

## **Preface**

This Report on the audit of expenditure incurred by the Government of West Bengal has been prepared for submission to the Governor under Article 151 of the Constitution. The Report covers significant matters arising out of the compliance and performance audits of various departments including autonomous bodies. Audit observations on the Annual Accounts of the Government would form part of a Report on State Finances, which is being presented separately.

The Report starts with an introductory Chapter outlining the audit scope, mandate and the key audit findings which emerged during the year-long audit exercise. Chapter 2 of the Report covers performance audits while Chapter 3 discusses material findings emerging from compliance audits. Chapter 4 includes the findings arising out of the Chief Controlling Officer based audit of Animal Resources Development Department.

The cases mentioned in this Report are among those which came to notice in the course of test audit of accounts during the year 2009-10 as well as those which had come to notice in earlier years but could not be dealt with in previous Reports; matters relating to the period subsequent to 2009-10 have also been included wherever necessary.

**URBAN DEVELOPMENT DEPARTMENT**

**2.2 KOLKATA ENVIRONMENTAL IMPROVEMENT PROJECT**

**Executive Summary**

Kolkata Environmental Improvement Project (KEIP) financed by an ADB loan is being executed by Kolkata Municipal Corporation and Government of West Bengal jointly to arrest the environmental degradation and improve the quality of life in the outer boroughs of Kolkata Metropolitan Area.

The project attempted to improve sanitation and hygienic living condition to the slum dwellers. There has also been satisfactory progress in construction of bridges and culverts under Canal Improvement component leading to free flow of water in the canals as well as better connectivity.

Performance Audit of KEIP, however, revealed some areas of concern in management of the project which adversely affected the outcome. The project, originally scheduled to be completed by June 2007, overshot the scheduled completion date thrice due to gaps in planning, deficient contract management and ineffective monitoring. Three main components of the project namely, Resettlement, Canal Improvement and Sewerage & Drainage Improvement works remained incomplete. In view of the slow progress the project completion has now been pushed back to June 2012.

Delayed setting up of Project Management Units resulted in subsequent delays in planning, tendering and project execution. Non-preparation of Detailed Project Report based on adequate survey and investigation led to frequent variations in scope of work. The survey and investigation required to be carried out by the Design & Supervision Consultant was not done; instead, the same was carried out by the working contractors after finalisation of estimates necessitating change in drawing and design and scope of work and upward revision of cost and delay in execution.

Implementation and monitoring of resettlement process was not satisfactory as 24 per cent of the affected families were not resettled as of November 2010 causing delay in Canal Improvement works.

Only 14 out of 42 work packages in Sewerage and Drainage component were completed. Augmentation works of two STPs have been suspended due to non assessment of plants and equipments before commencement leading to pollution load to the river Hooghly.

KEIP restricted planned activities of the solid waste management component upto procurement of vehicles only defeating the prime objective of scientific disposal of solid waste.

Functioning of Project Steering Committee to oversee the implementation of the project was not effective and internal control left much to be desired.

Thus, the main objectives of the project namely environmental improvement by up-gradation of Sewerage & Drainage system, de-siltation of the drainage canals choked by silt and construction of Sanitary Land Fill for scientific disposal of waste generated in the city could not be fully realised (June 2010) despite an expenditure of ₹ 967.07 crore.

### 2.2.1 Introduction

Kolkata Environmental Improvement Project (KEIP) is a joint effort of the Government of India (GoI), Government of West Bengal (GoWB), Kolkata Municipal Corporation (KMC) and Asian Development Bank (ADB) to arrest environmental degradation and improve the sewerage and drainage infrastructure in the outer boroughs<sup>39</sup> (*Appendix-2.2.1*) of the Kolkata Metropolitan Area (KMA) through upgradation of the city's sewerage and drainage system, restoration of the drainage canals choked by silt, evolving an efficient solid waste management system, providing basic urban services in slums and improving the facilities in parks and water bodies. The project was started in April 2002 and was scheduled to be completed in June 2007. The completion date has been extended to June 2012.

KMC and Irrigation and Waterways Department (I&WD), GoWB are the executing agencies for the project. There are two Project Management Units (PMUs). The PMU of I&WD reports to the Secretary, I&WD and is responsible for executing the Canal Improvement works, while the PMU of KMC reports to the Municipal Commissioner and is responsible for the remaining project components. PMU, KMC has separate units for project management, accounting, engineering and procurement and is headed by a Project Director (PD) (*Appendix-2.2.2*).

### 2.2.2 Audit objectives

The objectives of the performance audit were to assess whether:

- there was proper planning before commencement of the work;
- work packages of the project were executed effectively, efficiently and economically;
- monitoring at various levels was effective and the project was successful in arresting environmental degradation in the designated areas.

### 2.2.3 Audit Criteria

The criteria for the performance audit were:

- ADB's guidelines
- Feasibility Reports and ADB Project Appraisal Report,
- Master Plans.
- Loan Agreements,
- Best practices as applicable,
- Relevant Acts, rules and Government orders,

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<sup>39</sup> Group of contiguous wards of a corporation.

### 2.2.4 Audit scope and methodology

Performance Audit of the major components of the project namely Sewerage and Drainage Improvement (S&D), Solid Waste Management (SWM), Slum Improvement (SI), Canal Improvement (CI), Resettlement and Implementation Assistance (IA) with a total outlay of ₹ 1806.18 crore was conducted between April and July 2010 for the period up to March 2010. An entry conference was held in March 2010 with the Secretary, Municipal Affairs Department and the KEIP authorities wherein the audit objectives, criteria and methodology were explained. The audit findings were discussed in an Exit Conference held in November 2010 and the views of the Department have been suitably incorporated in the report. Audit acknowledges the co operation extended by the KEIP Authorities during the course of the Performance Audit.

Audit sample of 32<sup>40</sup> contract packages (34 per cent) covering 52 per cent of the total contract value was selected for detailed scrutiny by 'Simple Random Sampling without Replacement' method from the 95 contract packages awarded under KEIP till March 2010 (*Appendix-2.2.3*).

