implementation;
- survey of those not served in an area by the end of the programme with a view to

considering some subsidy or other arrangements only for the very poorest;
- gradual development of plans for landless and tenant groups;
- investigate the feasibility of two-pits or twin-pit latrines shared by 2 - 3 families.

7.4 **Finding:** In some extremely high water table areas such as the core of Patuakhali, current latrine technology (5-ring pit with slab) is not appropriate.

Recommendation: Collection of relevant experience from Bangladesh and elsewhere, applied research and small-scale trials should be carried out.

7.5 **Finding:** The emptying of pits, septic tanks,and soak-aways is causing problem in the two Phase I towns. The JRT has not been informed whether the sample hand tools delivered to those towns have been useful, but in addition to these hand tools it is probably warranted to supply more effective emptying equipment. The Consultant proposes to purchase vacuum trucks and let 2 or more pourashavas share the truck due to the high cost of both procurement and operation and maintenance. There are many problems associated with the use of vacuum trucks in towns like the ones covered by the Project, so the JRT suggests that the option of using a portable electrical submersible dewatering pump instead be evaluated.

Recommendation: The Consultant should look into the feasibility of the option of using a submersible dewatering pump for emptying of septic tanks and pits and adjust the recommendations in the sanitation report accordingly, if necessary. Furthermore, the operation and management of the emptying of pits shall be organised in such a way and at costs competitive with current practices so that people are encouraged to use the service instead of dumping the sludge near the pit.

8. OPERATION AND MAINTENANCE

8.1 **Finding:** WATSAN committees have been formed in Noakhali as well as Patuakhali with a composition identical to the one described in Guidelines for formation of the Pourashava WATSAN Committee & Ward Level WATSAN Committee. Male members are dominating in all committees except in Ward No. 3 of Patuakhali where the females make up 60% of the Committee. The guidelines do no give any direction on who or how to select the members of the Ward committees and it appears that this may result in imbalanced committees with regard to political observance. As a ward of Noakhali and Patuakhali pourashavas may consist of as many as 40,000 inhabitants, the work of the Ward Committee may be beyond the capacity of the committee.

Recommendation: The current WATSAN committee guidelines should be revised with a view to including more poor and/or women representatives. Sub-ward committees should therefore be formed in order to cover the need of the population of the Ward. Selection of members of such committees should be made in such a way that relevant NGOs and clubs in the areas select 50% of the members while the Ward Committee selects the other 50%.

8.2 **Finding:** The JRT had meetings with the chairmen of Noakhali and Patuakhali Pourashavas on the management of various services operated by the Pourashavas. Most of the revenues for financing such services come from the holding tax, so the Pourashavas do not have much experience in collecting service charges from users of facilities. It will therefore be necessary to strengthen the accountancy section in particular in administration of infrastructure services such as water supply and solid waste. Furthermore, the administration of separate accounts for different services is not normal for the Pourashava administration. The technical ability to operate a 24-hours piped water supply is not present in the Pourashava organisation. Both chairmen had an open mind towards privatisation of parts of the services.

Recommendation: Training programmes for the relevant Pourashava staff should be developed

and structured training be given to the concerned staff. The training should comprise preparation of budgets and closing and opening of annual accounts. Furthermore, the accounts systems developed during Phase I should be introduced in the Phase II Pourashavas.

8.3 **Finding.** The experience from Phase I proves that the training of operation and maintenance staff, for the piped water supplies in particular, needs careful planning and considerable time. The training of the pourashava's present administrative and accountancy staff can be done for several water supplies at a time, whereas the training of the technical operation and maintenance personnel can take place during construction of the particular water supply. Training of treatment plant operators can initially take place at the treatment plants of Chaumohani and Laksmipur followed by training at "their own" treatment plant when construction is completed.

Recommendation: The pourashavas should employ sufficient operation and maintenance personnel at the time when rehabilitation or new construction commence. The technical personnel should be trained on site during construction and the administration and accountancy personnel on courses covering several water supplies.

9. SOCIO-ECONOMIC ASPECTS

9.1 **Finding:** It was the intention of the Project to use the baseline studies in Phase II for planning of both hardware and software aspects. Unfortunately, information from the baseline studies has not been available when needed in Patuakhali and Noahkali pourashavas. Seven volumes were handed to DAG in draft form during the third week of January 1998 after the JRT had met with the Consultant to review the baseline studies. These recently completed studies are comprised of in-depth surveys of 5 towns, a marketing survey of one town and rapid assessments in 8 other towns. The consultant has stated that rather than completing in-depth studies of 23 towns, only 11 full studies will be completed with some more limited information on 6 other locations.

The TOR in the Consultant contract detailed the methodologies to be followed. Unfortunately only a limited amount of materials were available to the JRT during its meeting with DHV. From the brief time available to review these during the meeting, however, it did appear that some of the methodologies were not implemented. Specifically, those who did not appear to have been completed seem to have been the most participatory approaches (undertaking with community members social mapping, wealth ranking, participatory resource profiles using matrices). Another element apparently omitted is the production of digitized maps. Very importantly, review and feedback of significant findings from the baseline studies to community members have not been planned or undertaken. Such structured feedback can be an important means for stimulating community participation, building into other project activities. The Consultant did undertake other data collection methodologies stipulated in the contract, specifically, household survey, KAP, focus group discussions, rapid assessment (but not participatory rapid appraisal). The household survey was expanded considerably beyond initial plans, to consist of a two and one-half hour protocol. The Project reported that it did not entirely agree with the application of this extended questionnaire. The JRT also questions whether this will provide the same qualitative information as was implied in the TOR. It is not possible to comment at this moment on the utility of the study as undertaken thus far for the Project.

Recommendation: The Consultant should carry out baseline surveys in all 23 towns stipulated in the contract with Danida. The TOR for the baseline studies yet to be completed should be revised with a view to collecting and organizing data in ways which are most useful to the Project. For example, indicators such as those in the impact study should be listed on a summary page for each pourashava, thana and growth centre. A map should be provided. Feedback to the community and relevant local government organizations of significant information should be ensured.

9.2 **Finding:** Hygiene education in the Project seems to promote a large set of proposed behaviours. Research has demonstrated that programme impact tends to be greater when hygiene promotion is focused and when easily verifiable indicators are developed.

Recommendation: A minimum set of hygiene behaviours and knowledge should be identified and defined, where appropriate, by age, sex and economic group. Simple and verifiable indicators for each group should be defined and monitoring should be tested through local government health staff and NGOs supported by PMU staff.

9.3 **Finding:** The communication capacities and knowledge of participatory approaches of some project staff and collaborators is inadequate.

Recommendation: Before completing detailed communication plans, some communication and participatory training should be made available to all project staff, partners in local government institutions and NGOs. More in-depth training related to participatory techniques, training methods and hygiene promotion as well as field trips may be useful for those working in software aspects. Furthermore, available useful materials and competent sector professionals should be utilised to the maximum extent.

9.4 *Finding:* The PMUs will not be involved in direct implementation but will facilitate and monitor the work of groups such as staff of the local government health units, NGOs and CBOs. The Project staff has limited experience in handling NGOs.

Recommendation: To develop there own capacity for monitoring and supervision, the Project staff should undertake a limited number of small-scale direct implementation pilot activities and should seek advice about the most suitable ways of drafting contracts with NGOs.

9.5 **Finding:** For public mobilisation, the Project plans to work with a larger number of institutions and groups such as WATSAN committees, local government health staff, health communicators, NGOs and CBOs. This multi-dimension input conforms to best practice as has been experienced in Bangladesh.

10. FINANCE AND ADMINISTRATION

10.1 **Finding:** The financial report of December 1997 shows a total utilisation of Danida funds since project start of BDT 42,390,000 including establishment of the arsenic laboratory in Noakhali leaving a balance of BDT 869,537,000. No separate budget was made for the period January - June 1997 but annual budgets have been introduced from July 1997. The Danida account system has from Project start been used to monitor expenditures and the development of a comprehensive financial manual has just been finalised. The system however, does not show physical progress as compared to disbursement.

Recommendation: The Financial Management System should be further developed in order to support project management in monitoring and comparing physical outputs with actual payments and link up financial data with the MIS. Minor budget adjustments should be made in order to incorporate the cost of the establishment of the laboratory in Noakhali as well as it's future running cost. Also the additional staff of two field co-ordinators of PMU Noakhali should be taken into the budget.

10.2 **Finding:** The contracts with the Consultant and the Drilling Contractor do not contain a budgetline for contingencies to be administered by DAG.

Recommendation: Danida should consider that a contingency of 5% of the sums given in the contracts with the Consultant and the Drilling Contractor should be administered by DAG, but the approval of the Royal Danish Embassy should be sought in each case.

11. CROSS CUTTING ASPECTS

11.1 **Finding:** Many project staff have seriously tackled the issue of participation and involvement of women in the project activities and should be commended for initiatives such as stimulating the participation of more women on committees, bringing women professionals into the staff and developing women health communicators. However, the number of women, their position and quality of their participation in, for example, some Watsan committees require further attention.

Recommendation: In continuing its efforts to involve women, special attention should be given to the selection of women in WATSAN committees and sub-committees.

11.2 **Finding:** The good understanding of gender among many staff members is not yet reflected in concrete project activities. Some staff and project partners have less understanding and conviction with respect to gender and participation of women.

Recommendation: Sensitive and participatory gender training should be carried out and include: i) distinguishing women's participation from gender concerns, and ii) identifying where projects can fail when they do not involve women in certain ways. Gender-sensitive education planning should be taken further, for example, identifying relevant contents for tea-shop or market information activities with predominantly male groups. The recommendations from the 1997 JRT related to gender-specific indicators and approaches should continue to be followed.

11.3 **Finding:** After reviewing current plans, it was found that there is a real danger that poor families may not have sufficient access to piped water, household latrines, and public toilets.

Recommendation: Special initiatives should be taken to ensure a poverty orientation. Examples of such initiatives are:

- for piped water supply: i) working towards introduction of a cross-subsidy, ii) ensuring that semi-private standposts are targeted to the poor, and iii) siting public standposts off roads and in slum areas;
- for household sanitation: i) ensuring that saving/credit activities are targeted to poor, and ii) perhaps at the very end of an intervention in a sub-area providing subsidies for the poorest families.

The problem of reaching squatters and renters requires further innovative thinking.

11.4 **Finding:** With respect to good governance, Danida and DPHE project staff expressed concerns relating to issues such as site selection, selection of committee members and flow of benefits. Good governance is a serious issue insofar it effects the local credibility of the Project, as well as its ability to carry out its expressed objectives.

Recommendation: The community-based monitoring of activities, referred to earlier, should focus on specific issues such as site selection and flow of benefits to ensure checks and balances in important Project actions.

ANNEX 4

Project Papers: Guidelines, Strategies, Agreement etc.
Status as per end of December 1997

Output	1st Draft	Comments from			2nd Draft	Comments from		Approved by PD	Final Edition
		PMUs	DPHE	DHV		Pou. Pat	Pou. Noa		
Guidelines for formation of Pourashava and Ward Level WATSAN Committees	X	X	X		X	X	X	X	X
Guidelines for selection of NGOs	X	X	X		X	X	X	X	X
Gender Strategy and Guidelines	X	X	X	X	X	X			
Pourashava Agreement	X	X	X		X	X			
Guidelines for Implementation of Household Latrines	X	X	*	X	X				
Guidelines for Implementation of Public Toilets	X	X	*	X	X				
Guidelines for Implementation of Community latrines	X	X	*	X	X				
Guidelines for Targeting Poor	X	X	*	X	X				
Guidelines for Financing Scheme	X	X	*	X	X				
Guidelines for Monitoring and Evaluation	X	X		X					
Guidelines for Land Acquisition	X	*							
Arsenic Strategy	X	X		X					
Plan of Action (1997-98) for Patuakhali Pourashava	X	X	X	X	X	X	X	X	X
Plan of Action (1997-98) for Noakhali Pourashava	X	X	X	X	X	X	X	X	X
Plan of Action (1997-98) for General Activities	X	X	X	X	X	X	X	X	X
Plan of Operation	X	X	X	X	X	X	X	X	X
Strategy for Information, Education and Communication	X	*	*						
Strategy for Tendering and Procedure	X								
Outline on Supervision	X								
Guidelines for Hand Tube-Wells	X								

* Draft distributed and comments yet to be received.

ANNEX 5

SUGGESTED IMMEDIATE AMENDMENTS TO "TERMS OF AGREEMENT BETWEEN POURASHAVAS AND THE PROJECT"

General comments valid for both Pourashavas:

1. General Pre-Conditions: Last line: "planning, design and implementation of the sub-project. Operation and maintenance is the sole responsibility of the Pourashava."

3. Change heading to "Provision of Land": Add: "In cases where no suitable land owned by the Pourashava is available, the Pourashava shall assist the project with acquisition of private or government land."

5. Change heading to "Water Supply".

   Add somewhere: "Water supply in fringe areas shall be with deep tubewells whenever possible."

   Add somewhere: "The existing water supplies shall be rehabilitated before being connected to the new water supply, and an agreement made with the GOB about payment of water charges by consumers of the presently PWD operated water supply."

6. Drainage: Add at the very end: "prior to the commencement of any construction of new drains."

7. Sanitation: Last sentence to be changed to: "Cost of developing dumping sites to be borne by the project."

10. Pourashava staff input and training: Delete last two lines because the Pourashavas cannot create any permanent positions.

    Add: "Key operational staff to be made available for the Project at commencement of physical construction work."

11. Operation and Maintenance: Replace "commissioning" with "handed over."

13. Bank Accounts: Delete: "Sales amounts from sanitary latrines."

14. Generation of Revenue: Replace first sentence with: "Upon taking over physical components...."

15. Follow-up Phase: Replace "termination" with "completion".

Specific comments for Noakhali: Delete all references to "drains".

ANNEX 6

INVESTIGATION OF WATER CONSUMPTION IN THE TWO PHASE I TOWNS CHAUMOHANI AND LAKSMIPUR

Introduction.

The JRT decided that the trainee participating in the mission should have a separate scope of work as a part of his training. The scope of work was mainly to:

- estimate per capita water consumption in the two Phase I towns Chaumohani and Laksmipur;
- estimate hour peak factor and minimum night flow;
- investigate other relevant issues.

To carry out this investigation the trainee stayed in Majide in order to collect the necessary data at Chaumohani and Laksmipur treatment plants while the rest of the JRT visited Patuakhali.

Water Consumption

Since there are no water meters in the two towns it has been necessary to estimate water consumption by making a water balance. The following data were used:

1) Number of household users.
2) Consumption and number of users at commercial connections such as hotels, restaurants, schools, mosques, public toilets etc.
3) Consumption at public stand posts (PSP).
4) Total wastage and leaks. An estimated figure based on night flow measurements.
5) Total supply of water. Water meter readings recorded daily at the outlet of the overhead tanks.

The water balance calculations show that the water consumption per capita can be estimated to be in the range 92 to 128 litres per day. The two tables below summarises:

Table 1

Chaumohani Jan. 1998	Users	Consumption [l/day/user]	Total Consumption/Supply [m^3/day]
Domestic	7740	92-117	687-869
Commercial/institutional	14910	35-23	524-342
Wastage and leaks, 24 hours at 30 m^3/h			720
Total supply, average daily supply between 1/11/97-1/1/98			1931

Table 2

Laksmipur Jan. 1998	Users	Consumption [l/day/user]	Total Consumption/Supply [m^3/day]
Residential	6272	106-128	665-801
Commercial	11602	37-25	425-289
Wastage and leaks, 24 hours at 30 m^3/h			720
Total supply, average daily supply between 1/11/97-1/1/98			1810

The consumption from public stand posts amounted to:
- Chaumohani: 32 m3/day
- Laksmipur: 17 m3/day

which corresponded to 1-2% of the total supply.

