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MINISTRY OF TRANSPORT & COMMUNICATIONS
SULTANATE OF OMAN

THE STUDY
ON
ROAD NETWORK DEVELOPMENT
IN
THE SULTANATE OF OMAN

FINAL REPORT

APPENDIX

MARCH 2005

KATAHIRA & ENGINEERS INTERNATIONAL

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Report Composition

The Final Report of the Study is structured to meet the requirements of two user-groups, either for experts in-charge of planning or technical feasibility studies. It contains the following five volumes:

EXECUTIVE SUMMARY: is designed to address the decision-makers who do not have extensive information in technical and engineering aspects. It contains brief information on all the major aspects of the Study, and concentrates on input and output of each aspect. It contains also a more concentrated summary for the main conclusions.

MAIN REPORT – 1 "Road Network Development Plan": is designed for planners, engineers and directors of DGR and concerned ministries and authorities, who need more technical information on the Master Plan formulation. It contains comprehensive information on the present conditions in sectors related to the Study, planning objectives and strategies, development and evaluation of alternatives, components of planned projects, prioritization in the planning process, evaluation results of the Master Plan and overall implementation plan. This report contains the Chapters from 1 to 16.

MAIN REPORT – 2 "Pre-Feasibility Study": is designed to include technical and detailed studies carried out on significant projects selected in line with the policies and concept of the Master Plan. The report gives the objectives, preliminary design, cost estimate and project evaluation on the technical, environmental and economic viability of four road projects. In addition, it contains other detailed studies conducted on three projects on specific fields of environment, hydrology and management. This report contains the Chapters from 17 to 26.

APPENDIX: to contain necessary data, calculations and other information produced during the course of the Study.

DRAWINGS: to contain preliminary design drawings produced for the Pre-Feasibility Study projects.

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ABBREVIATIONS

4WD	:	Four Wheel Drive
5YDP	:	Five-Year Development Plan
AADT	:	Annual Average Daily Traffic
AAGR	:	Annual Average Growth Rate
AASHTO	:	American Association of State Highway and Transport Officials
AC	:	Asphalt Concrete
ADT	:	Average Daily Traffic
amsl	:	above mean sea level
AP	:	Aden Port
ASFR	:	Age-Specific Fertility Rate
BAR		Bowshar – Al Armarat Road
B/C	:	Benefit/Cost Ratio
BC	:	Box Culvert
BOOT	:	Build, Operate, Own and Transfer
BOT	:	Build, Operate and Transfer
bpd	:	Barrel per Day
BS	:	British Standard
CC	:	Cement Concrete
DBST	:	Double-Layer Bituminous Surface Treatment
DD	:	Detail Design
DGC	:	Directorate General of Communications (in Dhofar)
DG	:	Director General
DGR	:	Directorate General of Roads
DGWRA	:	Directorate General of Water Resources Assessment
DNC	:	Do Nothing Case
DOT	:	UK Department of Transport
DST	:	Double Surface Treatment
EBH	:	Existing Batinah Highway
EIA	:	Environmental Impact Assessment
ESCWA	:	Economic and Social Committee for Western Asia
EIRR	:	Economic Internal Rate of Return
FFCO	:	Flood Frequency Curve of Oman
F/S	:	Feasibility Study
FIRR	:	Financial Internal Rate of Return
FPF	:	Flood Peak Frequency
FTZ	:	Free Trade Zone
FYDP	:	Five-Year Development Plan
GCCS	:	Gulf Co-operation Council Standard