## Audit findings

### 2.2.5 Financial Performance

#### 2.2.5.1 Financial outlay and expenditure

The project was financed by an ADB loan along with contributions from the GoWB and the KMC. The initial estimated cost of the project was ₹ 1294.98 crore. The cost of the project at present (March 2010) stands at ₹ 1806.18 crore which includes a supplementary ADB loan of ₹ 360 crore. The total project cost and funding sources are shown below.

Table: 2.2.1-Total project cost and funding sources

			₹ in crore
Funding agency	Original Loan	Supplementary Loan	Total
ADB	799.98	360.00	1159.98
GoWB	245.70	87.75	333.45
KMC	249.30	63.45	312.75
	<b>1294.98</b>	<b>511.20</b>	<b>1806.18</b>

Source: QPR March 2010

An expenditure of ₹ 967.08 crore has been incurred till March 2010. Year wise expenditure on the project is shown in *Appendix-2.2.4*.

#### 2.2.5.2 Loan repayment

The GoI is passing the loan from the ADB in the form of 70 per cent debt and 30 per cent grant to the GoWB. The GoWB lends it on to KMC on similar terms. The loan with GoI is repayable over a period of 25 years commencing from July 2007. The loan agreement between KMC and GoWB stipulated that KMC would pay interest on the principal sum withdrawn and outstanding

<sup>40</sup> S7D-13 packages, CI-7 packages, SI-5 packages, Resettlement \$ packages and SWM-3 packages.

from time to time, at 14.5 *per cent* per annum, with a rebate of 2.5 *per cent* for timely payment of principal and interest.

The repayment of interest and principal was to commence from April 2004 and April 2009 respectively in terms of loan agreement. But as of June 2010 no repayment of principal and interest liability of ₹ 113.07 crore was made by the KMC which included an additional interest liability of ₹ 19.50 crore for non-adherence to the loan repayment schedule.

As per the loan agreement, a commitment charge at the rate of 0.75 *per cent* per annum on the amount of loan remaining undrawn against the amount stipulated as per drawal schedule during the project period was payable. The final withdrawal of the original loan (\$177.77 million) was required to be completed by December 2007. As only \$116.54 million (66 *per cent*) loan could be drawn till March 2010, the liability towards commitment charges works out to ₹ 25.75<sup>41</sup> crore (March 2010).

KEIP stated (November 2010) that there is an apparent contradiction between the provisions (Section 3.08 and 3.10) of on-lending agreement regarding repayment of loan and sought clarification (July 2010) from the Department which was awaited (November 2010).

### 2.2.6 Project Status

The completion of the project was rescheduled to June 2010 and subsequently to December 2011 due to inclusion of new contract packages under the supplementary loan and slow progress of work. The physical progress of the project was only 59 *per cent* as of March 2010 (**Appendix-2.2.5**). However, extension of time has been granted (December 2010) till June 2012 in view of the slippages in S&D and CI components. The SWM and SI components were, however, completed in May and September 2009 respectively. The engagement of consultants and procurement of office equipment under IA were also completed. As the resettlement process has been delayed its completion within the stipulated time frame appears to be uncertain.

Test check of 32 contract packages indicated that the project could not adhere to the implementation schedule due to gaps in planning, frequent changes in scope of work due to inadequate survey and design, poor contract management and ineffective monitoring. Till March 2010, only 54 out of total 106 work packages were completed, 41 packages were in progress and 11 packages were yet to be taken up (**Appendix-2.2.3**). Thus, despite incurring an expenditure of ₹ 967.08 crore over a period of eight years, the project had no significant impact on arresting environmental degradation in the outer boroughs of Kolkata as discussed in the subsequent paragraphs.

<sup>41</sup> Conversion factor is taken as \$1 = ₹45.00 (\$ 5721144.91 X ₹45) = ₹25.75 crore

## **2.2.7 Planning**

### **2.2.7.1 Mobilisation of resources**

The loan agreement (December 2001) with ADB provided for systematic and timely execution of the project through two PMUs with personnel experienced in Project Management, Accounting, Engineering and Procurement.

The PMU, KMC started functioning from November 2002 but it was not fully mobilised and could not create dedicated units for management of contract, maintenance of accounts and co-ordination even after three years from the date of start of the project. The PMU, I&WD started functioning only in July 2003 after a delay of 18 months. In the span of eight years there have been nine Project Directors in PMU, KMC and seven Project Directors in the PMU, I&W. Such frequent changes in management affected the quality of decision making and monitoring of the project. KEIP stated that due to procedural formalities there was delay in formation of PMU indicating lack of effective planning.

The same lack of seriousness was also observed in the appointment of consultants for project management (PMC), design and construction supervision (DSC)<sup>42</sup>, stakeholder consultation process and resettlement (NGO) and media management (PRC) as brought out in subsequent paragraphs.

The entire process of appointment of consultants was to be completed by March 2002. However, four consultants were engaged between July 2002 and January 2003 after an average delay of 186 days. KEIP assigned an NGO and two Social Sector Specialists from PMC and DSC for stakeholder consultation process and resettlement. This led to problems in coordination as well as failures in service delivery by the consultants. Critical start-up activities like benefit evaluation and monitoring the implementation of resettlement plan therefore got delayed. Hence contracts entered into for a period of five years for professional media management and stakeholder consultation were terminated within two to three years after payments of ₹ 2.14 crore. These works were re-assigned to the Social Development Unit setup (2005) for the purpose under the PMU of KEIP and consisted of KMC officials assisted by consultants.

### **2.2.7.2 Master plans and Detailed Project Reports**

The terms of reference of engagement of DSC stipulated that Sewerage and Drainage Master Plan (S&DMP), Solid Waste Management Master Plan (SWMMP) and Slum Improvement Master Plan (SIMP) were to be completed by July 2004. SIMP and S&DMP were approved in June 2006 and February 2008 after a delay of 24 and 44 months respectively. SWMMP prepared in May 2005 has not yet been approved. Consequently there was a huge gap between the recommendations in the Master Plans and the contract packages taken up under various project components (**Appendix-2.2.6**). KEIP stated (November 2010) that Master Plans were to be prepared for future use.