The figures in Tables 1 and 2 are very uncertain given the uncertainty of the data used. It should be noted that:

ad 1) The number of users is fixed in the calculation, but of course not in reality. The data used have been collected during a comprehensive survey /1/. A number of new households have been connected after completion of the survey, the number of persons served from the new connections is unknown. The average number of users per connection (nine) from the survey has been added to update the figures.

ad 2) Examples of commercial/institutional users are: restaurant guests having meals, pupils attending school, muslim worshippers washing themselves before praying etc. The number of users of the commercial connections are estimated in /1/ (again average number of users per connection has been added as above). The

consumption figures are estimated using typical water requirements for the specific commercial connection. Two sets of consumption figures have been stipulated (see data section at the end of the annex). These two sets of water requirement gives a range of commercial consumption which again results in the range of consumption per residential user.

ad 4) The night flow measurements are further described in below. The figures used are slightly lower than measured in January 1998 (34-38 m^3/h), because some consumption at night during Ramadhan is likely. On the other hand the assumption that the flow of wastage and leaks is constant during 24 hours is unlikely. Wasted water during daytime is probably less than during night time.

ad 5) The water meter readings are reliable data. All water passing through the meter is supplied to the system.

To put the water balance calculation in perspective data from /2/ on Hotel New Janata in Chaumohani shows a daily consumption of approx. 2 m^3 (1 day) whereas the calculations shows 16 - 22 m^3.

The impact study /3/ investigated consumption of 12 connections using water meters. The study found that the consumption varied from 45 l/cap/day to 193 l/cap/day with an average consumption of 141 l/day/cap. These figures would include wastage since the impact study did not look into technical issues. Since the data from the impact study does not include wastage then, if 10-20 % of the supply is deducted, they are of the same magnitude as the figures from the water balance calculations.

Above figures does still, however, indicate that the design criteria of 90 l/cap/day was estimated on the low side.

Peak Factor & Minimum Night Flow.

Water meter readings at the outlet of the overhead tanks for 24 hours have been carried out in both Chaumohani and Laksmipur. The tables below summarises:

Table 3, Chaumohani:

Date	Total supply [m^3/day]	Minimum Night Flow [m^3/h]	Peak Flow [m^3/h]	Peak Factor (hour)
02-03-97 /2/	1746	27	105	1.70
07-03-97 /2/	1664	27	106	1.87
16-01-98	1985	40	121	1.90
17-01-98	2020	36	137	2.10

Table 4, Laksmipur:

Date	Total Supply [m^3/day]	Night Flow [m^3/h]	Peak Flow [m^3/h]	Peak Factor (hour)
07-03-97 /2/	1801	27.6	134	2.24
08-03-97 /2/	1648	27.6	125	2.37
26-12-97	1788	34	140	2.62
17-01-98	1824	34	152	2.81

The peak factors seems to be high for this size of water supply systems. The peak flows measured in December 1997 and January 1998 are higher than the previously measured peak flows.

The leak detection report /2/ and the Superintendent of the treatment plant in Laksmipur states that night flow measurement might not reveal the actual wastage and leaks since storage tanks are filled at night (according to the Superintendent this happens because of low pressure during daytime). To investigate this issue a visit to the highest roof storage tank in the Laksmipur system was carried out. The visit took place at 1:30 PM i.e. at peak hour and it was observed that the roof tank was almost full and water was flowing into the tank. It is therefore very likely that recorded minimum night flow gives a good estimation of wastage and leaks.

The 24-hour recordings have been used to estimate the necessary overhead storage capacity if pumping is carried out for 16 hours. For both towns and the capacity needed is approx. 20 %. This figure can be used in designing storage tanks for the Phase II water supply schemes, it should, however, be noted that frequent power failures could hamper 16 hour pumping. See storage determination calculations in the data section.

Other relevant findings.

24-hour Water Supply Raises the Total Amount of Water Supplied.

In /4/ it is stipulated that 24-hour water supply is not raising the amount of supplied water. However, the collected data show that 24-hours supply does raise the amount of supplied water. In Chaumohani intermittent supply of 12.5 hours per day was introduced from July 8, 1997 to October 14, 1997 following a period of total stop in water supply.

The average supply in October, during intermittent supply, was approx. 1650 m^3/day. The average supply increased to approx. 1800 m^3/day by November 1, 1997 and is by January 1, 1998 approx. 1950 m^3/day.

The increase is most likely due to wastage and leaks. The 300 m^3 increase in supply corresponds very well 11.5 hours of the estimated 30 m^3/h wastage and leaks.

The Overhead Storage Tanks are too Small!?

The overhead storage tanks have a capacity of 400 m^3 which is approx. 20 % of the total daily supply. Normal procedures at the treatment plants is supposed to be that the overhead tank is filled by pumping in the evening and that pumping is resumed early morning.

During night flow measurements in Chaumohani a small supply (~18 m^3/h) was metered between 6:00 and 7:15 in the morning. Since this figure is highly unlikely the supply must have been interrupted i.e. the overhead tank must have been empty before the pump driver started the high-lift pumps in the morning.

This is another drawback resulting from the huge wastage and leaks.

Possible New Customers for the Piped Supply in Laksmipur.

200-300 households have applied for connection to the scheme in Laksmipur. According to the Superintendent these household are currently not being connected because of fear for not being able to supply the needed amount of water.
This is another drawback resulting from the huge wastage and leaks.

Coverage of Phase I Pourashavas.

In the Draft Project Completion Report the coverage of the piped water supply is estimated to 61% in Chaumohani and 68 % in Laksmipur. It is furthermore stipulated that approximately 40,000 people are receiving drinking water in the core areas of Chaumohani and Laksmipur. The population in the core area of Chaumohani and Laksmipur is 35,000 and 25,000.
The percentages have then been calculated using the figures in /1/. The total number of beneficiaries according to /1/ is 21.295 in Chaumohani and 17.319 in Laksmipur.

As it can be seen in Tables 1 and 2 above approx. 2/3 of the people served in both Pourashavas are using water at the commercial connections. If only residential consumers were used in the coverage calculation the coverage would be less than 25 %.

Similar figures are found in the CARU final report /6/, where it is estmated that a total of 21,000 people receive safe drinking water from the piped scheme. Out of the 21,000 people, 4,000 are commercial customers and other 4,000 are using standpost water. Stand post water users are mainly shopkeepers and floating population and should therefore not be included in the coverage percentage. These figures also give a coverage percentage of less than 25% presuming a total core area population of 60,000 in the two porashavas.

In fact, in the CARU final report /6/ it is estimated that a total of 21.000 (corresponding to 35 % coverage) receive safe drinking water from the two piped schemes.

Persons met

The following persons were contacted

Chaumohani:	Bill Clerks
	Plumber
	Plant operators
Laksmipur:	Mr. Shams Uddin, Superintendent
	Bill Clerk
	Plant operators
Majide:	Mr. Niller Jensenius
	Mr. Torsten Berg
	Mr. Rafique Ullah.

References

/1/
Survey carried out by Mr. Ahazar Ali & Mr. Rafique Ullah during Phase I. Not published.
The survey contains data on: Name of customer, location, type & size of connection, people served, storage tanks.

/2/
Water Supply and Drainage Scheme in District and Thana Centres. Leak Detection Programme. May 1997. Rambøll. Danida reference: 104.Bang. 102

/3/
DPHE- Danida Water Supply & Sanitation Project in Chaumohani and Laksmipur Pourashavas. Impact Study 1997.

/4/
Follow up: Laksmipur and Chaumohani Waterworks. Ashraful Habib. October1997. Not published. Internal report for DPHE-Danida Urban Water & Sanitation Project.

/5/
Draft Project Completion Report. Water Supply and Drainage Scheme in District and Upazila Centres. Phase I - Chaumohani and Laksmipur Pourashavas. 1997

/6/
DPHE- Danida Water Supply & Sanitation Project in Chaumohani and Laksmipur Pourashavas.
CARU Final Report, July 1997.

Data Section

Typical water requirements for the commercial connections:

Commercial connection:	Consumption/"user"	Consumption/"user"
Hotel	50	40
Hotel & restaurant	40	25
Restaurant	35	20
Cinema	10	2
Office	25	2
Hostel	30	30
Mosque	25	25
Confectionery	25	25
Tea shop	20	10
Public toilet	20	10
School	20	2
Library	5	2
Fish Market	30	30
Hospital, Laksmipur	200	200
Shops	30	30
Tobacco manufacturer	50	50

Average consumption/day from November 1, 1997 to January 1 1998:

Choumohani

Date	Meter Reading (m3)	Average Consumption/Day (m3)
01-11-97	447,381	
01-01-98	565,170	1931

Laksmipur

Date	Meter Reading (m3)	Average Consumption/Day (m3)
01-11-97	477,100	
01-01-98	587,480	1810

24-hour readings 17-18/1/1998 & storage determination, Chaumohani

Time	Water meter	m3	m3/h	Acc.	Pumping	Storage
07:00	596642			0	0	0
08:00	596715	73	73	73	126	53
09:00	596830	115	115	188	252	64
09:15	596867	37	148	225	283	58
10:00	596946	79	105	304	377	73
11:00	597067	121	121	425	503	78
12:00	597179	112	112	537	629	92
13:00	597298	119	119	656	755	99
13:32	597363	65	122	721	822	101
14:00	597426	63	135	784	881	97
14:30	597502	76	152	860	944	84
15:00	597563	61	122	921	1007	85
16:00	597675	112	112	1033	1132	99
17:00	597779	104	104	1137	1258	121
17:30	597845	66	132	1203	1321	118
18:00	597898	53	106	1256	1384	128
19:00	597989	91	91	1347	1510	163
20:00	598068	79	79	1426	1636	210
21:00	598136	68	68	1494	1761	267
22:00	598206	70	70	1564	1887	323
23:00	598275	69	69	1633	***2013***	***380***
24:00	598332	57	57	1690	2013	323
01:00	598377	45	45	1735	2013	278
02:00	598414	37	37	1772	2013	241
02:15	598424	10	40	1782	2013	231
02:30	598433	9	36	1791	2013	222
02:45	598443	10	40	1801	2013	212
03:00	598452	9	36	1810	2013	203
04:00	598492	40	40	1850	2013	163
05:00	598546	54	54	1904	2013	109
06:00	598597	51	51	1955	2013	58
07:00	598655	58	58	2013	2013	0

Storage volume Chaumohani: 380/2013 = 19 %

Storage volume Laksmipur (next page): (32+363)/1788 = 22 %

Calculations for storage determination deducting e.g. 20 % of supplied water (to account for reduced wastage and leaks does not alter the result significantly.

24-hour readings 26-27/12/1997 & storage determination, Laksmipur:

	Water meter	m3	m3/h	Acc. Cons.	Pumping 7:00-23:00	Storage [m3]
07:00	569390			0	0	32
07:30	569441	51	102	51	56	37
08:00	569492	51	102	102	112	42
08:30	569547	55	110	157	168	43
09:00	569599	52	104	209	224	47
09:30	569649	50	100	259	279	52
10:00	569702	53	106	312	335	55
10:30	569756	54	108	366	391	57
11:00	569821	65	130	431	447	48
11:30	569876	55	110	486	503	49
12:00	569942	66	132	552	559	39
12:30	569999	57	114	609	615	38
13:00	570064	65	130	674	671	29
13:30	570134	70	140	744	726	14
14:00	570203	69	138	813	782	1
14:30	570259	56	112	869	838	1
15:00	570316	57	114	926	894	0
15:30	570362	46	92	972	950	10
16:00	570406	44	88	1016	1006	22
16:30	570452	46	92	1062	1062	32
17:00	570497	45	90	1107	1118	43
17:30	570542	45	90	1152	1173	53
18:00	570576	34	68	1186	1229	75
18:30	570606	30	60	1216	1285	101
19:00	570633	27	54	1243	1341	130
19:30	570650	17	34	1260	1397	169
20:00	570686	36	72	1296	1453	189
20:30	570712	26	52	1322	1509	219
21:00	570740	28	56	1350	1565	247
21:30	570768	28	56	1378	1620	274
22:00	570794	26	52	1404	1676	304
22:30	570820	26	52	1430	1732	334
23:00	570847	27	54	1457	1788	363
23:30	570870	23	46	1480	1788	340
00:00	570891	21	42	1501	1788	319
00:30	570911	20	40	1521	1788	299
01:00	570930	19	38	1540	1788	280
01:30	570948	18	36	1558	1788	262
02:00	570966	18	36	1576	1788	244
02:30	570985	19	38	1595	1788	225
03:00	571004	19	38	1614	1788	206
03:30	571022	18	36	1632	1788	188
04:00	571039	17	34	1649	1788	171
04:30	571058	19	38	1668	1788	152
05:00	571075	17	34	1685	1788	135
05:30	571095	20	40	1705	1788	115
06:00	571118	23	46	1728	1788	92
06:30	571148	30	60	1758	1788	62
07:00	571178	30	60	1788	1788	32

ANNEX 7

BRIEF DESCRIPTION OF KEY INDICATORS AND BEHAVIOURS: AN EXAMPLE OF PRIORITISATION

WATER

- site selection procedures followed;
- proportion functioning;
- number of trained caretakers/health communicators;
- maximum time to make repairs is X days/number of repairs made by caretakers by gender;
- user payment (amount, timeliness);
- use of safe water for domestic purposes (drinking, beetle washing, pump priming, bathing infant);
- quantity used from safe sources (lpcd, especially for poorer families);
- poor have access to safe water sources (including piped sources in core areas);
- pourashava use of sanitation and water bank accounts as intended;
- O&M personnel in place and paid on time.

SANITATION

- proportion of population with access to sanitary latrines;
- timely emptying and safe dumping;
- water seals intact;
- knowledge of women and men about causal relationships between health, hygiene, water and sanitation;
- latrine cleanliness: visible excreta;
- use of latrines (by poor families, by all members of the family above 4 years);
- disposal of excreta of infants and toddlers;
- handwashing;
- key hygiene behaviours by age and sex.

ANNEX 8

WELL DESIGN CALCULATIONS

The following calculations are based on the information collected by the JRT during its mission. They should be considered a examples of how such calculations could or should be carried out. They should not be used directly by the Project or by the Consultant without verification.

1. CAPACITY OF PRODUCTION TUBEWELLS

Reference is made to page 6 of Consultant's hydrogeological report dated June 1997.

The Consultant states 2 limiting factors for the well discharge - flow velocity at the screen and flow velocity at the borehole face (boundary between gravel pack and formation). This statement is correct under normal conditions, but probably not for the coastal belt where well discharge needs to be restricted in order to prevent possible saline intrusion.

The JRT supports the Consultant's recommendation to limit well discharge to between 50 cu.m/h and 70 cu.m/h depending on the number of wells in the well field in order not to have a deep composite cone of depression to allow saline intrusion. But the flow rate of 50 cu.m/h appears underestimated with respect to clogging as shown below:

Sichardt developed a relation for maximum permissible well capacity for the danger of clogging as:

Q = 2 p r h (sqrt k / 30) where Q is the maximum permissible discharge for a permanent well in cu.m/sec, r and h are the radius and exposed length of the gravel pack and are in meters, k is the coefficient of permeability of the formation in m/sec and p stands for pie=3.14 and sqrt for square root. For the project gravel pack wells, r = 0.18 m and h = 30 + 05 + 05 = 40 m. Therefore:

Q = 1.51 * sqrt k cu.m/s = 5500 * sqrt k cu.m/h

= 60 cu.m/h for k = 10 m/d

= 85 cu.m/h for k = 20 m/d

= 105 cu.m/h for k = 30 m/d

Existing information indicate that the permeability of coastal aquifers ranges between 10 and 20 m/d and over. The Consultant found even higher k values for Chaumohani aquifers and assumed 25 - 50 m/d for Raipur. Therefore in the coastal belt consideration of saline intrusion is more critical than well clogging and that 70 cu.m/h well discharge may be feasible for a well field with fewer wells. However where demand is small, say up to 70 cu.m/h, it is advisable to install 2 nos 50 cu.m/h well rather than 1 no 70 cu.m/h as minimum 2 wells for supply safety reasons are needed for a scheme. A demand of 140 cu.m/h can be met by 2 wells of 70 cu.m/h instead of 3 nos 50 cu.m/h depending on aquifer properties.

