

Semi-Annual Environmental Monitoring Report

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BAN: Dhaka Water Supply Sector Development Program (Project Loan)

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Government of the People's Republic of Bangladesh

Ministry of Local Government, Rural Development and Co-operatives

Dhaka Water Supply and Sewerage Authority (DWASA)

Environmental Safeguard Monitoring Report

Dhaka Water Supply Sector Development Project (DWSSDP)

Funded by

Asian Development Bank and Government of Bangladesh

Consultants:

Design and Management Consultants (DMC)

Grontmij A/S in Joint Venture with AQUA-BETS-IWM

June, 2016

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Abbreviations

ADB	: Asian Development Bank
DMA	: District Metered Area
IEE	: Initial Environmental Examinations
IECs	: Important Environmental Components

Glossary

Important Environmental Components: Important Environmental Components are features of the biophysical or social or economic environments that are likely to be significantly affected by DWSSDP or facilities developments.

Initial Environmental Examination: The first stage in the environmental assessment undertaken for a regional or pre-feasibility level study for identifying and assessing possible environmental impacts.

Monitoring: Monitoring is the continuous assessment of DWSSDP implementation in relation to agreed schedules, the use of inputs, infrastructure, and services by project beneficiaries. Monitoring is undertaken to improve environmental understanding of cause –effect relationship, to provide an early warning of undesirable change in the environment, to verify earlier IEE/EIA predictions and to check on the effectiveness of environmental management plan.

1. INTRODUCTION

1. This Environmental Report has been produced as an additional report to the requirement of the contract for the provision of the construction supervision services to the Ministry of Local Government Rural Development and Cooperative (MLGRDC), Dhaka Water Supply and Sewerage Authority (DWASA) of Bangladesh for the Dhaka Water Supply Sector Development Project (DWSSDP) under Asian Development Bank, Project Number ADB Loan No 2382-BAN (SF). This DWSSDP has been screened for expected environmental impacts and assigned to Category B type according to ADB SPS 2009.
2. The report covers all construction contracts involved in the project in Dhaka city and the construction supervision of these contracts was implemented by Grontmij A/S in Joint Venture with Aqua, BETS and IWM. This report has been prepared in accordance with the environmental monitoring program followed by the environmental management plan (EMP) prepared before.
3. The purpose of this Environmental Monitoring Report is to satisfy the environmental safeguard requirements of the Government of Bangladesh and the Asian Development Bank (ADB) as well as to fulfill the requirements written in the loan document of Dhaka Water Supply Sector Development Project. The program goal of the project was improved health and quality of life and reduced poverty of the people of the project area by providing and improving access to adequate, sustainable safe water supply facilities.
4. This monitoring report has been made in consideration of the observations during the field visits performed by the Environmental Expert, DMC and according to the recommendations stated in the monitoring reports already submitted to ADB. This overall monitoring report covers the project period up to June, 2016. Site inspectors of Contractors have overseen the environmental safeguards in different phases of the sub-project works. Environmental Expert (EE) of the DMC is mainly overall responsible for Env. Monitoring but his input was limited as his input was part time only. The DMC organogram is provided in Appendix-2.
5. The following construction contract packages have been completed as indicated. The Package wise dates of signing of each contract and firms responsible for civil work construction are presented in Table-1

Table 1: The Status of Contracts

Contract Number	Location	Contractor and Effective Date	Status of the physical Construction	Progress of Environmental / Resettlement Works
ICB 02.1	7 District Metered Area (DMA) of MODS Zone 5, 8, 9. Geographical area grossly: Part of	National Construction Company Ltd (NCC) Effective Date: 04 April 2011.	Construction , Guaranty test and Handing over Completed	Details are stated in the Section 5.2 of the report

Contract Number	Location	Contractor and Effective Date	Status of the physical Construction	Progress of Environmental / Resettlement Works
	Banani, Nikunja-1 & 2, Baridhara DOHS, Khilket, Kuril, Naddah.	Completion date: September 2015		
ICB 02.2	8 DMAs of MODS Zone 8 out of 11 DMA. Geographical Area grossly: Bashundhara Residential Area, Baridhara, Nayanagar, Jagganathpur, Badda, Shahjadpur, Satarkul, Aftabnagar etc	China First Metallurgical Group Corporation Ltd. (CFMGC) Effective date: 30 May 2012.	Construction , Guaranty test and Handing over Completed	Details are stated in the Section 5.2 of the report
ICB 02.3	8 DMAs of MODS Zone -5 out of 10 DMAs. Geographical Area grossly: Gulshan 1 & 2, Mohakhali, Niketon, Tejgaon Industrial area up to Sonargaon Hotel, Karwan Bazar, Mohakhali DOHS, Tejkunipara, Nakhapara, Shaheenbagh. Banani DOHS .	Pratibha –Jain Irrigation-Navana JV(PJIN JV) Effective Date: 15 April 2012	Physical works completed in all 8 DMAs. Guaranty test and Handing over remains for 1-DMA	Details are stated in the Section 5.2 of the report
ICB 02.4	10 DMAs of MODS Zone -4 Geographical Area grossly: Pallabi, Mirpur 12, 11, 10, 6, 7, 2, 1 , Rupnagar, West kafrul, Agargaon, west Kazipara, West Shewrapara etc	Navana Pratibha – Jain Irrigation- JV(NPJI JV) Effective Date: 26 December 2012	Physical Construction completed for 7 and 3-DMAs dropped for new upcoming project. Guaranty tests completed for all DMAs.	Details are stated in the Section 5.2 of the Appendix

