

PN - ABC-561
61135

TETOUAN SEWERAGE MASTER PLAN AND ENVIRONMENTAL IMPACT STUDIES



WATER AND SANITATION
FOR HEALTH PROJECT

Operated by
CDM and Associates

Sponsored by the U.S. Agency
for International Development

1611 N. Kent Street, Room 1001
Arlington, VA 22209-2111 USA

Telephone: (703) 243-8260
Fax (703) 525-9137
Telex WUI 54532
Cable Address WASHAID

WASH FIELD REPORT NO. 265

MARCH 1989

The WASH Project is managed
by Camp Dresser & McKee
International, Inc. Principal
cooperating institutions and
subcontractors are: Associates
in Rural Development, Inc.;
International Science and
Technology Institute, Inc.;
Research Triangle Institute;
Training Resources Group;
University of North Carolina
At Chapel Hill

Prepared for
the Regional Housing and Urban Development Office
U.S. Agency for International Development, Morocco
WASH Task No. 020

WASH Field Report No. 265

**TETOUAN SEWERAGE MASTER PLAN
AND
ENVIRONMENTAL IMPACT STUDIES**

Prepared for the Regional Housing and Urban Development Office
U.S. Agency for International Development, Morocco,
under WASH Task No. 020

Prepared by

Pierre R. Leger

March 1989

Water and Sanitation for Health Project
Contract No. 5942-C-00-4085-00, Project No. 936-5942
is sponsored by the Office of Health, Bureau for Science and Technology
U.S. Agency for International Development
Washington, DC 20423

CONTENTS

CHAPTER	Page
ACRONYMS	iii
EXECUTIVE SUMMARY	v
1. INTRODUCTION	1
2. BACKGROUND	3
2.1 Description of Sewerage Management in Tétouan	3
2.2 Sewage Disposal Impact on the Region's Environment	4
2.3 Tétouan Sewerage Systems Master Plan Development Process	4
3. PROBLEMS AND ISSUES	7
3.1 Regional Approach to Sewerage Master Plan Development	7
3.2 Completeness and Soundness of Draft Terms of Reference	7
3.3 Completeness and Soundness of Proposed Bidding Process	8
3.4 Sewerage Master Plan Studies Contract Management	8
3.5 Sewerage Operations and Maintenance Staff Development	9
4. PROPOSED SOLUTIONS TO IDENTIFIED PROBLEMS	11
4.1 Regional Approach to Sewerage Master Plan Development	11
4.2 Completeness and Soundness of Draft Terms of Reference	11
4.3 Completeness and Soundness of Proposed Bidding Process	12
4.4 Sewerage Master Plan Studies Contract Management	12
4.5 Sewerage Operations and Maintenance Staff Development	12
5. CONCLUSION AND RECOMMENDATIONS	13
5.1 Conclusion	13
5.2 Recommendations	14
APPENDICES	
A. SCOPE OF WORK	15
B. TOR INCLUSIONS	19
C. ANE MEMO OF APRIL 1986	31
D. REVIEW AND ANNOTATION OF ISKANE/BCEOM AND RDE DOCUMENTS	43

ACRONYMS

ANHI	<i>Agence Nationale de l'Habitat Insalubre</i>
BCEOM/ISKANE	A consulting group.
GOM	Government of Morocco
MUN	Municipality of Tétouan
O&M	Operation and Management
RDE	<i>Régie de Eaux</i>
RHUDO	Regional Housing and Urban Development Office, AID
SOW	Scope of Work
TOR	Terms of Reference

EXECUTIVE SUMMARY

At the request of the Regional Housing and Urban Development Office (RHUDO) of USAID/Morocco, the Water and Sanitation for Health (WASH) Project provided the services of a senior sanitary engineer to verify the completeness and accuracy of the terms of reference (TOR) for the studies of the Tétouan Sewerage Master Plan and to help finalize them.

Specifically, the objectives of this particular assignment could be summarized as follows:

- Verify completeness and soundness of TOR.
- Verify sufficiency of information on environmental impact assessment and its responsiveness to USAID requirements.
- Recommend changes in TOR to assure ability of U.S. and Moroccan engineering consulting firms to participate.
- Evaluate institutional capability of the Municipality of Tétouan (MUN) to manage the studies.
- Develop technical and cost information which will assist MUN in bid evaluation.
- Determine and recommend level of assistance needed by MUN to be able to manage studies.
- Review and comment on the August 1988 report of the consulting firms of BCEOM/ISKANE on off-site sewerage system component feasibility and comments thereon made by the Régie des Eaux (RDE).

The study was conducted in two parts, a field visit to Morocco where relevant meetings with both Rabat and Tétouan Officials were held and adequate information was obtained and preparation in the U.S. of the requested documents.

Outcomes

- The TOR were reviewed with the municipal engineers responsible for finalizing the bid documents and appropriate additions were agreed upon.

- The bidding process was defined and an evaluation document has been prepared to guide the Municipality in selecting and negotiating a contract for the studies.
- Resources necessary to allow the Municipality to develop the institutional capability for managing the studies were identified.
- Technical assistance needs for supporting the Municipality were identified.

Conclusions and Recommendations

- Bid documents for the studies will need to contain information proposed for inclusion in the TOR prepared by the Municipality of Tétouan.
- The regional approach to pollution control in the Tétouan area should be encouraged by undertaking the environmental impact assessment for greater Tétouan.
- Serious consideration should be given to the multiplication of sewage treatment plants in the region as they require heavy investment and O&M costs.
- RHUDO/Morocco should develop a special assistance package which will seek to strengthen the special unit which the Municipality proposes to create for the purpose of managing the contract for the studies.
- The BCEOM/ISKANE study recommendations do not need to be followed up because the preparation of the Master Plan should address future need for off-site sewerage systems component design.

Chapter 1

INTRODUCTION

In January 1989 the AID Regional Housing and Urban Development Office (RHUDO) in Morocco requested WASH to provide a senior sanitary engineer to verify and finalize the completeness and accuracy of the terms of reference (TOR) for the studies of the Sewerage Master Plan. The TOR, together with other bid documents, were prepared by the Municipality of Tétouan (MUN), which intends to contract for the preparation of the Master Plan studies. These studies are to be partially funded from the 608-0194 Grant Program and HG-001 Program Loan Funds.

WASH provided the services of a senior sanitary engineer who spent six days in Morocco responding to the Scope of Work (see Appendix A), which can be summarized as follows:

- Review and analyze the draft TOR prepared by MUN and the *Régie des Eaux* (RDE) of Tétouan to determine their completeness and soundness;
- Determine whether the draft TOR included sufficient information to undertake the environmental impact assessment to be included in the Master Plan studies in accordance with guidelines established by the ANE/Environmental Officer in his memo dated April 1986;
- Recommend any changes to the TOR in format and/or presentation in order to assure that qualified U.S. and Moroccan engineering consulting firms will be able to respond to the Request for Proposal (RFP); and
- Evaluate the human and material resources to be provided by MUN that will allow them to effectively manage the execution of the Master Plan studies.

On January 26, 1989 the engineer arrived in Rabat and began the assignment on January 27. He was briefed by the RHUDO Project Officer and the Environmental Officer at USAID/Morocco. He met with the Director of the Directorate of Local Governments and his technical staff at the Ministry of Interior. The Engineer travelled with the RHUDO Project Officer to Tétouan where he spent two working days visiting with the MUN president and key technical staff, as well as the Director of the Regie des Eaux (RDE). He also attended several working sessions to review the entire bidding dossier provided by MUN.

While in Tétouan the engineer was given a brief tour of the cities and sewage disposal systems of Tétouan and Martil. Upon return to Rabat he met with the technical staff of the Directorate of Local Governments and the USAID/Morocco

Environmental Officer to report the outcome of the trip. The engineer also held a five-hour working session with MUN engineers at RHO/USAID/Morocco to finalize the TOR and other bid documents. A draft report was prepared and left with the RHUDO for review and comments.

At the outset of the original, five-day working assignment, the Scope of Work (SOW) was modified to respond to RHUDO and MUN requests. Specifically, the SOW was expanded to include the following:

- Evaluate BCEOM/ISKANE report "*Etudes d'Evaluation et de Programmation hors Site d'Assainissement*", which had received some negative comments from the RDE
- Develop technical and cost information that will assist MUN with the evaluation of proposals submitted in response to the bid invitation
- Determine and recommend the level of support needed by MUN to assume management responsibility for the Master Plan studies

It was agreed that a five-day extension was necessary for the engineer to address all of the requirements of the expanded SOW. The extension was executed as soon as WASH received the work order from USAID/Morocco and obtained approval from AID/Washington.