2. TYPES OF TUBEWELLS

Reference is made to page 7 section 2.4 of the Consultant's hydrogeological report dated DHV June 1997.

There are two types of production wells: production tubewells (PTW) of size 14"/6" and production test tubewells (PTTW) of size 8"/4". The Consultant assumed 300 m long 4 in. rising main for PTTWs and calculated the head loss to be about 15 m. Actually the length of rising main will be about 275 - 30 for pump chamber - 20 for screen as full flow will occur at the top of the screen = 225 m. A calculation using the graphs prepared by the British Water Engineering Practice gives the following head loss (HL) for moderately smooth PVC and iron casing. A 20% lower smoothness has been used for PVC than the book suggested:

Flow rates cu.m/h	HL (4" PVC) metres	HL (4" Iron) metres
50	8.2	13
40	5.7	10
30	3.0	5

The head loss in 6" dia 225 m long PVC casing for 50 and 70 cu.m/h are approx. 1 and 2 metres respectively.

Therefore the JRT agrees with the Consultant that conversion of PTTWs into production tubewells is not feasible. However the first consignment of 4" casing pipes can be used in smaller towns for flow rates not greater than 30 cu.m/h, but it would be better to install 6" screened PTWs in all cases.

3. FRESH AQUIFERS FOR NOAKHALI POURASHAVA

Reference is made to page 19 section 4.2.4.1 of the Consultant's hydrogeological report dated June 1997.

The Consultant states that the exploitation of fresh water aquifers north of Noakhali Pourashava must be considered as mining. The JRT questions this. The existing deep well hydrographs and other reports indicate that the coastal fresh water aquifers receive recharge from the inland. This is a function of aquifer transmissivity and hydraulic gradient. The electric logs conducted in the four drilled observation tubewells indicate good transmissive aquifers and as such are able to induce recharge from distances when hydraulic gradient steepens due to pumping. The volume of water calculated by the Consultant is sufficient for many years but in reality all these fresh waters, overlain and underlain by brackish/saline water, are not available for development as any significant drop in piezometric level will cause saline intrusion. Long term pumping test data and monitoring of water table and piezometric surface will give more insight for the long term safe yield. The fresh water aquifers north of Noakhali Pourashava appears not

confined by clay layers but the higher artesian pressure is the protector against saline intrusion. Consequently, in order to prevent or delay the salt water encroachment the composite drawdowns should be kept as low as possible. In order to achieve this, well discharge and the well spacing are rather important.

4. WELL SPACING

Reference is made to section 4.2.4.4 of the Consultant's hydrogeological report dated June 1997.

The Consultant used Thiem equation (please note the term In (r/R) shown in annex 2 of the Consultant's report should be In (R/r) and that p stands for pie =3.14) for calculating well spacing and accordingly calculated aquifer drawdown and interference drawdown of the pumping wells. The Thiem equation is for fully penetrating wells and the project wells will be partially penetrating wells. Therefore partial penetration correction is required to the calculated aquifer drawdown of the pumping wells. No correction is required for the influencing wells when spaced at a distance atleast twice the thickness of the aquifer. Therefore applying Kozney's formula for partial penetration correction and using the curves developed, the following corrections are made to the DHV calculations:

d/r = aquifer thickness/eff. well radius = 70/0.20 = 350

d/l = screen length/thickness of aquifer = 30/70 = 43%

Partial penetration correction for the above values from Kozney's curve = 0.60

Therefore the aquifer drawdown at the borehole face of the pumping well = 1.84/0.60 = 3 m and not 1.84 m as calculated by the Consultant.

So the total drawdown in the central well of 7 pumping wells with 50 cu.m/h discharge with mutual spacing of 100 m in a line becomes about 6.41 m and not 5.05 m as shown by the Consultant and therefore perhaps not acceptable.

Calculating the same but for wells spaced 150 m apart in a line gives total drawdown of about 5.73 m in the central pumping well (the critical well in the well field) and can be considered more safer than the 100 m arrangement.

The final well location plan shows a square grid well field and the total drawdown in the critical well is about 6.7 m for 5 plus 2 wells.

Therefore Noakhali Pourashava well field needs careful reassessment after the completion of pumping test on the 1st PTW.

Similarly corrections are needed for the other well fields shown by the Consultant.

The transmissivity values for Feni and Patuakhali looks too low from experience. Please note that the existing wells are generally mud flush poorly developed wells and their

specific capacities are too low and calculating transmissivity directly from these values will be an under estimate.

5. PUMP CHAMBER LENGTH

Reference is made to section 7 of the Consultant's hydrogeological report dated June 1997.

The contract provision for pump chamber length is 50 m for each well. The Consultant suggested this to be 35 m without giving any calculation.

According to available information the specific capacities of properly designed and developed wells will range between 15 and 30 cu.m/h/m. Therefore pump chamber length can be calculated as follows assuming 70 cu.m/h discharge:

Figures within ( ) are for thana towns. All values below are in metres.

Historic lowest piezometric level in the coastal belt:	2-4	(2)
Piezometric level depletion allowance due to pumping by a group of wells, typical Bangladesh semi artesian aquifers:	8	(5)
Estimated drawdown assuming 30% performance deterioration, specific capacity 10 cu.m/h/m:	7	(7)
Drawdown influence from other wells:	4	(1)
Pump submergence:	3	(3)
Pump length:	2	(2)
Bottom clearance:	1	(1)
Total	27	(21)

Therefore giving an additional factor of safety of 3 m the required pump chamber length for Pourashava and thana centres are 30 m and 24 m for each well respectively.

ANNEX 9

FINANCIAL STATUS

Period GOB : 01.07.97 - 30.06.98
Last Cost Escalation :

Period Direct Funding : 01.07.97 - 31.12.97
Budget reallocation date :

All amount in 1,000 Taka

Budget line	Project Components	Total Grand	Total Expenses till last period	Expenditure this period	Accumul Exp. local FY	Total Exp from Project Start	Utilized %	Balance end of quarter	Remaining Budget of Jul97-Jun98
			1	2	3	4	5	6	7
	PAID THROUGH GOB (RPA)								
10	Water Supply	119,142				0	0	119,142	3809
11	Drainage	47,407				0	0	47,407	1588
12	Sanitation	25,592				0	0	25,592	857
	TOTAL	**192,141**	**0**	**0**	**0**	**0**	**0**	**192,141**	**6254**
	DIRECT FUNDING (DPA)								
15	PMU-Danida Staff	29,560	176	1995	1995	2171	7	27,389	4505
17	Socio-econ. Activities	29,560		136	136	136	0	29,424	6414
18	Special Training	5,631				0	0	5,631	1250
19	Local Consultants	8,757				0	0	8,757	500
21	Suction Vehicle	7,340						7,340	
26	DAG Staff	13,228	116	1219	1219	1335	10	11,893	1681
50	Drilling Contract, Pihl & Sons	276,889	112,400	36135	36135	148535	54	128,354	
51	DHV-Design Supervision	116,570	34,064	16544	16544	50608	43	65,962	
55	Expatriate Consultant	40,608				0	0	40,608	
	TOTAL	**528,143**	**146,756**	**56,029**	**56,029**	**202785**	**115**	**325,358**	**14,350**
	IMPORTS (DPA)								
21	PMU -Transport facilities	17,910		19172	19172	19172	107	-1,262	
27	DAG - Transport facilities	5,285		5860	5860	5860	111	-575	
	TOTAL	**23,195**	0	**25032**	**25032**	**25032**	**108**	-1,837	0
	PROJECT OFFICE (DPA)								
21	PMU Office	39,649		5522	5522	5522	14	34,127	-2904
27	DAG Office	21,467	4,762	2253	2253	7015	33	14,452	-4206
23	Guest House	14,780	728	686	686	1414	10	13,366	2436
	TOTAL	**75,896**	**5490**	**8461**	**8461**	**13951**	**18**	**61,945**	**-4674**
89	Budget Margin	92,552				0	0	92,552	
	TOTAL PROJECT EXPENSES	**911,927**	**152,246**	**89,522**	**89,522**	**241,768**		**670,159**	**15,930**

ANNEX 10

Ministry of Foreign Affairs

COPY

Fax to: NCG
Taastrup
fax: 43 719944
att: Steffen Hvam

Asiatisk Plads 2
DK-1448 Copenhagen K
Tel. +45 92 00 00
Fax +45 31 54 05 53
Telex 31 292 ETR DK
Telegr. addr. Etrangeres
Giro number 3 00 18 06

Encl.	Number of pages (incl. this page)	Reference	Date
	3	104.Bang.174	14 april 1998

Dear Steffen,

Please find enclosed a few comments by undersigned to the draft joint DPHE-Danida Review Report. The deadline for comments by the government authorities, DAG and DHV is 18 April 1998, and undersigned expects to receive comments from Bangladesh by late April 1998. These comments will be forwarded to you as input for finalisation of the report. A copy of the comments from DHV is enclosed.

Generally, the report is comprehensive and well worked through. It is focused with many specific recommendations that can be used by the Project, GoB and Danida. A good piece of work.

Introduction: Please put undersigned's name at the bottom of the list of members representing Danida. Undersigned only participated a couple of days in the end of the mission.

Page 4 second last paragraph: Undersigned does not agree in the formulation "problematic if the present Consultant is treated differently from Danish companies". The issue is not really the country-wise origin of the company, moreover, the issue is the set-up that is different from most other Danida projects in the sense that in this project we have both a TA consultant and a Danida Advisory Group.

Page 6 second paragraph under the heading Water Supply: The strategy for exploratory/observation wells has been changed based on pilot drillings in Noakhali.

Page 7: A suggestion is made to include the following wording. " The JRT has serious doubts.....".

Page 10 paragraph no. 7: The point is well taken. An important task for the 1999 joint review will be to revise the PD based on the new national policy for the WSS sector.

Page 10 the third last paragraph: The point is well taken, the mandate of DAG needs clarification. Danida will follow-up on this issue.

Page 11 the first paragraph: The wording "re-negotiate" might not be appropriate. Addenda can be made to the TA contract as required. (the same for first para on page 12).

Undersigned will later forward the comments from the Bangladeshi authorities, the Danish Embassy and DAG.

Yours sincerely,

Jan Møller Hansen

Comments by Danish Embassy
to
Draft Report by Joint DPHE-Danida Review Team
on
Urban Water Supply and Sanitation Report

General comments:

A well-written report with many good recommendations. However, the recommendations should in accordance with Danida Guidelines be grouped into various categories:

1) Recommendations, which are regarded as so vital that they should be condition for the continuation of the Project;

2) Recommendations which are important for the Project to succeed.

3) General recommendations, which are not only important for the Project but for the sector as a whole.

The Embassy suggests that the Review Team in its final version of the Review Report categorizes its recommendations.

Specific comments:

List of Abbreviations:

CBO should be: Community Based Organisation.

Danida: Danish International Development Assistance under the Danish Ministry of Foreign Affairs.

Introduction, page 2, last sub-para:

You may wish to replace with: "A Draft Report containing the views of the JRT was in March, 1998 circulated by the Danish Embassy to relevant GOB institutions; Danida Advisory Group; and DHV with a request for comments by 14th April, 1998. Comments have been received from Ministry of LGRD&C (incorporating comments from DPHE); Danida Advisory Group; DHV; and the Danish Embassy. The comments have - where considered relevant - been incorporated in this final version of the Report. The received comments have been reproduced in Annex 10. All recommendations and proposals are subject to approval by the two Governments".

Para 2.1; page 3, sub-para 9:

You may choose to add: "A revision of the PP in June, 1998 was agreed to during the first meeting of the Steering Committee on 11th November, 1997"

Para 2.1; page 4, *Project Organization and Management*, sub-para 1:

It is an exaggeration to state that there are disputes about the membership of the Steering Committee. "uncertainty" may be a better word.

Para 2.1; page 4, *Project Organization and Management;* sub-para 4:

The Embassy agrees that the mandate of DAG needs to be clarified. In DHV's contract Appendix A: Scope of Services/TOR page 3 it is only stated: "The Consultant refers to the Danida Advisory Group in the implementation of his Services".

Para 2.1; page 4, *Project Organization and Management;* sub-para 6:

DHV has commented on this para, and the Embassy is basically in agreement with the comments.

Para 2.1; page 4, *Project Organization and Management;* sub-para 7:

It will have to be admitted that the TOR for the Consultant was not sufficiently sharp and clear in this aspect to specify that DHV was supposed to be "the Engineer".

Para 2.1; page 6, *Water Supply;* sub-para 1:

You may wish to add: "It is, however, premature to update the budget before the first contracts have been tendered."

Para 2.1; page 6; *Water Supply;* sub-para 6:

The Embassy finds that the proposed short-tem rehabilitation works in the total estimated cost of Taka 210,000 should be carried out in order to at least maintain the present level of service untill the new construction works have been completed. It should, however, be discussed with the Noakhali Pourashava whether the council can finance these short-term rehabilitation works by its own funds.

Para 2.1; page 7; *Water Supply;* sub-para 2:

It should be recorded that it was found feasible during the Appraisal in 1993 to have piped water supplies in the identified Thana Centres.

The Embassy shall have no objection to that revised feasibility studies are carried out for the Thana Centres preposed for piped water supplies. For more details please refer to comments under Para 9.7, page 72.

Para 2.1; page 8; *Finance and Administration;* sub-para 1:

The disbursement of funds during the period January to December, 1997 does not include payments made directly from Copenhagen to DHV and to the Danish drilling contractor.

Para 2.2; Recommendations; page 10; sub-para 3:

The Embassy would like to re-formulate the recommendation to read: "No contracts should be signed for piped water supplies before a suitable framework of by-laws, rules and regulations is approved for the involved urban authorities".

Para 2.2; Recommendations; page 11, sub-para 1:

The word "re-negotiate" should be avoided. What is required are merely some clarifications as also expressed in comments both from DAG and DHV.

Para 2.2; Recommendations; page 11, sub-para 7:

See comments under para 5.2.2 and para 7.2

Para 2.2; Recommendations; page 12, sub-para 1:

See earlier comments about the wording "renegotiation".

Para 2.2; Recommendations; page 15, sub-para 7:

Under special initiatives the Embassy cannot support introduction of cross-subsidy, which is also avoided in the latest version of the GOB policy.

Para 3; page 17, sub-para 1:

Out of the 8 Thana Centres in Patuakhali and Baguna districts the two Thana Centres: Galachipa and Kalapara are meanwhile reported to have been upgrated to Pourashava level.

Para 3; page 17, sub-para 3:

In line 2 you may wish to change the formulation to read:
"..headed by a part-time Project Director, and..."

Para 4.1; Preparatory Activities, page 19, sub-para 2:

Agreement with Patuakhali Pourashava has meanwhile been signed on 9th March, 1998, while the Agreement with Noakhali Pourashava was signed on 16th April, 1998.

Para 4.2; Implementation Activities; page 19, sub-para 2:

No reasons are stated for the various delays.

Para 4.2; Implementation Activities, page 20; *Hydrological Investigations and Drilling Work:*

The JRT fails to report that the drilling contractor is 1½ month delayed in commencement of his drilling work. It is, however, hoped that the delay will be eliminated by continuing the drilling activities during the month of June, 1998 in Patuakhali Pourashva, provided that weather permits.

Para 4.2; Implementation Activities; page 20; *Piped Water Supply;* sub-para 2:

See comments on by-laws under para 5.2.2 and para 7.2.

Para 4.2; Implementation Activities; page 20; *Hand Tube Wells;* sub-para 1:

The Project in September, 1997 actually prepared a complete "Arsenic Policy" out of which the arsenic removal unit and the laboratory are just components."

Para 5.1; National Policy etc.; page 23; sub-para 5:

In the latest version of the Policy all references to social cross-subsidy have been omitted.

Para 5.2.1; Agreements; page 24; sub-para 5:

It can be added that subsequently the Agreement with Patuakhali Pourashava was signed on 7th March, 1998 and the agreement with Noakhali Pourashava on 16th April, 1998. Most of the recommended changes have been incorporated in the mentioned Agreements.

