

ZAGREB HOLDING WATER AND SEWER INVESTMENT PROJECT: OPERATING PROCEDURES

Maja Feketic
INSTITUT IGH, d.d. Zagreb, CROATIA
maja.feketic@igh.hr

Josip Majer
INSTITUT IGH, d.d. Zagreb, CROATIA
josip.majer@igh.hr

Caslav Mladenovski
COWI A/S, DENMARK
cami@cowi.dk

The Zagrebacki Holding has received a loan (60 mill EUR) from the EBRD for large scale improvements of the water supply and wastewater facilities in the Croatian capital Zagreb, serving about 850,000 inhabitants. Zagreb Municipality will provide counterpart funding (40 mill EUR) for the investment component of this project.

The project comprises the following activities: 1) Project Management and Coordination - arranging overall project coordination including assistance to the Project Implementation Unit (PIU) in all aspects of project management and compliance with the EBRD Loan Agreement and other mandates; 2) Design of part of the works; 3) Project Procurement Service; and 4) Supervision of Works in construction phase under Croatian Building Act and other related and applicable local laws and regulations and under FIDIC Contract Conditions for Construction (Red Book).

The Project Implementation Unit (PIU) is set up by Zagrebacki Holding for the day-to-day management of the project. In consultation with the PIU, the Consultant (IGH) has established the Project Implementation Plan (PIP) to cover all aspects of project implementation ensuring an effective Project Management and adequate expert input.

The project will be implemented in a four-year period (2008-2011).

KEYWORDS: project management, project implementation plan, operating procedures.

INTRODUCTION

Background

The Zagrebacki Holding has received a loan (60 mill EUR) from the European Bank for Reconstruction and Development (EBRD) for large scale improvements of the water supply and wastewater facilities in the Croatian capital Zagreb, serving about 850,000 inhabitants. Zagreb Municipality will provide counterpart funding (40 mill EUR) for the investment component of this project. Croatia (area 56,580 km²) is administratively divided into 20 counties and the capital, Zagreb, has a county status.

Water supply

An organized water supply system in the city of Zagreb dates from 1878. Back then, the water supply system was providing water to some 10 000 inhabitants, while today the municipal water supply system provides drinkable water to 850,000 inhabitants residing in Zagreb and Samobor, Dugo Selo, Vrbovec and Rugvica, Stupnik and Sveta Nedelja municipalities.

The municipality is mainly supplied with groundwater from the river Sava alluvium extracted from wells and pumped directly (untreated) into the water network. The water network - made of different kinds of pipe material - is approximately 2,600 kilometres long.

In Zagreb, affordability issues and lack of resources have limited the development within the sector and made long-term planning difficult. Consequently, maintenance of the existing water supply system has been low. Hence, the water supply system in Zagreb municipality is in need of major repair and new investments.

Sewer system

The construction of the sewer network in Zagreb began in 1892. Today the sewer system is approximately 1,800 kilometers. Construction of a main collector line ("GOK") and a central waste water treatment plant (CUPOV) is on-going and in its final stage.

The sewer system covers roughly 88% of the total city area, meaning that 120,000 citizens are not connected to the public sewer system. In the city area; mainly the upper part of Mala Mlaka pump site spill, i.e. in Novi Zagreb – west and Brezovica and at slopes of Medvednica, which is not served by public sewer, some 10,000 septic pits have been established causing a threat to the surrounding environment. It is estimated that additional 450 kilometres of sewers are required to cover the need of the Zagreb municipality.

Scope

The project includes both Consulting Services and Construction Works.

The Consulting Service Contract consists of following activities: 1) Project Management and Coordination - arranging overall project coordination including assistance to the Project Implementation Unit (PIU) set-up by Zagrebacki Holding for the implementation of the project in all aspects of project management and compliance with the EBRD Loan Agreement and other mandates; 2) Design of part of the works; 3) Project Procurement Service; and 4) Supervision of Works in construction phase under Croatian Building Act and other related and applicable local laws and regulations and "Engineer" under FIDIC Contract Conditions for Construction (Red Book).