This report is the result of the work performed in Morocco and subsequently in the U.S. In addition a document entitled "*Rapport d'Evaluation des Ressources Nécessaire pour Exécuter les Termes de Référence*" was prepared and submitted to RHUDO/USAID/Morocco. This document provides the MUN with information to evaluate proposals submitted in response to the invitation to bid.

The following sections provide information on the situation that led to the request for the WASH assignment, problems and issues associated with the project and their possible solutions, and conclusions and recommendations to the RHUDO.

Chapter 2

BACKGROUND

2.1 Description of Sewerage Management in Tétouan

The Municipality of Tétouan, situated in the northern most province of Morocco on the Mediterranean Sea, is a major city with a population estimated at 300,000 inhabitants. The Municipality is not only the administrative center of the province but also an important center for commercial, financial, agricultural, and tourist activities.

The Municipality has an existing storm sewer drainage system that dates from its days as a Spanish Protectorate. This system discharges directly into the Oued Martil, which drains approximately 1,220 square kilometers of mountainous and slightly forested region into the Mediterranean Sea, which is located about six kilometers from the center of the city.

The system discharges into the Oued by means of an unknown number of large and small outfalls. Since its inception, a large number of cross connections with private sanitary sewers have been made, thus making the present system a combined one. However, through the AID-assisted Urban Development Project several new sanitary sewer lines have been constructed for sewage disposal of the Dersa-Samsa District. Past studies of the existing situation recommend that the sanitary outlets be gradually disconnected and integrated into a separate sewer system.

Presently, there is no central authority in charge of implementing or managing the existing combined system. Problems are solved as they occur by the Municipality's Technical Services. The Municipality has six technical departments which are placed under the Office of the Municipal Engineer. These are:

- a. the Environmental Service,
- b. the Roads and Sanitation Service,
- c. the Urban Development Service,
- d. the Public Lighting Service,
- e. the Planning and Studies Service, and
- f. the Municipal "Parc" (Garage/Warehouse).

The Sanitation Unit is overseen by a Technical Agent who supervises 40 workers divided into two teams: one team is responsible for current repair work, the second for rehabilitation of connections and lines.

The long-term objective of the Municipality is to have two separate sewers: storm sewers that will discharge into the Oued Martil and sanitary sewers for residential and industrial wastewater. Their effluent will receive adequate

treatment in order to permit it to be reused for agricultural or industrial purposes or be discharged in the Oued.

One of its most important short-term objectives is to have an effective and efficient municipal service to manage all aspects of sewerage systems development and operations. This includes management of Master Plan development and implementation and system operations and maintenance.

2.2 Sewage Disposal Impact on the Region's Environment

Tétouan influences an area which is about 30 kilometers square making the Municipality the center of a resort area that attracts tourists mainly from the interior parts of Morocco. The cities of Fnideq to the north and Martil to the south are also tourist attractions.

The Municipality of Tétouan presently produces an estimated volume of sanitary sewage of approximately 40,000 m³ per day and a load of pollutant matter of about 20,000 Kg/day. The pollutant load is also associated with that produced by the Municipality of Martil posing a major threat to the river, which is already considered heavily polluted and threatens coast line pollution.

The environmental impact of raw sewage of the magnitude now produced by Tétouan and Martil can severely affect public health, destroy recreational characteristics, and have adverse environmental effects on the fauna and flora of the region. Food-borne, waterborne, and dermatologic diseases may increase; bathing beaches may have to be closed, which will have a socioeconomic impact on regional development, and certain species of plant and animal life important to the ecosystem of the region may become endangered or be completely destroyed.

To implement the development plan for the region, the Government of Morocco (GOM) seeks to promote municipal sewerage systems in order to eliminate the risks of polluting the coastal areas. In this light, the Ministry of Interior has developed a regional pollution control program that calls for the construction of sewerage systems with adequate treatment facilities for the population centers along the coast. This includes Tétouan and Martil. The regional program is to be jointly funded by national and local governments and by external sources such as the European Investment Bank.

2.3 Tétouan Sewerage Systems Master Plan Development Process

The Municipality of Tétouan has made the decision to undertake studies for preparing a Sewerage Master Plan. These studies are to be conducted under contract by a qualified engineering firm, which may either be a Moroccan firm or a joint venture between U.S. and Moroccan engineering firms. The study is to be implemented under the management of the Municipality, which will be the owner of the work. It is to be jointly funded by the Municipality and RHUDO/USAID in the context of the Urban Development Project.

Initially, the delimitation of the study area had included the Municipality of Martil; however, the *Régie des Eaux* has reached agreement with the Municipality to design, construct, and manage a separate sewerage system for Martil. The feasibility study for the system, prepared by the RDE, proposes separate sanitary and storm sewers. Sanitary sewage is to be treated through a conventional treatment plant with secondary treatment facilities (activated sludge). Thus, the Tétouan Master Plan studies will require coverage of the municipal area and other zones that fall within the municipal catchment area.

The bidding dossier of the Municipality of Tétouan consists of three documents: the Terms of Reference (TOR), the General Conditions for Bid and Contract Award, and a sample contract document. These documents were prepared from similar dossiers from other municipalities of Morocco. It is expected that the request for bids will be published within the second trimester of 1989 and a contract will be awarded by fall 1989.

Chapter 3

PROBLEMS AND ISSUES

The key problems and issues that have been identified with the Tétouan Sewerage Master Plan development process are presented in the following sections:

3.1 Regional Approach to Sewerage Master Plan Development

The concept of regional planning for sewage management was a worthy one. It promised to be not only a cost effective one, but a more coordinated approach to addressing critical problems that concern public health, the environment, and regional social and economic issues. The decision of the Municipality of Martil to have its own sewerage systems, including off-site disposal, may not be that different in terms of financial investment compared to a combined Martil/Tétouan off-site disposal system. However, in the long term factors regarding operation and maintenance (O&M) and environmental protection will become more risky and costly in operating two separate systems. In this regard, it would have made more reasonable to have had a combined operation for the two municipalities.

3.2 Completeness and Soundness of Draft Terms of Reference

The terms of reference proposed by the Municipality of Tétouan are essentially appropriate. The shortcomings found were due to lack of sufficient information to allow them to be complete and sound in terms of their technical requirements. In particular, the specification plans and drawings were found to be incomplete. Some of the proposed scales, e.g., those for vertical sewer profiles, were not appropriate.

Information concerning environmental impact assessment could have been strengthened as sewage pollution of the Oued Martil and the coastal line surrounding the Oued's outlet into the Mediterranean Sea is a major environmental, economic, and public health threat to the region. The TOR also needed to be more complete regarding information to be collected and specific investigations to be carried out.

Information such as systems leakage, soil aggressivity, and sewage disposal methods used in households not connected to the existing sanitary sewer system are of utmost importance and should be requested in the TOR. The TOR needed to provide more guidance for its implementors, particularly in the design of sewers and their appurtenances where calculation methods need to be specified.

3.3 Completeness and Soundness of Proposed Bidding Process

The bidding process consists of requesting bids for work to be done, evaluating the bids, selecting and negotiating the bid with a successful bidder, and awarding a contract to that bidder. This process starts with the development of a work (project) plan that defines the specific activities to be performed, the human and material resources to be provided, the schedule of work performance, the management plan, and the cost for performing and managing the work.

Based on the work plan, the TOR and other documents of the bid dossier are prepared. The next step is to pre-qualify capable firms and/or request bids. Bids received are evaluated and a contract award is made after appropriate negotiations for a best and final proposal. The evaluation and negotiations for best and final are based on the information which is provided by the work plan.

Considering the above described process, it is clear that the process followed by the Municipality of Tétouan is neither complete nor sound. The TOR was not based on a prepared work plan, but from a master document provided by the Ministry of Interior to guide the process. While the master document was effectively adapted for Tétouan, by itself it does not provide a logical process to evaluate and negotiate bids, especially those that may be submitted by firms from different countries. Thus, there does not exist at present a basis for technical and cost evaluation and negotiation of bids.

3.4 Sewerage Master Plan Studies Contract Management

The Municipality of Tétouan does not possess the engineering expertise and experience required to undertake the Master Plan studies. This is also true for any other public institution in the Tétouan Province including the RDE. This is the reason why the studies will be contracted to a private entity that does have the required capabilities.

However, the contract awarded to the private entity will have to be effectively managed by the owner of the work or its representative (i.e., the Municipality of Tétouan). Contract management requires engineering competence to monitor the work in order to ensure that the work is being carried out to specification and the administrative and financial management competence to make sure that contract terms are being respected.