Contract Number	Location	Contractor and Effective Date	Status of the physical Construction	Progress of Environmental / Resettlement Works
ICB 02.5	10 DMAs of MODS Zone -10 Geographical Area grossly: Pallabi, Mirpur 12, 11, 10, 13,14,Vashantek, Matikata, Kafrul, Katchukhet, Ibrahimpur, east Kazipara, East Shewrapara etc	Cobra Tedagua JV Effective Date: 03 February 2013	Physical Construction completed for 6 and 4-DMAs dropped for new upcoming project. Guaranty test completed for all DMAs except DMAs 1006 and 1008.	Details are stated in the Section 5.2 of the report
ICB 02.6	20 DMAs of MODS Zone -3 Geographical Area grossly: Mohammadpur, Adabor, Shekertek, Dhanmondi, Lalmatia, Monipuripara, Elephant Road, Kathalbagan, Hazribag, Zigatola, etc	Ludwig Pfeiffer Hoch-und Tiefbau GmbH & Co.KG. Effective Date: 03 June 2013	Physical Construction completed for 7 and progressing in 3-DMAs.. 10DMAs dropped for new upcoming project. Guaranty test completed for all DMAs.	Details are stated in the Section 5.2 of the appendix

6. The actions of the contractors in relation to Environmental Management and Monitoring have been illustrated within this appendix and cover the project period until the 30th June, 2016.

2. BACKGROUND

7. The Asian Development Bank financed the Government of Bangladesh to assist with the implementation of Dhaka Water Supply Sector Development Project. The Project involved rehabilitation and upgrading of the existing water supply distribution networks utilizing production tube wells and surface water provision. The project included significant construction over more than 5 years in over populated urban areas.
8. The conditions prevailing in Dhaka in 2006 have been documented in the Feasibility Study carried out under TA 4651-BAN (SF) that prepared the concept for the current project. Since then a number of changes have taken place that are impacting on the project. These are: (i) Additional MODS (zonal areas of DWASA operations) have been

created; (ii) Significant cost escalation and inflation have taken place; (iii) National pipe manufacturers are starting to adapt to the need to produce Poly-ethylene pipes and expand capacity accordingly; (iv) Additional wells have been drilled into the lower aquifer; (v) Saidabad Surface Water Treatment Plant – Phase II was completed to augment the supply with 225 MLD.

9. Results available from the Manikdi Pilot scheme demonstrated the viability of 24 hour pressure operations, leading to lower production volumes and larger number of customers. Groundwater mining was a matter for concern with the rate of decline accelerating until 2008.

3. THE PROJECT

10. The Dhaka Water Supply and Sewerage Authority (DWASA) implemented the Dhaka Water Supply Sector Development Project with the assistance of the Design and Management Consultants (DMC). The DMC services for the project started from July, 2009. The project was funded by the Government of Bangladesh and the Asian Development Bank. The project benefits in the area covering a major part of the Dhaka Metropolitan city. DWASA has to control a balance between the growing demand for water resulting from a steadily increasing population and the declining groundwater availability.

a. Project Objectives

11. The objective of the project was to solve the most urgent problems in relation to water supply by introducing District Metered Areas (DMA) that are hydraulically self-contained and maintain water pressure 24 hours per day with minimum water head of 1 bar at any part of the DMA. Production and consumption will both be metered and water balance calculated and NRW to be reduced to 15% or less. Upon project completion, DWASA is responsible for continued operation and maintenance.