The Construction Works consists of the following activities: 1) Water Supply Works - Zagreb East, Water Reservoir Cerje, Zagreb West, Water Leakage Management Phase I and Phase II, and 2) Sewage Works - New Zagreb, Trešnjevka and Zagreb East.

Zagrebacki Holding (the Client) has designs available for all the above mentioned works to be implemented except for the sewage works in Zagreb East.

The project also includes supply and installation of Supervisory Control And Data Acquisition (SCADA) equipment (Water Supply and Sewerage).

Project Management Structure

For the day-to-day management of the project, a Project Implementation Unit (PIU) is set up by Zagrebacki Holding and approved by EBRD. Project Implementation Unit is an organisational unit established within the Zagrebacki Holding in charge of the technical implementation of the Project within its competence. PIU is further an implementing body, responsible for the overall financial and administrative management of the implementation of the Project, including organisation of tendering, contracting, contract management, verification of invoices before payment for Service, Works and Supplies Contracts, monitoring at contract level and reporting to the Bank.

The Zagrebacki Holding appoints the members of the PIU. The PIU Leader is authorised to represent Zagrebacki Holding throughout the Project implementation.

Project Manager for the project is a person appointed by the Consultant (IGH as Lead Consultant in a consortium of Partners), approved and delegated by the Client for all obligations and responsibilities for technical implementation of the Project.

The Project Manager (PM) establishes, review and updates, in consultation with the Zagrebacki Holding/PIU, the Project Implementation Plan (PIP).

PROJECT IMPLEMENTATION PLAN (PIP)

The Project Implementation Plan (PIP) for the Zagreb Holding Water and Sewer Investment Project is divided into four parts as follows: Part 1: Project Procedures System; Part 2: Financial Management System including Project Budget; Part 3: Procurement Plan; and Part 4: Construction Supervision.

The Project Implementation Plan covers all aspects of project implementation, and includes, inter alia: Project Scope, Project Programme, Project Budget, Project procurement, Project risk matrix, Project organizational planning, Communication plan, Systems and Procedures for Filing and Documentation, Quality Management.

The Project Implementation Plan (PIP) (the manual) is a dynamic document, which can be revised if required in order to match changes in the project or its environment.

Part 1: Project Procedures System

This document - Part 1 of the Project Implementation Plan, describes the PIU operation procedures system in detail including:

The Project Scope - the background for the project, the scope, stakeholder analysis, planning including the strategy for project implementation and means of verification to ensuring that project objectives and expected outputs are met by the project;

Project Programme - describing in detail: Project Milestones defining the thresholds for the planned and required key deliveries and events; Milestones for Project Documents listing periodicity for key project documents prepared by the Consultant and submitted to the PIU and key project documents prepared by Zagrebacki Holding and submitted to the EBRD for info and/or "no objection"; Reporting based on unified reporting templates; and Project Monitoring with the purpose to identify problems during the project implementation and to ensure that timely action is taken to solve any problems.

A detailed Project Programme is prepared (presented in PRIMAVERA) for implementation of the Project - showing all activities and key events for design, approvals, procurement, construction, completion, etc.;

Project Risk Matrix - analysis of the critical risks and assumptions is carried out and presented in a table together with identified potential impacts and possible mitigations to negate such impacts.

Example from the Project Risk Matrix presented in the PIP, Part 1, see Table 1.

Table 1: Project Risk Matrix

Assumptions	Completion of the tasks, according to the time schedule and the budget.
Risk	Inadequate functionality and quality of the existing designs (prepared by Zagrebacki Holding) forming the background for the preparation of tender documents (Procurement Packages).
Main Impact	The level of information and data captured in the already prepared designs (by Zagrebacki Holding) will have a significant bearing on the level of risk of construction cost (extra claims from constructors) and time over-run later.
Mitigation Actions	Efficient communication with/transfer of site information during implementation to the design teams (who prepared the designs) if any additional information / modifications to the designs required. A well organised construction supervision team should further surveys be required and extensive use of electronic integration of any survey data. Use of effective internal Quality Assurance System and control during construction phase.

Project Organizational Planning - describing the Project Organisation; Key Stakeholders Roles and Responsibilities; Project Implementation Unit including the staffing and the responsibilities of the PIU; the Project Team including presentation of organisation diagram; and Contact Details of all project stakeholders.

