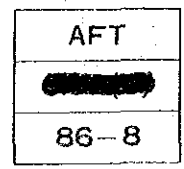
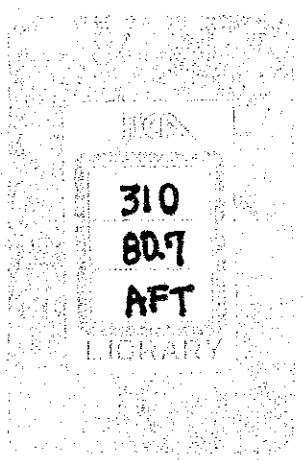


THE SULTANATE OF OMAN
THE DETAILED DESIGN REPORT
ON
THE WADI JIZZI
AGRICULTURAL DEVELOPMENT PROJECT

PREQUALIFICATION DOCUMENTS

JUNE 1986

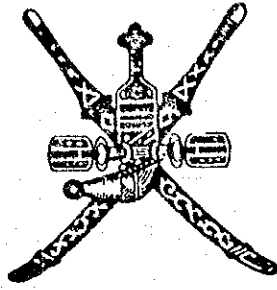
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SULTANATE OF OMAN
MINISTRY OF AGRICULTURE AND FISHERIES

WADI JIZZI
AGRICULTURAL DEVELOPMENT
PROJECT

PREQUALIFICATION DOCUMENTS

SANYU CONSULTANTS INC.

*Kyowa Bank Bldg.
Nishiki 2-15-22
Naka-ku, Nagoya 460
JAPAN
Tel. (052)201-8761
Telex J59901 SANYU*

*P.O.Box _____ Muscat
SULTANATE OF OMAN
Tel. _____
Telex _____*

国際協力事業団	
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PREQUALIFICATION DOCUMENTS

WADI JIZZI AGRICULTURAL DEVELOPMENT PROJECT

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I. INSTRUCTIONS TO APPLICANTS FOR PREQUALIFICATION

- 1. Introduction**
- 2. Prequalification Questionnaire**
- 3. Evaluation of Application**

I. INSTRUCTIONS TO APPLICANTS FOR PREQUALIFICATION

1. Introduction

The Ministry of Agriculture and Fisheries of the Government of the Sultanate of Oman (hereinafter called the Ministry) intends to invite tenders in the near future from the prequalified firms, joint ventures or partnerships for the construction works of an earth dam and appurtenant facilities of the Wadi Jizzi Agricultural Development Project on the Batinah Coast in the north of the Sultanate of Oman.

The Contract is expected to be signed in the near future and it is anticipated that the Construction Works are to be completed in 17 months including preparation and take-over of the completed Works.

In view of the foregoing, the Ministry will receive applications for the Prequalification from firms, joint ventures or partnerships. The successful parties will be invited to a Tendering for the said Construction Works.

The information given in these documents are intended to define the scope of work and to give general information to parties applying for Prequalification.

2. Prequalification Questionnaire

2.1 Qualification of Applicants

The parties eligible for the prequalification and the tender are firms, joint ventures or partnerships experienced in similar types of civil works construction.

2.2 Submission of Application

All FORMS and documents attached herewith under II. PREQUALIFICATION QUESTIONNAIRE must be completed in English in accordance with these Prequalification Documents by the party interested in receiving invitation for tender. Information edited in any other language should be accompanied by its translation in English.

In the case of a partnership or a joint venture, these FORMS and documents shall be completed not only for the partnership or joint venture itself but also separately for each individual partner or firm, and all of them shall be put in one sealed envelope as one set. The envelope shall bear the marking "Original" or "Copy". In cases of discrepancies between the "Original" and the "Copy", the "Original" shall govern. One "Original" set and two sets of "Copy" are further to be put in a larger sealed envelope. All the envelopes (both large and small) shall bear the following inscriptions on the cover.

Ministry of Agriculture and Fisheries

Wadi Jizzi

Agricultural Development Project

PREQUALIFICATION

Name of Enterprise

Month, Year

The envelope must be submitted by _____ hours (Omani standard time), _____ th _____, 1986 to the following address.

H.E. The Undersecretary

Ministry of Agriculture and Fisheries

P. O. Box 467, Muscat

Sultanate of Oman

Any applicant with late submission will not be considered unless the Ministry decides otherwise.

- 2.3 Detailed financial statements of the last three years certified by a CPA (certified public accountant) or a CA (chartered accountant) is to be attached to Form "A" - "Identification and Financial Data Sheet". The percentage of foreign equity of the individual company or corporation or the joint venture should be given in this financial statement.
- 2.4 Erasures and other changes should be noted over the initials of the person signing the application.
- 2.5 A partnership or joint venture can be organized as a union consisting of one sponsor (sponsor firm) and no more than four partners (partner firms) joined together legally with specific proportional interest in the union. The partners (firms) would have to bid capacities totalled, at least equal to the estimated value of the project. All securities would be binding on the partnership or joint venture and each individual partner (firm).
- 2.6 Positive answers should be given to all questions in the Prequalification Questionnaire. If necessary or required, additional sheets shall be attached to give full and detailed information.
- 2.7 The Ministry will inform all the applicants who are selected under the terms of the prequalification to tender for the said contract.
- 2.8 Prequalified applicants will be invited to obtain the tender documents from the Ministry/Tender Board and submit tenders. They are, however, under no obligation to do so.
- 2.9 Documents submitted by prospective applicants in connection with the prequalification will be treated as confidential and will not be returned.

- 2.10 Prequalified applicants shall base their tenders exclusively on the design and specifications stated in the tender documents, and unless specifically requested no alternative proposals will be entertained.
- 2.11 The Contract will be interpreted in accordance with laws of the Sultanate of Oman. The language of the Contract Documents will be English and the contractor's senior supervisory staff shall be able to speak, read and write the English language fluently.

3. Evaluation of Application

- 3.1 The evaluation of prequalification will be first made by the consultant (hereinafter called the Engineer) who will submit their report to the Ministry. The Ministry will then make the recommendations to the Tender Board for final decision.
- 3.2 It must be clearly understood that if discrepancies are found in the prequalification information submitted, the same will be considered unsatisfactory, and the applicant may be ineligible to tender. The Ministry may ask the applicant that the discrepancies be satisfactorily explained/resolved. The Ministry or the Engineer will not enter into lengthy correspondence with applicants relating to prequalification when seeking clarification.
- 3.3 The Ministry has the right to judge whether to accept or to reject the qualification of applicants based on the application submitted by applicants. The decision of the Ministry in this concern will be final.

4. Miscellaneous

- 4.1 The Ministry assumes neither obligation nor responsibility whatsoever to compensate or indemnify the applicant for any expenses or losses which may be incurred by the applicant in the preparation of his application nor does the Ministry guarantee that an award will be made under these Prequalification Documents.
- 4.2 All recipients of the Prequalification Documents, whether they apply for Prequalification or not, shall treat the details of the Documents as private and confidential, and should return the whole Documents either completed or blank.
- 4.3 The applicant who finds himself uninterested in applying for Prequalification shall return all the Prequalification Documents to the Ministry within 5 days.
- 4.4 Any questions concerning the Prequalification Documents should be addressed to the Planning Unit, Ministry of Agriculture and Fisheries in writing with a copy sent to the Engineer.