4. COMPLIANCE STATUS WITH NATIONAL/STATE/LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS

4.1. Consideration of Environmental Safeguards during Project Preparation

12. At the time of project preparation at feasibility stage, the TAPP consultants were deputed for the survey and preparation of IEE for the DWSSDP (Ref: IEE, DWASA, 2006). As part of detailed project preparation, environmental screening and assessment reports, IEEs were prepared by an environmental consultant engaged by the DWASA supported by ADB. Further, the consultant suggested to ensure in the procurement process that all information required for environmental safeguard stated in the environmental assessment report and its Environmental Management Plan (EMP) prepared under the respective pipeline rehabilitation Contracts had to be incorporated in the work schedule so that

contractors could adopt mitigation measures associated with construction works. Supervision consultant (DMC) monitored the implementation of EMPs used by the contractors; and ensure that the EMP was implemented throughout project implementation period. Half yearly Environmental Safeguard Reports were prepared by the Consultant and forwarded to PMU and ADB. It can be mentioned that IEE with EMP had been prepared according to ECA'95 (Environmental Conservation Act) & ECR'97 (Environmental Conservation Rules) and to follow the rules ordered by Bangladesh Government and ADB guidelines is mandatory. To follow the rules, contractors collected no objection certificates from local authorities (like DESA, City Corporation and Union Parisad etc.) before works started.

4.2. Development of Environmental Management Plan

13. The IEE report including EMP already prepared provided necessary recommendations on how the potential environmental hazards' impacts could be mitigated. The IEE guided to develop environmental management plan to provide guidance on what, how, when and where the mitigation measures had to be implemented. It includes also who had to implement and monitor the implementation of mitigation measures in different phases of the project.
14. The Initial Environmental Examination (IEE) report prepared under the feasibility stage has been helpful in the following ways:
 - It provides the basic information about the environmental conditions of the project areas and what would be the potential environmental impacts;
 - It provides the recommendations to mitigate potential environmental impacts and describes on how to implement in the environmental management plan;
 - It provides guidance on how the environmental monitoring has to be carried out; and
 - It indicates what kind of environmental statutory clearance will need to be obtained.

4.3. Preparation of Bid Documents with incorporating the statutory environmental requirements

15. The Environmental Management Plan (Ref: in IEE, DWASA, 2006) covers the information of potential environmental impacts and the required mitigation measures for the Project as has been incorporated in the bidding documents. In addition, the EMP was provided to the contractors before awarding a contract. The bidding documents included also some detailed instructions on the subjects to be highlighted in the IEE & EMP and environmental monitoring plan as stated below-
 - Precaution to be adopted during disposal of debris of solid wastes including disposal of organic debris generated during rehabilitation of water pipes.
 - Precaution to be adopted at sanitation and housekeeping at the labor construction camp like in the area of toilets, water supply, waste disposal, first aid and

maintenance etc.

- To measure and maintain the air quality standard.
- To measure and maintain the noise quality standard.
- To check the primary water quality standard including physical and chemical properties of drinking water.

16. The contractors' responses on the instruction to include works relating to environmental impacts associated with the **construction activities has been satisfactory**. Necessary budget was allocated for the project in particular for Category 'B' projects to handle environmental problems. Also the contractors' budgets covered the items of implementation of environmental management and monitoring plans as included in the contract document (Ref: DWSSDP, Tender Documents - Rehabilitation of Pipeline Networks, August, 2010).
17. The contract documents for the contractor (Clauses 2.13.3; 2.13.4; 2.14; 2.14.1; 2.14.3 and 2.14.4 of Employer's Requirements) include detailed terms and conditions regarding the safeguard issues and implementation of the Environmental Management and Monitoring Plans that had to be adhered to and implemented by the Contractors.

4.4. Environmental Statutory Clearances in consideration of loan covenants

18. Prior to commencing a civil work as stated in the loan document, all the required statutory clearances with regard to the project (DWSSDP) had to be obtained by contractors. Removal of trees along the rehabilitation sites was considered subject to planting of native species in the same area after completion of civil work. Therefore, trees might be removed in some places to allow for appropriate workmanship but in such cases the current construction safety standards have to be maintained properly and trees of the same species replanted. The required clearances from relevant authorities had to be obtained by the Contractors.

5. COMPLIANCE STATUS WITH THE ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

5.1. Monitoring of Environmental Quality

19. Most of the cases with a few exceptions, the contractors were monitored regarding the works done on a regular basis and the environmental quality maintained especially in terms of Air Quality, Water Quality, Noise Level, and other parameters with ecological aspects at a qualitatively and quantitatively acceptable scale. During site visits it seems that the air pollution caused by dust and smoke produced by HDD machines and small generators as well as the noise pollution caused by same machines were not so high to exceed the limit of standard range. Nevertheless, Team leader of DMC ordered in written to all Contractors to collect the laboratory reports on environmental quality parameters related to project activities like drinking water quality parameters, air quality parameters

and noise level and environmental quality test reports of different DMAs, involving construction works, to be submitted to DMC

20. Overall aspects associated with environmental monitoring were discussed with stakeholders including contractors. Policies and Regulations of the Government of Bangladesh through Department of Environment and ADB SPS formed the basis of the environmental quality monitoring. The given Non-compliance notices (NCN) and associated letters issued to the Contractors by the Team Leader of DMC were complied with effectively, but not always to full stretch, to implement the environmental safeguards in construction works of the project.
21. The Environmental Management Plans (EMP) submitted by the Contractors were approved by the DMC. The monitoring activities were administered continuously. The qualitative and quantitative monitoring of IECs including qualitative measuring was conducted by the contractors.