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<sup>42</sup> Design and Supervision Consultant

The reply was not tenable as the project envisaged preparation of a Sewerage and Drainage Master Plan (S&DMP) for the entire city which would form the basis for finalising detailed engineering design and help in prioritising the works within the budget.

It was also seen that no Detailed Project Report (DPR) incorporating implementation schedule of different components of the project and layouts had been prepared. The loan was approved on the basis of feasibility study report prepared in January 2000. This resulted in frequent variations in scope of work (*paragraph 2.2.7.3*) and affected the planning issues as interface between various components were not factored while executing the works (*paragraph 2.2.9.3.1*).

### **2.2.7.3 Deficiencies in Preliminary Reports**

The Design and Supervision Consultant (DSC) was engaged (August 2002) to conduct surveys and investigations for preparing Preliminary Design Reports (PDRs) of all components. After approval of PDRs the consultant had to carry out Topographical & Level Survey (T&LS) prior to preparation of Detailed Engineering Drawings (DEDs). PDRs and DEDs had to be prepared within four and 12 months respectively from the date of engagement. Audit observed that there were delays of 26 months on an average in the preparation of PDRs and DEDs (*Appendix-2.2.7*).

T&LS as well as Geotechnical Investigation (GI) are pre-requisites for commencement of S&D and CI work since detailed estimates were to be prepared and tenders finalised on the basis of these inputs. Scrutiny of work packages related to S&D and CI components revealed that without conducting detailed survey and investigation work estimates were finalised and contracts awarded. The surveys were later carried out through the working contractors (*Appendix-2.2.8*) at a cost of ₹ 1.37 crore in 17 packages.

Detailed analysis of the CI and S&D packages revealed following deficiencies in initial survey and design:

- In CI packages the consultant had carried out topographical surveys at intervals of 100 metres against the required interval of 30 metres. As a result, in three<sup>43</sup> packages assessment of actual section and silt level of the canal could not be made. Consequently, there were wide variations between estimated and executed quantities. Analysis of four<sup>44</sup> other contract packages covering two canal systems indicated major design changes leading to substantial variations in scope of work and cost overrun. In Keorapukur canal there was design failure as site conditions were not correctly gauged at the Preliminary Design Report stage. Hence earthen channels had to be replaced by RCC trough. Similarly, in one canal of TP Basin, RCC trough had to be provided to cope with the additional discharge from augmented pumping station which was not considered at the design stage.

<sup>43</sup> CW-5, CW-8 and CW-10.

<sup>44</sup> CW-9, CW-12A, CW12CR-1 and CW-12CR-2.

- In five S&D works the design reports did not take soil conditions and location of public utilities into accounts, detailed assessment of existing equipment was also not made. As a result the alignment of sewer lines, methodology of work and technical specifications underwent changes during execution.

KEIP stated (November 2010) that scope of work could not be finalised before awarding of contract due to non-availability of underground utility maps, time gap in preparation of estimates and commencement of work and ground realities. The reply is not acceptable as PMU held DSC responsible for frequent variations at very early stages of the contracts as well as planning and design mistakes. This resulted in delays of up to 19 months and increase in cost by ₹ 63.76 crore in the two components of S&D and CI (**Appendix 2.2.9**).

### **2.2.8 Contract Management**

The PMU, KMC has a separate Contract Management Unit (CMU) under the supervision of a Chief Engineer, whereas Project Implementation Committee (PIC) is the nodal agency of PMU, I&WD. For timely completion of the project, an effective and responsive contract management is required. The KEIP with the assistance of consultants was to ensure timely finalisation of bids, availability of free and clear sites, proper co-ordination between different agencies and monitor the performance of the contractor. Review of selected packages indicated slippages in contract management as discussed in *paragraphs 2.2.9.2, 2.2.9.3 and 2.2.9.4* dealing with the implementation of CI, S&D and SWM components of the project.

Audit scrutiny further revealed that poor progress of work delayed recovery of interest free advance in 12 contract packages. Advance amounting to ₹ 11.15 crore remained unadjusted for 19 months on an average with consequential loss of interest of ₹ 1.41 crore<sup>45</sup> as of March 2010 which could have been avoided through proper planning and timely execution of the work (**Appendix-2.2.10**). Moreover in three packages<sup>46</sup> mobilisation advance of ₹ 1.61 crore was released two to four months prior to handing over of sites (November 2006 to December 2007) to the contractor.

The Department stated (November 2010) that Mobilisation Advances were made to the contractors in accordance with the provisions of the contract. The reply was not tenable as the adjustment of the advances was made after considerable delay. The reply was silent on the issue of release of Mobilisation Advance before handing over of sites.

#### **2.2.8.1 Delays in bid evaluation**

Tenders for the work packages SDC and SDD under S&D component were invited in January 2006 at an estimated cost of ₹ 102.76 and ₹ 103.80 crore for completion by June and December 2009 respectively. The bidding process

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<sup>45</sup> Calculated at the rate of 8 percent per annum

<sup>46</sup> RSA 4, RSA 5 and RSF

was to be completed by August 2006. Scrutiny revealed that during evaluation (April 2006) of technical bids the committee lowered the financial criteria of cash flow requirement without informing the bidders. As ADB sought clarifications (July 2006) a second technical evaluation was made (July 2006) and sent to ADB for approval. The revised evaluation was not in accordance with the financial criteria mentioned in the bid document. Therefore a fresh evaluation (August 2006) had to be made. After this evaluation in case of SDC, tenderer 'A' previously not found technically qualified became qualified as a post balance-sheet event was taken into consideration.