Para 5.2.2; By-laws; page 25:

A working group including representatives from Local Government Division, the Dutch and Danish Embassies, and the Dutch supported 8 Towns project and the Danish supported Urban Water and Sanitation project has had a number of meetings with a representative of Ministry of Law and Parliamentary Affairs. It has now become clear that By-laws can only be approved in areas where there is a legal foundation for such by-laws. However, it seems possible to enact a framework of Rules, Regulations and By-laws, which should be able to achieve the goals envisaged. The working group expect to finish its work by early June, 1998.

As at least some progress have been made, the Embassy suggests in agreement with DAG to reformulate the recommendation to read: "No contracts should be signed for piped water water supplies, before a suitable framework of By-laws, Rules and Regulations is approved for the involved urban authorities".

Para 5.2.3; Land acquisition; page 25:

Funds for land acquisition and for compensation for crops are to be included in the ADP 1998-1999.

Para 5.5; Revision of PP; page 28, sub-para 2:

The recommendation is identical to the decision made at the first Steering Committee meeting held on 11th November, 1997.

Para 5.5; Revision of PD; pages 28 and 29:

The Embassy is in agreement that it is premature to try to update the budget before the first contracts for piped water supplies have been tendered. Revision of PD should be included in the TOR for the 1999 Review Mission.

The Embassy appreciates the idea to increase the GOB contribution, but warns that it may be very difficult to change the PCP.

Para 6.1.1; page 31; sub-para 2:

In line 2 you may wish to change the formulation to read: "..headed by a part-time Project Director,.....".

In line 6: "The PMUs are also supported by Danida employed expatriate and local advisers as well as support staff".

Para 6.1.2; page 33; sub-para 1:

Please add: "and the WID Focal Point of the LGD Division of MLGRD&C".

Para 6.1.2; page 33; sub-para 3:

Please omit the last two lines as being unnessary.

Para 6.2.3; page 35; sub-para 3:

Additional staff (field coordinators etc.) in Patuakhali PMU will be employed when they are required.

Para 6.2.3; page 36; sub-para 6:

The JRT should elaborate more on how the division of responsibilities are unclear, (or omit the sub-para). As it is formulated now, it is useless.

Para 6.2.3; page 37; sub-para 3:

Revised job descriptions will be prepared in connection with recruitement of new expatriate advisors to be advertised in June, 1998 for appointments in 1999.

Para 6.2.3; page 37, sub-paras 4 and 5:

A conclusion is missing.

Para 6.2.4; page 37; sub-para 3:

Please replace "by-laws" with "a framework of By-laws, Rules and Regulations".

Para 6.3.1; Mandate of DAG; pages 38 and 39:

The Embassy is in agreement that the mandate of DAG has to be clarified.

It would be appreciated if Danida Copenhagen (S.6/StS.1) would clarify the mandate of DAG. In the contract with DHV Appendix A: Scopes of Services/TOR page 3 it is only stated: "The Consultant refers to Danida Advisory Group in the implementation of his Services".

As no contingencies are included in the contract with DHV, it has so far been necessary to request StS.1 to make addenda to DHV´s contract when any additional services are required (examples: urban planner; and container for supervision team on drilling).

But authority to make changes in TOR, scope of activities etc. needs to be clarified. In this connection it is assumed that the Embassy (being mentioned amongst "the Parties" to the contract) has that authority, while DAG is not mentioned.

Para 6.3.2; page 40; first sub-para:

Please add: "The Danish consulting company should be employed in accordance with the provisions for such services in Annex A.6.1 in the Project Document".

Para 6.4; *Consultant´s Outputs;* pages 40 and 41:

Reference is made to the various comments both from DAG and DHV on these issues. The Embassy is basically in agreement with these comments. It is a misunderstanding that DHV has tried to get additional fees. (This would anyway have required StS.1´s approval on the Embassy´s recommendation in order to succeed).

Para 6.4; *Consultant´s Outputs;* page 41; sub-paras 5 and 6:

It should be admitted that the TOR was not crystalclear, as it did not state that DHV was supposed to be "the Engineer".

It would be advisable to avoid the word:"re-negotiation" in the recommendation. What is required are merely some clarification on certain issues as also mentioned in the comments from both DAG and DHV.

Para 6.4; *Quality Assurance;* page 42; sub-paras 5 and 6:

The Embassy supports the recommendation on Quality Assurance and is not satisfied with the comments from DHV on this issue.

Para 6.5; Role of Local Government Institutions; page 43; sub-para 1:

The Embassy supports that the Plans of Action for Sub-projects should reflect the duties and responsibilities of the local government institutions, DPHE and PMUs. This is essential to create a feeling of ownership as well as support to capacity development of local level institutions and should be taken into consideration in preparation of the next Plans in July, 1998.

Para 6.6.4; *NGOs;* page 45; sub-para 3, 2nd "bullet":

It should be added that credits shall be provided by the NGOs own funds (not Project funds).

Para 6.7; *Reporting;* page 48:

Are the three "bullets" to be considered as Recommendations ?

Para 7.1; page 49, sub-para 2:

It is unclear why the present JRT finds it unfortunate that a staff bonus system is included in the Agreement with the two Pourashavas. A bonus system was actually recommended by the 1997

Review Team on the Chaumohani/Laksmipur project.(Please refer to page 83 of the Final Review Report). Two members actually took part in both missions, so it is not understood why they apparently have changed their opinion on this issue.

Para 7.2; page 51:

Please refer to explanations given under Para 5.2.2 on page 25.

Para 7.2; page 51, sub-para 4:

The Embassy agrees that it would be best if the Pourashava itself alone would set all water tariffs and fees. It is still expected that the Pourashava will set water tariffs and water charges in order to achieve a balanced annual budget. But final approval by GOB will be required in accordance with GOB regulations. As water tariffs most likely will only be revised once every year or every second year, it should be possible to live with this situation.

Para 7.4; page 53; sub-para 2:

The Embassy considers that any possible arsenic mitigation activities in Phase 1 towns should not be included under Phase 2. If the Pourashavas of Chaumohani and Laksmipur request arsenic mitigation activities, it is the intention of the Embassy to finance such activities under the decentralized financing authority of the Embassy. However, such initiative should come from the mentioned Pourashavas.

Para 8.1; page 57; recommendation:

Please avoid the word "re-negotiation".

Para 8.2; page 59; recommendation:

A time frame should be addded to the recommendation.

Para 8.4; page 60; sub-para 2, second-last line:

The sentence most likely should read: "This is a common problem.."

Para 9.2; page 63; sub-para 1:

It may be added that sweet groundwater with low iron content has subsequently been located in Raipur Pourashava in the depth of 350 - 375 meters. This means that no treatmaent plant will be required in Raipur.

Para 9.3.3, page 67:

The JRT should have mentioned that the drilling contractor is 1½ months delayed in the start of his drilling activities. It is hoped that this delay will be eliminated through continuation of the drilling operations in Patuakhali Pourashava beyond 1st June, 1998 provided that the weather permits.

Para 9.7; page 72:

As commented upon on page 17, the two Thana Centres of Galachipa and Kalapara in Patuakhali and Barguna districts are reported to have been upgraded to Pourashava status.

The Embassy agrees that the feasibility studies will have to be updated, and this is currently been done by DHV. It looks like the four smallest Thana Centres will not be feasible for piped water supplies. This issue will be discussed during the discussions on follow-up on the recommendations, which will be initiated shortly between the PD; DAG and the Embassy.

Para 9.7; page 72; sub-para 2:

The fourth sentence on the 8th line should read: "Based on the...the Thana Nirbahi Officer...".

Para 9.7; *Hand Tubewells;* pages 73 and 74:

The Embassy strongly endorses the recommendation about an early start of project activities in a few Thana Centres and growth centres without piped water supply and has also earlier requested DAG to do so.

Para 9.8; Arsenic issues; page 74:

The Embassy is concerned about the risks involved in disposal of sludge from arsenic removal units and possible health hazards for operators of such units. These issues should be considered carefully before proceeding.

Para 9.8; Arsenic issues; page 75, last sub-para:

Monitoring should include all the issues referred to in the previous sub-para and should also include uses of water; and quality of water as a post-construction testing activity every six months.

The feasibility of other safe water options (f.ex. rain water harvesting) in the fringe areas should not be abandoned altogether. The Project should take the initiative to study alternative safe water options and their use in the project area.

Para 10.1; Drainage in Noakhali; page 77:

Embassy agrees that no drainage activities should be undertaken outside the Pourashava boundary. This issue has been corrected in the Agreement with Noakhali Pourashava before signing the Agreement.

Para 11.3; *Household Latrine Programme;* page 84, last sub-para:

It should be added that any credit facilities by NGOs should be from the NGOs own funds (not Project funds).

Para 11.4; Emptying of Pits and Disposal of Sludge; page 86 and 87:

New ideas on this issue seem to come from every new review mission.

Para 12.2; page 89; sub-para 1:

The Pourashava Chairman should be chairman for the WATSAN committee (not administrator).

With the persons mentioned there will be 11 members.

Para 12.4; page 91; sub-para 2:

The lack of experiences amongst some Pourashavas in collection of service charges from users of facilities does not include Patuakhali Pourashavas, where the piped water supply has more than 2000 house connections (as recorded under para 9.6). The Embassy has earlier found that this Pourashava recovers a substantial part of its water bills.

Para 13.1; Overall Financial Status; page 93:

There are some misunderstandings, as the JRT apparently has not realised that payments to DHV and to the Danish drilling contractor is done directly from Copenhagen. Consequently no payment vouchers in relation to the two mentioned contracts are to be found at the Royal Danish Embassy. The total utilisation of Danish funds as per 31st December, 1997 should consequently be recorded as Taka 241,768,000. (Please refer to a new version of Annex 9 prepared by DAG and attached to these comments).

Para 13.2.1; Flow of Funds; page 94:

Please add that DHV and the Danish drilling contractor, E. Pihl & Søn are paid directly from Copenhagen under contracts signed with Danida (StS.1).

Para 14.1; Poverty; page 97; sub-para 1:

Definition of poor and very poor should be more precise. How much is some small disposable income ? Excess disposable income ?

Para 14.1; Poverty; page 98, recommendation at bottom of page:

The Embassy cannot support the idea of introduction of cross-subsidy. This principle has also been omitted in the latest version of the GOB Policy.

Para 14.2; Page 99, sub-para 4:

Does this sub-para not require a recommendation ?

Para 14.2; *Gender*; page 100:

The Embassy is in agreement with the project that gender sensitive participatory training should be made mandatory. It is suggested

that this point is highlighted as a specific recommendation for all levels of staff and management.

Annex 7:

Please change the headline to read: "Brief description of key indicators on behaviours: An example of prioritisation"

You are also advised to add (as "new bullet 3"):

- cleanlines of water point and surroundings

and (as "new bullet 5"):

-types and frequency of breakdowns

Annex 9:

Please replace with new updated Financial Status prepared by DAG as per 31.12.1997 (Copy attached).

Dhaka 12th May, 1998

Erik Sjørslev Jensen.

Erik Sjørslev Jensen

FINANCIAL STATUS

Period GOB : 01.07.97 - 30.06.98
Last Cost Escalation :

Period Direct Funding : 01.07.97 - 31.12.97
Budget reallocation date :

All amount in 1,000 Taka

Budget line	Project Components	Total Grand	Total Expenses till last period	Expenditure this period	Accumul Exp. local FY	Total Exp from Project Start	Utilized %	Balance end of quarter	Remaining Budget of Jul97-Jun98
			1	2	3	4	5	6	7
	PAID THROUGH GOB (RPA)								
10	Water Supply	119,142				0	0	119,142	3809
11	Drainage	47,407				0	0	47,407	1588
12	Sanitation	25,592				0	0	25,592	857
	TOTAL	**192,141**	**0**	**0**	**0**	**0**	**0**	**192,141**	**6254**
	DIRECT FUNDING (DPA)								
15	PMU-Danida Staff	29,560	176	1995	1995	2171	7	27,389	4505
17	Socio-econ. Activities	29,560		136	136	136	0	29,424	6414
18	Special Training	5,631				0	0	5,631	1250
19	Local Consultants	8,757				0	0	8,757	500
21	Suction Vehicle	7,340						7,340	
26	DAG Staff	13,228	116	1219	1219	1335	10	11,893	1681
50	Drilling Contract, Pihl & Sons	276,889	112,400	36135	36135	148535	54	128,354	
51	DHV-Design Supervision	116,570	34,064	16544	16544	50608	43	65,962	
55	Expatriate Consultant	40,608				0	0	40,608	
	TOTAL	**528,143**	**146,756**	**56,029**	**56,029**	**202785**	**115**	**325,358**	**14,350**
	IMPORTS (DPA)								
21	PMU -Transport facilities	17,910		19172	19172	19172	107	-1,262	
27	DAG - Transport facilities	5,285		5860	5860	5860	111	-575	
	TOTAL	**23,195**	**0**	**25032**	**25032**	**25032**	**108**	**-1,837**	**0**
	PROJECT OFFICE (DPA)								
21	PMU Office	39,649		5522	5522	5522	14	34,127	-2904
27	DAG Office	21,467	4,762	2253	2253	7015	33	14,452	-4206
23	Guest House	14,780	728	686	686	1414	10	13,366	2436
	TOTAL	**75,896**	**5490**	**8461**	**8461**	**13951**	**18**	**61,945**	**-4674**
89	Budget Margin	92,552				0	0	92,552	
	TOTAL PROJECT EXPENSES	**911,927**	**152,246**	**89,522**	**89,522**	**241,768**		**670,159**	**15,930**

Government of the People's Republic of Bangladesh
Ministry of L.G.R.D & Cooperatives
Local Government Division
WS-1

AMBASSADEN DHAKA
BILAG
28 APR. 1998
104 | Bang | 174

Memo.No.WS-1/Dani-(5)/Urban/98/ 255(2) Dated: 21.04.98

Sub: Comments on Draft Joint DPHE-DANIDA Review on Urban Water Supply and Sanitation Project.

Ref: No. 104.Bang.174 February, 1998

The undersigned is directed to send herewith the comments on the Draft Joint DPHE-DANIDA Review on Urban Water Supply and Sanitation Project.

(A.S.M. Rashidul Hai)
Sr. Assistant Secretary

To
Mr. Erik Sjørslev Jensen,
Counsellor,
Royal Danish Embassy,
House No. 1, Road -51, Gulshan, Dhaka. 1212.

Copy:
Secretary,
Economic Relations Division,
Shere-Bangla-Nagar , Dhaka.
(Attn. Mr. Khandaker Khalikuzzaman,
Deputy Chief)

COMMENTS ON DRAFT JOINT DPHE-DANIDA REVIEW ON URBAN WATER SUPPLY AND SANITATION PROJECT (FEBRUARY 1998).