GDP	:	Gross Domestic Products
GR	:	Grouted Riprap
GRDP	:	Gross Regional Domestic Products
GVA	:	Gross Value Added
ha	:	hectare
HCM	:	Highway Capacity Manual
HDM	:	Highway Design Manual
HUC	:	Highway User Cost
IB	:	Irish Bridge
ICC	:	Industrial Clarification Code
IEE	:	Initial Environmental Examination
IMF	:	International Monetary Fund
IR	:	Internal Regulation
ISIC	:	International Standard Industrial Classification
JICA	:	Japan International Cooperation Agency
LFPR	:	Labor Force Participation Rate
LNG	:	Liquefied Natural Gas
LOS	:	Level of Service
MAF	:	Mean Annual Flood
M/P	:	Master Plan
MCI	:	Ministry of Commerce and Industry
Mcm	:	Million cubic meters
MD	:	Ministerial Decision
MOAF	:	Ministry of Agriculture and Fisheries
MOC	:	Ministry of Communications
MOCI	:	Ministry of Commerce and Industry
MOD	:	Ministry of Defense
MOE&W	:	Ministry of Electricity and Water
MOF	:	Ministry of Finance
MOG	:	Ministry of Oil and Gas
MOH	:	Ministry of Health
MOHC	:	Ministry of Heritage and Culture
MONE	:	Ministry of National Economy
MOT&C	:	Ministry of Transport and Communications
MRMEWR	:	Ministry of Regional Municipalities, Environment and Water Resources
MWR	:	Ministry of Water Resources
N.A., N/A	:	Not Available
NBE	:	New Batinah Expressway
NPV	:	Net Present Value
NR	:	National Road

NSA	:	National Survey Authority
OD	:	Origin-Destination
PC	:	Precast Concrete
PC	:	Pipe Culvert
P/C table	:	Production and Consumption Table
PCE	:	Passenger Car Equivalent
PCSG	:	Pre-stress Concrete Steel Girder
PCU	:	Passenger Car Unit
PDO	:	Petroleum Development of Oman
PFI	:	Private Finance Initiative
POT	:	Peak Over Threshold
PSS	:	Passing Sight Distance
R/A	:	Roundabout
RC	:	Reinforced Concrete
RCSG	:	Reinforced Concrete Steel Girder
RD	:	Royal Decree
RD/DGC	:	Road Department of DGC
RDI	:	Road Density Index
RO	:	Riyal Omani
ROP	:	Royal Oman Police
ROW	:	Right of Way
SCTP	:	Supreme Committee for Town Planning
SGRF	:	State General Reserve Fund
SPT	:	Standard Penetration Test
QSR	:	Quriyat - Sur Road
SSD	:	Stopping Sight Distance
ST	:	Surface Treatment
TEU	:	Twenty Feet Equivalent Unit
TFR	:	Total Fertility Rate
TOR	:	Terms of Reference
TRB	:	Transportation Research Board (USA)
TRL	:	Transport Research Laboratory
TTC	:	Travel Time Cost
UAE	:	United Arab Emirates
UK	:	United Kingdom
VCR	:	Volume/Capacity Ratio
veh	:	Vehicle
VOC	:	Vehicle Operating Cost
vpd	:	Vehicle per day
ph	:	Vehicle per hour

APPENDIX 1-1

Relevant Plans and Studies

1. National Development Plans
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Appendix 1-1

RELEVANT DEVELOPMENT PLANS AND STUDIES

1. NATIONAL DEVELOPMENT PLAN

1.1 Long Term Strategies and Five-Year Development Plans

Since 1976, six Five-Year Development Plans have been prepared in Oman. At present, the Sixth Five-Year Development Plan (2001-2005) is being implemented. These development plans were considered as the five-year implementation plans of two long-term strategies for development. The first long-term strategy was for the period 1970-1995, and the second one for the period 1996-2020. The first four development plans were prepared under the policies of the first long-term strategy, while the recent two plans under the second long-term strategy, Oman Vision 2020.