Tenderer 'B' who was technically qualified for both the packages had not extended the validity period of the bids. KEIP, however, obtained ADB's approval by stating (July 2006 and August 2006) that all the bidders had extended the bid validity period for both the packages. Thereafter though, B's bid for SDC was the lowest, this could not be considered as its validity had expired. Similarly in SDD package B's bid was rendered invalid during financial evaluation; and tenderer 'C' previously found to be technically unresponsive was awarded the contract.

KEIP admitted that ADB's approval was obtained by furnishing incorrect facts relating to extension of bid validity. They also stated that the lowest tenderer 'B' did not extend the validity period. The reply is not tenable as the bid of lowest bidder could not be evaluated due to delay in finalising the bids by KEIP.

Thus, frequent changes in the technical parameters and non-communication of correct facts to ADB resulted in non selection of lowest bidder and avoidable financial burden of ₹35.30 crore.

## **2.2.9 Project Implementation**

### **2.2.9.1 Resettlement**

Drainage canals in Kolkata are heavily silted and fully encroached upon obstructing the flow of water. Loan agreement as well as Resettlement Policy of ADB stipulated that CI work should start after resettlement of all the affected canal bank dwellers. The resettlement work was to be taken up in January 2003 and completed by November 2007. 3141 flats have been constructed/purchased till March 2010 and work on 224 flats was in progress. The resettlement of 24 *per cent* (797) of the 3365 identified families was yet (March 2010) to be completed. The reasons for delays were delay in conducting survey (six years), delay in land acquisition and unwillingness of beneficiaries to relocate.

#### **2.2.9.1.1 Survey and allotment**

The Resettlement Plan for 3507 affected families prepared in November 2000 on the basis of survey conducted by KMC was updated in 2005, as the PMU, I&WD could not finalise the actual length of the canals to be rehabilitated till 2005. The delay in decision held up the resettlement of Canal bank dwellers. This had a cascading effect on canal improvement works and sewerage and drainage works as discussed in paragraphs 2.2.9.2.1 and 2.2.9.3.1.

The revised list of 3626 families identified after verification survey conducted by consultants in November 2005 was neither vetted nor approved by the KEIP authority. Photographs were also not affixed beside the names of the householders. Scrutiny revealed that thumb impressions or signatures of the heads of 288 families were not taken. Further, identity cards issued did not have unique numbers as test check revealed that 18 cards with the same identity numbers were issued to 36 individuals. The department stated that alternative *ID* card number was recorded for the 18 additional individuals in the allotment register. However, corrected cards were not issued.

The KEIP authority again revised the list in January 2009. The number of families to be resettled came down to 3365 as the works could be carried out without shifting the remaining 261 families.

In view of the above it could not be ascertained as to whether the list of displaced families was complete and correct. This is borne out by the fact that 44 flats (out of 2568) at different relocation sites were handed over to persons whose names and *ID* card numbers were different from those shown in the list.

KEIP stated that the names were misprinted. 20 flats at different relocation sites were handed over without taking any signature/left-hand thumb impression (LTI) in the allotment register. The acknowledgement was subsequently obtained at the instance of Audit. This indicates lapses in identification of beneficiaries and allotment of flats.

The Loan agreement stipulated that relocation sites for affected persons should be located within two kilometers of their existing dwelling places and such relocation sites were to be confirmed in consultation with the affected persons. Due to non availability of land, most of the relocation sites were three to four kilometers away from the canal banks. As a result 573 affected families refused to move to the new flats constructed at a cost of ₹ 8.19 crore for fear of loosing their livelihood. From the available records it could not be ascertained as to whether written confirmations as required were taken from the affected persons before construction of the flats or otherwise.

The Department stated (November 2010) that efforts were on to persuade the unwilling families to relocate and were now showing positive results. However, no records regarding positive results were furnished to audit.

#### **2.2.9.1.2      *Monitoring of resettlement process***

The Social Development Unit (SDU) of KEIP, responsible for monitoring of the resettlement process was required to prepare monthly reports and submit to the external monitoring agency for resettlement for onward submission to the PMU and ADB. Records regarding preparation and submission of monthly reports were not maintained. In addition a Social Safeguards Compliance Monitoring Report was required to be prepared by the KEIP authority but no such report had been prepared as of March 2010. In the absence of the desired reports, the grievances of the affected families could not be ascertained and suitable redressal measures could not be taken.

The External Monitoring Agency reported (December 2009) that flats meant for canal bank dwellers were being let out to outsiders and recommended necessary action. KEIP has not investigated the matter (March 2010).

The Department stated (November 2010) that the monthly report was not prepared by SDU as the same was reported and discussed in the Project Monthly Review Meeting. The reply was not tenable because as per the Resettlement Plan, the preparation and submission of the monthly report was required for project monitoring by the PMU and ADB. In regard to non-investigation the Department replied that the report of the external monitoring agency was not specific but indicative.

### **2.2.9.2 Canal Improvement (CI)**

The Canal Improvement component of KEIP was revised in 2005 and 2008 resulting in increase in the length to be desilted from 53 km to 104 km. This included four drainage canal systems<sup>47</sup> which are the major outfalls of the S&D network and the canals of the East Kolkata Wetlands (EKW). It also envisaged augmentation/construction of three pumping stations at outfall locations to arrest water logging particularly during heavy rainfall and high tide. 53 culverts and bridges were to be replaced/upgraded to eliminate drainage constrictions in canals.

The improvements in the canals were to be completed by June 2007. The scheduled completion date considering the modified scope of work and slow progress was revised to June 2010. Scrutiny of records revealed that only 54 *per cent* of the length of the four drainage canal systems was complete (March 2010). The work on the three pumping stations had also not been completed. However, there was satisfactory progress in respect of culverts and bridges as 87 *per cent* of the work was complete. In addition to allowing free flow of water in the canals, these provide better connectivity between canal banks and adjoining areas.