II. PREQUALIFICATION QUESTIONNAIRE

CERTIFICATE

FORM A. Identification and Financial Data

FORM B. Personnel

FORM C. Applicant's Experience Record

FORM D. Current Contracts

FORM E. Equipment

FORM F. Assumed Sub-Contractors

AFFIDAVITS

PREQUALIFICATION QUESTIONNAIRE FOR APPLICANTS
INTERESTED IN SUBMITTING TENDERS FOR CONSTRUCTION OF
THE WADI JIZZI AGRICULTURAL DEVELOPMENT PROJECT

CERTIFICATE

It is understood and agreed that the information submitted herewith is to be used by the Sultanate of Oman and Sanyu Consultants Inc. in determining, according to their sole judgment and discretion, the eligibility and qualification of prospective applicants, to perform work in connection with the Wadi Jizzi Agricultural Development Project.

In consideration of being permitted to submit his qualifications as a prospective applicant for review, the undersigned waives any claim against the Sultanate of Oman and Sanyu Consultants Inc. that might arise with respect to their decision as to a prospective applicant's qualification.

A prospective applicant will not be considered qualified unless he possesses reputation, ability, experience, qualified personnel, availability of equipment, and net current assets or working capital sufficient in the judgment of the Sultanate of Oman and Sanyu Consultants Inc. to render it possible that he can satisfactorily execute the contract, should it be awarded to him, and meet his obligations therein incurred.

The signing by the undersigned of this prequalification questionnaire guarantees, as evidenced by the sworn affidavit required herein, the truth and accuracy of all statements and of all answers to the interrogatories hereinafter made. Any untrue data, statements and answers given by the applicant to the Employer will cause the applicant to be disqualified.

The undersigned hereby authorizes and requests any public official, engineer, architect, surety company, bank, depository, material or equipment manufacturer or distributor or any other person, firm, or corporation to furnish any pertinent information, requested by the Sultanate of Oman and Sanyu Consultants Inc., deemed necessary to verify the statements made or information provided by the undersigned herein, or regarding the competence and general reputation of the prospective applicant.

The undersigned understands and agrees that further qualifying information may be requested, and agrees to furnish any such information at the request of the Sultanate of Oman and Sanyu Consultants Inc. Failure to complete this form adequately and/or the inclusion of any misleading statements may result in disqualification.

Dated at _____, this _____ day of _____, 1986.

(Name of Organization)

By _____

(if corporation, seal)

(Title)

FORM A -- Identification &
Financial Data
(page 1/3)

1. Organization's Name _____
Date and Place of Establishment _____
2. Type of Organization _____
3. Capital Paid in Cash R.O. _____
4. Head Office Address _____
Tel. No. _____
Cable Address _____ Telex No. _____
5. Local Office Address, if any _____
Telephone No. _____ Telex No. _____
6. Objectives or Purposes of Organization _____
(attach memoranda and articles, deed of partnership or joint venture or other relevant documents or if appropriate, excerpts from such documents.) _____
7. Number of Years of Civil Engineering Experience _____
8. Number of Employees (Permanent Employment only):
Total _____
Engineers _____
Technicians and Specialists _____
Foremen _____
9. Has the Organization ever failed to complete any work awarded to it? (Answer "Yes" or "No". If "Yes", identify the work and explain why in separate sheet) _____
10. Total Liabilities in R.O. equivalent _____
11. Total Assets in R.O. equivalent _____
12. Net Worth (11 minus 10) in R.O. equivalent _____
13. Liquid Assets in R.O. equivalent _____

14. Bank References _____

15. Current Credit Resources in R.O. equivalent _____

16. Percentage of Foreign Equity of individual firm, partnership or
joint venture _____ %

17. Bonding Capacity _____ R.O.
(list names of institu- _____ R.O.
tions and bondable _____ R.O.
amount in US\$ equivalent) _____ R.O.
_____ R.O.

18. State if you intend to form a joint venture with other firm(s)

a) Name of Firm _____
Address _____
Role _____

b) Name of Firm _____
Address _____
Role _____

19. State if you intend to sub-contract any (specialised) part of the
works

a) Name of Firm _____
Address _____
Kind of Work _____

b) Name of Firm _____
Address _____
Kind of Work _____

20. Value of Contract for (Maximum) R.O. _____
which firm would tender (Minimum) R.O. _____

Corporation Partnership or Joint Venture Information

If a Corporation

1. President's name and nationality

2. Vice-President's name and nationality

3. Secretary's name and nationality

4. Treasurer's name and nationality

5. Names and nationalities of major stockholders
 - 1) _____

 - 2) _____

 - 3) _____

 - 4) _____

 - 5) _____

If a Partnership or Joint Venture

1. State whether Partnership or Joint Venture.
State also whether it is existent or proposed.

2. Name, nationality and address of all partners (designate the name of sponsor)
 - 1) _____

 - 2) _____

 - 3) _____

 - 4) _____

 - 5) _____

(Note: Attach the detailed financial statements of the last three years certified by a CPA or a CA at the end of Form A.)

(a) Strength of Personnel in the Organization

1. No. of Graduate Engineers operating in:
 - i) Oman _____
 - ii) Middle East _____
 - iii) Elsewhere _____

2. No. of Supervisory Personnel (technicians, specialists and foremen) operating in:
 - i) Oman _____
 - ii) Middle East _____
 - iii) Elsewhere _____

3. No. of Graduate Engineers available for assignment in this Project _____

4. No. of Supervisory Personnel Available for Assignment in this Project _____

(b) Names and Construction Experience of Key Personnel (Managers and Engineers) proposed for the Project

No.	Individual's Name	Nationality	Proposed Position	Present Position or Office	Years of Construction Experience	Years with Firm

Note: 1) Dossier of Key Personnel (Form B(c), page 14) is to be completed for each individual listed here.
 2) Use additional sheets, if needed, by reproducing this page.

(c) Dossier of Key Personnel (Managers and Engineers) to be Assigned to this Project

No. Name and Nationality _____

Position Proposed _____

Date of Birth _____

Education _____

Linguistic Capabilities _____

Positions held since Graduation (Start from the latest one)

Experience for Particular Projects (Start from the latest one)

Dam _____

Dam _____

Dam _____

Dam _____

Other Civil Works _____

Other Civil Works _____

Other Civil Works _____

- Note: 1) Use additional sheets as needed, by reproducing this page.
2) The space for "Experience in Particular Projects" shall contain the following information:

(Name of Project) (Country where constructed) (Year he engaged)
Select most representative projects, and add the type in case of Dam.