The Project Organisation structure is illustrated in the Figure 1 outlining the major project agreements among the key stakeholders.

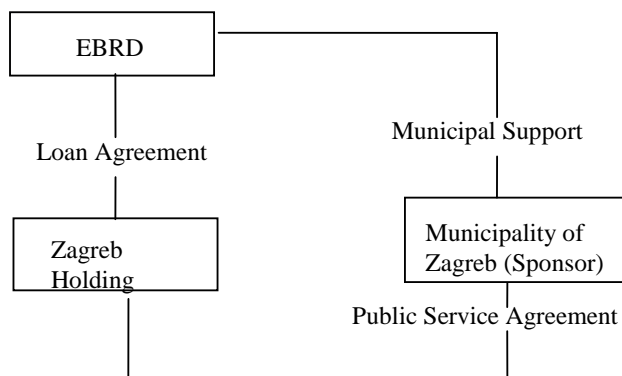


Figure 1: Project Structure

In Figure 2 is shown the organisational setup for the implementation of the Zagreb Holding Water and Sewer Investment Project.

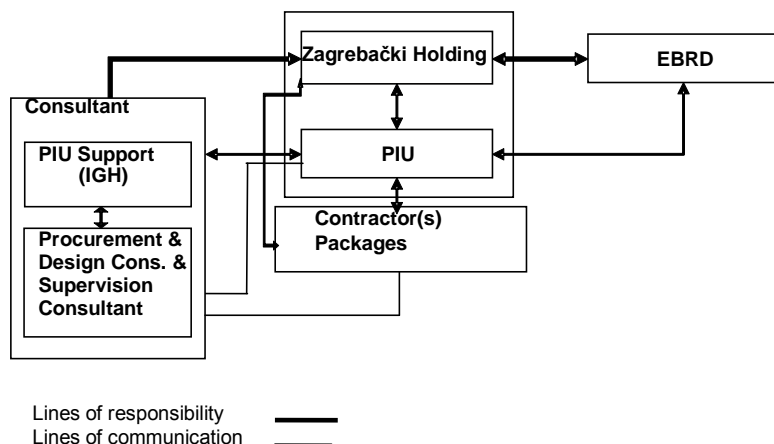


Figure 2: Project Organisation of the Implementation of the Project

Communication plan - describing in detail communication procedures including lines and targets, frequency, reporting and timely information distribution to ensure the streamlining of information flow between the PIU and project participants.

Systems and Procedures for Filing and Documentation - describing in detail: Document Types produced on the project; Identification of Documents; Registration and Distribution of Reports and Minutes; Handling of Communication Documents; Filing System; and Document Layout.

Quality Management - is carried out according to Zagreb Holding/PIU quality management system and the procedures described in the Project Implementation Plan Part 1, 2, 3 and Part 4. This section of the PIP describes the Preparation and Quality Verification of Project Documents including Internal and External Check and Approval procedures and approval of final versions of documents.

Quality verification is defined as "Activities to verify the fulfilment of quality requirements". Checks and approvals are used in order to verify the quality.

The check and approval covers both internal preparation of documents and all receiving documents from project stakeholder. The individuals responsible for the preparation of the *document* do the self-check and discipline check (technical and financial). The responsibility for the professional content of the document rests with the author of the document, who shall always personally check that the document is complete, correct, and sufficiently detailed, not with the person checking it.

The check of project documents is an independent activity to be planned and carried out like all other activities of the project. The check shall be performed and possible revisions made to the satisfaction of the PIU Director.

Part 2: Financial Management System including Project Budget

This document describes the PIU operation procedures system in relation to procurement of works and EBRD reporting and payment of Contractors including management of the Project Budget including:

Project Accounting and Budget Management System - describing in detail:

- *Project Accounting Systems:* All accounting related with the Project is maintained by the Accounting Department of Zagrebacki Holding. All the related expenses will be accounted separately in specially opened sub-accounts. However, in order to keep track on the project development, PIU maintains accounting for all project related activities, including loan disbursement, estimation/calculation of interest and principal payments values, loan servicing payments, invoices received from the Contractors, and accounts verification.