1.2 First Long Term Strategy for Development (1970-1995)

The Development Council approved, in February 1975, the country's long-term development strategy (1970-1995). Its main objectives were as follows:

1. Working towards development of new resources for the national income beside the oil resources and replace it in the future.
2. To increase investments directed towards income generating projects, especially in the areas of industry, mining, agriculture and fisheries.
3. To emphasize on the development of domestic human resources capable of assuming its role in the Omani economy.
4. To allocate investments among different regions, so that benefits are shared equally by all regions and citizens of the country. This will lead to the elimination of disparity among the regions, with regard to the level of living. Special priority should be given to the least developed regions at present.
5. Supporting and development of present housing centers and their maintenance against the mass migration to densely populated centers.
6. Completion of the infrastructure.
7. Attention is given to water resources as it is a vital element for the continuation of the economic activity and development and maintenance of environment.
8. Supporting domestic trading activity through removal of difficulties of transport, storage and the different obstacles that hinder the completion of the commercial markets. This to increase the competitive activity and securing a reasonable level of prices.
9. Completion of constituents for establishing a free national economy based on the private sector activity based on free competition and through provision of loans for the vital projects in accordance with the available resources of the country.
10. Promotion of the efficiency of the state administrative apparatus.

1.3 Five Year Development Plans under First Long Term Strategy

1) First Five Year Development Plan (1976-1980)

This plan coincided with the phase of Oil Boom. The plan concentrated on benefiting from the oil resources offered by the boom, to complete the infrastructure, increase the economic capacity of the national economy and promote the private sector. The most prominent achievement in this plan is the establishment of the State General Reserve Fund (SGRF) in 1980, which aimed at ensuring the economic stability and sustainable development.

2) Second Five Year Development Plan (1981-1985)

This plan aimed at raising the investment rates so as to strengthen the production capacities, pursue the completion of the infrastructure, support the private sector and strive to ensure fair distribution of the fruits of development among the regions.

3) Third Five Year Development Plan (1986-1990)

The beginning of this plan coincided with the significant drop in oil prices. It sought, as much as possible, to maintain adequate levels of economic activity, together with the maintenance of economic and fiscal balance of the country, and continuance of providing the basic services such as education, health and social supports. The government adopted policies for reducing and rationalizing expenditure without jeopardizing the achievement made, particularly in the social ones.

4) Fourth Five Year Development Plan (1991-1995)

This was the last plan within the framework of the first development strategy. It was concentrated on directing the investments towards productive projects to broaden and diversify the production base and encourage the private sector. Special attention was given by the plan to sectoral and regional development processes. It was also distinguished from the previous plans by its concentration on the policies as effective methods for achieving its objectives.

1.4 Evaluation of Achievements during the Period 1970-1995

Since the present sultan came to power in 1970, Oman had successfully laid the foundation for transforming the country's socioeconomic system from a traditional to a modern system until the end of the plan period. Like most Gulf countries, hydrocarbons form the most important sector of the Omani economy, with crude oil accounting for around 40% of GDP. However, in contrast to neighboring states such Saudi Arabia and the UAE, Oman's oil resources are relatively limited and difficult to extract. Oman is therefore attempting to diversify the economy away from its current reliance on oil exports. In the 1980s it emphasized the development of non-oil

manufactured exports. Natural gas was discovered in large quantities in the late 1980s and early 1990s, and diversification plans have focused on this resource.

In May 1994, the World Bank and the International Monetary Fund (IMF) prepared their respective reports on the country's economic situation. The former, at the request of the government, presented its report entitled "Sustainable Growth and Economic Diversification". It provided detailed discussions of the achievements realized during the previous twenty-three years (1970-1993) and a set of proposed corrective measures which would enable the country to meet current and future challenges, with the aim of achieving sustainable development and economic diversification. The latter, within the framework of its annual consultations with the government regarding the country's financial and fiscal positions, suggested a group of measures related to the economic adjustment process, which should be adopted in order to avoid the impacts that will result from continuing the current expenditure policies.