(d) Names and Qualification of the Technicians, Specialists and Foremen Proposed for the Project

No.	Name	Nationality	Category/Qualification	Years of Construction Experience	Years with Firm

Note: 1) Use additional sheets, if needed, by reproducing this page.

FORM C - Applicant's Experience Record
(page 1/3)

(a) Experience in Fill-Type Dam Construction --- General

1. Years of Fill Type Dam construction experience in:

- a) Oman since _____
- b) Middle East since _____
- c) Elsewhere since _____

2. Largest Annual Rate of Fill-Type Dam construction in:

- a) Oman R.O. _____ in year of _____
- b) Middle East R.O. _____ in year of _____
- c) Elsewhere R.O. _____ in year of _____

3. Value of Largest Fill-Type Dam project completed singly (without association with other companies) in:

- a) Oman R.O. _____
Proj. Name: _____
Construction Period: _____ to _____
- b) Middle East R.O. _____ (1R.O. = _____)
Proj. Name: _____
Construction Period: _____ to _____
- c) Elsewhere R.O. _____ (1R.O. = _____)
Proj. Name: _____
Construction Period: _____ to _____

4. Value of Largest Fill-Type Dam project completed in joint venture and percentage in interest:

- a) Oman R.O. _____
Proj. Name: _____
Percentage: _____%, Constr. Period: _____ to _____
- b) Middle East R.O. _____ (1R.O. = _____)
Proj. Name: _____
Percentage: _____%, Constr. Period: _____ to _____
- c) Elsewhere R.O. _____ (1R.O. = _____)
Proj. Name: _____
Percentage: _____%, Constr. Period: _____ to _____

5. Expected Annual Construction Value of Fill-Type Dam construction for 1986 in:

- a) Oman R.O. _____
- b) Middle East R.O. _____
- c) Elsewhere R.O. _____

FORM C - Applicant's Experience Record
(page 2/3)

(b) List of Completed Projects of Fill-Type Dam Construction in Last 5 Years

<u>No.</u>	<u>Name of Project/Country</u>	<u>Date of Contract</u>	<u>Date of Completion</u>	<u>Contract Value (R.O.)</u>
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- Notes: 1) Start the list with the project with the latest contract date
- 2) Above projects are to be detailed in the following sheets.
(Form C(c), page 18)
- 3) Use additional sheets, if needed, by reproducing this page.

FORM C - Applicant's Experience Record
(page 3/3)

(c) Experience Record in Detail For Fill-Type Dam Construction in Last 5 Years

No. ___ Project Name: _____

Description of Project: _____

Client: _____

Contract Value: R.O. _____

Commencement Date (contractual/actual): _____ / _____

Completion Date (contractual/actual): _____ / _____

Time Extensions, Completion Delays, Penalties, Major Claims or Litigations (Answer "Yes" or "No". If "Yes", explain detail in separate sheet): _____

Joint Venture (if any) - percentage: _____

Partner(s): _____

No. ___ Project Name: _____

Description of Project: _____

Client: _____

Contract Value: R.O. _____

Commencement Date (contractual/actual): _____ / _____

Completion Date (contractual/actual): _____ / _____

Time Extensions, Completion Delays, Penalties, Major Claims or Litigations (Answer "Yes" or "No". If "Yes", explain detail in separate sheet): _____

Joint Venture (if any) - percentage: _____

Partner(s): _____

Note: Use additional sheets as needed, by reproducing this page.

(b) Experience Record in Detail for Current Contracts

No. Project Name: _____

Description of Project: _____

(in progress, awarded or pending award?) _____

Client: _____

Contract Value: R.O. _____

Commencement Date (contractual/actual): _____ / _____

Completion Date (contractual/estimated): _____ / _____

Progress Percentage Completed: _____

Time Extensions, Completion Delays, Penalties, Major Claims or
Litigations (Answer "Yes" or "No". If "Yes", explain detail in
separate sheet): _____

Joint Venture (if any) - percentage: _____

- Partner(s): _____

No. Project Name: _____

Description of Project: _____

in progress, awarded or pending award?: _____

Client: _____

Contract Value: R.O. _____

Commencement Date (contractual/actual): _____ / _____

Completion Date (contractual/estimated): _____ / _____

Progress Percentage Completed: _____

Time Extensions, Completion Delays, Penalties, Major Claims or
Litigations (Answer "Yes" or "No". If "Yes" explain detail in
separate sheet): _____

Joint Venture (if any) - percentage: _____

- Partner(s): _____

Note: Use additional sheets as needed, by reproducing this page.

(a) List of Equipment owned by the Applicant and available for this Project

Earthwork Equipment (1/3)

Equipment	Make	Model	Machine weight (ton)	Pay load (ton)	Perform. volume (m ³)	Engine power (PS)	Age (yr)	Condition ^{1/}	Remarks

Note 1. Leave out where not applicable
 2. 1/ For condition enter excellent, good or fair

(b) List of Equipment owned by the Assumed Subcontractors and available for this Project

Earthwork Equipment (2/3)

Equipment	Make	Model	Machine weight (ton)	Pay load (ton)	Perform. volume (m ³)	Engine power (PS)	Age (yr)	Condition ^{1/}	Name of Subcontractor

Note 1. Leave out where not applicable

2. ^{1/} For condition enter excellent, good or fair

(c) List of Equipment foreseen to be hired by the Applicant and available for this Project

Earthwork Equipment (3/3)

Equipment	Make	Model	Machine weight (ton)	Pay load (ton)	Perform. volume (m ³)	Engine power (PS)	Age (yr)	Condition ^{1/}	Source

Note 1. Leave out where not applicable

2. 1/ For condition enter excellent, good or fair

(d) List of Equipment owned by the Applicant and available for this Project

Concrete Work Equipment (1/3)

Equipment	Make	Model	Capacity	Unit time Performance	Engine or motor power (PS/KW)	Age (yr)	Condition ^{1/}	Remarks

Note 1. Leave out where not applicable
2. 1/ For condition enter excellent, good or fair

(e) List of Equipment owned by the Assumed Subcontractors and available for this Project

Concrete Work Equipment (2/3)

Equipment	Make	Model	Capacity	Unit time Performance	Engine or motor power (PS/KW)	Age (yr)	Condition 1/	Name of Subcontractor

Note 1. Leave out where not applicable

2. 1/ For condition enter excellent, good or fair

(f) List of Equipment foreseen to be hired by the Applicant and available for this Project

Concrete Work Equipment (3/3)

Equipment	Make	Model	Capacity	Unit time Performance	Engine or motor power (PS/KW)	Age (yr)	Condition ^{1/}	Source

Note 1. Leave out where not applicable

2. 1/ For condition enter excellent, good or fair

(g) List of Equipment owned by the Applicant and available for this Project

Other Equipment (1/3)

Equipment	Make	Model	Capacity	Unit time Performance	Engine or motor power (PS/KW)	Age (Yr)	Condition ^{1/}	Remarks

Note 1. Leave out where not applicable

2. 1/ For condition enter excellent, good or fair

(h) List of Equipment owned by the Assumed Subcontractors and available for this Project