The project accounting should be maintained on day to a day basis, with further summarisation of actual data on monthly, quarterly and finally on annual basis. This information should be widely used for project budgeting and budget management.

- *Management of Project Budget:* Budgeting is a very important part of the PIU activity. Budget is the financing plan of the project implementation activity and achievement of planned results. The PIP stipulates that the budget should be prepared at an early stage of the project, even taking into account that it could be changed significantly during the actual implementation phase. Therefore it is proposed, in the PIP, that the Project Budget is revised on monthly basis, based on the estimates of payments provided by the Contractors and the analysis of the project activity and deviation from planned results is carried out.

The careful monitoring and updates of the Project Budget will allow Zagreb Holding/PIU to make necessary adjustments in the loan withdrawal schedule with respective notification of the EBRD on the changes and progress achieved

- *Zagreb Holding Economical Performance Indicators:* In parallel with collection and monitoring of project financing and expenses activities, PIU has to furnish EBRD (Quarterly and Annually) information on a number of financial coefficients / affirmative covenants specified in the Loan Agreement between Zagrebacki Holding and the EBRD.

Loan Servicing - describing in detail:

- *Loan Servicing:* The first step allowing withdrawing the funds from the Loan account is to obtain/satisfy the requirements applying to the Borrower necessary for Loan Effectiveness. A complete list of the requirements is presented in the Loan Agreement between the Zagrebacki Holding and the EBRD.

- *Debt Service Reserve Account Management:* According to the Loan Agreement the Debt Service Build-Up (DSR) Account is to be established prior to the first application for the Disbursement, into which Zagreb Holding shall deposit and at all times maintain a balance of equal to not less than the HRK equivalent of the sum of all payments of principal and interest on the Loan which will be due and payable during the next six months.

Procedures for payment to the Contractor - describing in detail: The Payment Procedures including Advance Payment procedures, Interim / Monthly Payments and Final Payment. Loan Disbursement Procedures where the approximate order of documents approvals processing necessary for the loan disbursement/payment to the Contractors is presented.

Part 3: Project Procurement

This document describes in detail the Procurement Arrangements during the implementation of the Project including:

Procurement packages - describing in detail the Packages including description of the background, no of procurement packages, type and content/specification and budget of each procurement package.

Procurement Arrangements - describing in detail:

- *Procurement strategy of the Project:* Procurement of all goods, works and services required for the Project and to be financed out of the proceeds of the EBRD Loan to Zagreb is carried out in compliance with the procurement rules for public sector operations under the "Procurement Policies and Rules for Projects Financed by the European Bank for Reconstruction and Development", as specified in the Loan Agreement between the EBRD and Zagrebacki Holding. Goods, works and services (excluding consultant's services) are procured through open tendering. All contracts are subject to the review procedures set out in "the Procurement Policies and Rules" and are subject to prior "no objection" by EBRD.

The contracts for the Engineering works designed by the Employer (mainly water supply and sewer piping) are based on FIDIC Conditions of Contract MDB Harmonized Edition 2006, for Building and Engineering works designed by the Employer and based on unit prices. Supply and Installation of equipment (bulk flow meters, potable flow measuring equipment, pressure meters, radio communication equipment etc.) for the water supply system and supply and installation of equipment (flow meters, rain meters etc) for the sewer system is based on FIDIC (Yellow Book) Conditions of Contract for Plant & Design-Build or EBRD "Standard Tender Documents for the Supply and Installation of Plant and Equipment".

- *Procurement Process:* For the procurements with time constraints "Open Tendering" procurement procedure without pre-qualification is used. It means that all interested tenderers who have purchased the tender documents can submit a tender. However, post-qualification is carried out, of those tenderers who have provided any tender security required etc., to ensure that these meets the criteria as stipulated in the "Invitation to Tender Notice". Detailed data on the key milestones are presented in Table 2.

Table 2: Key Milestones of the Procurement Package

Activity / Document and timing	
Type of project	Works (EBRD - FIDIC Red Book)
Cost estimate	(price)
Procurement Method	Open International Tendering
Prequalification Documents	(date)
Prequalification	(date)
Tender documents completed	(date)
Invitation for tendering starts	(date)
Tender evaluation completed	(date)
Contract signed	(date)
Contract completion	(date)

A detailed description of the actions and documents which need to be prepared during the tender period is provided with reference to relevant forms /templates, which are attached as annexes.