The slow progress of Canal work was due to changes in the design of canals (*paragraph 2.2.7.3*), delay in resettlement of canal bank dwellers and inadequate monitoring of the performance of the contractors as discussed below:

#### **2.2.9.2.1 Delay in resettlement of canal bank dwellers**

The canal work scheduled to begin in January 2003 actually commenced in February 2006 due to non-finalisation of the canal stretch to be rehabilitated. In six test checked contract packages it was seen that there was an average delay



**Fig. 1: Encroached Canal Bank**

<sup>47</sup> Churial Canal System, Keorapukur Canal System, , New Monikhali-Begore Canal System, Tollygunge-Panchmangram Basin

of 12 months till March 2010 due to non availability of continuous encroachment free canal stretch (**Appendix-2.2.11**). The de-siltation work was thus done intermittently in four contract packages<sup>48</sup> related to three canal systems<sup>49</sup>. As these canals have been partially excavated, the possibility of re-siltation in the completed portions and consequent flooding cannot be ruled out.

#### 2.2.9.2.2 Sub-optimal progress of work

Construction of three canal pumping stations was undertaken (March 2007) under a turnkey contract (CW-01) at a bid price of ₹ 52 crore for completion by September 2009. The objective was to provide relief from water logging in six boroughs. Due to poor performance (15 per cent) the contract package was terminated in July 2009 after payment of ₹1.40 crore. The balance work was awarded



Fig. 2: Incomplete Pumping Station at Chowbhaga

(July 2010) to another agency at a cost of ₹ 69.82 crore resulting in cost escalation of at least ₹ 14.02<sup>50</sup> crore. In addition, KEIP had already made advance payment of ₹ 4.61 crore to CESC Ltd. in March 2007 for bulk power supply for the proposed pumping stations. As the pumping stations were not ready the money had remained blocked for more than three years.

The department stated (November 2010) that during checking of design and drawing submitted by the agency, it was noticed that many of the design parameters were not proper and the agency failed to submit correct drawings which resulted in delay. The Design and Supervision Consultant was engaged to prepare the detailed design and drawing of all components of the project. Therefore, the decision to award this particular work on turn-key basis including preparation of drawing and design by the working contractor turned out to be injudicious. This is also borne out by the fact that the department awarded the balance work on item rate basis to avoid further delay.

#### 2.2.9.3 Sewerage & Drainage

The S&D component of the project covered seven boroughs (I, VII & XI to XV) in the added areas of the city. Underground trunk networking pipelines were to be laid along with house connections with proper arrangement of interception and diversion of Dry Weather Flow (DWF) to Sewage Treatment Plant (STP) through pumping stations. Storm Weather Flow (SWF) was to be

<sup>48</sup> CW-08, CW-09, CW-11 and CW-13

<sup>49</sup> Churial, New Monikhali and TP Basin

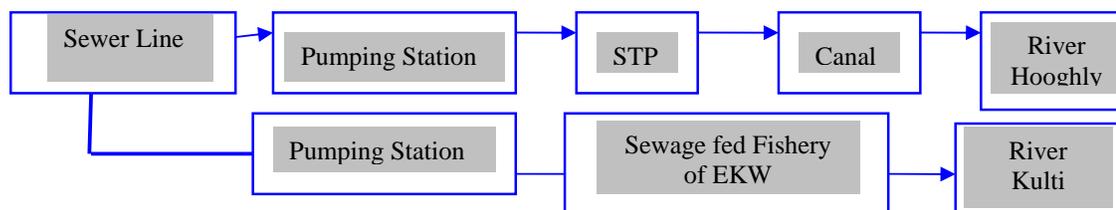
<sup>50</sup> ₹14.02 crore = ₹69.82 (contract value of balance work)+ ₹1.40(up-to-date payment)- ₹52 (original contract value)- ₹5.20(performance security)

discharged to outfall canal networks through gravity flow. The work was to be taken up in July 2002 and was to be completed by June 2007. Of the 42 work packages taken up under S&D only 14 packages were completed at a cost of ₹ 155.68 crore and the rest were at various stages of execution as of March 2010 (*Appendix-2.2.12*).

### 2.2.9.3.1 Interlinking of various work packages

The Central Public Health and Environmental Engineering Organisation (CPHEEO) manual stipulates that in designing waste water collection, treatment and disposal system, planning generally starts from the final disposal point and goes backwards to produce an integrated design to suit the topography and the available hydraulic head to be supplemented by pumping, if essential. Though the different components of S&D and canal works were interrelated, these interfaces were not considered while concluding the individual contracts.

#### Flow chart of a sewer system under KEIP



Scrutiny of the four completed packages<sup>51</sup> on networking pipelines in boroughs XIII and XIV and part of XI revealed the following deficiencies in planning:

The sewerage of the boroughs was to be pumped into the South Suburban East and Gardenreach STPs for final disposal into river Ganga through canals. Audit scrutiny revealed that the works of networking pipelines were taken up between May 2005 and February 2008. The contract packages<sup>52</sup> for pumping stations related to the networking system were however, taken up two years later, in February 2007 and May 2007. The networking lines were completed between April 2009 and January 2010 at a cost of ₹ 135.67 crore; but the work on pumping stations was ongoing while the augmentation work of Gardenreach STP had been suspended. On the other hand, none of the improvement works of related canals taken up between March 2007 and March 2008 were completed (March 2010). So, networking pipelines completed at a cost of ₹ 135.67 crore could not be fully utilised in absence of corresponding treatment and disposal capacity downstream.

The KEIP admitted that related packages were not sequenced due to non-availability of sites.

<sup>51</sup> SDA1, SDA2, SDB1 and SDB1-TW

<sup>52</sup> SD23 and SD24R1

### 2.2.9.3.2 Net working Pipeline

The work of laying sewer lines was scheduled to be completed by June 2010. As of March 2010 only four out of the 16 packages were completed. Six of the 12 incomplete packages were delayed upto 27 months. Delay was mainly attributable to poor performance monitoring by KEIP and inaccurate assessment of site conditions necessitating changes in scope of work as discussed in paragraph 2.2.7.3 and below:

The Sewerage & Drainage network package (SDD2) awarded (November 2006) at a cost of ₹ 55.23 crore was to be completed in June 2009. The contractor failed to achieve the physical targets from the outset and was not responsive to repeated directions to expedite the work. KEIP, however, allowed him to continue the work and paid ₹ 13.16 crore including escalation. The tender was terminated, invoking performance guarantee, in July 2009 when only 8794 metre of pipeline had been laid against the target of 20051 metre. The balance work was approved (July 2010) at a cost of ₹ 53.14 crore resulting in additional burden of ₹ 9.95<sup>53</sup> crore.