Other Equipment (2/3)

Equipment	Make	Model	Capacity	Unit time Performance	Engine or motor power (PS/KW)	Age (yr)	Condition ^{1/}	Name of Subcontractor

Note 1. Leave out where not applicable

2. 1/ For condition enter excellent, good or fair

(i) List of Equipment foreseen to be hired by the Applicant and available for this Project

Other Equipment (3/3)

Equipment	Make	Model	Capacity	Unit time Performance	Engine or motor power (PS/KW)	Age (yr)	Condition ^{1/}	Source

Note 1. Leave out where not applicable

2. 1/ For condition enter excellent, good or fair

FORM F - Assumed Sub-Contractors

1. Firm's Name _____
and Country of Incorporation _____

2. Year Incorporated: _____

3. Type of Organization: _____

4. Head Office Address: _____

5. Names and Positions
of Principal Officers: _____

6. Number of Engineers (permanent employment only): _____

7. Number of Technicians, Foremen & Operators (permanent employment only):
Technicians _____
Foremen _____
Operators _____

8. Number and total value of Contracts which the sub-contractor completed in last 3 years:
R.O. _____ / No. _____

9. Category of works to be executed by the sub-contractor:

NOTE: Use additional sheets, if needed, by reproducing this page.

AFFIDAVITS

EITHER AFFIDAVIT NUMBER (1), (2) OR (3) MUST BE EXECUTED. AFFIDAVIT NUMBER (4) MUST BE EXECUTED BY ALL PROSPECTIVE CONTRACTORS.

(1) AFFIDAVIT FOR INDIVIDUAL

_____ being duly sworn, deposes and says that the foregoing financial statement, taken from his books, is a true and accurate statement of his financial condition as of the date thereof and that the answers to all the foregoing interrogatories and all statements therein are true, complete, and accurate.

(2) AFFIDAVIT FOR CO-PARTNERSHIP

_____ being duly sworn, deposes and says that he is a member of the firm of _____

_____, that he is familiar with the books of the said firm showing its financial condition; that the foregoing financial statement, taken from the books of the said firm, is a true and accurate statement of the financial condition of the said firm as of the date thereof; and that the answers to all the foregoing interrogatories and all statements therein are true, complete, and accurate.

NOTE: A co-partnership must give firm name and signature of all partners.

(3) AFFIDAVIT FOR CORPORATION

_____ being duly sworn, deposes and says that he is _____ of the _____, the corporation described in and which executed the foregoing statement; that he is familiar with the books of the said corporation showing its financial condition; that the foregoing financial statement, taken from the books of the said corporation, is a true and accurate statement of the financial condition of the said corporation as of the date thereof and that the answers to all the foregoing interrogatories and all statements therein are true, complete and accurate.

NOTE: A corporation must give full corporate name, signature of official, and affix corporate seal.

(4) AFFIDAVIT FOR INDIVIDUAL, CO-PARTNERSHIP, AND CORPORATION

I, _____, an individual
(Name)

we, _____ and _____, partners
(Name) (Name)

trading as _____

We, _____, a corporation

by _____
(Name of Officer) (Title)

hereby certify, that (I)(we) have neither directly or indirectly entered into any combination or arrangement with any person, firm or corporation, nor entered into any agreement, the effect of which is to prevent competition or increase the cost of construction of the project for which this Prequalification Questionnaire is being submitted.

And we further certify that all statements and all authorizations and requests contained herein are made under oath to accompany (my)(our) prequalification submission with the Sultanate of Oman.

_____, being duly sworn, deposes and says that

he is _____ of _____
(Name of Contractor)

That he is duly authorized to make the foregoing affidavit and that he makes it on behalf of () himself; () said co-partnership; () said corporation.

Sworn to before me this _____ day of _____, 19 ____.

(Notary Public)

My commission expires _____

STATE OF _____)

ss.:

COUNTRY OF _____)

III. PROJECT DESCRIPTION

1. Employer
2. Engineer
3. Location and Geographical Features
4. Meteorology and Hydrology
5. Topography
6. Geology
7. Socio-Economic Conditions
8. Scope of Work

III. PROJECT DESCRIPTION

1. Employer

Employer means the Government of the Sultanate of Oman, and the legal successors in title to the Employer who will employ the Contractor. The address of the Employer shall, for the purpose of the Contract, be deemed to be:

Ministry of Agriculture and Fisheries
P.O. Box 467, Muscat
Sultanate of Oman

2. Engineer

The Engineer as defined in the Contract will be;

Sanyu Consultants Inc.
Kyowa Bank Bldg.
Nishiki 2-15-22
Naka-ku, Nagoya, 460 Japan
Tel. 052-201-8761
Telex: J59901 SANYU

3. Location and Geographical Features

The Wadi Jizzi basin, the objective area intended for water resources development in this Project, is located in the north of the Batinah region, forming one of the large alluvial fans near Sohar. The Wadi Jizzi river, originating from Al-Hajar Al-Garbi and joining a number of affluents, traverses the North Batinah region extending to a length of about 75 km from west to east and stretching over the catchment area of about 1,300 sq.km within a range from latitudes 24°03' to 24°27' N and from longitudes 56°06' to 56°45' E, and empties into the Gulf of Oman at the point near Sohar.

Sohar is one of eleven Wilayat in the Batinah region, and Sohar town lies on the Batinah coast in northern Oman, some 220 km north-west of the capital, Muscat.

The four lane paved highway linking Muscat and Sohar through the Batinah coast is the only way to get to Sohar. The Qabail-Buraimi road branches off from the above highway and runs through the left border of the Wadi Jizzi alluvial fan. The dam site is accessible by following the Qabail-Buraimi road for 20 km and then following an earth road for 4 km after turning left from the main road.

4. Meteorology and Hydrology

Being located in the arid homoclimatic zone, the Project Area undergoes severe climate conditions. There are two distinct seasons in a year; the winter season and the summer season.

The winter season, from November to March, is characterized by a series of tropical depressions which bring heavy rainfalls in the catchment of rivers causing occasional high flood in them. April is a transitional period between winter and summer. The months from May to September are characterized by extreme continentality with hot and dry climate. In April weather becomes progressively warmer and drier. May and June are usually the hottest and driest with the maximum temperatures rising up to 45°C, and the relative humidity during these two months falls below 60% as a daily average.

October is also a transitional period with weather becoming increasingly cool. November and December becomes again cold with occasional rainfalls.

The annual rainfall changes markedly from season to season and from year to year amounting to 102 mm as an average in the past 11 years at Sohar, of which about 97% concentrates during the winter season and transitional periods from October to April. In other words, the summer

season from May to September accounts for only 3% of annual rainfall. The daily mean temperature varies from 32.6°C in July to 18.2°C in January with an annual average of 25.7°C at Sohar. Major climatic elements, in terms of monthly averages observed at Sohar, are summarized as shown in Table-1 and Figure-1.