Both the Municipality's Technical Services and the RDE have been considered as potential entities to be given the responsibility for managing the studies. While the RDE possesses the technical and administrative capability to manage urban hydraulics work, neither institution has the specific experience with sewerage systems master plan development to allow them to effectively manage these studies. Both institutions will have to be technically strengthened in order to carry out the required contract management tasks.

Because the decision has been made to give the responsibility for management of the Master Plan studies to the Municipality, there is now the need to

create a special municipal unit. This unit will be created at the time that work will begin and most likely be staffed by existing municipal personnel who do not have required experience with sewerage systems planning and management. Therefore, staff capability will need to be developed simultaneously with the implementation of the studies contract.

3.5 Sewerage Operations and Maintenance Staff Development

During the conduct of the studies, the contractor is supposed to determine which sewers urgently need to be rehabilitated, and such work is to be immediately performed. The Municipality has two teams responsible for such work; however, it will need to ensure that its teams possess adequate skills to perform the work and start taking O&M responsibilities for newly constructed and rehabilitated sewers.

Chapter 4

PROPOSED SOLUTIONS TO IDENTIFIED PROBLEMS

4.1 Regional Approach to Sewerage Master Plan Development

While it may be difficult at this time to develop a regional approach to sewerage master plan development, greater coordination and cooperation among local jurisdictions must be sought in developing sewerage systems. If the control of pollution of the region's coastal area is the goal of the Government of Morocco, it is important that pollution control measures for the region be uniform. It is, therefore, recommended that environmental impact studies be made not only for Tétouan, but be extended to cover Martil and Fnideq.

4.2 Completeness and Soundness of Draft Terms of Reference

To address the problem of completeness and soundness in the TOR, it was specifically recommended that the Municipal engineer be charged with the task of preparing the bid documents. This is included in Appendix B, which strengthens the specification plans and drawings as well as specifying complementary tasks. These further strengthen the TOR through:

- a. More complete description of plans and drawings to be prepared, including appropriate scales and details.
- b. More complete information to be collected from sewerage system investigations and sewage disposal practices in Tétouan.
- c. Complementary assessments to be made regarding the environmental impact studies for existing and proposed systems, e.g., determination of rare or threatened fauna and flora species in the project area as well as the impact on fisheries and the location of archeological and historical sites which may be affected by sewage disposal.
- d. Assessment of health status and irrigation water quality; determination of existing or potential cultivable crops in the region; and determination of treated sewage disposal impact on the groundwater tables in irrigable areas both in terms of water quality and water quantity.
- e. Specificity of recommendations made on the type of methods to be used in calibrating sewerage systems, as well as the type of material to be used with respect to soil aggressivity in the area.

- f. Proposal to plan and conduct a scoping session on the sewerage system's option which has been retained for construction and the results of the impact assessment.
- g. Request for appropriate mitigation actions be proposed to eliminate or reduce adverse effects on the environment from the selected option.

4.3 Completeness and Soundness of Proposed Bidding Process

Understanding the rationale for following the described bidding process, the Municipality made a request (approved by RHUDO/USAID) for the WASH engineer to prepare a logical work plan for the studies. This was accomplished and is presented in a separate report "*Rapport d'Evaluation des Ressources Nécessaire pour l'Exécution des Etudes du Schéma Directeur de Tétouan*" which is being submitted separately from this report.

Specific contents of the work plan are (a) a detailed description of tasks to be performed in each activity; (b) a schedule of activities and tasks; (c) the human and material resources required for the studies; (d) the description of qualifications necessary to perform the tasks as well as staff loading; (e) the estimated cost for implementing the studies, and (f) contract management requirements.

4.4 Sewerage Master Plan Studies Contract Management

The specific tasks, structure, and resources needed to manage the contract for the sewerage master plan studies are also presented in the report mentioned above. It will be crucial that the unit be created, structured, and staffed as a special unit directly responsible to the President of the Municipality similar to the Urban Development Project Unit. This should be done as soon as possible.

An institutional strengthening plan should be developed and implemented as soon as possible. Such a plan should include technical assistance to establish management structures and systems for the unit, support in the monitoring and evaluation of work performed by the Contractor, and a training program requiring both on-the-job and formal training (short courses) in sewerage systems planning and management.

4.5 Sewerage Operations and Maintenance Staff Development

A staff skills development plan will need to be developed for the sanitation teams of the Municipality who will need to take full responsibility for the operation and maintenance of newly constructed and rehabilitated sewer lines. This plan should address both supervisory and operational skills needed by the sanitation teams. This plan will need to be developed as soon as the management unit has been fully established and the studies have started.

Chapter 5

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The national, regional, and local commitment to sewage pollution control exists. Therefore, the basis for closer coordination and cooperation among local jurisdictions with sewerage systems development is possible and must be strongly promoted. For this reason, the environmental impact study for the region will need to be a major component of the Tétouan Sewerage Master Plan studies. This will not only serve the purpose of satisfying USAID policy regarding the implementation of environmental impact assessment for development projects, but also begin to introduce this important concept in Morocco.

As for the completeness and soundness of the TOR, it should be satisfactory and it ensures that qualified U.S. and Moroccan engineering consultant firms will be able to respond to the request for bid. Moreover, it contains sufficient information to permit the environmental impact assessment to be undertaken as part of the studies, which is to be contracted in accordance with the guidelines established by the ANE/Environmental Officer (see Appendix C, April 1986 memo).

Concerning the bidding process, the evaluation report prepared by the WASH Consultant should assist MUN in the evaluation of bids and subsequent contract negotiations.

The Municipality is fully committed to assume responsibility for management of the studies and further develop its capabilities to manage the implementation of the Sewerage Master Plan. It presently has no capability to undertake these tasks. Therefore, the recommendations made by the WASH engineer for the establishment of the unit should provide guidance for ensuring the Municipality's capability to assume management responsibility for the studies.

Finally a review of the ISKANE/BCEOM report "*Etudes D'Evaluation et de Programmation Hors Site d'Assainissement*", August 1988, was presented as an outcome of a study for the Urban Development Project; and the subsequent comments on the report made by the RDE in its letter of September 9, 1988 to the *Agence Nationale de l'Habitat Insalubre* (ANHI) were reviewed. A summary of both documents and the WASH consultant's annotation on their content are presented in Appendix D.

It is to be noted that treatment facilities are needed for both cities. However, the study was very preliminary and would have to be complemented by more in-depth studies before a final choice could be made. The studies for the sewerage master plan should be performed before a plant is designed. The off-site sewerage component will be adequately studied during the implementation of the Master Plan studies.

The design and construction of the proposed off-site facilities would require a year to prepare project and bidding documents and about three years to build. Considering that the master plan studies will take 18 months to be completed, there should be no haste to separate this important component of the sewerage system master plan from the overall studies. Therefore, no follow-up on this specific study should be done separately at this time.

5.2 Recommendations

The following key recommendations are specifically made to RHUDO/USAID to support the studies and subsequent implementation:

- RHUDO/Morocco should ensure that there be greater regional coordination and cooperation in pollution control policies and activities. As Tétouan is the largest polluter of the region, it should be its responsibility to ensure that adverse socioeconomic and environmental impacts on the region be identified and addressed.
- RHUDO/Morocco should provide the support the Municipality will require, particularly in the evaluation of the technical components of bids.
- RHUDO/Morocco should provide full assistance in the development of the municipal unit to oversee the management of the studies. It is the most appropriate entity to offer technical assistance support for this purpose. Such technical assistance will require that at least a long-term sanitary engineer be posted in Tétouan to assist the Municipality with the development and operation of the unit. Other areas of assistance will be in training program development in sewerage systems planning and management and O&M. Technical assistance in the use of microcomputer software for sewer network optimization should also be provided.
- RHUDO/Morocco should closely monitor the environmental impact assessment which is to take place in the course of these studies in order to ensure their appropriateness and adequacy.

APPENDIX A
SCOPE OF WORK

STATEMENT OF WORK

TETOUAN SEWERAGE MASTER PLAN

AND

ENVIRONMENTAL IMPACT STUDIES

A. PURPOSE:

The municipality of Tetouan intends to contract for the preparation of the Master Plan for the sewerage system and treatment facility. The studies will be partially funded with the 608-0194 Grant Program and the EG-001 Program loan funds. In order to finalize and verify the completeness and technical accuracy of the terms of reference, the municipality of Tetouan and USAID require the assistance of a sanitary engineer to finalize the terms of reference.