In SDBI and SDA2 packages the methodology had to be changed to the trench less method from open cut method during execution, as site conditions had not been assessed during survey and preparation of design reports. The existing contractor not being technically competent the works had to be sub-contracted. This led to delay upto 23 months and extra financial liability of ₹ 2.38 crore. The department stated (November 2010) that due to non-availability of underground utility maps, methodology of trenching was changed during execution. The reply was not tenable as the work was supposed to commence after finalisation of the drawings, design and layout.

### 2.2.9.3.3 Pumping Stations.

Seven contract packages consisting of upgradation/construction of 40 pumping stations taken up to improve the flow of DWF and SWF were to be completed by December 2009. The work is still ongoing. There was on an average delay of 17 months as of March 2010 due to the following reasons.

- The progress of work in five packages<sup>54</sup> suffered due to delay in finalisation of site before commencement of work. The work (SD 32) of construction of new Pumping Station for Borough-XV covering two worksites was to be completed by October 2008. One work site was handed over to the contractor after nine months. The site for the other pumping station was changed a year after award of work. The alternative site has not yet been handed over to the contractor.
- In three packages<sup>55</sup> 27 drainage pumps for installation in nine<sup>56</sup> pumping stations were procured at a cost of ₹ 3.86 crore. Soon after

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<sup>53</sup> ₹53.14 crore + ₹13.16 crore – ₹1.12 crore – ₹55.23 crore – ₹5.52 crore

<sup>54</sup> SD 23, 26, 27, 28 and 32

<sup>55</sup> SD 26, 27 & 28

<sup>56</sup> SD 26: Datta Bagan, Beerpara; SD 27: PS 2 Ambwdkar Bridge, PS 3 EE 1 Minor Channel, PS 4 Kasba drainage; SD 28: Topsia A, Kuliatangra, Pagladanga, Chingrihata.

installation, four pumps started malfunctioning. Apprehending similar problems in basic design the remaining 23 pumps were not installed at the other seven pumping stations. This could not be detected during performance testing since pumps were not tested simulating the ground conditions as required.

The department did not offer any comments in respect of delay in finalisation of sites. Regarding non-installation of pumps the department stated that it was due to non-completion of civil works. However, the contention of the department was not convincing as it was evident from the records that the Jadavpur University had been engaged to review the basic design aspects of all the supplied pumps. Pending receipt of the report (July 2010) the pumps could not be installed.

Thus, failure to complete the work in time affected the interlinking with the sewerage network and defeated one of the prime objectives of the project.

#### **2.2.9.3.4 Sewerage Treatment Plants-Discharge of untreated sewage**

The S&D Master Plan had laid particular emphasis on the environmental improvement of two major recipients of waste waters of the city, the Hooghly and Kulti Rivers and lay down the standards for discharge of waste water into the rivers. The Ganga Action Plan (GAP) also recommended that no untreated dry weather flow (DWF) from the city should be allowed to discharge into the river. Central Pollution Control Board (CPCB) in their report (2009-10) emphasised on 100 *per cent* secondary treatment of sewage before discharge into the canals.

Under KEIP, three existing STPs (Bangur, Gardenreach and South Suburban) were to be augmented for treatment of a total of 154 Million Litre Day (MLD) of sewage prior to discharge and two new STPs (for Borough VII and Borough XII) were to be constructed. Two of the three existing STPs were not working while two new STPs proposed were dropped from the project on the consideration that the sewage would get naturally treated while passing through the fishery channels of EKW area.

#### **Functioning of Sewerage Treatment Plants**

The augmentation work of Bangur and Gardenreach was taken up (May 2008) to increase their capacity from 47.5 to 57 MLD and from 45 to 52 MLD respectively. The work was awarded to an agency at a cost of ₹ 9.59 crore in May 2008 for completion by May 2010. KEIP did not assess the condition of the plants prior to finalisation of the scope of work. Consequently when the equipment malfunctioned during execution and needed replacement, the augmentation work was held up (November 2010).

Scrutiny revealed that in South Suburban East STP one drainage channel was connected to the pump sump without any screening arrangement which runs the risk of clogging the existing pumps. The additional flow of storm runoff might also affect the functioning of the STP.

The Department (November 2010) accepted that the work was awarded without assessing the actual condition of the existing plants.

### **Untreated sewage into river Hooghly**

KEIP had stated (June 2010) that out of 226 MLD of sewage from Kolkata discharged into Hooghly only 92 MLD was being treated. Actually, only 45 MLD of sewage was being treated at South Suburban East STP as the Garden Reach STP was non-functional since December 2009. Thus, 181 MLD of untreated sewage was being discharged into Hooghly resulting in increase in pollution load. Monthly analysis report of the effluent <sup>57</sup>(April and May 2010) indicated that the level of Faecal Coliform (FC) was 15000 MPN/100 ML against the CPCB norm of 500 MPN/100 ml.

### **Discharge into river Kulti**

The sewage (1100 MLD) from Kolkata discharged into the river Kulti receives partial treatment as it passes through EKW (an extensive fishery occupying 5000 hectares of land). The effluent has high FC level of 7333 MPN/100 ML against the norm of 500 MPN/100 ML. Analysis of FC of the effluent discharged into Kulti is not being done. An additional 110 MLD of sewage would be discharged into the river after implementation of KEIP. Epidemiological study of the health of the EKW fishermen as proposed in the Master Plan to assess whether secondary treatment of wastewater was required to reduce exposure of the fishermen to the toxic elements was not included in the scope of work of the project.