The perennial flow in the river are observed in the upper reaches and tributaries where river deposits are shallow and hard rock material reaches as far as the river bed. Several floods a year are usually caused by storms not only making the plain area in a state of emergency but also wasting a considerable amount of surface water into the sea.

Areal rainfalls have been calculated by using Thiessen Polygon Method. The amount of average annual rainfall is as below;

Areal Average Rainfall

<u>Basin and Area</u>	<u>Catchment (sq.km)</u>	<u>Areal Rain (mm/yr)</u>
1. Dam Site (Above Dam)	812	128
2. Residual (Below Dam)	471	110
3. River Mouth (Entire Basin)	1,283	121
4. At Sohar	-	102

5. Topography

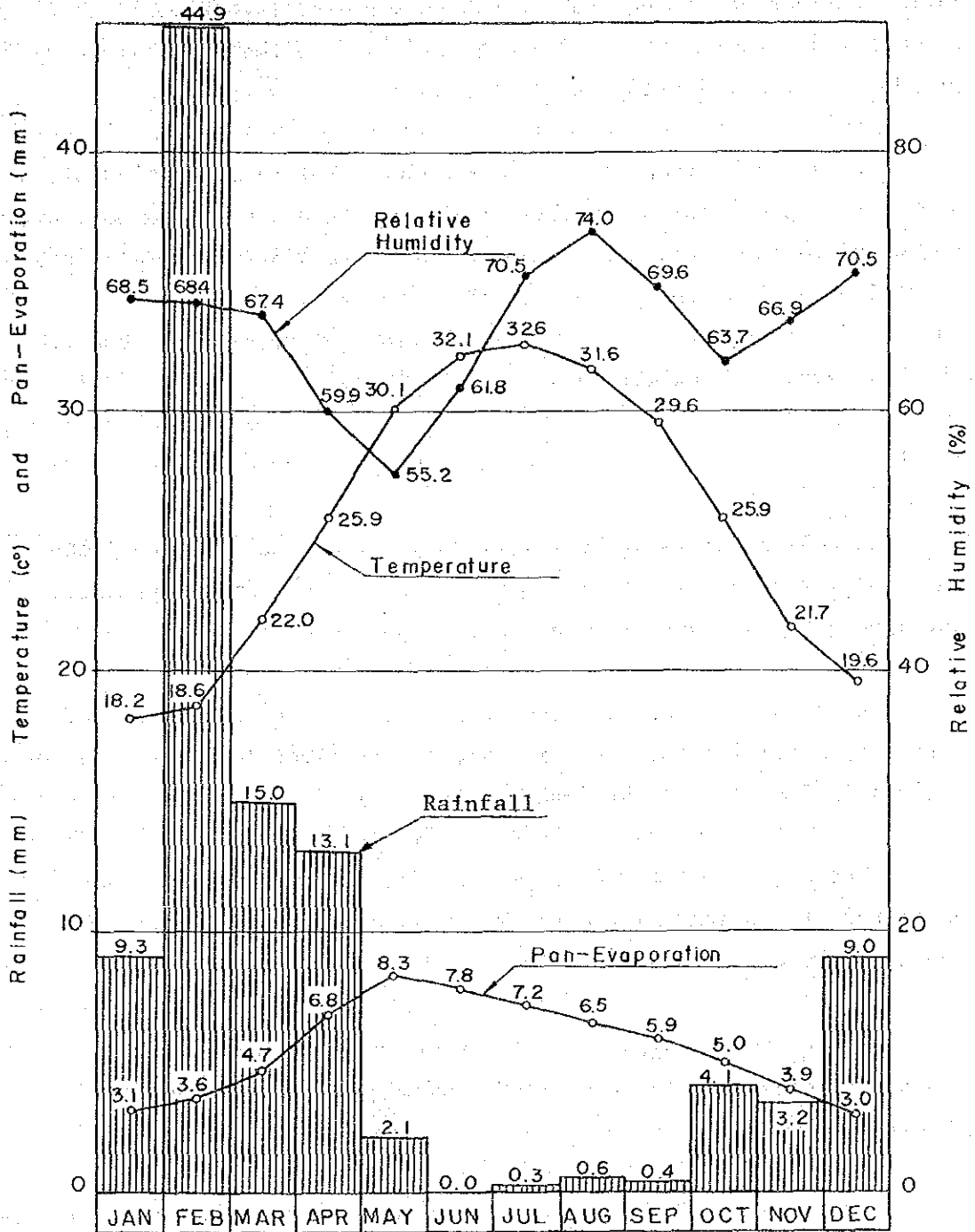
The Wadi Jizzi basin is roughly divided into three topographical classifications; lowlying area consisting of fan land and gravel plains, hill area consisting of river terrace, talus and the foot of the mountain, and central mountain mass consisting of ophiolite. The proposed dam site is located on the mid-stream of the Wadi Jizzi at the confluence of the Wadi Jizzi and the Wadi Awhin. The river bed at the dam site has a width of about 650 m and a gradient of 1/140.

The topographical features of the dam site are described hereunder in the order of the left bank, right bank and river beds.

Table -1 Major Climatic Elements at Sohar

<u>Climatic Element</u>	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sep.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Annual</u>
<u>Rainfall (mm: 1974 - 1984)</u>	9.3	44.9	15.0	13.1	2.1	0.0	0.3	0.6	0.4	4.1	3.2	9.0	102.0
<u>Temperature (°C: 1973 - 1984)</u>													
Maximum	24.4	24.5	28.2	33.4	38.0	38.8	37.6	36.4	35.6	33.7	29.4	26.0	32.2
Minimum	11.9	12.6	15.7	18.4	22.2	25.4	27.6	26.7	23.5	18.1	14.0	13.2	19.1
Mean	18.2	18.6	22.0	25.9	30.1	32.1	32.6	31.6	29.6	25.9	21.7	19.6	25.7
<u>Relative Humidity (%: 1973 - 1984)</u>													
Maximum	95.4	94.8	94.3	92.5	88.3	93.5	95.6	96.7	96.1	95.1	95.8	96.7	94.6
Minimum	41.6	41.9	40.5	27.2	22.0	30.0	45.4	51.2	43.1	32.2	37.9	44.3	38.1
Mean	68.5	68.4	67.4	59.9	55.2	61.8	70.5	74.0	69.6	63.7	66.9	70.5	66.4
<u>Pan-Evaporation (mm/day: 1976 - 1984)</u>													
	3.1	3.6	4.7	6.8	8.3	7.8	7.2	6.5	5.9	5.0	3.9	3.0	5.5
<u>Sunshine Hours (hrs/day: 1973 - 1979)</u>													
	7.2	7.7	8.1	8.7	10.3	9.9	8.7	8.5	9.3	9.1	8.4	7.6	8.6
<u>Wind Velocity (Km/day: 1973 - 1984)</u>													
	56.4	61.0	67.2	70.3	73.3	75.2	85.3	84.9	71.0	58.6	49.6	46.3	66.6

FIGURE --1 SEASONAL VARIATION OF RAINFALL, TEMPERATURE, RELATIVE HUMIDITY AND PAN-EVAPORATION



The left and the right banks are the river terraces consisting of sand and gravel, and rise on the dam axis with slope of about 20 degrees from the river bed. The crests, however, are flat at elevations ranging from EL 165 m to EL 170 m and extend widely. On the flats lie many deep gullies which are developing at high speed.