B. SCOPE OF WORK:

The contractor will work with the Regional Housing Project Advisor (RHO/PSC/USAID Morocco), the Mission Environmental Officer, the engineering staff of the Municipality of Tetouan (MUN), the representatives from the Ministry of Interior/Directorate of Local Governments (MOI/DCL), and engineering staff of the Tetouan Regional Public Utility Authority (RDE/REGIE) to review and analyze the draft Terms of Reference prepared by the MUN and the RDE to determine their technical soundness and completeness. The contractor will determine whether the draft TOR includes sufficient information to permit the environmental impact assessment to be undertaken as part of the studies to be contracted in accordance with the guidelines established by the ANE/Environmental Officer in his memo dated April 1986. The consultant will recommend corrections and inclusions to be made to the TOR to assure technical completeness and accuracy. The consultant will also recommend any changes in format and/or presentation to be made to the TOR in order to assure that qualified US and Moroccan engineering consultant firms will be able to respond to the RFP, when announced. The consultant will evaluate the resources (human and material) to be provided by the Municipality of Tetouan to effectively manage the execution of the Sewerage Master Plan Studies.

C. REPORTING REQUIREMENTS:

The Contractor will prepare a report summarizing the recommendations concerning the TOR and will include a determination of the technical soundness and completeness of the TOR including the environmental impact assessment. The report (in English) will be prepared in the field and submitted to USAID upon completion of the assignment. WASH should be given a copy of this report.

D. QUALIFICATIONS OF CONSULTANT:

The Contractor shall provide a senior sanitary engineer with previous engineering experience in North Africa, who is professionally fluent in French (FSI S3/R3) and who is able to draft all his reports in the field in English.

E. LOGISTIC SUPPORT:

USAID will provide the Contractor with office space in Rabat, a local telephone, and will assist in arranging meetings with government officials.

F. TRAVEL:

It is anticipated that the Contractor will be authorized a one-way ticket from Tunis, Tunisia (where the consultant will be completing another AID assignment) to Casablanca (economy class).

G. RELATIONSHIPS AND RESPONSIBILITIES:

The Contractor will work under the direction and supervision of the RHO/Rabat Officer Harry Birnholz and PHO/Project Manager Tahar Berrada and in consultation with the Mission Environmental Officer, Eric Loken.

H. TIMING:

The work is to be performed within a total period of one (1) week. The expected starting date is 30 January 1989 and the estimated completion date is 4 February 1989. A six-day work week is authorized for the Contractor while in the field. The sanitary engineer is to be in Rabat and Tetouan for the entire period of 29 January 1989 through 4 February 1989.

APPENDIX B
TOR INCLUSIONS

ANNEX 2
REVISION DES TERMES DE REFERENCE

MISSION	ACTIVITES	DESCRIPTION DES PLANS	RECOMMANDATIONS
A. PLAN DE COLEMENT			o CITER LES ORGANISMES A CONTACTER POUR RECUEILLIR LES INFORMATIONS NECESSAIRES
A-1 COLLECTE DE L'INFORMATION DISPONIBLE	o LOCALISATION DES DOCUMENTS o DEPOUILLEMENT DETAILLES DE LA DOCUMENTATION		
A-2 ANALYSE CRITIQUE DE L'INFORMATION	o ANALYSE ETUDES ET DONNEES: .RESEAUX EXISTANTS .DEVELOPPEMENT URBAIN .DEMOGRAPHIE .CONSOMMATION EAU POT. .AUTRES SECTEURS		
A-3 ETUDE DE L'ASSAINISSEMENT	o REPRESENTATION DES RESEAUX ET OUVRAGES o INSUFFISANCES OBSERVEES . ECOULEMENT EAUX PLUVIALES . ECOULEMENT EAUX USEES . ETAT DU RESEAU ET EFFLUENTS .. ENQUETE SUR ECHANTILLONS DE 10% DES CONDUITES .. INSPECTION DES, REGARDS, AVALOIRS, BRANCHEMENTS (2%), CANALISATIONS, DEVERSOIRS, OUVRAGES DE POMPAGE, AUTRES	o PLAN D'ENSEMBLE 1/5000 : 80 x 50 CM2 : CONTENU: TRACE DES RESEAUX: EAUX USEES, EAUX PLUVIALES. SEULS LES PRINCIPAUX COLLECTEURS SERONT PORTES A MENTIONNER AUSSI STATIONS DE RELEVEMENT, DEVERSOIRS D'ORAGE o PLAN D'OSSATURE DU RESEAU: 1/2000, 80 X 50 CM2, LE TRACE COMPLET DES RESEAUX EXISTANTS. A MENTIONNER: TOUS LES OUVRAGES, LIMITES DES BASSINS VERSANTS, LE NOM DES RUES PRINCIPALES ET DES CITES PRINCIPALES, LE NUMERO DES REGARDS ET DES PROFILS. o LES PROFILS EN LONG: 1/1000(H) - 1/100(V) : RENSEIGNEMENTS A FOURNIR: . LES COTES DE FIL D'EAU . LES COTES TAMPONS DE REGARDS	o APPRECIER ETAT PHYSIQUE DES CANALISATIONS (BON OU VETUSTE) o ETAT DE PERFORMANCE DES STATIONS DE RELEVEMENT ET TOUT AUTRES OUVRAGES D'ASSAINISSEMENT o LOCALISER ET ESTIMER LES FUITES OU INTRUISIONS EVENTUELLES D'EAUX SOUTERRAINES OU AUTRES DANS LES CANALISATIONS ET TOUT AUTRE OUVRAGE o DEFINIR LA NATURE DES FUITES ET NOTAMMENT LEUR SALINITE o EXAMEN DU MODE D'ASSAINISSEMENT DANS TOUTE LA VILLE o CONFRONTER LES STATISTIQUES EXISTANTES (VERIFICATION SUR LE

A-3 ETUDE DE L'ASSAINISSEMENT :	.. ANALYSES SORTIES :	ENTRE REGARDS :	o DESCRIPTION DU
(SUITE) :	DES PRINCIPAUX :	. LES DISTANCES CUMULEES :	MODE D'EVACUATION
:	REJETS: DEBITS, :	. PENTE AU 1/1000 DE LA :	ET DE REJET DES
:	QUALITE DES EAUX :	LIGNE FIL D'EAU :	NON-RACCORDES,
:	.. INSTALLATION DISPOSI- :	. DIAMETRE DE LA CANALI- :	L'ETAT DE FONC-
:	TIFS DE JEUGEAGES :	SATION OU CARACTERISTI- :	TIONNEMENT DE CES
:	EN CONTINUE AU NIVEAU :	QUES DE LA SECTION DU :	INSTALLATIONS ET LEURS
:	DES REJETS :	COLLECTEUR :	INCIDENCE SUR LA SITUA-
:	:	. LES DIMENSIONS: :	SANITAIRE
:	:	DIAMETRE EN MM. :	o ESTIMER LE TAUX DE
:	:	LES DEUX COTES EN MM :	RACCORDEMENT AU RESEAU
:	:	QUAND ELLE EST RECTAN- :	o LOCALISATION DES ZONES
:	:	GULAIRE. :	INONDABLES DE TETOUAN
:	:	SI LE COLLECTEUR A :	o DESCRIPTION DES PROJETS
:	:	UNE FORME PARTICULIE- :	DE PROTECTION DE LA
:	:	RE, FOURNIR UNE COUPE :	VILLE
:	:	DE DETAIL SUR UN CAL- :	
:	:	QUE DE FORMAT 21 X :	
:	:	29.5 AUQUEL SERA AT- :	
:	:	TRIBUE UN NUMERO :	
:	:	PRECEDE DE LA LETTRE :	
:	:	T QUI SERA AUSSI :	
:	:	MENTIONNE SUR LE :	
:	:	PROFIL EN LONG DANS :	
:	:	LA CASE DU DIAMETRE :	
:	:	OU LA SECTION :	
:	:	. LA NATURE DES MATE- :	
:	:	RIAUX DE CANALISATIONS :	
:	:	A PORTER DANS LA CASE :	
:	:	DES DIAMETRES ET SEC- :	
:	:	TION. :	
:	:	B=BETON NON ARME :	
:	:	BA= BETON ARME :	
:	:	AC= AMIANTE CIMENT :	
:	:	G= GRES :	
:	:	F=FORTE :	
:	:	A=ACIER :	
:	:	PVC=POLYCHLORURE DE :	
:	:	VINYLE :	
:	:	PY= POLYETHYLENE :	
:	:	MD=MATERIAUX DIVERS :	
:	:	. L'ETAT DE LA CANALISA- :	
:	:	TION :	
:	:	SOIT B=BON :	
:	:	SOIT V=VETUSTE :	
:	:	DE SORTE QU'UNE CANA- :	
:	:	LISATION DONT LA SEC- :	
:	:	TION EST CIRCULAIRE EN :	
:	:	AMIANTE CIMENT DE DIA- :	
:	:	METRE DE 400MM EN BON :	
:	:	ETAT SERA INDIQUE: :	
:	:	AC400B :	
:	:	. L'ANGLE DE L'ALIGNE- :	
:	:	MENT :	