5.2. Implementation Status of Environmental Safeguards during Construction

22. With some exceptions, Contractors of all ICB-02.x contracts followed contract conditions stated in the Employer's requirement Section 6.2.14.1.
23. Some of the construction areas, especially in ICB 2.5 there was not enough facility to implement occupational health and safety measures. In that area, the contractor violated the environmental safety regulations although the Team Leader had given them alert to avoid such violation in the past.
24. Investigation results from field visits which outlines the implementation of environmental safeguards for sub-projects are stated below-

ICB 2.1:

At some locations after HDD bentonite with mud slurry was left. At several places soil was dumped indiscreetly and not being removed timely causing obstructions to public and traffic. Excavated pits were left without backfill for sometimes more than 7 days without proper protection. and safety measures although it would have been small work in comparison to earth cutting for pipe laying.

The contractor of the ICB submitted the noise test report and document of safe drinking water supplied by New Samurai Company. Noise tests were accepted but document against water quality test report was not acceptable as it did not include all quality parameters like air quality parameters immediately. It was observed from test reports that the noise value during construction was within standard range and was no hazard for health and other environment.

At construction sites such as DMA 802 and 808 sometimes there were no drinking water supplies and toilet facilities/ mobile toilets for laborers near to construction areas; in most of the areas PPEs and basic first aid facilities for the labors were absent. It is appreciated that trouble shooting poster was seen in the construction area.

ICB-02.2

In the Aftabnagar area in general top soil was not disposed of properly while the open cut for pipe laying was being done, however after completion excavated material was disposed of. First Aid box and Personal Protective Equipment (PPE) were not present when the laborers' were working in the construction area. Laborers informed that most of them were not aware on this and in most cases they did not know how to use and also to handle it.

In the area Notun bazaar, labors could not use PPE although they got it from contractor. Drinking water supply for labors was near to construction work but the water quality tests from any laboratory were not done.

After completion about all excavated roads are reinstated to original or better condition. In the construction area near to the road named Bilbarir Tach, Shahajatur of DMA 804, there were no basic first aid facilities and PPEs. Even, there were no drinking water supply and toilet facilities for laborers near to construction areas. Troubles shooting posters or informatory sign boards were not displayed in the said construction area.

In the construction area of DMA 805, there were no basic first aid facilities but PPEs, water supply and toilet facilities for laborers were present. Troubles shooting posters or informatory sign boards were present in the said construction area.

Air quality test reports in the construction area near to HDD machines were submitted to TL of DMC. In the air quality parameters, SPM and NOx values were higher than standard range (Appendix-4). So, lubricants and necessary old parts of the HDD machine needed to be changed or HDD machines be replaced to new one to comply with the air quality standard prescribed by ECR'97 (Environmental Conservation Rules) and subsequently new air quality test Report submitted to the Team Leader of DMC.

Also drinking water quality tests for laborers and noise quality tests near to HDD machines and power generators were taken and sent to DMC.

In the construction area of DMA 801, basic first aid facilities, PPEs, water supply and toilet facilities for laborers were present. Troubles shooting posters or informatory sign boards were present in the said construction area.

In the Construction Area of DMA 807, the basic first aid facilities, water supply and toilet facilities for laborers were not present but PPEs were present partially. Troubles shooting posters or informatory sign boards were present in the said Construction Area.

ICB-02.3

In Niketon of Gulsan-1 occupational safety measures were used by the laborers but no drinking water was supplied for laborers while the open earth cutting was done in the road-1 within the DMA-506.

From 13 to 19 May 2013 the installation activities in DMAs 504 and 505 were suspended following poor marking and protection of excavations and untidy disposal of excavated soil, until contractor had taken adequate corrective measures. In DMA-505, no occupational safety measures were used by the laborers and site office was long distance from construction area while in most of the cases, there were no latrine facilities near to construction area.

After completion about all excavated roads were reinstated to original or better condition. In the construction area near to the road no. 8 of DMA 508, there were no PPEs facilities. Even, there were no drinking water supply and toilet facilities for laborers near to construction areas. It is embarrassed that the contractor has sent test results of drinking water supplied to labors but some labors claimed with sorrow that they could not get any drinking water from contractor.