Since then, the Omani government conducted its own overall evaluation of the achievements during the previous quarter of a century. It revealed several socioeconomic challenges in spite of the major achievements made. Main challenges facing Oman were summarized as follows:

a. The increasing deficit in the general budget; a decline in financial reserves; levels of public debt that must not be exceeded; and instituting a mechanism for achieving equilibrium in the public finance.
b. The dependence of the national economy on a single depletable source (oil), which is affected mainly by external economic and political factors.
c. The expected gradual decline in the oil reserve in the coming twenty-five years.
d. The prominence of the government role in the goods and services production fields, which limits the opportunities available for the private sector in these fields.
e. The lack of certain laws and systems for the provision of a suitable environment for the growth and diversity of private sector activities.
f. The weak integration between the oil sector and other production and services sectors. All production and services sectors are characterized by low efficiency and poor quality, which reduces their ability to compete at international level.
g. The poor production efficiency in government systems and the inefficient utilization of available resources.
h. The low levels of private saving and investment rates and the increasing consumption tendencies.
i. The existing disequilibrium in the labor market, including the low level of national labor participation and expansion in the employment of expatriate labor
j. The poor productivity of human resources, the low status of some professions and handicrafts, in addition to their insignificant participation in the national economy.
k. The incapability of national labor to cope with the rapid developments in the technological field.

The outlines of the second long-term development strategy and the Fifth and Sixth Five Year Plans are described in the following section.

2. OMAN VISION 2020 AND RECENT DEVELOPMENT PLANS

2.1 Oman Vision 2020

For addressing the challenges described in 1.4, the "Vision for Oman's Economy: Oman 2020" was prepared. It was adopted as the second long-term development strategy for the period 1996-2020 on January 1 1996, in accordance with the Royal Decree No (1/96). The Fifth Five Year Plan was considered as the first implementation program for the achievement of the primary dimensions of the "Vision".

The primary aim of the Oman Vision 2020 was to maintain at least the current level of per capita income in real terms, and to strive to double it by 2020. This would be achieved through treating the Fifth Five Year Plan period (1996-2000) as a transitional stage during which the government would attempt to achieve a balance between revenues and expenditures by the end of the Plan. The Vision also aimed at providing suitable conditions for economic take off. The government would strive to use the proceeds of oil and gas for sustainable economic diversification and it will accept full responsibility for promoting basic health, education and training for Omani citizens, in addition to adopting policies that promote their standard of living.

The Vision adopted the "Achievement of Economic Balance and Sustainable Growth" as the basic strategy, and the following three as the main strategies for assisting it.

1. Human Resources Development
2. Economic Diversification
3. Private Sector development

A. Achievement of Economic Balance and Sustainable Growth

Table 2-1 shows a summary of targeted levels of economic indicators in the Oman Vision 2020. These values aimed primarily at indicating the importance of establishing necessary macroeconomic bases that are sufficient to fulfill the objectives of economic balance and a sustainable growth strategy. Special consideration was given to the diversification of income sources, private sector development and human resources development. Estimated values were considered as preliminary indicators, to be subjected to further checking, on a yearly or periodic basis and during the preparation of each five year plan, in the light of the results achieved each year.

Table 2-1 Macroeconomic Indicators in Oman Vision 2020

% to GDP at 1988 Constant Prices				
	Item	1995	2000	2020
1	Total Revenue	38.8%	34.6%	16%
2	Total Expenditure	48.8%	34.6%	14%
3	Deficit/Surplus	10.0%	0.0%	2%
4	Total Final Consumption	78.8%	72.4%	68%
5	Domestic Saving	21.2%	27.6%	32%
6	Total Investment	14.5%	16.9%	34%
7	Public Investment	10.1%	8.3%	3%
8	Private Investment	4.4%	8.6%	31%
9	Total Imports	34.5%	29.9%	20%
10	Total Exports	41.1%	40.5%	23%
11	Non-oil Exports	9.4%	14.4%	13%
12	Oil Exports	31.7%	26.1%	10%
13	Current Account (Deficit/Surplus)	-7.2%	-8.0%	4%
14	Public External Debt	20.9%	16.3%	9%
15	SGRF Balance	17.4%	2.9%	24%
Annual Average Growth Rate (%)				
	Item	1991-95	1996-00	2020
16	Gross Domestic Product	5.8%	5.1%	7.4%
17	Non-oil GDP	6.8%	5.7%	8.8%
18	GDP per Capita	0.02%	1.0%	3.8%