	:	:	. LE NUMERO DES REGARDS :
	:	:	LES REGARDS SONT SITUES:
	:	:	SUR DES CONDUITES PRIN-
	:	:	CIPALES OU SECONDAIRES.:
	:	:	. LORSQUE REGARD SUR :
	:	:	CONDUITE PRINCIPALE :
	:	:	LES NUMEROS SERONT :
	:	:	FORMES D'UNE LETTRE :
	:	:	ALPHABETIQUE ECRITE :
	:	:	EN MAJUSCULE (INITIA-
	:	:	LE DE RUE OU AVENUE :
	:	:	DE LA LOCATION DE LA :
	:	:	CONDUITE) ET D'UNE :
	:	:	PARTIE NUMERIQUE :
	:	:	REPRESENTANT L'ORDRE :
	:	:	DU REGARD A COMPTER A:
	:	:	PARTIR DE L'EXTREME:
	:	:	AVAL. :
	:	:	. LES REGARDS DES :
	:	:	COLLECTEURS SECONDAI-
	:	:	RES PORTERONT LE MEME:
	:	:	NUMERO QUE LE REGARD :
	:	:	DE JONCTION DU COL- :
	:	:	LECTEUR PRINCIPAL :
	:	:	SUIVI D'UN NUMERO :
	:	:	D'ORDRE A COMPTER A :
	:	:	PARTIR DE CE DERNIER.:
	:	:	LES NUMEROS D'ORDRE :
	:	:	SERONT SEPARES PAR :
	:	:	UNE VIRGULE ET AINSI :
	:	:	DE SUITE. :
	:	:	. LE NOM DE LA RUE :
	:	:	. LE NOM DES RUES INTER-
	:	:	SECTIONS. :
	:	:	:o PLANS DES OUVRAGES: :
	:	:	. ETABLIR PLAN GENIE CIVIL:
	:	:	. DES SETAITS ACCOMPAGNE-
	:	:	ONT LE PLAN FAISANT :
	:	:	L'INVENTAIRE DES DIFFE-
	:	:	RENTS ELEMENTS DE L'OU-
	:	:	VRAGE. :
	:	:	. DRESSER UN TABLEAU IN-
	:	:	VENTAIRE DES EQUIPEMENTS:
	:	:	ELECTRO-MECANIKES DE :
	:	:	L'OUVRAGE. :
A-4 ETABLISSEMENT DE	:o RECENSEMENT DES INDUSTRIES :	:	:
L'ENQUETE INDUSTRIELLE	: ET ETABLISSEMENTS CLASSES :	:	:
	:o ENQUETE DES INDUSTRIES ET :	:	:
	: ETABLISSEMENTS CLASSES :	:	:
	:o ENQUETES CHEZ LES POLLUEURS :	:	:
	:o SYNTHESE ET RECOMMANDATIONS :	:	:

A-5 ETUDES DE LA POLLUTION DES COURS D'EAU	:o COLLECTE ET ANALYSE DOCU-	:	:o DETERMINER LES ESPECES
	: MENTS AUX COURS D'EAU DANS	:	: DE LA FAUNE ET DE LA
	: L'AIRES DU PROJET	:	: FLORE QUI SONT RARES OU
	:o RECONNAISSANCE DETAILLEE	:	: MENACEES D'EXTINCTION
	: DE L'OUED RIO MARTIL	:	: ET LEUR HABITAT CRITIQUE
	:o ANALYSE QUANTITATIVE ET	:	: DANS L'AIRES DU PROJET
	: QUALITATIVE DES REJETS	:	:o DETERMINER LES SITES
	:o REPORT DES INFORMATIONS SUR	:	: ARCHEOLOGIQUES ET HISTO-
	: PLANS A ECHELLE APPROPRIEES	:	: RIQUES DANS LA ZONE DE
	:o ECHANTILLONNAGE DES EAUX	:	:o L'ETUDE
	: DE RIO MARTIL FILTRES	:	:
	: DANS LE SABLE SUR SON	:	:
	: EMBOUCHURE EN PERIODE SECHE	:	:
	: ET PLUVIEUSE, A MAREE BASSE	:	:
	: ET HAUTE, ET A FREQUENCES	:	:
	: TRADUISANT ETAT EFFECTIF	:	:
	: DE LA POLLUTION DU RIO ET	:	:
	: SON EMBOUCHURES	:	:
	:o ANALYSE PHYSICO-CHEMIE ET	:	:
	: BIOLOGIQUE DES ECHANTILLONS	:	:
	:o DEFINITION ETAT FUTUR DES	:	:
	: POLLUTIONS DE L'OUED AUX	:	:
	: HORIZONS 2000 ET 2010	:	:
:o DEFINITION PROGRAMME	:	:	
: D'ACTION IMMEDIAT ET DE	:	:	
: SURVEILLANCE POUR CONSERVA-	:	:	
: TION ECOSYSTEME	:	:	

A-6 ETUDE REUTILISATION DES EAUX USEES EPUREES ET DES BOUES	:o MENER UNE RECONNAISSANCE	:	:o DETERMINER LA SITUATION
	: GENERALES POUR IDENTIFICA-	:	: SANITAIRE DE LA REGION,
	: TION DES APTITUDES ET COM-	:	: EN IDENTIFIANT LES
	: TRAITES DES TERRAINS DE LA	:	: MALADIES D'ORIGINE
	: ZONE D'ETUDE	:	: HYDRIQUE ET PARASITAIRES
	:o ETABLIR CARTES D'APTITUDES	:	:o DETERMINER QUALITE
	: ET DE CONTRAINTES	:	: ACTUELLE DES EAUX
	:o SELECTION DES ZONES FAVORA-	:	: D'IRRIGATION (COLIFORMES
	: BLES A L'IMPLANTATION	:	: FECAUX/100ML-MOYENNE
	: D'ELEMENTS DE SYSTEMES DE	:	: GEOMETRIQUE)
	: REUTILISATION DES EAUX USEES:	:	:o DETERMINER CULTURES CUL-
	: EPUREES	:	: TIVEES OU CULTIVABLES

A-7 ETUDE DES USAGES D'EAU ET DES REJETS	:o RECUEIL DE DOCUMENTS SUR	:	:
	: L'UTILISATION DE L'EAU PAR	:	:
	: DIVERS USAGERS	:	:
	:o PRECISER CARACTERISTIQUES DE:	:	:
	: REJETS	:	:
	:o ECHANTILLONNAGE DES EAUX DES:	:	:
	: OUEDS ET PUIITS DANS L'AIRES	:	:
	: DE L'ETUDE	:	:
:o PRECISER CARACTERISTIQUES DE:	:	:	
: LA CONSOMMATION DE L'EAU	:	:	

A-11	ETABLISSEMENT DES COUITS UNITAIRES	: o	ETABLIR DES MODELES MATHE-	:
		:	MATIQUES OU TABLEAUX POUR	:
		:	PERMETTRE EVALUATION RAPIDE	:
		:	DES COUITS PAR TYPE D'OUVRAGE:	:
		:	. MODELE SUR ORDINATEUR	:
		:	COUT RESEAUX PRIMAIRES,	:
		:	SECONDAIRES, ET TERTIAIRES:	:
		:	. FORMULATION, ABAQUES OU	:
		:	TABLEAUX DES STATIONS DE	:
		:	RELEVAGE ET D'EPURATION	:
		:	ET REUTILISATION	:
		:	. FORMULATION PERMETTANT DE	:
		:	VENTILATION DES CHARGES	:
		:	D'EXPLOITATION	:
		: o	RAMENER LES DIFFERENTS PRIX	:
		:	UNITAIRES SOUS FORME DE	:
		:	FOURCHETTE TRADUISANT DES	:
		:	RATIOS PAR HA. OU PAR SER-	:
		:	VICE ACCOMPLI	:

A-12	SYNTHESE DES ETUDES DE LA MISSION	: o	ETABLIR UN RAPPORT DE SYN-	: LISTE DES PLANS A FOURNIR:
		:	THESE DE CHACUNE DES ETUDES	: o
		:	ET FAIRE RESSORTIR LES CON-	: PLAN GENERAL DE LA SITUA-
		:	CLUSIONS	: TION
		:		: o
		:		: PLAN INDIQUANT LES
		:		: PROFONDEURS DE LA NAPPE
		:		: SOUTERRAINE
		:		: o
		:		: PLAN INDIQUANT LA SALINITE:
		:		: DE LA NAPPE SOUSTERRAINE
		:		: o
		:		: TABLEAU DES TEMPERATURES
		:		: ROSE DES VENTS
		:		: o
		:		: PLUVIOMETRIE
		:		: o
		:		: HYDROGRAMME DE CRUE ET
		:		: LIGNES D'EAU DE RIO MARTIL:
		:		: o
		:		: GRAPHIQUE INDIQUANT LA
		:		: VARIATION DU NIVEAU MARIN
		:		: o
		:		: GRAPHIQUE INDIQUANT LES
		:		: FREQUENCES DE DEPASSEMENT
		:		: o
		:		: PLAN DE COURANT MARINS,
		:		: COURBES BATHYMETRIQUES
		:		: o
		:		: PLAN D'AMENAGEMENT URBAIN
		:		: INDIQUANT NOTAMMENT LES
		:		: DIFFERENTES ZONES ET LES
		:		: PROJETS
		:		: o
		:		: PLAN DU RESEAU D'EAU POTA-
		:		: BLE
		:		: o
		:		: PLAN DU RESEAU D'EGOUT
		:		: EXISTANT AVEC INDICATION
		:		: DES DIFFERENTS POINTS
		:		: DE REJET
		:		: o
		:		: PLAN INDIQUANT L'EMPLACE-
		:		: MENT DES GRANDS POLLUEURS
		:		: o
		:		: PLAN INDIQUANT LES ZONES
		:		: INONDABLES
		:		: o
		:		: PLAN DECRIVANT LES PROJETS:
		:		: EVENTUELS ET DE PROTECTION:
		:		: CONTRE LES CRUES

B IDENTIFICATION DES VARIANTE:	:	:
-----:	:	:
:	:	:
B-1 ETUDE GLOBALE DES SYSTEMES:	o ENUMERATION DES DIFFERENTS :	:
INTEGRES D'ASSAINISSEMENT :	SYSTEMES INTEGRES D'ASSAI-	:
D'EPURATION, DE :	NISSEMENT :	:
REUTILISATION ET DE REJETS:	o DEGAGER LES PRINCIPES ET :	:
:	GRANDES LIGNES DE CHAQUE :	:
:	SYSTEME INTEGRE ENVISAGE :	:
:	:	:
B-2 IDENTIFICATION DES	o PROCEDER A UNE IDENTIFICA-	:
VARIANTES D'OSSATURE DE	TION TECHNIQUE DES VARIANTES:	:
RESEAU, D'EPURATION ET	DU POINT DE VUE DE LA REALI-	:
REJETS ENVISAGEABLES	SATION DES DIFFERENTS OUVRA-	:
:	GES DES SYSTEMES :	:
:	o FAIRE UNE COMPARAISON TECH-	:
:	NIQUE DES DIFFERENTS ELE-	:
:	MENTS DES SYSTEMES INTEGRES :	:
:	:	:
:	:	:
:	:	:
B-3 PREMIERE SELECTION DE LA	o PROCEDER A L'ANALYSE CRITI-	:
VARIANTE DES	QUE ET L'ETUDE COMPARATIVE :	:
SYSTEMES ENVISAGEABLES	DE L'ENSEMBLE DES SYSTEMES :	:
:	INTEGRES AFIN DE FIXER LE :	:
:	CHOIX :	:
:	o DEFINIR LES MOYENS HUMAINS :	:
:	ET MATERIELS NECESSAIRES A :	:
:	L'EXPLOITATION ET L'ENTRE-	:
:	TIEN DES OUVRAGES DES VA-	:
:	RIANTES :	:
:	o DETERMINER LA FIABILITE :	:
:	DES RESULTATS ESCOMPTES :	:
:	o DETERMINER LES COUTS DE :	:
:	REALISATION & DE MAINTENANCE:	:
:	o DETERMINER L'IMPACT SUR :	:
:	L'ENVIRONNEMENT :	:
:	o ANALYSER L'ADAPTATION DES :	:
:	VARIANTES AUX SCHEMAS DE :	:
:	DEVELOPPEMENT URBAIN :	:
:	PREVISIBLES :	:
:	o EVALUER LA SOUPLESE DES :	:
:	DIFFERENTS OUVRAGES POUR :	:
:	REPOUDRE AUX DIFFERENTES :	:
:	PERIODES (E.G. ESTIVALE) :	:

C ETUDE ET COMPARAISON DES VARIANTES D'ASSAINISSEMENT, D'EPURATION DE DE REUTILISATION ET DE REJET:	:	:	:
-----:	:	:	:
C-1 ETUDE PRELIMINAIRE DES VARIANTES PROPOSEES	:o DETERMINER POUR CHAQUE VARIANTE ET POUR HORIZONS 1995-2000-2010 CARACTE- RISTIQUES TECHNIQUES ET COUTS DES COMPOSANTES DES SYSTEMES	:	:
C-2 COMPARAISON ECONOMIQUE DES VARIANTES PROPOSEES	:o PROCEDER A ACTUALISATION DES COUTS GLOBAUX A 3 TAUX HORIZONS 1995-2000-2010 :o PROCEDER A COMPARAISON ECONOMIQUE DES COUTS ACTUALISES :o ANALYSE DE L'ENSEMBLE DES RESULTATS	:	:
C-3 SELECTION DE LA VARIANTE A RETENIR	:o PROCEDER A ETUDES DE CRITERES SPECIFIQUES :o ETABLIR CLASSEMENT DEGA- GEANT VARIANTE FAVORABLE	: PLAN A FOURNIR: :o PLAN D'ENSEMBLE AVEC INDICATION DES GRANDS POLLUEURS :o PLAN DE BASSINS VERSANTS EXTERIEURS ET URBAINS POUR LES EAUX PLUVIALES :o PLANS DES DIFFERENTS SCHEMAS DU RESEAU D'ASSAI- NISSEMENT AVEC LOCALISA- TION DES OUVRAGES PARTI- CULIERS A UNE ECHELLE DE 1/2000 (CE PLAN DOIT FAIRE RESSORTIR LES RESEAUX QUI SERONT CONSERVES, CEUX QUI SONT SUPPRIMES, ET CEUX A PROJETER :o PROFIL EN LONG DES PRINCIPAUX COLLECTEURS DE CHACUNE DES VARIANTES	:

APPENDIX C
ANE MEMO OF APRIL 1986

ANNEX C

MEMORANDUM

Date: April 19, 1986

To: RHUDO/Rabat, Harry Birnholz, Regional Housing Officer

From: ANE/PD/ENV, Stephen P. Lintner, Environmental Coordinator JFL

Subject: MOROCCO - Tetouan Urban Development Project (608-EG-001) -
Scope of Work for Environmental Assessment of the Wastewater
Treatment Plant and Wastewater Disposal System

1. Introduction

The Regional Housing Office/Rabat has closely worked with the Environmental Coordinator, Area for Area and Year East to assure that environmental concerns have been addressed in both the design and implementation of the Project. This concern is well illustrated by the detailed information on site specific environmental issues provided in Annex I of the Project Paper.

2. The Need for Preparation of an Environmental Assessment

The decision to include the design and implementation of a wastewater treatment plant and wastewater disposal system within the scope of the Project will require the preparation of an Environmental Assessment in compliance with the requirements of 22 CFR 216, "A.I.D. Environmental Procedures". The preparation of an Environmental Assessment, in accordance with the attached scope of work, will meet this requirement when complemented by an Environmental Mitigation Plan which identifies how the findings and recommendations of the Assessment will be incorporated into the implementation process for this element of the Project. It should be noted that no construction activities for either the wastewater treatment plant or the wastewater disposal system for the plant can be contracted for prior to the completion, review and approval of the Environmental Assessment and development of an Environmental Mitigation Plan.

3. Contracting for Preparation of the Environmental Assessment

It is recommended that the preparation of the Environmental Assessment be contracted as an element of the planned technical assistance program for the Project. The preparation of the Environmental Assessment is clearly within the capability of existing Moroccan consulting firms and should provide an opportunity for the consultant to apply their skills to a new type of study. It is estimated that the preparation of the study will require three person months of effort, six weeks for a physical planner and six weeks for an environmental engineer. It will also require one week of support by a draftsman and two weeks of secretarial support. This time estimate is higher than that for an American consulting firm due to the lack of experience Moroccan consulting firms have with doing this specific type of study.