In the construction area of DMA 507, there were no PPEs facilities. Even, there were no drinking water supply and toilet facilities for laborers near to construction areas. It is embarrassing that the contractor did not follow the order of TL of DMC regarding the establishment of environmental safeguards although TL had given notice more than once to the contractor to comply with environmental laws.

In the construction area of DMA 509, there were partially PPEs facilities; even there were no troubles shooting posters or informatory sign boards, drinking water supply and toilet facilities for laborers near to construction areas. It is embarrassing that the contractor did not follow the order of TL of DMC regarding the establishment of environmental safeguards although TL has given notice more than once to the contractor to comply with environmental laws.

In the Construction Area of DMA 510, there were no PPEs facilities; even there were no troubles shooting posters or informatory sign boards, drinking water supply and toilet facilities for laborers near to Construction Area s. It is embarrassing that the Contractor did not follow the order of TL of DMC regarding the establishment of environmental safeguards although the TL has suggested to the Contractor to comply with environmental laws.

It has been observed from test results of supplied drinking water for labors in this ICB that the values of the water quality parameters were within the standard range. So, the

water used for drinking purposes was safe for human consumption. Other test reports like noise and air quality examination reports were produced by DOE (Department of Environment). It was observed that all air and sound quality parameters results were out of standard limit according to ECR'97. So, contractor had to take initiative to comply with it and concentrate on prohibition of sound and air pollution in the construction area or minimize the value of noise and air quality parameters within the standard range. It was appreciated that the contractor submitted the air and noise quality reports again. It is observed that mostly all air quality parameters results were under the standard limit according to ECR'97 but except for SPM. So, contractor had to take initiative to comply with it and concentrate on prohibition of air pollution in the construction area or minimize the value of all air quality parameters within the standard range. All ambient sound levels were out of standard level except Crain machine. So, contractor had to take initiative to comply with it through EMP.

ICB 2.4

In the construction area near to the road number 6 of DMA 401, there were no basic first aid facilities and PPEs. Even, there were no drinking water supply and toilet facilities for laborers near to construction areas. Laborers informed that most of them were not aware on this (PPEs) and in most cases they did not know how to use and also to handle it.

In the construction area of DMA 402 and 403, there were no basic first aid facilities but PPEs were present partially. There were no drinking water supply but toilet facilities for laborers near to construction areas were present. Laborers informed that most of them were not aware on this (PPEs) and in most cases they did not know how to use and also to handle it.

In the construction area of DMA 404, there were basic first aid facilities and PPEs. There were drinking water supply facility but toilet facilities/ mobile toilet for laborers near to construction areas were not present.

In the Construction Area of DMA 405, there are partially basic first aid facilities and PPEs. There are drinking water supply facilities but toilet facilities/ mobile toilet for laborers near to Construction Area s are not present. In some places (Ahmadnagar), there is lack of safety security of the works that have been completed before, even no cover on the opening of the holes done for the house connections were there. This type of faults may create serious accidents.

In the construction area of DMA 407, most of the facilities like basic first aid facilities and water supply for laborers were present but Mobile toilet for the labor was not present. Most of the PPEs used for the labor were existent in that area. Troubles shooting posters or informatory sign boards were present in the said construction area.

After several notices by the TL-DMC air quality test report in the construction area near to HDD machine was submitted to TL of DMC. Environmental Expert of DMC analyzed the results of the air quality parameters supplied by the contractor and observed that all parameters values are within the standard limit except SPM. In this circumstance, Environmental Expert of DMC requested to comply on this parameter immediately. To overcome the noncompliance on that parameter, lubricants and necessary old parts of the HDD machine had to be changed. After correction the noncompliance mentioned, new air quality test report had to be submitted to the Team Leader of DMC.

ICB 2.5

In the construction area of DMA 1008, there were basic first aid facilities and partially PPEs. There were drinking water supply facility but toilet facilities/ mobile toilet for laborers near to construction areas were not present. Troubles shooting posters or informatory sign boards were present in the said construction area.

In the construction area of DMA 1006, there were no PPEs facilities; even there were no troubles shooting posters or informatory sign boards, and toilet facilities for laborers near to construction areas. Drinking water supply for labor was present in that area. It was embarrassing that the contractor did not follow the order of TL of DMC regarding the establishment of environmental safeguards although the TL had suggested to the contractor to comply with environmental laws.

The contractor of ICB 2.5 replied against the letter of TL regarding the examination of environmental quality test reports that they did not hamper the environment while doing construction works. This was not a proper reply from the contractor and he should have submitted the necessary environmental quality test reports to prove their compliance. Necessary environmental monitoring tests including drinking water quality for laborers and noise and air quality tests near to HDD machines and power generators were not done despite that TL of DMC had given notices again and again to do it immediately.