The recent river bed of the Wadi Jizzi, formed with flood plain deposits, expands abruptly wider at the confluence with the Wadi Awhin, the proposed dam site, and reaches about 10 km width or more in the coastal area. In the upstream portion, the river bed width varies with bulges of the mountain. Four distinct flow courses can be observed at the Wadi Jizzi around the dam.

6. Geology

The Wadi Jizzi basin is mainly composed of the Hawasina group of the sedimentary rocks, the metamorphic rocks, the Semail ophiolite of the igneous rocks, and the Quaternary deposits.

Geology of the dam site consists of bed rocks, upper terrace deposits, middle terrace deposits and recent river deposits. The main geological features of them are:

* Bed rock consists of serpentine, and is overlain by upper terrace deposits. It is generally hard except some parts, and impermeable layer. However, it does not come into contact with the dam embankment.

* Upper terrace deposits consist of well consolidated sand and gravel. Because of the consolidated condition the deposits are regarded as soft rock.

They are overlain by middle terrace deposits, and outcrops at both abutments that come into contact directly with the dam embankment. They are weathered and weakly cemented in the surface. Therefore the permeability is high at the abutments.

* Middle terrace deposits consist of consolidated sand and gravel. They are moderately soft, and are regarded as soft rock. They are overlain by recent river deposits. Because they have abundant opened joints and vesicles in lower part, the permeability is high.

* Recent river deposits spread over the Wadi channel, and consist of very loose sand and gravel. The average thickness is 3.1 m.

7. Socio-Economic Conditions

Sohar is the largest town in the Batinah coast. The importance as an administrative center of the coastal populous agricultural region and also the headquarters of Wilaya Sohar has resulted in considerable interaction between Sohar and its hinterland.

The area under Wilaya Sohar administration extends about 35 km along the coastline from Majis to Khadaq with a width of about 50 km inland. Industry of Wilaya Sohar consists of agriculture, fisheries, manufacturing, mining and commerce.

There is no large manufacturing industry in Sohar. The industrial development is limited to workshops for carpenters, metal workers and car repairs. Small retail shops, some banks and offices, though limited, contribute to the local commercial development.

The national Sohar copper mining project is currently in operation at the upstream reach of the dam site in the Wadi Jizzi basin.

The town of Sohar is confined to a narrow coastal strip of about seven kilometers long and some 400 m wide from the beach. The government agencies including the police headquarters, hospital, school and power station, are located in the southeast part of the area.

There is one water supply station as a part of Sohar Urban Development Project which is promoted by the Ministry of Electricity and Water and the water supply to the area was commenced from beginning of 1984.

8. Scope of Work

The Project consists of construction works of the following facilities:

(1) Detention Dam

Location - on the Wadi Jizzi, Wilaya Sohar, Batinah Coast

Reservoir Area - 1.25 sq.km

Reservoir Capacity - 5.4 MCM

Dam Body - Zone Fill Type

- Max. height ... 20.4 m

- Dam volume ... 629,000 cu.m

Main Spillway - Gateless overflow and chute type

- 4,700 cu.m/sec (Design flood discharge)

- 5.3 m (Design head of overflow)

- 184.2 m (Width of crest)

Emergency Spillway - Gateless, overflow and chute type

- 3,100 cu.m/sec (Design flood
discharge)

- 3.5 m (Design head of overflow)

- 278.2 m (Width of crest)

Conduit

Main Conduit - Steel pipe with accessories,

inside diameter 1,500 mm

Pipe length ... 114 m

Max. discharge ... 13 cu.m/sec

Emergency Conduit - Steel pipe with gate, etc,

inside diameter 1,500 mm,

Pipe length ... 66 m

Gate ... 1,600 x 1,600 mm

manual operation

Max. discharge ... 10.2 cu.m/sec

(2) Dispersion Facilities

Location - 3.3 km downstream of the dam

Structure - Fill protected with gabions

Crest length - 243 m

Crest height - 3.7 m

(3) Observation Facilities

Observation Well

Total number of the Wells 5 Nos.

Diameter of Well 100 mm

Depth of Well 70 m 3 Nos.

40 m 1 No.

20 m 1 No.

Automatic water level gauge 1 No.