Procurement and Implementation Plan - "Master Plan" showing the timing of the project implementation activities including procurement and construction supervision of the Contract Packages is presented.

Part 4: Construction Supervision

This document describes the Construction Supervision Arrangements during the implementation of the Project including:

- *Roles and Responsibilities under Construction Supervision* - Construction supervision is performed by the selected Supervision Consultant (SC) acting as the Engineer (as specified in the FIDIC Conditions of Contract for Construction, First Edition 1999, MDB harmonized edition May 2005, amended March 2006) during the construction of the project. The Engineer will be responsible for all construction supervision from the Commencement Date until the end of the Defects Liability Period. The organisation of the supervision for this project is illustrated in Figure 3 showing the contractual relations and communication between parties of the project implementation.

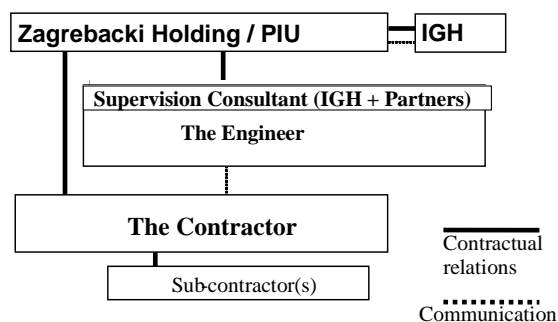


Figure 3: Relationship between the Parties of the Project

The tasks of the Contractor and the Engineer during the three main phases of the Project implementation, i.e. Pre-Construction, Construction and Defects Liability phase are described in detail.

The Supervision Consultant (SC) will prepare his own Supervision Manual on how the

supervision will be performed. The SC will also prepare a Quality Assurance Manual describing the quality assurance of his supervision.

Phases of the Construction supervision - describing in detail the three main activities: Pre-construction activities such as organisation of quantity control, quality monitoring and checking and organisation of administration and monitoring system; Supervision activities comprising quality check before construction, quantity control, quality monitoring and checking, testing, monitoring and recording and contract administration; and Defects Notification Period activities comprising final control and completion activities.

Monitoring and Reporting of Project Implementation - describing in detail:

- *Project Monitoring and Reporting from Supervision Consultant:* In order for the Zagrebacki Holding/PIU to monitor and report progress to key project stakeholders the Supervision Consultant /the Engineer shall forward a number of reports to the PIU for comments and approval. To organise administration and monitoring the Supervision Consultant (SC) is establishing a system to handle all the supervision construction documents. A detailed list of documents to be prepared by the Supervision Consultant is presented.

- *Employer/PIU's Own Monitoring and Reporting:* Based upon the Supervision Consultant reporting, Zagrebacki Holding/PIU reports to the key stakeholders. The Contractor will submit a payment schedule at the commencement of the construction works, and update the payment schedule on quarterly basis. Each monthly invoice from the Contractor will show a summary of all payments, etc. Examples of such forms are shown in the PIP. Reporting to EBRD is dealt with in Part 2 of the PIP.

CONCLUSION

The most important aspect of a successful project management is a high standard organisation of work which implies that all project participants are fully aware of their responsibilities, task assignments and deadlines.

It is also important that the key project personnel recognizes the relation between various task assignments in order to act in due time.

In order to implement the aforementioned activities it is essential to make a project implementation plan with clearly and unambiguously defined roles and procedures on the project.

By establishing the project implementation plan we have created a solid basis for completion of the project within the anticipated time schedule and budget meeting the established quality requirements. However, it should be emphasized that the Project Implementation Plan is based on that the attitude among all individual staff on the project is:

- Having a Quality culture
- Working with the PIP as a tool
- Updating the PIP when necessary

It should be underlined that the project is in its early stage of implementation. Therefore, it is not possible to address the lessons learned at the moment. However, it can be concluded that

during the preparation of the PIP we have been lead through a detailed analysis of the project scope, contractual basis for the projects including the established agreements, the EBRD procedures, etc., all of which has helped us to establish a solid basis for the project implementation including organization approach.

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