ICB 2.6

In the construction area of the 20 DMAs, there were partially basic first aid and PPEs facilities for the labors. There were no drinking water supply and toilet facilities for laborers near to construction areas. Laborers informed that most of them were not aware on this (PPEs) and in most cases they did not know how to use and also to handle it. In some cases, there were open pits with no fencing in the construction area which might have created serious accident.

In the Construction Area of the DMA 310, there were partially basic first aid and PPEs facilities for the labors. There were no drinking water supply and toilet facilities for laborers near to Construction Areas. Laborers informed that most of them were not aware on this (PPEs) and in most cases they did not know how to use and also to handle it. In some cases, there were open pits with a single tape around the hole but no fencing in the Construction Area. This type of fault may create serious accidents. So, the Contractor should follow the safety security rules governed by DOE and Donors.

As requested by the TL-DMC drinking water quality test results for laborers and noise and air quality tests near to HDD machines and power generators were submitted to DMC. Most of the quality parameters' values were within the standard range. All affected infrastructures caused by sub-project works have been restored to original condition. The response of the contractor of ICB 2.6 on environmental quality during the construction phase was good to excellent.

5.3. Review Comments on Contractors Reports

5.3.1. Environmental Safety Issues

25. The Contractors' reports included little regarding occupational safety measures. It appeared that contractors did not arrange training as instructed by ADB on occupational health and safety. The contractors were requested to incorporate one section on "Environmental Management Plans and Monitoring of Safeguards Compliance" in their monthly reports as desired by the ADB. But no such section was incorporated in their reports.

5.3.2. Environmental Monitoring

26. During the reporting period, compliance to environmental requirements was checked by DMC based on review and validation of Contractor's IEE and EMP as well as field observations and instructions to comply with environmental laws of ECR'97 and ADB environmental guidelines.

Contractor's IEE

27. Environmental Examinations (IEE's) were prepared for each ongoing contract according to ADB's Environment Policy (2002) and Environmental Assessment Guidelines (2003). These IEE tried to include the assessment of the environmental impacts of water networks being built and steps and mitigation measures taken to avoid negative impacts at the pre-, during- and post-implementation of the sub-project works.
28. The Contractors of all rehabilitation packages submitted their Environmental Management Plans according to 'Environmental Assessment Requirements and Environmental Review Procedures' of the ADB. The revised EMPs incorporated a number of mitigation measures for each DMA, mainly related to the disposal of sanitary and other waste, location of fuel, oil and lubricant depots, sheds for equipment, labour and housing facilities, etc. Environmental Site Plans were developed in each EMP in

relation to environment safeguards like air quality, noise and nuisance as well as waste management and disposal of wastewater.

29. Overall Findings result from inspection reports and visual observations on the investigated sub-projects are stated in section 8 (Eight) of this report.

6. APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT

30. The methodology was a combination of organizational principles and strategies through which responsibility for performing the monitoring process is shared with different stakeholder groups. Methods like site visits, stakeholders' consultation, qualitative as well as quantitative analysis of quality parameters, analysis of monitoring reports of site inspectors, subjective judgment etc. were used for environmental monitoring. Normally, Contractors' inspectors monitored the works in relation to environmental efforts in the sub-projects and they sent the results of the monitoring to DMC. DMC monitored the construction works and oversaw the work of contractors' activities required for environmental requirements. DMC also coordinated with Donor agencies and related Governmental agencies on the issue of environmental requirements and monitoring.

7. MONITORING OF ENVIRONMENTAL IMPACTS ON PROJECT SURROUNDINGS (AMBIENT AIR, WATER QUALITY AND NOISE LEVEL)

31. Normally the noise produced in the construction area appeared insignificant especially in the time of using open cut method for pipe laying but small amount of noise might have occurred at the time of using HDD method and operation of power generator. Some contractors submitted noise test results to their respective CME. With a few exceptions, the results have shown that the noise values during construction were within standard range. It is safely stated that the noise dimension occurring in construction areas was minimized through implementing the EMP.
32. Meanwhile water quality (especially for drinking water quality for laborers engaged in construction sites) tests results of various parameters were submitted by different ICB contractors except of ICB- 2.5 to DMC. The values of the water quality parameters were within the standard range. So, the water used for drinking purposes was safe for human consumption.
33. Air pollution owing to produced dust by earth cutting and emission of smoke happened by the operation of HDD machines and power generators occurred of low level at construction periods. To comply with the legal requirement, SPM, SO_x and NO_x tests had to be done. Most of the contractors, except of ICB-2.5, have submitted test results of air quality parameters. Most of the parameters values were not higher than standard range.