Source: "Vision for Oman's Economy - Oman: 2020"

The main features of Oman's economy at the macro level until 2020 were as follows:

1. Structure of Public Finance:

Government revenues are expected to increase in such a way that fiscal balance will be achieved before the year 2000. Accordingly, there will be no need to withdraw from the SGRF balance. Thereafter, the volume of revenues is expected to increase at a rate higher than that of the uses. Hence, a surplus in the state general budget will be achieved, and it may reach up to 2% of GDP by 2020.

2. Reserves (Government Savings):

Applying the policy of transferring oil revenues resulting from an increase in oil prices above US$15 per barrel and up to US$17 to the SGRF, will lead to the increase of the stock of the fund at an increasing rate throughout the next twenty-five years. This will be from less than US$ 3 billion in 1995 to about US$ 25 billion in 2020.

3. External Balances:

In 2000, surpluses in the current account throughout the projection period (1996-2000) will replace the current deficit, estimated in 1995 to be about 7.2% of GDP. These surpluses shall remain at this level up to 2020. The preliminary estimates indicate the continuous increase non-oil exports from 9.4% of GDP in 1995, to about 13% in 2020. Accordingly, non-oil exports will gradually replace oil exports. The latter are expected to decrease from 31.7% of GDP in 1995, to 10% in the year 2020. Goods imports will also gradually decrease from 34.5% in

1995, to 20% in the year 2020.

4. Saving Structure:

As a result of the approved policies and as indicated by primary data, the Gross Domestic Consumption is expected to decrease from 78.8% of GDP in 1995, to 68% in 2020, due, in particular, to the decrease in government consumption. Accordingly, Gross Domestic Saving will increase from 21.2% in 1995, to 32% in 2020, as a result of the increase in government saving in particular.

5. Investment Structure:

As a result of the possible increase in the savings rates, the total investments in the Omani economy are expected to increase from 14.5% of GDP in 1995, to 34% in 2020.

The increase in total investment is naturally attributable to the increase in the private investments, which are expected to increase from 4.4% in 1995, to 31% in 2020. This will lead to the achievement of the policies aiming at developing the private sector role in the national economy. Private investments will then be the primary engine of the sustainable economic growth, as targeted in the dimensions of the Vision for Oman's Economy.

6. Economic Diversification (Growth and Structure of GDP)

Positive development will occur in the structure and growth rates of the GDP as a result of the above mentioned changes that will result from the application of approved program policies. These approved policies will lead to an increase in the GDP growth rates throughout the next twenty-five years. The GDP growth rate is expected to increase from 5.8% in 1995, to more than 7.4% in 2020.

The approved new fiscal policies will lead to positive changes in the relative prices of non-oil goods and tradeables, against those of the non-tradeables. They will also strengthen the external balances, due to the changes in relative prices and the development of the real exchange.

B. Human Resources Development

The most important dimensions of the human resources development strategy are as follows:

1. To achieve a balance between population and economic growth by reducing the current population growth rate to less than 3% by 2020, through reasoning and enlightenment.
2. Provision of health services and reduction of the rates of mortality and infectious diseases
3. To strengthen the general education
4. To establish a post-secondary and technical education system based on the provision of the main specialization required by the national economy.