4. The Requirement to Plan and Conduct a "Scoping Session"

A.I.D. environmental procedures require that a "scoping session" be held as part of the process of preparing an Environmental Assessment. The purpose of

a "Scoping Session" is to provide input into the implementation of the Scope of Work for the Environmental Assessment through the conduct of a review meeting. It has been the experience of the Bureau for Asia and Near East that such sessions are invaluable in providing an opportunity to identify local concerns and planning conflicts which may result in potentially significant delays in project implementation if not addressed in the design process. This is especially true of the siting of wastewater treatment plants and the selection of wastewater disposal options which often generate great controversy if not handled with sensitivity in the planning process.

5. Review of the Draft Environmental Assessment

The delegations of authority to Mission Directors do not include the provisions of 22 CFR 216, "A.I.E. Environmental Procedures," therefore, all environmental clearances must be issued by the Bureau Environmental Coordinator. It is planned that the following A.I.E. direct-tire personnel would comment on the Draft Environmental Assessment during the 45 day review period:

- Mission Environmental Officer, AID/Rabat;
- Environmental Officer, Office of Housing, Bureau for Private Enterprises;
- Environmental Coordinator, Bureau for Asia and Near East.

6. Preparation and Implementation of an Environmental Mitigation Plan

Concurrent with preparation of the Final Environmental Assessment, the Regional Housing Office will prepare an Environmental Mitigation Plan which will outline their decisions on incorporating the findings and recommendations of study into the implementation plan for the wastewater treatment plant and wastewater disposal system. This mitigation plan will be reviewed and approved by the environmental personnel identified in Section 5 above.

7. Environmental Clearance

Following review of the Final Environmental Assessment and the Environmental Mitigation Plan, the Bureau Environmental Coordinator, Bureau for Asia and Near East will issue a final environmental clearance which will allow the Regional Housing Office to proceed with construction.

8. Technical Support to the Regional Housing Office

The Environmental Coordinator, Bureau for Asia and Near East will be available upon request to provide support to the Regional Housing Office in preparation

of the subject Environmental Assessment. In addition, the Office of Housing should consider having either Dr. Ronald Stryker, Mission Environmental Officer and/or Robert Kahn, Mission Project Officer in the Office of Energy and Natural Resources (a former Regional Office Environmental Officer) meet with the consultant to discuss A.I.D. environmental requirements and review the Scope of Work.

Attachment: "Scope of Work - Tetouan Wastewater Treatment Plant and Wastewater Disposal System - Kingdom of Morocco"

cc: PRE/E, D. Painter
AID/Rabat, R. Stryker, Mission Environmental Officer
REDDC/Rabat, R. Adams, Project Manager

Document No. 1355G

SCOPE OF WORK
ENVIRONMENTAL ASSESSMENT OF THE TETOUAN WASTEWATER TREATMENT PLANT
AND WASTEWATER DISPOSAL SYSTEM
KINGDOM OF MOROCCO

1. Legal Requirement for Preparation of an Environmental Assessment

The provisions of Government of the United States legal regulations entitled, 22 CFR 216, "I.D. Environmental Procedures" require the preparation of an Environmental Assessment for any action which is funded by the United States Agency for International Development (A.I.D.) which might result in significant environmental impact. These procedures require that all wastewater treatment plants and their wastewater disposal systems be subject to the preparation of an Environmental Assessment. It should be noted that Environmental Assessments are frequently required to be prepared for infrastructure projects which are submitted for funding to Multilateral and bilateral international development institutions.

2. The Purpose of Environmental Assessments

The purpose of an Environmental Assessment is provide the individuals responsible for making decisions on the financing, design, implementation and operation and maintenance of a proposed project with an understanding of the potential environmental impacts of the proposed action and alternatives to the proposed action. The Environmental Assessment is structured so that these individuals can: (a) review the environmental implications of the action and its alternatives in a comparative fashion and (b) review proposed mitigation activities which would eliminate or reduce negative environmental impacts. It is important to note that the findings and recommendations of Environmental Assessments do not determine whether a project is implemented but rather are intended to provide decision makers with an understanding actions which they can take to address potential environmental impacts.

3. Outline of the Environmental Assessment

The Environmental Assessment should generally follow the outline provided below. It should be clearly understood by the individuals preparing the study that an Environmental Assessment is a concise analytical document directed to providing the reader with an understanding of potential environmental impacts and identifying what actions can be taken to eliminate or reduce these impacts. The consultant is encouraged to use maps, drawings, photographs and tables in preparing the Environmental Assessment.

Title Page

Executive Summary

Table of Contents

List of Figures

List of Tables

List of Annexes

1. Description of the Proposed Action

The text should provide a description of the proposed wastewater treatment plant and wastewater disposal system. This should include an analysis of capital cost (foreign and local currency), operation and maintenance costs (foreign and local currency), institutional development and training requirements, personnel requirements, an analysis of reliability of the proposed plant and system under Moroccan conditions and anticipated environmental benefits.

2. Alternatives to the Proposed Action

The text should provide a description of pragmatic, cost-effective and implementable alternatives to the proposed action. This will include the following alternatives:

- No Action Alternative (This alternative would assume that no investment would be made in wastewater treatment and wastewater disposal).
- Wastewater Treatment Technology Alternatives (Type of Treatment, Level of Treatment).
- Wastewater Disposal System Technical Alternatives.
- Siting Alternatives for the Wastewater Treatment Plant, Wastewater Disposal System and Discharge Point.
- Phased Implementation Alternatives for the Wastewater Treatment Plant to Provide for Staged Investments in the Levels of Treatment and/or Capacity of of the Plant.

3. The Existing Environment

The text should provide a concise description of existing environment in the project area to include a description of physical, biological and cultural

features. The text should pay particular attention to elements of the environment which will be potentially effected by the proposed action or alternatives to the proposed action. The text should provide specific information on the present practices of wastewater collection and disposal, it should include an estimate of the volume of wastewater and characterize its composition, and a description should be provided of streamflow characteristics and water quality.

The text should also provide a description of Government of Morocco policies and laws concerning the collection, treatment and disposal of domestic and industrial wastewater. The text should describe any permits which will be required for the discharge of wastewater and identify authorities which have responsibility for the monitoring of the operation of the wastewater treatment plant and wastewater disposal system.

4. Potential Environmental Impacts from the Proposed Action and Alternatives to the Proposed Action

The text should provide a comparative analysis of the potential environmental impacts resulting from implementation of the proposed action and alternatives to the proposed action. It should provide an analysis of the differences in capital cost, operation and maintenance cost, institutional development and training requirements, personnel requirements, reliability under Moroccan conditions and environmental benefit between the proposed action and the alternatives.

5. Proposed Mitigation Actions to the Proposed Action and Alternatives to the Proposed Action

The text should identify mitigation actions which can be taken to eliminate or reduce potential negative environmental impacts of the proposed action and alternatives to the proposed action. All proposed mitigations should be pragmatic, cost-effective and implementable. Proposed mitigations will include an analysis of capital cost, operation and maintenance cost, institutional development and training requirements, reliability under Moroccan conditions and environmental benefit.

6. Annexes

The text shall contain the following annexes, however, the consultant may provide additional annexes as appropriate.

Annex A. List of Preparers

Annex B. Bibliography

Annex C. Record of the Scoping Session

Annex D. List of Persons Contacted

4. Special Issues:

The text of the Environmental Assessment shall address the following concerns:

A. Potential Impacts to Archaeological and/or Historical Sites

The text shall provide a discussion of potential impacts to archaeological and/or historical sites as the result of implementation of the proposed action or alternatives. The consultant shall meet with representatives of the Government of Morocco authorities responsible for the protection of archaeological and historical sites to review the location of sites in the project area and to assess potential impacts.

B. Potential Impacts to Rare and/or Endangered Species and their Critical Habitat:

The text shall provide a discussion of potential impacts to rare and/or endangered species and their critical habitat as the result of implementation of the proposed action or alternatives. The consultant shall meet with representatives of the Government of Morocco authorities responsible for the protection of rare and/or endangered species to determine what species are in the project area, identify areas of critical habitat and to assess potential impacts.