8. OVERALL FINDINGS CONSIDERING INSPECTION REPORTS AND DIRECT FIELD OBSERVATION AND RECOMMENDATION/ REMEDIAL ACTION.

Having site visited, findings had been identified as stated below-

Observations:

Overall observations are as follows-

- In all sub-projects investigated, necessary Personal Protective Equipment (PPE) (e.g. Ear Protection Gear, Mask, Goggles, Safety Shoes etc.) were not supplied sufficiently to the workers during construction, although contractors had given commitment to supply these sufficiently as soon as possible.
- Most of the cases, open excavation pits were not covered during non-working hours which might cause accident for the community.
- Chemicals especially HTH solutions/Sodium Hypo chlorate were disposed into sewerage line through pipeline without treatment, although the HTH solutions used were of very low concentration.
- In all sub-projects investigated, limited troubleshooting posters or informatory sign boards were displayed during construction. In many cases, the roads were blocked caused by inappropriate open trench and soil dumping.
- In a few cases the environmental condition of the construction sites were not satisfactory due to lack of proper initiative and negligence in regard to exposed pits, soil dumping and wastage of Bentonite mix mud slurry.
- In a few cases sewerage water flooded the road during construction work.
- In all sub-projects, no child labor was employed.
- In all sub-projects, drinking water and sanitation facilities for labors was nearby working area. But test result of drinking water quality parameters was not always found in field office.
- In all sub-projects, there was no Potential loss of trees/vegetation/aesthetics in the scheme area.
- In all sub-projects, no construction work was being carried out close to any streams or water bodies. With a few exceptions, there were facilities (Drains) to divert water flow from the construction sites to avoid flowing of fines, aggregates, spilled oil/ lubricants to any open stream.
- In all sub-projects, no agricultural and homestead land were used to improve the water supply network.

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- Nearly in all sub-projects, drainage channels were not obstructed and free from any obstacles allowing continuous water flowing nearby sites.
 - In all Sub-Projects, fuel and lubricants were stored on solid platforms.
 - Often campsites were not in good condition for working. Most of the cases, the spoil/excavated materials were found haphazard position in its yards.
 - Most of the cases, the wastes produced from construction area (like excavated and discard materials etc.) which might pollute the environment were collected and disposed to a sanctioned area for dumping.
 - In most cases, dust produced from construction area resulting air pollution was controlled by sprinkling water. But in some cases not any control measures for dust suppression were used.
 - Not all contractors' personnel and laborers could undergo EMP training. In most of the cases, labors were not even aware on occupational safety.
 - Ecological sensitive areas were not found adjacent to the scheme areas.
 - In some areas contractors did not supply the occupational safety equipment (OSE) for the laborers. On the other hand, when the contractor had given OSE the laborers, mostly untrained, were not interested to use it because of their negligence and also absence of awareness on the environmental issues.
 - In most sub-projects investigated, troubles shooting posters or informatory sign boards were displayed during construction period.
 - Not always drinking water was supplied for the laborers and were latrine facilities near to construction area.
 - Sometimes open cut was without Palisading walls or protection walls, which may be susceptible to land slide or land erosion.
 - In some areas, top soil was not conserved properly while open cut for pipe laying or for gate valve fitting was being done in the road side.
 - Most of the Contractors of ICBs submitted the environmental quality test Reports like air, noise and water quality test Reports for the sub-Projects. In some cases, the values of air quality parameters were higher than standard range; which is unacceptable according to ECR'97, although Dhaka's overall air quality is poor and the contribution of the Project is difficult to establish.
 - Contractors who were engaged in construction works did not arrange any day Training program prescribed by ADB on Occupational Health and Safety for their laborers and staff and were instructed to comply.

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- In all sub-projects, fuel and lubricants were stored on solid platforms.

34. Recommendations:

- Sufficient Personal Protective Equipments (PPEs) (e.g. ear protection gear, mask, goggles, safety shoes etc.) and first aid items must be provided for full compliance in every sub-project by the contractors to comply with legal safeguards.
- Laborers and all personnel including contractors and their related experts should be trained on EMP and occupational health and safety to be aware of environmental issues and full safety security of the project works.
- Drinking water supply and sanitary facilities for laborers should be ensured within the short distance of the construction areas.

9. OVERALL ACTIVITIES INVOLVED IN THE PROJECT INCLUDING ENVIRONMENTAL SETTINGS MADE DURING THE PROJECT

Environmental Monitoring

35. During visits, the Environmental Expert requested contractors to improve their PPEs facilities; which they generally followed but only ICB-2.5 did not response to comply with the environmental safeguards properly.
36. The constraints to implement environmental safeguards in construction and operation stages have been reported on and subsequently, the overall compliance for environmental issues has been satisfactory.
37. All recommendations suggested in the monitoring reports were not established fully but most issues in relation to environmental monitoring works were ensured to comply with the environmental requirements in the field level.
38. However, The Environmental Expert has alarmed these contractors who did not fully comply to ECR'97 to ensure the implementation of all recommendations described in the EMP at field level immediately.
39. Contractors who did not follow the laws especially ECR'97 properly were alerted that they were violating the Environmental laws and regulations of Government of Bangladesh and failed to follow the ADB guidelines.