5. To provide a system for technical education and vocational training that is capable of preparing labor to adapt to the needs of various specialization and skills in the labor market.
6. To create employment opportunities for Omanis in public and private sectors:
   - reduction in the number of government employees to reach a maximum of 30 employees for each 1,000 population
   - continuing the Omanization policy in the government sector to achieve the targeted percentage of 95% by 2020
   - increase fees imposed on expatriate labor from RO 60 to RO 120

Table 2-2 Distribution Target of Omani labor by Sector

Item	1993		2020	
	Number (Thousand)	(%)	Number (Thousand)	(%)
Omani labor:				
-in the Public Sector	175	73%	270	30%
-in the Private sector	65	27%	662	70%
Total	240	100%	892	100%

Source: "Vision for Oman's Economy - Oman: 2020"

The main quantitative indicators are shown in Table 2-3.

C. Economic Diversification

The move from an economy based on a mono depletable source continuously affected by external economic and political factors, to an economy with varied and renewable sources, is essential if economic diversification is to be achieved. This necessitates adopting an appropriate set of policies and mechanisms that are consistent with the dimensions of the diversification strategy.

Table 2-3 Quantitative Indicators for Human Resources Development

Sector	Indicator	1995	2020
Population	1. Annual Growth Rate	3.7%	Less than 3%
Health	1. Life Expectancy at Birth	67.4 years	At least 70 years
	2. Infant Mortality Rate	20 deaths/1,000 live births	10 deaths/1,000 live births
	3. Immunization		100% of the children
	4. Number of Beds in HP (Patient/Bed Ratio)	485 persons/bed	335 persons/bed
	5. Number of Physicians (Pop./Physician Ratio)	844 persons/physician	715 persons/physician
	6. Number of Nurses (Pop./Nurse Ratio)	346 persons/nurse	325 persons/nurse
General Education	1. Minimum Level of Basic Education	9 years	10 years
	2. Short-term Trainng		Job training
	3. Secondary Education		2 years for univ. studies
Higher Education	1. Enrollment	9%	40%
	2. Enrollment of Women (Age Group 20-40)		40%
Tech./vocational Education	1. Percentage of Students	4.5%	50%
Employment	1. % of Omani Labor Force	17% of total population	About 50%
	2. % of Women in L. F.	6%	12%
	3. % of Omanis in Public Sec.	68%	95%
	4. % of Omanis in Private Sec.	15%	75%

Source: "Vision for Oman's Economy - Oman: 2020"

The most important policies are as follows:

1. Pursuing a high value-added strategy, characterized by adopting capital intensive production method, and depending on highly advanced technology, scientific research and development.
2. Adopting an export-led diversification strategy.
3. Developing small and medium scale establishments.
4. Furthering the integration of Oman's economy with the world economy through the free flow of goods, services and factors of production.
5. Adopting the strategy of the transfer technology
6. Creating a suitable macroeconomic climate for the development of tradable production sectors.
7. Creating a dynamic efficient and competitive private sector, in addition to pursuing privatization policies, upgrading laws and systems, simplifying procedures and promoting investments.
8. Developing the qualifying human resources in a proper and efficient manner which will enable them to accommodate rapid technological changes.
9. Developing and conserving water resources through efficient utilization, since water is considered to be an essential element for the continuance and progress of economic development.

Quantitative and qualitative indicators for diversification are shown in Table 2-4.