FINDINGS AND RECOMMENDATIONS	COMMENTS
General Analysis :-	
1. Proposed new by-laws for water and sanitation covering the two Phase I Pourashavas were submitted for approval by the MLGRD & C about 1½ year ago, but are still not approved. Without approved and implemented by-laws with the necessary staff positions, the sustainability of such water supplies is questionable. [5.2.2, Page - 25]	1. Under the Pourashava Ordinance, a set of model by-laws will have to be approved by Govt. Towards this end LG division has formed a working group with representative of M/O Law and the concerned development partners to formulate from the model by-laws. The concerned Pourashava will frame and adopt their own by laws based on the model by-laws.
2. Acquisition of land for drilling and water works has caused considerable problems. Probably, a more active role of the DPHE Project Managers might have expedited the matter. [5.2.3, Page - 25]	2. So far no problem has yet been reported regarding acquisition of land for drilling and water works. However the Project Managers have been instructed to complete the acquisition process of the identified land.
3. - Due to discrepancies between the Project Proforma (PP) and the Project Document, a revision of the PP is needed. [5.5, Page - 27 - It is necessary to revise the Project Document, but the detailed information required for a revision of the Project Document is not yet available. Such a revision might also bring the Project in line with the Danida Sector Programme Support Document under preparation. [5.5, Page - 29).	3. The PP will be revised in due course reflecting the latest observation on the revised PRODOC in line with DANIDA SPS documents.
4. ***Project Organization and Management*** The Steering Committee has only once during the year of implementation. There are disputes about the membership of	4. In the approved PP, provision has been kept for

	the Committee, including whether the concerned Counsellor of the Royal Danish Embassy and the Chief Project Adviser shall be members. The JRT finds it important, that the Steering Committee plays its intended role. [6.1.2, Page-33]	specially inviting representatives of Donors to attend this meeting. In the steering committee meeting held on 11/11/96 the representatives of Royal Danish Embassy and the CPA were invited.
5.	The organisational set-up in the DPHE staffed Central Coordination Unit with a part time Project Director is to some extent a constraint to project implementation. [6.2.2, Page-35]	5. The PMUs have already been established for smooth implementation of the project. PD is co-ordinating the activities at the central level.
6.	The DPHE staffing of the Project Management Units has been very scarce. The Project Managers have only been in the offices occasionally and only recently a few of the planned Assistant Engineers reported to the PMUs. The DPHE employed personnel has not played a sufficiently active role in project preparation. [6.2.3, Page - 35]	6. 19 AEs were recruited for this project. Some of them resigned causing temporary shortage have [illegible] Steps are being taken to fill up these posts. PMs could not initially attend office due to lack of office facilities. Now they are attending regularly.
7.	The Danida Advisory Group's (DAG) mandate to manage the Consultant is not clear. Does DAG have the mandate and professional capacity to approve changes in Danidas contract with the Consultant, including reducing the outputs stated in the contact, without written accept by Danida or the Royal Danish Embassy ? [6.3.1, Page-38]	7. Management of the consultancy works as per terms of contract should be examined and reviewed by CCU/DAG/PMUs.
8.	In general, the work of the Consultant seems satisfactory. DHV intends, with the apparent consent of DAG, to reduce the outputs specified in the Contract, such as reducing the number of full socio-economic baseline surveys, the number of solid waste management plans and the extent of training provided to pourashava staff. In spite of the reduction of the Consultant's outputs. DHV has proposed an increase of the consultancy budget by approximately DKK 5 millions. [6.4, Page-40,41]	8. The contractual obligation of DHV consultants should accordingly be complied with. Increase of cousultancy budget does not seem to be justified.
9.	DHV has replaced the original drilling supervisor with a hydrogeologist with little practical and relevant experience. According to the Consultant's interpretation of the Contract	9. CCU has not been notified about this replacement. DAG may look into it.

clauses on drilling supervision, they are supposed to provide "The supervisor". but not "The Engineer." Such a distinction is not made in contracts with Danish consulting companies. It is, therefore, problematic if the present Consultant is treated differently form Danish companies. [6.4, Page-41]

10. A quality assurance plan has been prepared, but hardly been implemented. Apparently, reports have not been quality assured. Neither quality assurance reviews not audits, both mentioned in the Contract, have been carried out. The JRT finds this regrettable. [6.4, page-42]

10. Implementation of QAP (Quality assurance plan) will be followed as the work progresses.

11. DAG has drafted a number of relevant guidelines, but there is no distinction between guidelines and procedures. Some important guidelines have not yet been discussed with or approved by the Project Director. [6.6.2, Page-44]

11. Important guidelines are to be discussed with PD for approval by competent Authority.

12. The planning and reporting system is still under development, but the system appears too extensive and without sufficient flexibility. Till now, only one semi-annual progress report has been produced by the Project. This progress report does not compare targets with achievements. "The Project has yet to establish the necessary monitoring systems. A management information system is planned to be completed by the end of April 1998 together with a financial management system. A draft monitoring guideline is under preparation. DAG is aware of the mentioned shortcomings. [6.7, Page-47,48]

12. Semi-annual progress reports should compare targets & achievements. Project should establish Monitoring, System, FMS & MIS. MIS is likely to be completed by end June'98.

13. ***Follow-up on Phase I activities :***
In 1997, a leakage detection programme developed by a Danish consultant did not produce the desired results. [7.3, Page-52]

13. Consultant report should produce desired results.

14. A large number of he shallow had tubewells, installed in the fringe areas, have high arsenic contents. However, at present the Phase II Project should not be involved in drilling of deep hand tubewells in Chaumohani and Laksmipur.s. [7.4, Page-52,53]

14. Remedial activities of SHTW of phase I having high Arsenic contents in fringe areas should be taken care of.

15. ***Socio-Economic Analysis***
Some draft reports of baseline studies have been prepared by the Consultant. The baseline studies for the first year

15 DHV should design baseline surveys as per

	were too late for planning usage in Patuakhali and Noakhali Pourashavas. Useful information appears in the completed studies. There are basic weaknesses in the design of the baseline studies, partly because the original ToR were not particularly focused. It is also a problem that baseline studies have, for example, been undertaken for four locations where work is not scheduled to begin until 2003. At this moment, it is not possible to comment on the utility of the studies for the Project. However, some immediate changes in the study designs are required. [8.1, Page-55.56.57]	TOR and the same is to be planned at an appropriate way.
16.	The Consultant has stated that, due to overspending on the baseline studies, only 11 full studies with be completed with some more limited information on other locations rather than completing in-depth studies of 23 towns. [8.1, page-5.7]	16. The consultant should complete in depth studies as per terms of contract.
17.	At this early point in Phase II, hygiene education activities have yet to begin. However, the groundwork has been undertaken. [8.2, Page-57]	17. Hygiene education activities should be planned accordingly.
18.	*Water Supply :* The Danish Drilling Contractor charges 30 times more for a 2" exploratory/observation well than the local contractors. There is need for a revision of the strategy for exploratory/observation wells. [9.3.2, Page-65]	18. Agreed.
19.	In most cases, the Consultant's design criteria are neither well documented nor justified. The suggested choice of materials is questionable in some cases. The Consultant has admitted the shortcomings and has agreed to submit a new report. [9.4.1, Page-68]	19. Consultant's design criteria should be justified & documented.
20	The cost estimates for the water supply component prepared by the Consultant indicate that the coast of the piped water supply component for entire Project will be approximately 2.5 times the cost estimate in the Project Document. It should be expected that the cost estimates may change considerably when the detailed design is completed. [9.4.3, Page-69]	20. Comments will be furnished when the detailed design is completed.
21	Particularly high cost increases are seen for the proposed water supply for Noakhali Pourashava. Fringe areas cannot be supplied from hand tubewells, so a piped water scheme is	21. The option of piped water supply is agreeable.

that only option. It does not appear feasible to carry out the proposed shortterm rehabilitation work. The whole system has to be abandoned. [9.5, Page-70]

22. With regard to Patuakhali Pourashava, much effort should be made to retain in operation as large parts of the existing piped water systems as possible. Firstly, the existing systems should be rehabilitated. Then repairs and elimination of wastage should continue until the combination of leakage and wastage is reduced to less than 20% Finally, the planned extension of the schemes should take place. The fringe areas of Patuakhali are sparsely populated and well suited for deep hand tubewells. However, the Project Document does not contain a provision for such wells. [9.6, Page-71]

22. Revised Project Document should contain DHTW in fringe areas as proposed.

23. No Thana centre in the entire Bangladesh in operating a piped water supply. The JRT has doubts as to the financial and administrative feasibility of piped water supplies in Thana centres. [9.7, Page-72]

23. Under the proposed Local Govt. reform Thana/Upazila Parishad will be formed which will be able to operate a piped water supply system.

24. ***Drainage and Solid Waste***

In Noakhali Poruashva, the proper drainage depends on necessary improvements to the khals and canals outside the Poruashava boundaries. Drainage of Noakhali Pourashava is also covered by another project and the two projects have tentatively agreed that the Danida supported project take care of the khals and canals outside the Pourashava boundaries. The JRT doubts that the Project can make such a commitment. [10.1, Page-77]

24. The project should take care of primary and secondary drains and outfall.

25. ***Sanitation :***
The emptying of pits and tanks together with safe disposal of sludge continues to pose problems. The JRT has reservations regarding the Consultant's proposal to purchase vacuum trucks and let different towns share a truck. An alternative, and most likely feasible, option might be to use portable electrical submersible dewatering pumps.
[11.4, Page-86,87]

25. Consultants proposal for vacuam truck appears more suitable for such works.

26. At thana centre level, a Union WATSAN Committee will be responsible for operation and maintenance with the assistance of DPHE Thana Engineer. The capacity of the Union WATSAN Committees is insufficient for the operation and maintenance of piped water supply schemes. Furhemore, many thana centres are situated in two or more unions, making the proposed institutional set-up impractical. [12.5, Page-91,92]

26. Same as Para 23.

Composed by: B. Barua , C:WORD\N-COMMEs

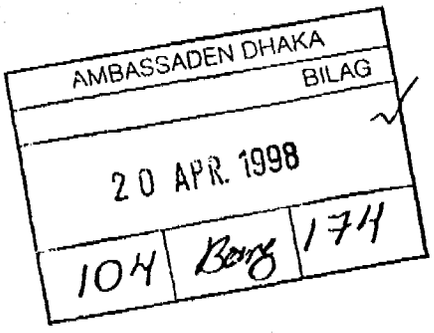
DPHE-DANIDA URBAN WATER AND SANITATION PROJECT

CENTRAL COORDINATION UNIT

Govt. of the Peoples
Republic of Bangladesh
Department of Public Health Engineering
175-178, Kakrail, DPHE Bhavan
Dhaka-1000
Project Director/
Additional Chief Engineer(works)
Tel (off): 934 3361, 934 7382
Danida Advisory Group
GPO Box 749
Tel: 934 6167-70 Fax: 934 4791
email:watsap@dhaka.agni.com

Ref. No. 01.002.xx-xx/255(98)

16th April, 1998



Royal Danish Embassy
House NO. 1, Road No. 51,
Gulshan
Dhaka-1212.

Att: Counsellor Erik S. Jensen

Subject: **Comments from the Project on Draft Joint DPHE-Danida Review, Urban Water Supply and Sanitation Project, February 1998.**

Dear Erik,

Attached please find comments from the Project on the above mentioned report for your information and further action.

Yours sincerely,

Hans Anderskouv
Chief Project Adviser

DPHE-Danida Urban Water and Sanitation Project

HA - 12.04.1998

Comments from Project Advisers on Draft Joint Review Report of February 1998.

5.2.1 Agreements between the Pourashavas and the Project

Preparation and signing of agreement with Noakhali and Patuakhali Pourashavas has been a problematic and lengthy process. The Project has put a quite an effort in this activity and have had a great number of meetings with both the Pourashava chairmen and the PD.

Unfortunately, many of these meetings has been used to discuss details wordings, spelling and grammar of minor significance to the content in the agreements.

The JRT comments to the agreements are to the Project's understanding of a similar insignificant type, which in best is of less importance and in worst could create further discussions and delays.

The Project highly appreciate suggestions and recommendations from the JRT but in this case it is the opinion of the Project, that part of the findings and recommendation leave a totally imbalanced picture of the work done by the Project and the importance of the JRT recommendation.

5.2.2 By-laws

The Project agrees that approval of By-laws and especially approval of staff positions are very important for sustainability of piped water supply schemes.
But tendering can be a lengthy process and the Project may gain useful time for approval of By-laws if the Recommendation is revised to:

No contracts for procurement of materials for and construction of piped water supplies should be signed before suitable by-laws for water and sanitation are approved.

5.5 Need for Revision of Project Proforma and Project Document

Need for revision of Project Proforma

With reference to comments on para 6.2.2 the Project should suggest that the revision of the Project Proforma scheduled for June 1998 should include provision for a full time Project Director instead of the present part time Project Director being primarily Additional Chief Engineer for Works.

6.2.2 Central Co-ordination Unit

Para 5: The Project agrees with the finding of the JRT and the Project recommends that provision for a full time Project Director should be given at the soonest. With reference to comments on section 5.5 revision of the Project Proforma scheduled for June 1998 should include such provision.

6.3.1 Mandate of DAG

Even that the Project agrees with the JRT's Recommendation a few comments on the findings should be given.

Para 3: Solid Waste Management Plans
Preparation of a Solid Waste Management Plan should be a participatory process involving local authorities, communities and users. According to the Contract the consultants input on solid waste is a 3 month badge early 1997 with one expatriate and one local waste collection specialist.

Even if possible it is most un-timely to conduct a participatory design process 4 - 7 years before implementation.

The output from the consultant as agreed by DAG includes two Solid Waste Management Plans - for the two biggest Pourashavas - which are much more comprehensive than anticipated in the Terms of References plus a comprehencive guideline for future participatory use in the following Pourashavas and Thana Centres.

The Project should suggest that the forthcoming back-up service for DAG should do a comparative evaluation of the consultant's output, input and Term of References.

Para 4: Training

According to Terms of Reference the consultant should provide training of O&M staff of the 3 existing piped water supply systems and on two locations to have new systems.

Out of the 3 existing systems only the system in Patuakhali Pourashava is available for training in the consultants contract period.

The existing system in Noakhali operated by DPHE should not be rehabilitated to be a part of the future Pourashava system.
The existing system in Feni should be rehabilitated and incorporated in the future Pourashava system but this will happen after the consultant's contract has expired.

DAG and DHV have scheduled to prepare a long-term training plan - including training input from the consultant - in April 1998. The plan may propose adjustments to Terms of Reference for the consultant.

The Project should suggest that the forthcoming back-up service for DAG should prepare a comparative evaluation of the consultant's output, input and Terms of Reference based on the out- and input so far and the scheduled plan.

Para 5: Baseline Surveys

DAG and DHV have agreed to adjust the Terms of Reference for the Baseline Surveys in order to get the Surveys a little better in line with the implementation schedule.

But DAG has not agreed to leave nine towns completely unstudied as stated in the Consultant's 4th Progress Report.

DHV has afterwards agreed to do survey in all 23 towns and methodology and Terms of Reference should be discussed in March-April 1998.

6.3.2 Need for Strengthening of DAG

The Project appreciate the JRT's Recommendation of professional back-up for DAG and the PMUs.

But the JRT is requested to clarify what is meant by a quality assurance system and quality assurance of the work of DAG/PMUs and how this should be practically implemented.

6.3.3 Division of tasks between DAG and the PMUs

The heading of this section is found misleading, as the section only deals with the role of the PMUs and in particular with the PMUs handling of NGOs.

The Project disagrees to the statement that "the Project staff has limited experience in handling NGOs". Some of the Project staff have in fact several years of experience in drafting contracts and contract management of NGOs. Furthermore, the Project has, before the JRT, had contact with a number of other organisations to seek advice about NGO procedures.

6.4 Role of Consultants

Consultants output:

To the opinion of the Project some of the JRT's findings as expressed in this section must be based on misunderstandings and some clarification is needed.

Para 1: It is not the opinion of the Project that DHV has had the intention to reduce the outputs as specified in the contract.

Except for reduction of number of baseline surveys (see comments on 6.3.1 para 5) adjustments of schedules and outputs have been proposed by DAG and discussed and agreed with DHV.

Para 2 and 3: In October 1997 DAG requested DHV to prepare a proposal for a revised consultancy schedule based on the project implementation schedule including an appropriate extension of the contract period. The proposal was meant to be basis for discussions with the JRT in January 1998.

The Project fully agrees that although the obvious inconsistency in the Consultant's contract creates severe problems for the implementation this does not justify an additional consultancy fee as proposed by DHV.

Para 4: With reference to comments on 6.3.1 it is not the opinion that of the Project that the agreed adjustments of schedules and outputs are a significant reduction of the consultancy services.

Para 8: **Recommendation:**

The Project does not agree that re-negotiation of the Consultant's contract is needed.