KEIP stated (November 2010) that all environmental and epidemiological issues in respect of the treatment of waste water through fishery of EKW and final discharge into Kulti River did not fall under their purview. The reply is not acceptable because as per the recommendation of the S&D Master Plan, the PMU, KMC was mandated to conduct the epidemiological study of the health of fisherman.

### **2.2.9.4 Solid Waste Management (SWM)**

#### **2.2.9.4.1 Scope of work vis-à-vis Actual execution**

The SWM component of KEIP was planned to improve the management of municipal, hazardous and bio-medical solid waste generated in the city. It was to focus on extending door-to-door collection service, segregation of recyclable and non-recyclable wastes at source, improvement of solid waste transportation through replacement of open containers by closed ones, use of bulldozers and mechanical sweepers. This component further consisted of disposal of municipal solid wastes in an environmentally safe manner to land fill sites.

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<sup>57</sup> Sewage treated in STP

Adequate primary collection, treatment and management of solid waste are crucial in ensuring the sustainability and functioning of the improved S&D and canal system of Kolkata. Most of the sub-projects in the SWM component were dropped on KMC's assurance that these would be carried out from their own funds. KEIP therefore procured only 83 vehicles at a cost of ₹ 25.29 crore between November 2003 and March 2009.

The Department stated (November 2010) that the project only covered partial and tangential aspects of SWM and accordingly KEIP authority restricted its activities under SWM.

#### **2.2.9.4.2 Collection and transportation of waste**

The process of segregation of municipal waste to lessen the burden on the existing dumping site at Dhapa was yet to be introduced in 134 wards out of 141 wards of KMC. Even basic collection equipment like litter bins, hand carts and tricycles with buckets had not been purchased as their design was not finalised in four years.

Domestic waste was not collected regularly and 388<sup>58</sup> out of 662 collection points were open spaces. As a result, the surrounding areas and roads were littered with garbage and sewer lines got choked leading to flooding during the monsoons.

67 vehicles received from the manufacturers during February 2006 and October 2007 did not comply with the BS-III emission norms effective from April 2005. The Feasibility Report (2000) and the SWM Master Plan had assessed (May 2005) the need for a maximum of four mechanical sweepers. Against this requirement KEIP procured 12 mechanical sweepers between January 2004 and November 2008 at a cost of ₹ 12.57 crore from a single foreign supplier. All the 12 mechanical sweepers were handed over to KMC between September 2004 and December 2008 for utilisation. Records indicate that three mechanical sweepers were purchased only for utilisation of fund of ₹ 2.20 crore meant for purchase of collection equipments.

The supplier of the mechanical sweepers did not provide any servicing facility till May 2008 in violation of the contract. As a result the sweepers<sup>59</sup> were in-operative upto 24 months due to lack of timely maintenance. There was no monitoring of the utilisation of the Sweepers as log books were not maintained.

The Department stated (November 2010) that the mechanical sweepers were procured as per decision of KMC due to delay in finalising design of the collection equipments. Regarding non-servicing of vehicles the department stated that they were not aware as to why the users (KMC) of vehicles could not approach the agency in time.

<sup>58</sup> As per Master Plan 2005

<sup>59</sup> WB 03B 5718 and WB 03B 9172

### 2.2.9.4.3 Sanitary Land Fill

The present method of disposal of solid wastes at Dhapa is not scientific because the waste is neither placed systematically nor covered with earth and compacted. Alarming levels of heavy metals have been detected in the surrounding areas and the leachate (biochemical decomposition of waste by bacteria) generated at Dhapa has very high Biological Oxygen Demand (BOD).



Fig. 3: Unscientific Land fill at Dhapa

To address the problem, the Feasibility report (January 2000) and Loan Agreement<sup>60</sup>, provided for construction of a Sanitary Land Fill (SLF). The KEIP authority proposed (December 2004) to construct a SLF adjacent to the existing land fill at Dhapa in East Kolkata Wetland (EKW) area at an estimated cost of ₹ 36 crore. This was done despite the fact that the site was in an ecologically fragile zone which had been declared a Ramsar site in August 2002. ADB therefore excluded the package (December 2007) from its financing scope. KEIP, however, replied that the Ramsar site can be used for such work. Till date (July 2010) no alternative site for the proposed SLF has been identified by KMC.

As a result, 95 per cent of the collected solid waste from Kolkata is being dumped unscientifically with a high probability of contamination of surface and ground water and consequent health hazards to the populace.

The Department stated that as construction of Sanitary Landfill Site was a policy matter, the KMC would resolve this issue in due course. However, no site had been identified for construction of proposed SLF by KMC till November 2010.

### 2.2.9.5 Slum Improvement

One of the objectives of KEIP was to provide improved living condition in the slums of Kolkata by providing basic civic amenities like supply of water, construction of sanitary latrines, washing/bathing platforms, light posts and concrete pavements. Under KEIP, slum improvements in 85 slums located in the core areas of KMC (Ward 1 to 100) was completed at a cost of ₹ 41.32 crore.

Kolkata has more than 2500 slum zones with a population of 14.75 lakh<sup>61</sup> occupying 13 per cent of the KMC area and forming 40 per cent of the total population of the city. Hence, prioritisation of the slums on the basis of poverty level and existing civic conditions was necessary before taking up improvement activities. Instead of using survey data prepared by KMC in

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<sup>60</sup> Supplementary Loan Agreement Sch-I para C

<sup>61</sup> Source SI Master Plan

2000-01 KEIP chose to select slums on the basis of recommendations of respective ward councilors.

Though the condition of the slums in the added areas (Ward 100 to 141) was more adverse than of those in core areas of the city these were left out of the purview of KEIP. The PD stated (July 2010) that the scope of work was restricted as per policy decision. The relevant records were, however, not made available to audit.

It was seen in audit that in 37 water deficit slums out of 85 covered under this project water supply was not augmented due to inadequacies in the supply system. KEIP instead of addressing this critical issue dropped the sub-component from the purview of the project.