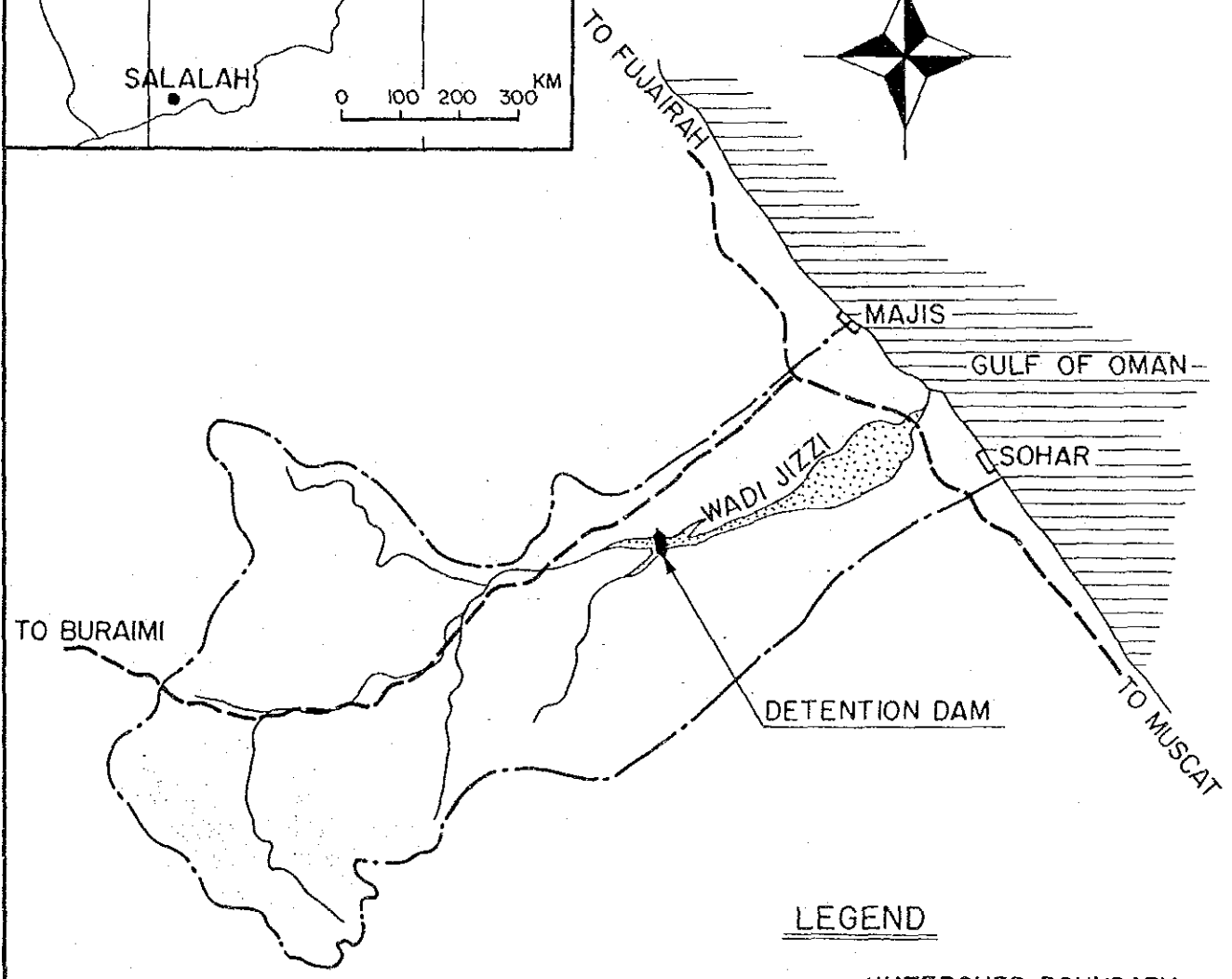
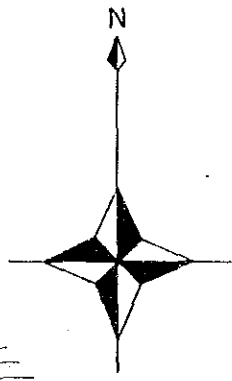
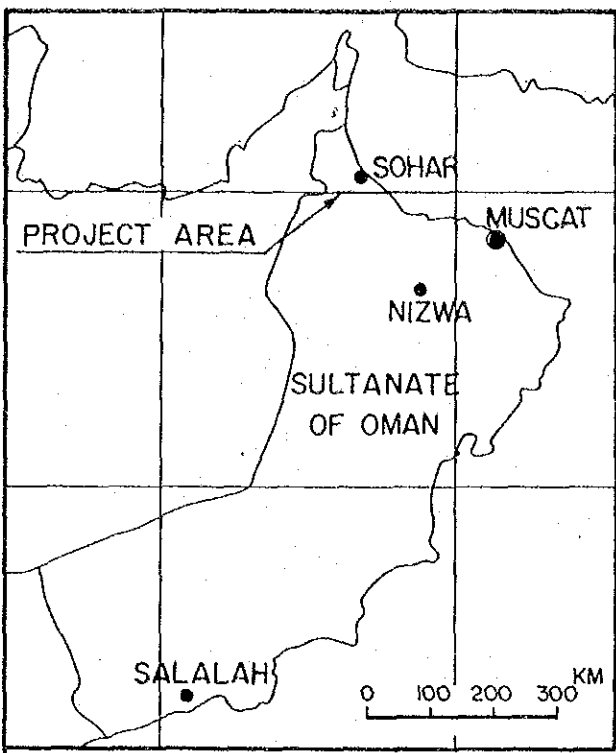
(within reservoir)