An assessment of solid waste and training should be done by the DAG back-up service and if appropriate adjustments af those two components could be discussed with DHV

6.6 Preparation of Project Guidelines and Procedures

6.6.1 General

Page 43
Para 1: "With reference to the prep..." delete **socio-economic as the list in Annex** 4 refers to both soft-and hardware guidelines.

This also refer to **Table of content ANNEX 4: Should** be: "Development of Guidelines and Strategy Papers"

Para 2: Not entirely true. A considerable number of guidelines had been prepared quite a long time before the JRT. However, the process of receiving comments and discussing drafts is often lengthy.

6.6.2 Procedures for Tendering

All the locally available materials other than PVC pipes and fittings for piped water supply schemes including rubber joints, PE pipes for reticulation lines and/or house connections shall be supplied by the concerned contractors. This provision shall be included in the BOQ items.

PVC pipes, joints, fittings, PE pipes shall be procured through international tendering in 2/3 consignments as per implementation plan. For storing, DPHE's existing storing facilities shall be used with a separate arrangement (if possible). Proper storage management procedure shall be maintained by the project.

As per existing rule, any tender which is 5% lower than the estimated price then the bid is rejected straightway.

In cases where the lowest bidder quotes rate more than 5% above then it requires approval from higher authorities which is time consuming. To overcome the situation it is proposed that PMU shall go for negotiation. This procedure was also followed in the 1st Phase.

6.6.3 Procedures for Contract Management and Supervision

Engineering Adviser (EA) is not an approving authority. She/ He will only certify/recommend the bills for payment. The Technical Adviser on behalf of Danida will approve bills for payment. This will also minimise unwanted pressure on the EA from different corners.

6.6.4 Guidelines for NGO Selection

Page 45
Para 1: There is no Directors of NGOs mentioned in the Guidelines.

Para 2: It should be noted that the Guideline is written **only** for two of the towns that the Project operates in; Noakhali and Patuakhali Pourashavas, with the intention of it being updated/revised in terms of experience gained from these two Pourashavas.

Para 6: It the goals are to strengthen the capacity and raise the status of the Pourashavas perhaps it would be important for them to be in charge of payments?

Page 46
Last Para: "It appears....." should perhaps be moved to: **6.6.1./General** (page 43)

6.7 Planning and Reporting

Page 47
Para 2: Re "the number of guidelines could be limited". The Project is still uncertain about which Guidelines the JRT found unnecessary. The Project has discussed the Guidelines prepared, under preparation and planned, in the light of the comment of the JRT, and decided to differentiate between Guidelines and Procedures. The Guidelines shall be used as guiding papers, as suggestions for implementation, while procedures will be rules to be followed for implementation.

As the Project is still in a start-up phase we find, however, that the Guidelines and Procedures prepared and planned for are necessary for smooth implementation and co-ordination, and to ensure that experiences from the Phase-1 Project are utilised.

Page 48
Para 2: Are the three pins to be understood as Recommendations?

7.1 *Status of Phase I Project, Agreements and Continuation of Support*

Para 4: Unaccounted-for Water

While it is felt that the figures (30 – 40%) for unaccounted-for water are somewhat exaggerated, the Project agrees on the severity of the problem.

Para 5: Chlorination Dosing

Sufficient training in this respect has been given, the latest one in June 1997. The Project is of the opinion that the equipment is sufficiently simple, and that ample spare parts had been provided. The problem is one of proper and regular cleaning. However, special attention will be given to issue during visits.

Para 6: Water Supply

The Project agrees that there are no technical constraints to 24 hours water supply. This message was repeatedly communicated to the Pourashava in question, over the two months period when supply was intermittent.

Para 7: Tools

The Project disagrees that insufficient tools had been supplied; in 1995, following the recommendations of an external consultant, tools were provided. In 1997, having again sought the advice of an external consultant, another – more extensive – set of tools were handed-over to both Pourashavas. While the situation may have changed, both towns by the end of the project period were adequately supplied with tools.

Para 7: Drawings

Training on how to up-date as-built drawings was rendered in May, 1997. While up-dates have been carried out to some extent in Laksmipur, no action has been taken in Choumohani. The Project will provide further advice in this respect.

Para 7: Manuals

All technical manuals except the Management Manual have been translated and distributed. The remaining manual will be distributed by April, 1998.

Para 9: **Accounting System**

The Project accountant, supervising the Pourashava Water Section Account Staff, considers the latter adequately capable of double entry accounting. The assessment is based on the regular monitoring formats submitted, as well as spot checks.

Para 11: **Recommendation**

With respect to the actual recommendation, the Project's comment is as follows:

Follow-up and monitoring of the Phase 1 Towns will be intensified. **The Project will review its quarterly monitoring reporting format with a view to ensuring that findings/feedback are communicated to the Pourshava Water Sections and the Chairmen.**

The Project does not plan to provide any financial assistance to the Phase 1 Towns. Phase 1 Water Section staff will be invited to appropriate Phase II training activities.

7.3 Report on Leak Detection

The Project agrees that additional PTWs will not solve the problems.

The Project will attach increased emphasis on regular leak detection, using water metres, and include leak detection as an indicator in the bonus system.

Also the Project will investigate the availability, suitability and cost of leak detection equipment.

A Leakage Detection Cell may be established within DPHE. The cell will constitute a team headed by an engineer who may be given proper training by the Project. The Project may also provide necessary equipment and logistic supports. The cell shall do leak detection elsewhere in Bangladesh for which service charge may be claimed from the customer.

7.4 Arsenic Contamination in Phase I Pourashavas

Any initiative with respect to alleviation of the problem will have to come from the Pourashavas themselves. Should such requests be made, the most appropriate means of (potentially) tackling the issue appears to be to go for arsenic removal, involving the subcontracting of activities to one or more NGOs.

The Project would, however, need to thoroughly test not only the technologies involved, but also the NGO set-up in Noakhali Pourashava, before similar endeavours can be embarked upon elsewhere, or "scaled up". Hence, any arsenic removal assistance to the Phase 1 Poursahavas would not be possible before 1999.

8.1 Baseline Studies

Page 55
Para 1: The baseline survey being late was due to ineffective planning from Danida and the Consultant prior to signing and later as scheduled in the Consultants contract.

Page 56
Para 4: Maps have been provided in the final report.

Para 5: The review and feedback to the communities of significant findings have been planned, by DHV, and will be undertaken in May 1998. However, the Consultant has to proceed with caution with regard to reviewing findings from 'Willingness to Pay studies': interventions such as piped water in Thana Centres might not take place. Furthermore, in some of the town where studies have been completed implementation will not take place for a long period of time. The basic danger in both these cases is to raise unrealistic expectations.

Page 57
Para 2: A clear, step-by-step approach for revision of the TOR where the revision have no apparent budgetary consequences have now been developed. Perhaps the Para can be removed or rephrased ?

Para 3: "Baseline studies... to begin until Kalapara Thana 2002, Betagi Thana and Pathorghata Pourashava 2003". Based on the outcome of careful reconsideration of the viability of piped water supplies in thana centres it will decided if the "Level of interests Studies" shall be carried out or not.

Page 57:
Part of the Recommendation:

A revised Terms of Reference (including time schedule) for the remaining towns will be drafted by the Project, then discussed and agreed with the Consultant. Given the complications likely to arise, it is not advisable to renegotiate the Contract itself.

8.3 Communication Capacity

The need for communication is highly different among project staff, hence the need for communication training is also divers. No single training will benefit the whole staff group.

A working group has therefore been formed which will define the needs for communication training of project staff.

The Project will define the needs for communication training in the NGOs, Pourshava, Thana Centres, DHPE, Pourashava WATSAN Committee and Ward Level WATSAN Committee.

Participatory approaches are essential to ensure the sustainability of the Project. The question is, however, whether it is effective to train people, who do not recognise and understand this fact. If people are not open towards involvement of people, then there is a great risk that the training will be in-effective, hence it will not serve the purpose. A sensitive prior to training will therefore be needed in certain cases.

Regarding health communicators. The health communicator model will be used in Noakhali. In Patuakahli it is not yet decided which model will be used. But it is considered a good idea to have community based animators. The final set-up of health education will be based on ideas from the selected NGO, combined with the projects own ideas.

Regarding Arsenic. We have developed an arsenic strategy during a workshop in February, which also deals with communication regarding arsenic.

Regarding that much information and education has to go through personal contact. The personal contact will be especially strong in selected poverty pockets, through an area based education with sanitation (step-by-step plan). The final set-up will still be based on ideas from the selected NGO combined with the projects own ideas.

8.4 School Hygiene

Patuakhali Pourshava has been chosen as area for the "Intensive District Approach for Education" Project as well as school sanitation programme of UNICEF. 2(Two) UNICEF staff are working in Patuakhali. During a field visit of the Patuakhali PMU the problems identified in a UNICEF school was lack of involvement of school management committee, hygiene education seemed less addressed, and teachers have not received training on hygiene education, and they were not well motivated about regular maintenance of facilities. It should be mentioned that problems have not been analysed in a structured way.

The Patuakhali PMU can therefore only intervene in this work following a structured problem identification analysis which of course demands a close collaboration with UNICEF.

The activities for out-of school children is a more virgin area. These activities can be undertaken with-in the area based programme which will be the job of the NGO. At this stage we consider this group a specific target group which demands specific methods.

9.2 Hydro-geological Activities

Para 1: Raipur

A survey on ground water quality is done based on the existing HTWs of possible different depth. The survey indicates that the tendency of decrease of iron concentration towards deeper depth.

Example:

Depth	Iron mg/1
10 – 15	3 – 12
223 – 230	1.5 – 2.0
259 – 280	0.75 – 0.95
247	0.95
259	0.83
280	0.75

So, the screen is placed in deeper depth from 315m to 325m in OTW, to use as exploratory hole as well as observation well.

Iron content of this OTW is to be found 0.2 mg/1 as informed by the Danida Lab. Maijdee.

Para 1: Feni

3 exploratory wells with 50mm ND may be constructed in Feni at different depth.

1st exploratory/OTW may be drilled up to 300m depth. The depth of rest wells to be decided based on the lithology of 1st bore hole tentative depth for 2nd & 3rd may respectively 200, 250m local contractor may be engaged for these drilling, but sealing will be difficult, importance may not be given on sealing in shallow dia well.

Para 2: Patharghata

Hydro-geological investigation like water quality analysis on existing wells geophysical surface sounding, exploratory bore holes etc. will be taken up soon.

Exploratory bore hole/OTW may have to go deep around 375-400m.

Few (3-4) exploratory bore holes may be considered to drill in different depth starting from 300-400m.

Emphasis should be given in eastern side of town.

Time will be the factor of constraint to drill beyond 300m by the local contractor.

Local contractor may drill the 1st exploratory/OTW upto 350m depth.

Lithology of 1st well will confirm the depth of other exploratory/OTW.

If there will be no significance of fresh water within this drilled depth then more deeper (400m) depth to be considered for other wells.

Deeper depth (400m) can be drilled by Pihl, if local contractor can not do such depth within short period of time.

Para 3: Long term pumping test & recovery including St.dd.test are not done due to:

Noakhali:

- Existing PTWs are in very shallow depth (20m) and with their aquifer.
- Water quality are not suitable
- Present well field is about 4km away from the existing PTWs.
- New well are constructed mainly in deep depth to abstract fresh water.

Raipur:

- No existing PTWs with Pourshava/DPHE.
- Fishery depth has got one PTW around 200m depth, but which is different now.
- Rest PTWs of fishery depth are in shallow depth and department can not stop their water supply.

Other Thana:

In most of the towns

- No access to measure the water level by inserting the dip meter.
- No access are available for conducting step draw down test like discharge throttling system, tee for fixing aquifer weir, etc.
- Disruption of water supply are not allowed for conducting long term pumping test & recovery.
- Frequent disruption of electricity.

Feni:

- There is no access to lower the dip meter in some wells.
- Dip meter could not be lowered down inside the well though the tube one obstacle in some wells.
- No access to fit the aquifer weir.
- The delivery pipe joint outside of pump house are buried & cemented.

- Short term pumping test are done to estimate the approximate well capacity.

Patuakhali:

- Few wells can not discharge water continuously even at very low rate.
- Yield was not possible to split in different steps.
- Long time disruption of water supply water not possible for long term pumping test recovery.
- Frequent disruption of electricity.
- Step draw down test are conducted in few wells which are enable to yield water to split in different steps.

9.3.1 Production Wells

Design of Production Wells

Para 2:

Safe yield is to be determined from pumping test. The number of PTWs may very based on design yield.

Para 4: Pump Chamber casing diameter

- 12" dia or even less dia is suitable for such submersible pump to abstract $70m^3/1$
- Submersible pump also has got some advantage.
- Project may install submersible pump at the beginning.
- But in case of unserviceable/failure/damage of the submersible pump, turbine pump may have to be used in future due to the scarcity of submersible pump in local market.
- Major number of wells under DPHE/Pourashava have got 14" dia pump chamber and equipped with turbine pump.
- Larger dia like 14" is suitable for maintenance & repair purposes.
- DPHE may be consulted for their experience.
- KSB (Pump Manufacturer) also may be consulted to know whether 12" is sufficient to equip the turbine pump of $70m^3/1$ capacity.
- However, submersible pump is preferred but alternative should be planned for future.
- So, there should be provision for the installation of turbine pump also.

Para 5: Pump Chamber length

It is agreed pump chamber length may be decreased to:

Well size	Well size
14"x6"	8"x4"

Big town	30m	40m
Thana	25m	35m

Detail calculation is in other paper.

Number of Production Wells

Para 2: Number of Wells

Number of wells may be finalised based on socio-economic & urban development survey and safe yield of PTW.

Para 3: Stand by well

- One number stand by well may be considered only where 1 – 2 numbers of wells are planned in the scheme
- Stand by wells are not preferred where 3 or more wells are in the planning.

Para 4: Local contractor may be considered to construct a PTW with proper sealing for test basis, but time will be the constraint.

Para 6: Recommendation

- Agreed, maxm yield should be $50m^3/1$, unless pump test clearly justify higher yield
- As for pump chamber diameter see comments on 9.3.1. Para 4
- Agreed, one stand by well may be considered where only 1 – 2 PTWs are planned.

9.3.2 Exploratory and Observation Wells

Selection of Drilling Contractor

Para 4:

- Local contractor may do the exploratory/OTW wells up to the depth maxm 350m, though time will be the constraint.
- Pihl may be engaged in deeper depth around 410m specially in Pathorghata.
- Project should have a very handy geophysical bore hole logger.

Exploratory wells to Identify Aquifers with Low Iron Content

- It is not preferred for new exploratory bore hole where existing # TW can feed the information on water quality of various depth.
- Exploratory bore hole are required in Feni, Eklashpur and all thana level towns to assess spatial variation in the ground water iron content & other purposes.

Observation Wells for Monitoring Up-coming of Saline Water

Para 3: Down coning

Down coning can be monitored from few existing HTWs.

Para 4: OTW in the same hole in every PTWs

It is preferred & agreed to have only one OTW in one well field. The observation well may vbe installed in separate bore hole beyond the depth of PTW and should be close o PTW.

Observation Wells for Pumping Tests

Para 3: OTW drilled in Noakhali 20m apart from PTW

- OTW installed is about 40m away from PTW.
- OTW is drilled to act an exploratory bore hole as well observation well to know also the lithology. So it is drilled nearer to PTW.
- There are existing HTWs, exploratory wells which are treated as OTW in different distances ranging from 100 to 1000m.

Para 5: Recommendation

- Exploratory well to know spatial variation in iron content are required in all thanas, Feni & Noakhali except Patuakhali Pourashava.
- Only one OTW may be drilled beyond 20m depth of PTW in one well field.
- Which can also be constructed by local driller because time may be permissible.
- Spacing between PTWs will be calculated, but land availability will be the constraint for maintenance of proper spacing. In such case few extra draw down to be considered.

9.8 Arsenic Issues

Page 74
Para 3 pin 1: Under the section describing the arsenic removal unit.

- The operational cost is 10 taka/family/month.
- The units are build of locally available parts only.

10.1 Strategy for Implementation of Drainage Schemes

Noakhali Pourashava, Recommendation.