Apart from this, the scope of Slum Improvement works provided for implementation of long term measures like establishment of land titles for slum dwellers, registration of dwellings, recognition of tenancy rights and introduction of municipal tax to enhance the security and creditworthiness of the slum dwellers. No such measure has been implemented so far. The slum improvement work of KEIP has, however, succeeded in providing access to improved sanitation and hygienic living conditions to the slum dwellers.

The Department stated (November 2010) that the Project could not extend the facility because of inadequacy in the supply system. The Department did not furnish any comment on non-implementation of long term measures.

#### **2.2.10 Monitoring**

For effective monitoring and quality control the project envisaged four levels of reporting. Initially the contractor was to prepare a Monthly Progress Report (CMPR) depicting progress of work and quality adhered to in execution of each work package and to furnish it to the Consultant (DSC). On the basis of CMPR, the DSC was to prepare Engineer's Monthly Progress Report (EMPR) recommending suitable action against any hindrance to the progress of work and to report to PMU. PMC was to prepare a consolidated Monthly Progress Report for the project as a whole on the basis of which Quarterly Progress Report is prepared by CMU for onward transmission to the ADB.

The Contractor's Monthly Progress Report and Engineer's Monthly Progress Report for 24 of the 32 selected contract packages could not be made available to audit. Analysis of these reports for three S&D networking packages<sup>62</sup> indicated that DSC commented on the poor quality and slow progress of work, however, remedial measures and follow up actions were not adequately documented. In respect of Bangur and Gardenreach STPs the contractor did not submit CMPR since commencement of the work in May 2008. As a result failure of the equipment could be detected only during site visit by PMC in January 2009. KEIP admitted the fact and stated that no tangible action could be taken against the defaulting contractor due to absence of any penal clause

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<sup>62</sup> SDC, SDD-1, SDD-2

in the contract. KEIP assured that these issues would be taken care of by the project in future packages.

As per Loan Agreement, the State was to constitute a Steering Committee to oversee the implementation of the project under the Chairmanship of the Minister of Municipal Affairs and Urban Development of the State consisting of 15 members from different government agencies and local bodies. It was also stipulated that the Committee would meet quarterly. Records revealed that the Committee was constituted in July 2002 and remained non functional for four years as no meeting was held till August 2006.

As of May 2010, only 6 meetings were held against the required 30 meetings. Similarly, the Project Review Committee (constituted in December 2005) had also not met regularly as only 13 meetings were held against 53 required during this period. Moreover, the recommendations of the Committees like finalisation of the SWM Master Plan at the earliest, immediate cleaning and desiltation of the Churial Canal to provide relief from water logging and expediting the relocation of unwilling canal bank dwellers to the constructed flats were not complied with.

The Department stated (November 2010) that meetings of the committee were held as and when considered necessary.

#### **2.2.10.1      *Non-maintenance of basic records***

Scrutiny of records of PMU, KMC revealed that payments through respective Running Account Bills were not based on the departmental measurement books. The measurements were taken and compiled by the contractor and checked by the DSC. The project authority replied that CPWD manual was not applicable for the project because construction under this project was guided by FIDIC conditions of contract. The reply was not tenable as PMU, I&WD maintained departmental measurement books and the modalities of working of PMU KMC also provided that departmental measurement books would be issued to DSC for recording measurement.

As per terms<sup>63</sup> of contract, a 'Site order Book' is required to be maintained by the contractor for recording the day to day instructions issued to the contractor and compliances thereto. Besides, statement of cost of Plant and Materials to arrive at actual cost of procuring and delivering these were to be kept ready for inspection at any point of time. The KEIP did not furnish any Site Order Book and stated that statements of cost were not maintained as those were not mandatory. In absence of such vital records it could not be ascertained as to how KEIP monitors proper execution of works.

#### **2.2.10.2      *Monitoring by ADB and GoI***

ADB missions from time to time reviewed overall implementation of the project and compliance with the loan covenants. They identified major

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<sup>63</sup> Clause 14.5 of the general condition of contract of part-II

bottlenecks and suggested time bound action plan to expedite project implementation. ADB and GoI had also introduced Tripartite Portfolio Review Meeting (TPRM) for reviewing the progress of ADB funded projects. Scrutiny of findings of the Review Missions and TPRM indicated that their recommendations like preparation of S&DMP Master Plan, Resettlement of affected canal bank dwellers were not done within stipulated time. ADB commented on the frequent variations in the scope of work at an early stage of contract due to inadequate planning and design. Though PMU had assured that DSC would be penalised for such lapses, no document in support of such compliance was available on record. Furthermore there was no enabling contract provision in this regard. Thus, it is evident that despite the existence of an elaborate infrastructure for project monitoring KEIP did not always analyse deviations or attempted course corrections.

### **2.2.11 Conclusion**

The objective of the project to arrest the environmental degradation of designated areas of Kolkata by upgrading sewerage and drainage system and rehabilitating the outfall canal system was yet to be fulfilled, eight years after commencement of the project. Due to non-adherence to time schedule of repayment of ADB loan, KEIP had to shoulder liability towards commitment charges. The planning was inadequate and implementation of various components widely deviated from the schedule. The consultants engaged failed to render proper assistance to KEIP authorities in implementing the project effectively and economically. The Canal Improvement works were affected due to delays in resettlement of canal bank dwellers. Though the different components of S&D and canal works were interrelated, these interfaces were not considered at the tendering stage. This defeated one of the basic objectives of the project. The Solid Waste Management component was totally overlooked as the proposal for Sanitary Land fill for scientific disposal of garbage in Kolkata has been dropped. As all the STPs were not fully functional untreated sewage was being discharged into the river.

### **Recommendations**

- *Time schedule of repayment of loan should be strictly maintained to avoid liability on account of commitment charges.*
- *A holistic approach needs to be adopted for dovetailing the work of Sewerage and Drainage, Canal Improvement and Resettlement components.*
- *KEIP should have a re-look on contract management for ensuring timely completion of works and optimum utilisation of resources.*
- *For better co-ordination and effective monitoring regular meetings of Steering Committee and Project Review Committee may be ensured.*