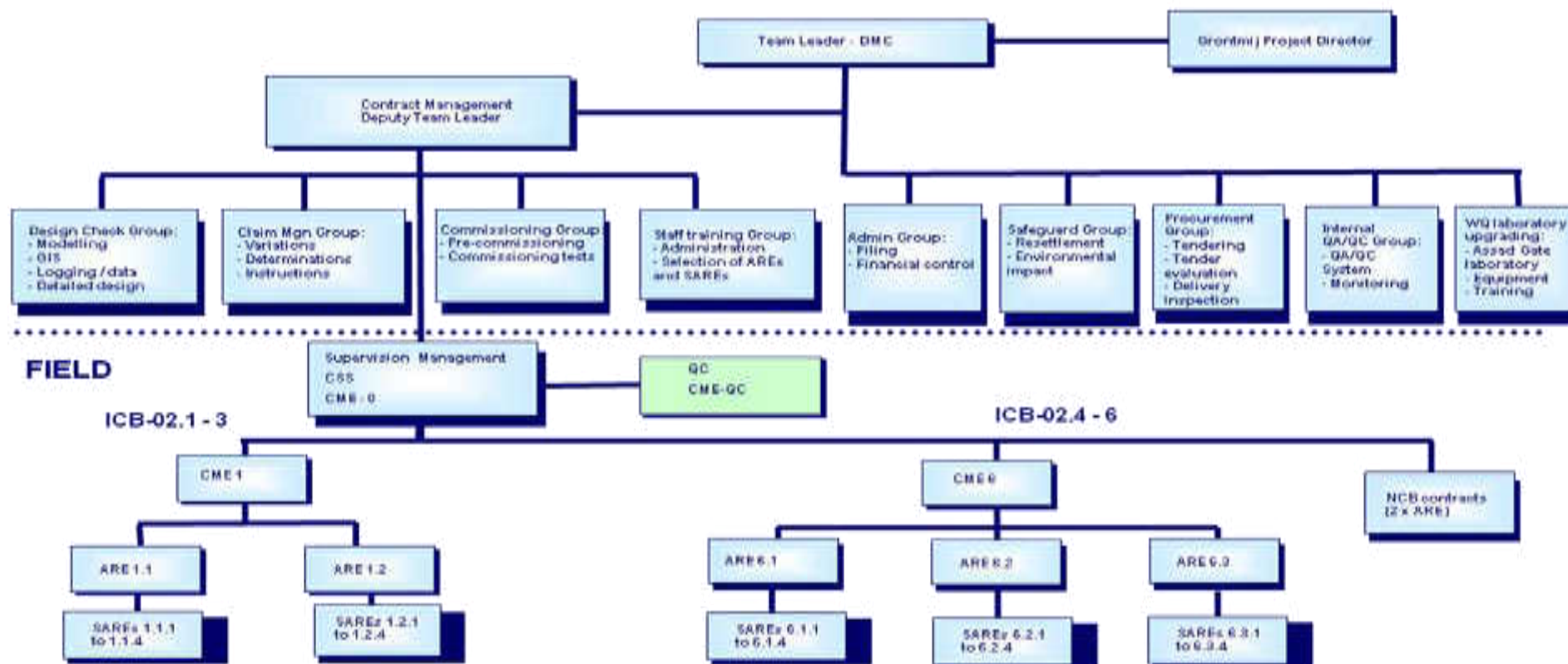
10. CONCLUSIONS AND RECOMMENDATIONS

40. Most of the contractors involved in construction works in different ICBs followed the safeguard measures contained in ECR'97. To enforce the Environmental laws and regulations of Government of Bangladesh and follow the ADB guidelines completely, TL of DMC issued letters further to the Contractors in case of noncompliance of environmental issues.
41. Although a few environmental problems appeared at the construction works, the overall environmental status found in different sub-projects areas were investigated as stated in section 8.0 and the mitigation measures as stated in the EMP were prescribed to overcome the difficulties. In some cases, TL of DMC gave warnings again through letters to the contractors to ensure the implementation of EMP properly in case illegal actions appeared.
42. During the duration of the project, it was observed that the safeguard implementation on the works in relation to environment improved to ensure and comply with the DoE and ADB requirements.

Appendix 1: DMC Organogram

Dhaka Water Supply Sector Development Project (DWSSDP)

Organogram - DMC



Appendix-2 Photographs of Physical Works: Partially compliance



The road of DMA 407, ICB-2.4



DMA 405 in ICB2.4