Although the Project accepts the JRM Recommendation it is still the opinion of the Project that drainage in Noakhali is an important component if the objectives of the project should be achieved.

The Project should propose that status on drainage in Noakhali should be reviewed by the Project and a JRT during implementation of the ADB/STIDP project and that budget for drainage in Noakhali should be maintained so far.

11.1 Standard Design on Public Toilets

Orientation of the whole toilet building in a north south direction would only be possible if available space permits.

Practice of draining soak-away overflows to roadside drain shall be acceptable only when the effluent is found more or less bacteria free, colour and odour less.

A pilot scheme on effluent treatment is going to be taken soon in Noakhali. If the treated effluent is found acceptable environmentally and socially then the option can be considered.

11.4 Emptying of Pits and Disposal of Sludge

In lieu of submersible pump, suction pump may be more appropriate for such arrangement. A dumping site must be identified prior to making such arrangement. It has been experienced from the 1st Phase that dumping place is not easily found.

For the public toilets, this type of arrangement will not be suitable. For the effluent further treatment can be made and for the sludge, at 3-4 years interval the accumulated sludge can be dumped by digging pit nearby with sufficient protective measure.

Sharing of vacuum tanker is not feasible rather tanker can be leased out to another Pourashava if full responsibility is given to the former.

12.2 Composition of WATSAN Committees

The selection procedure for Ward level WATSAN Committee was discussed in the Pourashava. Present were Pourshava 'Chairman, Executive Engineer DPHE, Commissioners of Patuakhali Pourashava and staff from Patuakhali Pourashava and the Project Manager, SEA and SE from PMU Patuakhali.

The Project Manager, Pourshava Chairman and Executive Engineer DPHE Patuakhali did not consider an election feasible, and did not believe in that idea, because in most of the cases, they thought there would be too much quarrels. Therefore they preferred a selection of the members.

Regarding the involvement of women. In many committees in Bangladesh, there is a certain percentage of women, however often these women are not very active, and in most cases they are dominated by men in the committee. As a matter of fact they are often only ornament. What the project is aiming at, is to get the **active** participation of women in decision making. This demands good facilitation of the meetings, which can be done by men as well as women. However of course the project will work at increasing the number of women in the committees.

Regarding the Ward Level WATSAN Committee. The wards in Patuakhali consists of 15,000 – 20,000 inhabitants.

According to the newest local government laws of Bangladesh. The Pourashava will have 9 wards, which mean that there will be 9 ward level WATSAN Committees.

At the same time the NGO will have worked intensively in poor areas. Here the communities will be heavily involved in the implementation through a set-up, which is yet to be defined. It is envisaged that existing CBOs and credit groups will be involved.

12.4 Institutional Set-up

Recommendation:

Only key staff should be employed when construction works commence.

12.5 Operation and Maintenance in Thana Centres

Execution of piped water supply schemes may be deferred till legal institution has been established at Thana level. DPHE Than Engineer in collaboration with the existing Thana Development Committee should be able to execute the other activities. Inclusion of Union WATSAN is not feasible.

The idea of privatising small piped system in Thana centre could be piloting as a test case.

14.2 Gender and Participation of Women

Page 99
Para 1: "They should be commended..." This sentence should be deleted as the activity belongs to Phase 1.
"Project has also .." Referring to who ? – there are six female staff assigned to the Project: two local socio-economists, two field-coordinators and two expatriate socio-economic advisers?

Para 2: Whilst all efforts will continue to be made to ensure the active involvement of women in all project activities, experience has shown that token representation – based on numerical quotas – is not enough. Women's representation

must include a real role in decision-making and expressing demand. The women who are presently members of the Ward Level WATSAN Committees in Patuakhali are very active and keen.

Page 100: Gender

The importance of sensitive and participatory gender training is so great that is should be made mandatory. It is vital that all Project members and partners, in particular males, share understanding and conviction about gender issues.

14.3 Good Governance

"Doubts ..." It may ... be necessary to downgrade the environmental ambitions of the Project".

14.4 Environment

Please clarify "It may... be necessary to downgrade the environmental ambitions of the Project". In what sense ? Regarding what aspects?

ANNEX 8 Well Design Calculations

1. Capacity of Production Tube wells

Para 3: Flow rate 50m^3/h underestimated

- 50m^3/h is estimated in case of saline intrusion as it is in the coastal belt.
- But the discharge rate may very, which will be confirmed after pumping test.
- May be in the range of 50 –70m^3/h

Para 7: Adjustment Number of PTWs

- It is advisable to install:

  2 Nos 50m^3/h instead of 1 no. 70m^3/h
  2 Nos 70m^3/h instead of 3 no, 50m^3/h

But it depends on aquifer character and self yield.

2. Types of Tube wells

Para 2: Head loss for 300 m rising main

Head loss is estimated for 4" & 300m long rising main.
300m is an example only.

The length of rising main will very based on the depth of aquifer.

4. Well Spacing

Para 2: Theme equation

Agreed, it is a print mistake.

Should be Ln (R/r) instead of Ln (r/R)

5. Pump Chamber Length

Length of pump chamber may be reduced
14"x16" = 30m in big town & 25.0m in thana level
8"x4" = 40m in big town & 35.0m in thana level

a. 14"x16" Size well assuming 70m^3/h

	Big Town	Thana Level

AGL	1.0m	1.0m
LSWL	4.0m	3.0m
PCA	5.0m (3+1+1)	5.0m
ESD	6.5m	6.0m
25y, ESD	1.6m	1.5m
DA	5.0m	3.0m
10y-DA	0.5m	0.3m
DIWF	3.0m	2.0m
	26.6m	21.8m
Safety	29.6m	24.8m
	~30.0m	~25.0m

So, 30.0m big town
25.0m Thana 1

b. 8"x4" Size well assuming 30-40 m^3/h with 250m long rising main:

5.7m friction loss for 225 m rising main
6.3 m friction loss for 250m rising main

Friction loss + Draw-down influence due to well field
6.3 + m m 2.7= 10.0

Big Town	Thana
30.0m	25.0m
10.0m	10.0m
40.0m	35.0m

So, 40.0m big town
35.0m Thana level

DPHE-DANIDA URBAN WATER AND SANITATION PROJECT

CENTRAL COORDINATION UNIT

Govt. of the Peoples
Republic of Bangladesh
Department of Public Health Engineering
175-178, Kakrail, DPHE Bhavan
Dhaka-1000
Project Director/
Additional Chief Engineer(works)
Tel (off): 9343361, 9347382
Danida Advisory Group
GPO Box 749
Tel: 9346167-70 Fax: 9344791
email:watsap@dhaka.agni.com

Ref. No. 01.002.xx-xx/287(98)
& 01.030.06-01/287(98)

28th April, 1998

Royal Danish Embassy
House No. 1, Road No. 51
Gulshan-2
Dhaka-1212.

Att: Counsellor Erik Sjorslev Jensen

Subject: **Comments from the Project on Draft Joint DPHE-Danida Review, Urban Water Supply and Sanitation Project, February 1998**

Dear Erik,

By mistake the attached comments on the Report's point 8.2, 9.1 and 11.3 was not included in our comments of 12.04.1998 submitted to you on 16.04.1998.

If not too late I should appreciate the late comments to be attached to the previously submitted.

If you prefer the attached comments to be incorporated in the comments of 12.04.1998 a revised set of comments could be prepared and submitted to you.

Please excuse our mistake.

Yours Sincerely,

Hans Anderskouv
Chief Project Adviser

HA/mri

Recommendation 8.1:

A minimum set of hygiene behaviours and knowledge should be identified and defined, where appropriate, by age, sex and economic group. Simple and verifiable indicators for each group should be defined and monitoring should be tested through local government health staff and NGOs, supported by PMU staff.

Comment:

The Project agrees that health education should be tailored to specific situations and target groups. The Project will also work towards simple community self-monitoring, facilitated by community-based health workers.

Recommendation 9.1.:

At the beginning of an intervention in an area, social mapping should be done of existing water supplies, including types of sources, number of user households, households and groups of people without access to safe water.

Comment:

The fringe area inventory of water and sanitation facilities already form the basis for the area-based approach, whereby least-covered areas get priority. The PMU agrees that where possible, the pre-intervention situation must be documented through detailed social mapping, with a view to facilitating and strengthening monitoring, planning and evaluation, in both the PMU and the Pourashava Health Section.

Recommendation 11.3:
Comment:

With reference to recommendation 9.1., the Project is in the process of developing an area-based implementation plan, initially for Noakhali Pourashava. The Plan will be implemented sequentially, with several partner NGOs, initially focusing on identified community needs for for hygiene education. The TOR of the NGOs will include the identification of particularly underprivileged groups within the localities. The Project in principle agrees to the desirability of eliminating general subsidies. However, the alternatives - savings, credit activities - require careful consideration in view of their implications in terms of staffing and funding. A workshop

has been planned for May, 1998, with a view to shedding light on this crucial issue.

FIVE DISTRICTS WATER AND SANITATION GROUP

CONSULTANCY SERVICES FOR DPHE-DANIDA URBAN WATER AND SANITATION PROJECT

Client: DANIDA, Denmark

Consultants: DHV, AQUA, DEVCON
House 109, Road 4, Banani, Dhaka
Tel. 871980, Fax. 872374

To : Mr. Erik Sjorslev Jensen
Counsellor
Royal Danish Embassy
House 1, Road 51, Gulshan
Dhaka - 1212

Dhaka, 12 April 1998

Your Ref : your letter 104.Bang.174 dated 18 March 1998
Our Ref : C/Btr/556

Subject: **Draft Review Report from the Joint DPHE-Danida Review of the Urban Water Supply and Sanitation Project**

Dear Mr. Jensen,

Please receive herewith our comments on the Draft Review Report of the Urban Water Supply and Sanitation Project.

Yours sincerely,

Jaap Butter
DHV/5DWSG Project Manager

DHV 5 DWSP DANIDA - DPHE

cc: Mr. Jan Moeller Hansen
DANIDA
Advisor Water Resources Management and Water Supply
2, Asiatisk Plads
DK-1448 Copenhagen K, Denmark

cc: Mr. Hans Anderskouv
Chief Project Advisor, DAG
DPHE-Danida Urban Water and Sanitation Project
Dhaka

COMMENTS on the

DRAFT REPORT, JOINT DPHE - DANIDA REVIEW
URBAN WATER SUPPLY AND SANITATION PROJECT (UWSP), BANGLADESH

BY:
DHV - FIVE DISTRICTS WATER AND SANITATION GROUP (5DWSG)

This note contains the comments of DHV Consultants BV and its associates, as the Consultant in the UWSP, on the Draft Report of the Joint DPHE-DANIDA Review which was carried out between 10th and 25th January 1998. We appreciate the invitation to submit our observations and comments on the Draft Report.

First of all we would like to express our general appreciation for this Draft Report. The Mission has undertaken a sizeable effort. We have the impression that a great number of observation and suggestions will be of benefit to the further development and implementation of the project, under the overall co-ordination of DAG and with consultancy services by DHV Consultants and its partners.

The structure of this note follows the structure of the draft review report. At each comment reference is made to the relevant section and page number of that draft review report. Quotations from the draft report are presented in *italic*.

The comments start with the Executive Summary. In case subjects appear again in later chapters of the draft review report, the comments are not repeated, but normally a reference to these later chapters is given at the end of each of our comments/observations.

2. *EXECUTIVE SUMMARY*

2.1 *Findings*

Page 4

Project Organisation and Management

Fourth paragraph.
The JRT states that *DAG's mandate to manage the Consultant is not clear.* Although this point may also refer to the lines of command and communication between DANIDA and DAG, we would like to comment here that - to our DHV Project Manager - this mandate was clarified during the inception phase of the project. In the first meeting between DAG, Danish Embassy and Consultant it was already stated that the Consultant's PM should co-ordinate all implementation issues with the DAG's Chief Advisor, who was entrusted with the delegated authority from DANIDA to monitor and control the Consultant's services. This was understood to include revisions of work plans to ensure an optimal implementation of the Project. The subject has been discussed in subsequent DAG-DHV meetings, as also noted by the JRT. So far this has appeared to be a workable set-up for DHV.
(refer to chapter 6.3.1, Mandate of DAG, page 38)

Sixth paragraph.
It is stated that *DHV intends ..... to reduce outputs*. This is an incorrect and misleading formulation.
The Consultant intends, in discussion and co-operation with DAG, to deliver those outputs that are of most use to the Project, and therewith to use the Consultant's resources available within the contract in the most effective way. This seemed especially important given the programmatic nature of the Project

on the one hand (with a staggered implementation schedule per town, spread out over a ten-year period) and the rather rigid time schedule for the provision of the consultancy services on the other hand.
Proposed revisions are by no means a reduction of outputs, but rather a change in outputs. For example in solid waste, in stead of delivering solid waste management plans for 23 towns, it was considered more effective to deliver comprehensive management plans for two towns, to prepare them in close co-operation with the concerned Local Authorities, and to deliver guidelines to DAG for the preparation of similar management plans in the remainder of the towns at a moment closer to implementation.
(refer to chapter 6.4, Role of Consultant, page 40)

The JRT states that *... in spite of the reduction in the Consultant's outputs, DHV has proposed an increase of the consultancy budget ....*
We strongly object to this suggestive, misleading and incorrect information. Firstly, as explained above, the outputs have not been reduced, but have changed. Secondly, DHV - in response to a request by DAG - has prepared a proposal for revisions in the contract, related to inconsistencies in the project design and revised work plan.
Please note that a major portion of the proposed revision was the provision of a more continuous presence of DHV's Project Manager in the project, to enable more flexible responses to demands of the project and to provide continuous technical back-up. This last point has also been identified by the JRT as an element from which DAG would greatly benefit (see also fifth paragraph of page 4).
(refer to chapter 6.4, Role of Consultant, page 41)

Seventh paragraph.
The report states that *DHV has replaced the original drilling supervisor with a hydrogeologist with little practical and relevant experience.* This statement is in-complete.
At the time of bidding rather limited information was provided in the TOR on the drilling works. As the TOR prescribed supervisory activities of the drilling works by the team's hydrogeologist we opted in the context of the international competitive bidding for a job contractor, which was clearly illustrated by the CV and the tariff quoted for the person concerned . When our job-contractor fell seriously ill we discussed with Danida various options of replacement. Danida preferred to stick to the original set-up of our bid and we are of the opinion that we have found an excellent replacement within the available resources and operational conditions.
The new hydrogeologist has been selected because of his experience in hydrogeological investigations including drilling supervision, and because of his personality which we consider suitable to work in remote and under sometimes difficult conditions.
(refer to chapter 6.4, Role of Consultant, page 41)

Eighth paragraph.
The report states that *a quality assurance plan has been made, but hardly been implemented. Apparently, reports have not been quality assured.*
These observations are not correct. As explained to the JRT, the quality of reports is assured as follows: the individual expert is primarily responsible for the quality of the report. It is the PM who controls whether the report meets both technical and editorial requirements. Only in case the PM is not satisfied, and he is not able to resolve the issue with the expert, he will consult DHV's head office. All 5DWSG reports have - in that sense - past the quality control of DHV, as the PM approved them for submission.
(refer to chapter 6.4, Role of Consultant, page 42)

Page 5

Socio-Economic Analysis

First paragraph.
The report states that .... *The baseline studies for the first years were too late for planning usage in Patuakhali and Noakhali.*
The first-year baseline studies were indeed a bit late. In the original planning the timing of the socio-economic surveys was considered to fit better in the overall project implementation schedule. Following Danida's decision to reschedule the starting date of the project it was considered more appropriate to have the socio-economic surveys start at a later date taking into consideration the seasonal limitations on field investigations.
The baseline study results for Patuakhali and Noakhali are now being used for the detailed designs for water supply in these two towns.
(refer to chapter 8.1, Baseline Studies, page 55)

Second paragraph.
The report mentions that ... *the Consultant has stated that, due to overspending ..... only 11 full studies will be completed .....*
The Consultant has not stated this. The reason for not carrying out baseline surveys in all the towns is DHV's and DAGs consideration that it is not desirable to carry out surveys in towns where project implementation will start many years later. The JRT in its report mentions the same consideration.