IV. EXHIBITS

PROJECT LOCATION

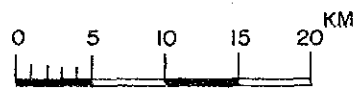
PROJECT MAP

GENERAL PLAN



LEGEND

- WATERSHED BOUNDARY
- WADI COURSE
- HIGHWAY



PROJECT LOCATION

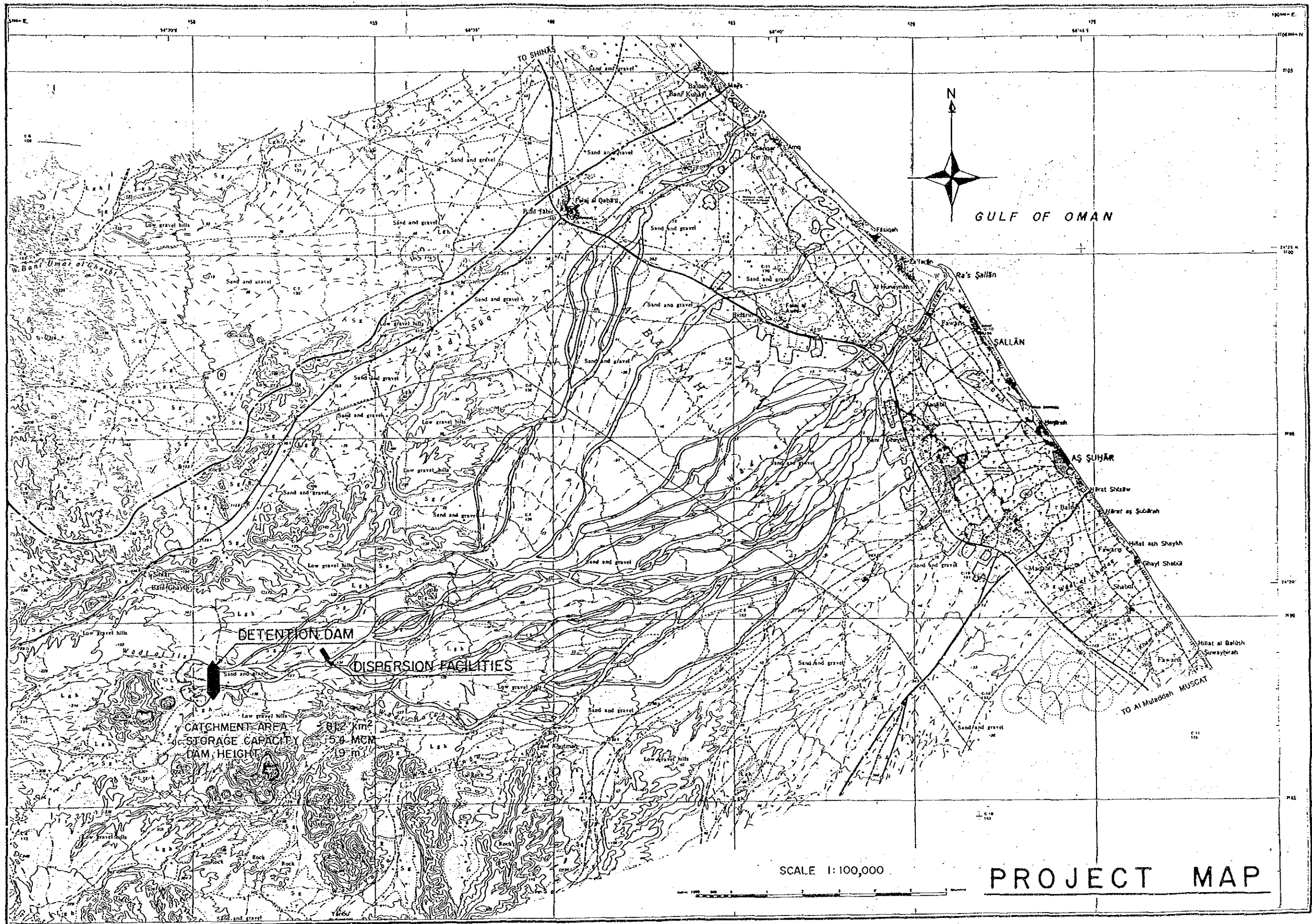
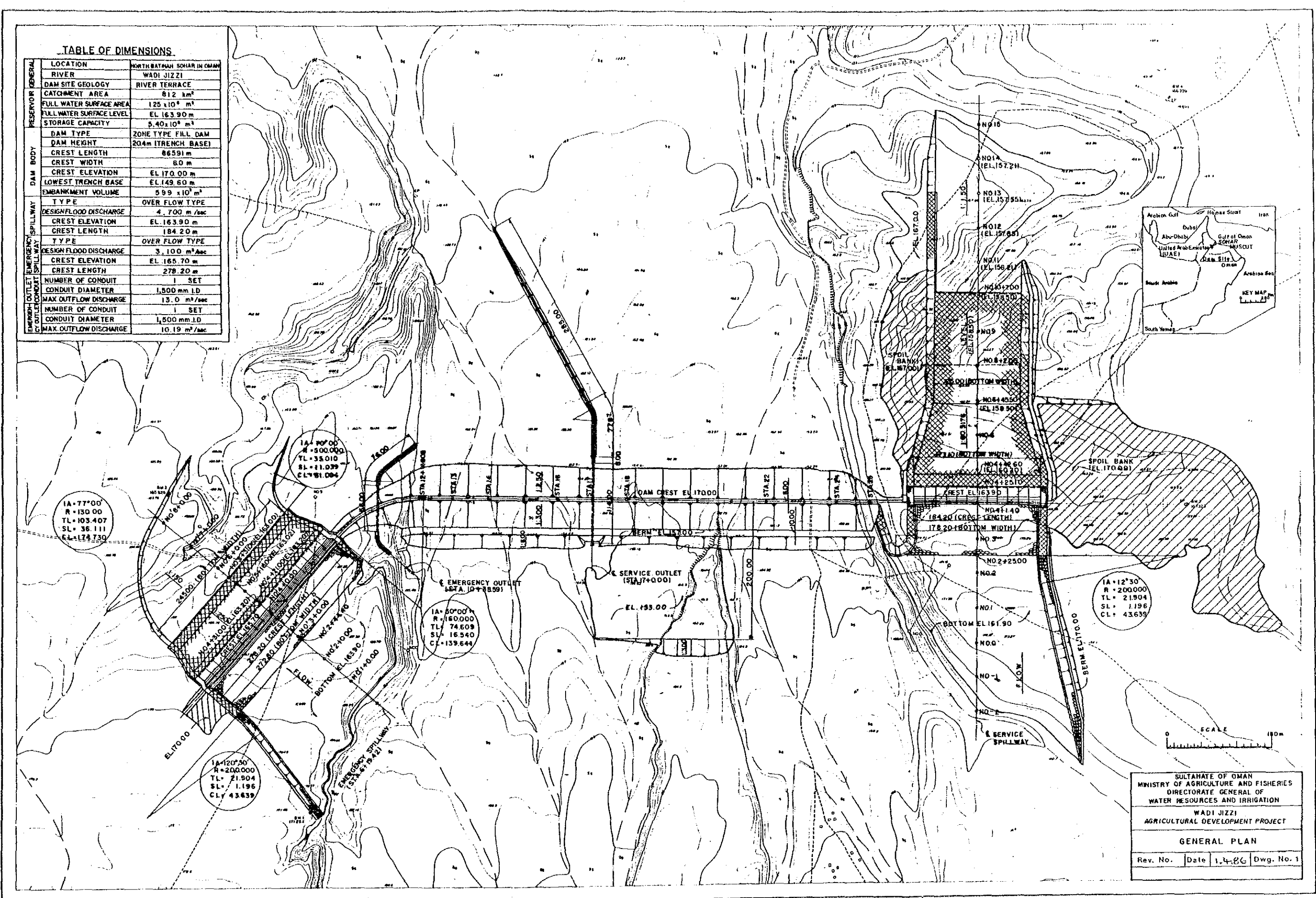


TABLE OF DIMENSIONS.

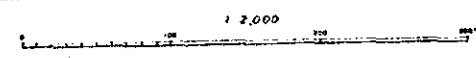
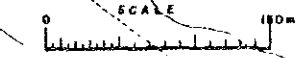
RESERVOIR GENERAL	LOCATION	NORTH BATHNAH SOHAR IN OMAN
	RIVER	WADI JIZZI
	DAM SITE GEOLOGY	RIVER TERRACE
	CATCHMENT AREA	812 km ²
	FULL WATER SURFACE AREA	125 x 10 ⁶ m ²
DAM BODY	FULL WATER SURFACE LEVEL	EL 163.90 m
	STORAGE CAPACITY	5.40 x 10 ⁶ m ³
	DAM TYPE	ZONE TYPE FILL DAM
	DAM HEIGHT	204m (TRENCH BASE)
	CREST LENGTH	86591 m
SPILLWAY	CREST WIDTH	8.0 m
	CREST ELEVATION	EL 170.00 m
	LOWEST TRENCH BASE	EL 149.60 m
	EMBANKMENT VOLUME	599 x 10 ⁶ m ³
	TYPE	OVER FLOW TYPE
EMERGENCY OUTLET	DESIGN FLOOD DISCHARGE	4,700 m ³ /sec
	CREST ELEVATION	EL 163.90 m
	CREST LENGTH	184.20 m
	TYPE	OVER FLOW TYPE
	DESIGN FLOOD DISCHARGE	3,100 m ³ /sec
CONDUIT	CREST ELEVATION	EL 165.70 m
	CREST LENGTH	278.20 m
	NUMBER OF CONDUIT	1 SET
	CONDUIT DIAMETER	1,500 mm I.D.
	MAX OUTFLOW DISCHARGE	13.0 m ³ /sec
EMERGENCY SPILLWAY	NUMBER OF CONDUIT	1 SET
	CONDUIT DIAMETER	1,500 mm I.D.
	MAX OUTFLOW DISCHARGE	10.19 m ³ /sec
	CONDUIT DIAMETER	1,500 mm I.D.
	MAX OUTFLOW DISCHARGE	10.19 m ³ /sec



SULTANATE OF OMAN
 MINISTRY OF AGRICULTURE AND FISHERIES
 DIRECTORATE GENERAL OF
 WATER RESOURCES AND IRRIGATION
 WADI JIZZI
 AGRICULTURAL DEVELOPMENT PROJECT

GENERAL PLAN

Rev. No.	Date	1.4.86	Dwg. No. 1
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