5. The Planning and Conduct of a "Scoping Session"

A.I.D. environmental procedures require that a "Scoping Session" be held as part of the process of preparing an Environmental Assessment. The purpose of a "Scoping Session" is to provide input into the implementation of the Scope of Work for the Environmental Assessment through the conduct of a review meeting. Experience in other countries in the Near East has show that "Scoping Sessions are invaluable in providing an opportunity to identify local concerns and planning conflicts which may result in potentially significant delays in project implementation if not addressed in the design process. This is especially true of the siting of wastewater treatment plants and the selection of wastewater disposal options which often generate great controversy if not handled with sensitivity in the planning process.

The following steps should be taken in the planning and conduct of a "Scoping Session":

A. The meeting will be chaired by a representative of the Government of Morocco organization responsible for implementation of the proposed wastewater treatment plant and wastewater disposal system.

D. The meeting will be held at a suitable facility in Tetouan and should take approximately 2 hours.

C. A list will of organizations/individuals to be invited to attend the meeting will be developed by the consultant in consultation with the client and the A.I.D. Regional Housing Office. The list should include representatives of organizations which will have responsibility for the financing, construction, operation and maintenance of the facilities; representatives of organizations which may be subject to potential environmental impacts from the project; and individuals knowledgeable of the type of intervention and potential sources of data for preparation of the Environmental Assessment. The client will be responsible for issuing the invitations.

5. The meeting should follow the following format:

- . Meeting is Called to Order by the Chairman
- . Meeting Participants Introduce Themselves
- . A Brief Presentation by the Consultant on the Proposed Action
- . A Brief Presentation by the Consultant on the Purpose and Objectives of Environmental Assessments
- . Brief Presentation by the Consultant on the Anticipated Environmental Impacts of the Proposed Action based on preliminary investigations
- . The Chairman Supervises an Question and Answer Session
- . The Chairman Requests Organizations Which Have Useful Information for Preparation of the Environmental Assessment to Discuss the Information and Make Arrangements for Meetings with the Consultant

E. The consultant shall make a list of those individuals which attend the meeting and a record of their comments. This material should be included as an appendix to the Environmental Assessment.

6. Proposed Personnel to Prepare the Environmental Assessment:

It is anticipated that the consultant shall provide the a two person team to prepare the Assessment with qualifications and experience as follows:

A. Physical Planner: The consultant shall provide an individual with professional training and experience in the planning, design and implementation of programs of urban infrastructure including wastewater treatment plants and wastewater disposal systems. The individual shall be responsible for the description of the existing environment, analysis of wastewater treatment plant site alternatives and wastewater disposal system alignment and discharge point alternatives. They shall be responsible for the analysis of permitting and monitoring requirements. The physical planner shall assist the environmental engineer in the assessment of reliability of the proposed action, alternatives and mitigations under Moroccan conditions.

B. Environmental Engineer: The consultant should provide an individual with professional training and experience in the planning, design, operation and maintenance of wastewater treatment plants and wastewater disposal systems. This individual shall be responsible for the description of the proposed project and alternatives, analysis of the potential impacts of the proposed action and alternatives, and analysis of mitigation actions. The individual should be capable of developing basic cost estimates for both capital and recurrent costs associated with the proposed action and alternatives and for mitigation activities.

7. Work Plan and Review Process

The first task of the consultant shall be to prepare a work plan for the preparation of the Environmental Assessment for review and approval by the client. This plan shall provide a proposed date for the "scoping session" and include a 45 day review and comment period between preparation of the Draft and Final Environmental Assessments.

8. Progress Reports

The consultant shall submit a monthly progress report on the preparation of the Environmental Assessment. The report shall contain a summary of progress made in preparation of the Environmental Assessment, list key meetings, identify significant problems and provide for an accounting of labor and other costs.

9. Publication of the Environmental Assessment

The consultant shall provide the client with 20 copies of both a Draft and Final Environmental Assessment.

APPENDIX D

REVIEW AND ANNOTATION OF ISKANE/BCEOM AND RDE DOCUMENTS

ANNEX 4

REVIEW AND ANNOTATION OF ISKANE/BCEOM AND RDE DOCUMENTS

A. Background

In the context of the Urban Development Project of Dersa-Samsa of Tétouan, the consulting group of ISKANE/BCEOM was requested to conduct a study on the evaluation and programming of Off-Site Sewage Disposal System. This followed a first mission that had pointed out problems posed by raw sewage disposal in Martil and Tétouan and proposed that a sewage treatment plant be constructed to treat raw sewage from Tétouan with the possibility of integrating the raw effluent from Martil.

The ISKANE/BCEOM report prepared and submitted after the second study (Off-Site Sewage Disposal) provided the following recommendations. These were based on hypothetical information applied to population projections, water consumption, connection rate, sewage production rate, and peak flow factor (1993 - 2003) for Tétouan, Martil, and the existing and projected industrial zones in greater Tétouan.

- Location

Locate a future station on a site located on the left bank of the Oued Martil which would be ideal for both Tétouan and Martil.

- Size and Type of Treatment

On the basis of pollutant loads of 390 mg-BOD/liter for domestic effluent and 1200 mg-BOD/liter, treatment stations were sized for the year 2003. These were based on population equivalents of 325,000 for Tétouan and its industrial zones; and for Martil, 20,000. For Tétouan, high load activated sludge treatment, including adequate primary treatment and mechanical dehydration for sludge, was found to be most suitable. For Martil an oxidation ditch with adequate pretreatment units, clarifiers, and sludge drying beds were found to be most suitable. The study recommended that the Tétouan treatment plant be slightly increased to treat effluent from both Tétouan and Martil. An option to build the sewage treatment plant in two phases was proposed. The primary treatment stage would be built in Phase 1 with the secondary stage to be built at a later date.

- Interceptor Sewer

Locate an interceptor sewer for Tétouan on the bank of Oued Martil to drain sewage from Tétouan toward the proposed treatment plant. The size of the interceptor sewer was determined from projected sewage flow of 22 catchment areas of Tétouan for 1993 and 2003. Seven overflow devices designed to evacuate combined sewage-storm

water at three times the peak flow were proposed to be placed on the interceptor. The slope for the interceptor sewer was 0.002 m/m with intermediary pumping.

For Martil an interceptor composed of a gravity sewer with intermediate pumping of sewage toward the treatment plant (distance of 1.5 km) was proposed.

B. Observations of the RDE

1. Concerning the Overall Study

The RDE felt that a master plan for a wider area than that considered by the study should be prepared and should include a more in-depth examination of the actual situation. It was felt that the proposed solutions constituted only a preliminary step in formulating options that would need to be compared in order to reach the lowest cost objectives.

2. Concerning the Specific Design Details

The RDE felt that the study contained the following weaknesses:

- The calibration of the proposed treatment plant and interceptor sewer were based on flow data and pollutant loads which were not specifically measured.
- The "dilution rate" or design overflow rate proposed for the overflow design was treated summarily.
- The final destination of treated effluent was not studied or the degree of treatment was not based on specific data on proposed plant effluent quality.
- The choice of location for the treatment plant was not justified. The choice must result from considerations relative to the physical environment. In this regard, the RDE felt that the comparison between a stabilization pond and activated sludge was not fair or appropriate.
- The question regarding sludge was not considered in an in-depth manner. Local interest in surface drying of sludge could exist.
- Concerning the interceptor sewers, the profiles proposed impose pumping in all cases (even for treatment by stabilization pond). The RDE felt that most of the city sectors were above 25 meters and based on the configuration of the sewer network, it should be possible to elevate the interceptor lines by a few meters and have gravity flow toward the treatment plant over most of its length except for the lower sectors of Martil which would need pumping. The advantage of such a solution justifies that several options be studied.

C. WASH Consultant Annotations

The information presented in the study is the type found in a feasibility study. Its weakness, however, was that it did not make specific recommendations on the actions which would need to take place in order to design and build the off-site component of the sewerage system. The preparation of a sewerage master plan for the two cities is essential for long-term planning of sewage management and, therefore, should precede the specific study for the off-site sewerage systems component, particularly for Tétouan.

As for specific design considerations, technical approaches and methods were found to be appropriate. However, some very relevant questions were raised by the RDE and should have been answered by this preliminary study. These are:

- the criteria for treatment prior to effluent disposal in the specific case of Oued Martil and the Mediterranean Sea;
- the justification of the proposed site on both technical and economical bases;
- other possible profiles for the interceptor which would eliminate most of the required pumping;
- the feasibility of achieving a 0.002 m/m slope with local firms, as this requires experienced sewer builders (Note: in other North African Countries which have local experience with sewer construction, 0.003 m/m is the minimum recommended slope); and,
- the need to conduct a full environmental impact assessment in regard to the proposed solutions.