In discussions with DAG the following was - in our opinion - agreed: baseline surveys should in principle be carried out close to the date of implementation. DHV would therefore carry out extensive surveys (more extensive than specified in the TOR) in the first batch of towns:
* to provide the required information in these first towns;
* to extract findings generally applicable to the entire project area; and
* to distillate a simpler survey protocol for the remainder of the towns.

In addition rapid assessments on the interest in piped water were to be carried out in small towns where implementation was scheduled late, but where the feasibility of piped water schemes was questioned.
Surveys in the other towns would be carried out using the simpler survey protocol. For a second batch of towns this was to be done by DHV, in the remainder of the towns this was to be done by another party because the Consultant's experts would no longer be available at the time the surveys were required.
Based on this agreement DHV has scheduled the use of its resources over the two periods provided for in the contract.
(refer to chapter 6.3.1, Mandate of DAG, page 39)
(refer to chapter 6.4, Role of Consultant, page 41)
(refer to chapter 8.1, Baseline Studies, pages 55-57)

Page 6

Water Supply

Third paragraph
The JRT comments that the Consultant admitted that there were shortcomings in the outline designs for piped water supply. This has indeed been admitted to a certain extent, but it has also been explained that these shortcomings were built-in in the status and purpose of the report. As to content and comprehensiveness of reports a distinct difference should be made between conceptual/outline design reports and preliminary/final design reports.
Status of the report: as described in the Inception Report of April 1997, the Consultant is of the opinion that an outline design document is to be based on a set of parameters: condition of the present

water supply system, population data, the interest - or market - for piped water, water consumption, technical design criteria and water resources. Information on the various parameters is gradually coming available: a population study has been done in November 1997, results of the socio-economic survey became available in February 1998 while drilling information is not yet finalised. For the draft outline design report submitted in June 1997 the more detailed and up to date input data were not yet available, and in accordance with normal practice existing data were used for the outline design reports.
Purpose of the report: the main objectives of that draft report were: 1) to report on the findings of inventory surveys and 2) to present to the Client a first indication of the investment costs. DHV is of the opinion that the report has met these objectives.

The JRT mentions that the Consultant has agreed to submit a new report. We would like to stress here that - as explained to the JRT - it has always been the intention to submit a more detailed outline design once the full set of basic information was available. The JRT therefore has not requested more than DHV had already planned to do.
(refer to chapter 9.4.1, Design Criteria and Outline Design, page 68)

Drainage and Solid Waste

Page 7

Fourth paragraph
The Consultant shares the JRT's reservation regarding the proposed waste collection system. However, the solid waste management plans are joint products of the Local Authorities and the Consultant and therefore contains elements which - from purely technical point of view - might be less appropriate. It is the Consultant's opinion that a plan fully supported by the Local Authority is more valuable than a plan drafted by a consultant on purely technical grounds. Please note that most elements of the plans are scheduled as pilot activities to enable review and adjustment - again in co-operation with the Local Authorities.
(refer to chapter 10.2, Solid Waste Management Plans, page 78)

2.2 Recommendations

Page 10

Tenth paragraph.
The JRT recommends that *Danida should consider to recruit a Danish consulting company to provide back-up to the DAG.*
Please note that the earlier proposal by DHV for extension of its services - made on the request of DAG - was primarily intended to provide such back-up. The proposal was not made in the light of the preparation of detailed designs for piped water supplies, as incorrectly mentioned by the JRT in the first paragraph of page 11.
(refer to chapter 6.3.2, Need for Strengthening of DAG, page 39)

Page 12

First Paragraph
The Consultant welcomes the JRT's recommendation to agree on specific revisions of the remaining socio-economic baseline studies, considering the argumentation provided by the JRT. Please note that such revisions have been subject of discussions between DAG and DHV and that the work plan for the first year had been adjusted as a result of these discussions.
(refer to chapter 8.1, Baseline Studies, page 57)

Sixth paragraph
We would like to comment here that the drilling of exploratory/observation wells by local contractors may considerably increase the supervisory tasks of the Project.
(refer to chapter 9.3.2, Exploratory and Observation Wells, page 66)

Last paragraph
The JRT's recommendation that another ("Danish") consulting company should be involved in scrutinising design reports prepared by DHV may result in an unclear division of responsibilities or ownership of these reports. Such a set-up may have some implications which were not foreseen in the TOR and Contract for consultancy services. DHV considers it as it professional duty to properly address and implement all relevant aspects and deliver final reports on the various components up to the required and in fact best standards within the resources available.
(refer to chapter 9.4.1, Design Criteria and Outline Design, page 68)

disagree.

Page 13

Second and third paragraph.
The JRT's suggestion of particular emphasis on cost consciousness in the preparation of designs for water supply may indeed be considered as a further elaboration of the TOR of the Consultant, but we would like to stress here that an optimisation of costs is - and has always been - one of the important criteria in the design activities of DHV.
(refer to chapter 9.4.3, Cost Aspects, page 69)

Seventh paragraph
The JRT recommends that the Consultant makes population estimates and projections in an additional number of project towns (including two phase-1 towns). In page 73 the JRT gives an estimate of required resources for such additional activities: 1 ½ to 2 man-months for the local consultant. This is under-estimated. The involvement of the expatriate consultant is required to guarantee an appropriate interpretation and extrapolation of data. Moreover, base maps of the two phase-1 towns are not available.
(refer to chapter 9.7, Water Supply in Other Towns and Centres, page 73)

Page 14

Fourth, fifth and sixth paragraph.
The JRT recommends further inputs by the Consultant in the field of solid waste management and sanitation. We would like to note that the required outputs in these sectors have been delivered against the inputs prescribed in the TOR. Additional inputs could be provided based on an elaboration of additional services required.
(refer to chapter 10.3, Dumping Sites for Solid Waste and Sludge, page 79)
(refer to chapter 11.4, Emptying of Pits and Disposal of Sludge, page 87)

Page 15

Third (full) paragraph.
The JRT recommends a schedule for training of staff for piped water supply systems, which differs from the one proposed by the Consultant's in their second report on Organisational Development. This report provides argumentation for the proposed schedule. We suggest that, rather than bringing forward new proposals, the JRT comments and builds on earlier proposals made by the Project.
(refer to chapter 12.4, Institutional Set-Up in Relation to ..... Water Supply Schemes, page 91)

4. STATUS OF PROJECT IMPLEMENTATION

4.2 Implementation Activities

Page 20

Piped Water Supply

The report states that the outline design for Patuakhali has been postponed to May 1998. This is not correct.
An outline design for the water supply system of Patuakhali has been submitted in December 1997. In February information from the socio-economic baseline survey came available. In April/early May the first results from drilling activities are expected. After that date an update of the outline design was planned to incorporate these latest field results.
In the meantime a preliminary design for Patuakhali has been prepared (including socio-economic information but excluding detailed results from drilling activities) to enable DAG to decide on the scope of the construction works and in order not to delay the planned detailed design activities (scheduled for April - June 1998).

6. PROJECT ORGANISATION AND MANAGEMENT

6.4 Role of Consultants

Consultants Outputs

Page 41.

First paragraph.
The report states that *the Consultant has stressed the need to revise the contract.* This is not correct. DHV has prepared a proposal for revisions in the contract on the request of DAG. (see also our comments on page 4 of the JRT report).

Third paragraph.
The report mentions a reduction of the Consultant's fee versus a reduction of the Consultant's outputs. Please note that not only reductions have been agreed upon with DAG, but that these were balanced with additions to outputs. The required inputs to achieve the revised outputs have (at least) been the same as provided for in the contract.

Quality Assurance.

Page 42

Second Paragraph
The report mentions that *according to the DHV Project Manager the QA Manager considered his task to be completed when the QA manual was prepared.* This is a wrong interpretation of what has been said. The QA Manager has been consulted regarding revisions in the QA plan prepared by the Project Manager, and he is still available to provide similar inputs.

Fourth Paragraph
The report mentions *the quality of the piped water supply outline design report* as an example of where DHV's QA system has failed.
The Project Manager (PM) does not consider this an example of a failure of the QA system. As explained to the mission, the individual expert is primarily responsible for the quality of the report. It is the PM who controls whether the report meets both technical and editorial requirements. Only in case

the PM is not satisfied, and he is not able to resolve the issue with the expert, he will consult DHV's head office.
The outline design report mentioned above has - in that sense - past the quality control of DHV, as the PM approved it for submission.

8. SOCIO-ECONIMIC ANALYSIS

8.1 Baseline Studies

Page 56

Third paragraph.
The JRT states that *a clear list of data should have been developed between the Project and the Consultant, data necessary for detailed design and planning.* This has taken place: the first 1 ½ month of the assignment has been used for extensive discussions between the Consultant, DAG and PMU to determine topics to be investigated in the surveys. We would like to note here that the list thus developed included more parameters than originally foreseen in the TOR.

Fourth paragraph.
Regarding the identification of indicators for monitoring and evaluation, this has been subject of several meetings between the Consultant and the Project, including a workshop in October 1997. But because project targets, methodologies and approaches were not fully clear at that time, the baseline survey may have covered more aspects than strictly necessary. The Consultant appreciates the JRT's recommendation that the baseline studies prepared so far be used by the PMUs and that they provide feedback for the design of future surveys (fifth paragraph).

Sixth paragraph
The JRT states that *some of the methodologies detailed in the contract were not implemented.* This is correct.
The JRT mentions that *the original TOR were not particularly focused, too extensive and included protocols which are more suitable for rural areas.* We agree with this observation and this is one of the reasons why the survey methodologies have been revised. The two methodologies not used were "participatory resource profiles using matrices" and "social mapping". These were tried but found inappropriate to the urban setting. Other participatory methods were extensively used, however: group discussions, focus groups, key informant interviews and observations.

Page 57

First paragraph.
The JRT comments that the long questionnaire took 2 ½ hours to administer. This is not correct. It took 1½ hours at the most. The reason for the long questionnaire was to approach several aspects of household water and sanitation practices from various angles, in order to arrive at firm conclusions and to be able to extract a shorter version of the questionnaire to be used in the remainder of the towns. With this approach the most significant indicators could be selected. Also, aspects were identified which vary little between the different towns and also these may be excluded from future surveys.

In addition to the implementation of the longer questionnaire, DHV carried out rapid assessments in eight towns into the interest in piped water. These are small towns of which the feasibility of piped water supply is being questioned (also by the JRT). An early indication of the interest for piped water was considered an important parameter in the determination of that feasibility.

9. *WATER SUPPLY*

Page 63

9.2 Hydrogeological Activities

First Paragraph.
Exercises to identify aquifers with low iron content have been carried out as part of the hydro-geological investigations and as part of the ongoing drilling programme.

Last paragraph
The JRT states that the Consultant *did not carry out all activities stated in the contract.* The justification for this decision has been given in the Consultant's Inception Report (April 1997).
The JRT fails to mention that additional activities have been carried out, such as geo-electric surface soundings and supervision of drilling of observation wells by local contractors in Noakhali. This is an example of an adjustment of the Consultant's activities and outputs to ensure an optimal use of the available resources.

Page 64

First paragraph.
Arsenic – the 5DWSG is and has been analysing for arsenic as part of initial water quality investigations and on samples from newly constructed wells.

9.3 Tube well Drilling

9.3.1 Production Wells

Design of Production Wells

Second Paragraph.
Quoted figures of 70 and 50 m3/hr are for preliminary design purposes only. Actual safe yields will be based on the available data and will be related to a number of different technical criteria. The number of PTWs will vary based upon these yields.

Third paragraph.
PTTWs have been drilled in Raipur and although the head loss problems are known it may be appropriate to drill such wells in other towns, under certain circumstances.

Fourth paragraph.
14" pump chambers are included in the Bill of Quantities and are standard practice for DPHE. Based upon experience with the wells drilled in the 97/98 season it may be appropriate to use smaller diameter pump chambers. The use of a smaller diameter upper hole may reduce costs and this will be discussed with the Contractor.

Fifth paragraph.
Pump chamber – it is agreed that pump chamber length can be reduced where appropriate.

Number of Production Wells

Page 65
First paragraph.
The number of production tube wells will be finalised according to socio-economic and technical criteria, including the safe yield of each well. The numbers quoted are based upon yields of 50 m3/hr and it is likely that final safe yields will exceed this figure.

Second paragraph.
It is agreed that the provision of standby wells for schemes with several wells may be reconsidered.

Third paragraph.
Local contractors may be considered to construct a PTW with proper sealing for test basis, but time will be the constraint.

Recommendations.

There is no technical justification for quoting a figure of 50 m3/hr, especially as these wells are being extensively developed. The safe yield of the well will be based on pumping test data, pump characteristics, flow velocity and the geology/hydro-geology of the site.
It is agreed that diameter and length of pump chamber can be reduced.

9.3.2 Exploratory and Observation Wells.

Selection of Drilling Contractor

Page 66
Recommendations.

In Eklashpur and especially Raipur it was necessary for deep observation wells to be drilled by the Danish Contractor, in order that the required information could be collected. In other areas the issue of hiring local contractors is being examined. Where deeper depths are required Pihl & Son will be used to drill deep OTWs (>320m).

Also being assessed is the purchase of geophysical logging equipment for DAG.

Exploratory Wells to Identify Aquifers with Low Iron Content.

This exercise has already been carried out. In Eklashpur exploratory wells were drilled by a local Contractor to identify aquifers of low salt content but also to assess their iron content. In Raipur a water sampling exercise was undertaken which showed that iron content decreased with depth. Therefore a well was drilled to 375m to locate an aquifer with low iron content.

Such mapping has been carried out in other towns, including Patuakhali, and is planned for Pathorgata in mid 1998. Geophysical sounding will also be carried out in Pathorgata to attempt to identify fresh water aquifers.

Observation Wells for Monitoring Up-coning of Saline Water

The suggestion of an observation screen in a PTW was abandoned after consultation with the Contractor.

Observation wells have been placed in the well fields at Eklashpur and Raipur for the purposes of monitoring draw down and water quality. In Eklashpur such wells exist both within and outside the well

field and in the deep and intermediate aquifers. It is probable that another deep OTW may be required in Eklashpur, for this purpose.

It is not intended to drill one OTW for each PTW.

It does not seem appropriate to use an unsealed locally constructed OTW to monitor saline up-coning or draw down in an adjacent sealed PTW. Both wells should be constructed to the same standard if such monitoring is to be effective.

Page 67

Observation Wells for Pumping Tests.

The Consultant did not recommend 16 OTWs; this was part of the Specification of the drilling contract. It is of course better to have as many OTWs as possible in pumping tests but the requirements for pure science should be balanced with realities such as available funds, land, time etc. Where conditions permit both newly constructed and already available wells will and have been used in pumping tests so that there will be as comprehensive a coverage as possible. Where possible deep and shallow OTWs are monitored as part of the pumping tests.

Regarding the location of OTWs as stated above the requirements for pure science cannot always be fulfilled. There are a number of issues related to the position of wells such as available land, location of power lines, access for equipment, layout of the drilling equipment etc.

The justification for the siting of OTWs at Eklashpur is that such wells were required within the wellfield area to prove the aquifer sequences with the more sophisticated geophysical logging equipment, and for monitoring drawdown within the wellfield. In such a constricted site such wells must, by necessity, be close to the locations of the PTWs.

Nevertheless it should be noted that the thickness of the lower aquifer at Eklashpur is approximately 50m and the deep OTW is located 33m away (not 20m), an existing OTW is approximately 70 away and there are 3 other OTWs at greater distances around the site. For the shallow OTW at Eklashpur, the aquifer thickness is approximately 30m and the OTW is located 35m away.

Minimum spacing is being kept to where possible but this requirement must be balanced with the available land.

Recommendations

Where existing data are not adequate exploratory wells have and will be drilled to identify fresh water and low iron aquifers.

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