Table 2-4 Quantitative Qualitative Targets for Diversification

Sector	AAGR (%) 1995-2020	Relative Shares to GDP (%)			Remarks
		1995	2000	2020	
Oil	-2.2	33.5	25.9	9.0	1. Crude Oil Extraction Rate Decrease from 850,000 bpd to 426,000 bpd in 2020 2. Oil Reserves Gradual depletion, despite the expected increase 5 billion barrels
Gas	11.1	1.5	5.0	10.0	1. Natural Gas Reserves 16 trillion cubic feet, with expected discovery of additional reserves
Agriculture	4.5	3.0	3.5	3.1	1. Increase of cultivated consistent with available water resources 2. Raising of productivity with modern techniques 3. Development of agro-industries
Fisheries	5.6	1.1	1.0	2.0	1. Utilization of modern and high value added technologies 2. Development of necessary infrastructure, such as fishing ports
Mining	10.8	0.6	0.6	2.0	1. Proven Reserves of Main Minerals a. Copper: Additional reserves of around 15 million tons b. Chromite: More than 100,000 tons c. Coal: More than 100 million tons d. Silica: Around 5.6 million tons
Manufactur-ing	7.3	5.4	6.8	15.0	1. Expansion of the petrochemical industry, based on gas as a feed stock 2. Expansion of oil refining 3. Expansion of the production of agricultural, fisheries and mining sector 4. Increase in the participation of foreign investment
Electricity & Water	4.5	1.7	4.3	2.0	1. Promoting privatization in order to increase in productivity 2. Providing water to areas that are not yet supplied
Const. & Real Estate		3.2	6.9	10.0	1. Development of the country's infrastructure
Trade & Tourism	3.9	14.1	17.8	18.0	1. Expansion of non-oil production for the increase in trade exchange 2. Utilizing Oman's location for export, re-export and transit operations 3. Raising tourism's share of GDP from 0.8% in 1995 to 3% by 2020
Transport & Telecomm.	5.9	7.0	8.6	8.0	1. Upgrading the efficiency of existing ports and development of a new po 2. Expanding and upgrading the existing telecommunications network
Finance	5.9	7.9	4.3	8.0	1. Meeting the increased funding needs and volume of savings resulting from the high growth of the national economy 2. Need to develop the export oriented services
Private Serv.	5.0	8.3	3.2	5.0	1. High rates of growth based on the following factors: a. A large population increase, with an annual average growth rate of 3.7 b. An income increase, with a per capita income of RO3,000 by 2020
Public Serv.	1.1	13.9	12.6	10.0	1. Expected decline of the public services, resulting from the following: a. Achieving economic stabilization and rationalizing public expenditures b. Enhancing the role of the private sector c. Enhancing economic diversification d. Human resources development
Custom D. & Imptd Serv.		-1.2	-5.0	-2.1	
GDP	**3.3**	**100.0**	**100.0**	**100.0**	

Source: "Vision for Oman's Economy - Oman: 2020"

D. Private Sector Development

Through the evaluation studies conducted between 1994 and 1995, a group of challenges facing the private sector development were pointed out. The most important challenges extracted from the studies were as follows:

1. Challenges Related to Increase of Government Role in Economic Activity
2. Challenges related to the Inability of Some Laws and Regulations to Provide a Suitable Environment for Increase and Diversification of Private Sector Activities
3. Challenges Concerning the Inability of the Financial or Material Incentives to Create a Self Reliant Private Sector
4. Challenges Concerning the Insufficiency of the Financial and Banking Sector

Capabilities to Meet the Various Needs and Requirements of the Private Sector
5. Challenges Related to Infrastructural Inefficiency and Non Conformity with the Rapid Changes in Modern Technology
6. Challenges Pertaining to the Incapability of Education and Training Outputs to Meet the Labor Market Requirements

For addressing these challenges, the following was considered as the primary dimensions of the private sector development strategy:

1. To provide a stable macroeconomic framework.
2. To reduce gradually the government role in economic activities (i.e. goods and services).
3. To upgrade the legal and regulatory framework.
4. To provide a suitable system of incentives in order to increase private sector investments.
5. To upgrade and support the financial sector so as to provide an appropriate environment for promoting the private sector role in all economic activities.
6. To upgrade the infrastructure
7. To develop human resources

For this strategy, no quantitative indicators were presented.

2.2 Fifth Five Year Development Plan (1996-2000)

1) Objectives of the Plan

The main objectives of the Plan were as follows:

1. To achieve a balanced budget by the end of the plan period
2. To increase the crude oil production to 880,000 bpd on average through the period
3. To achieve an average GDP growth rate of 4.6% at current prices
4. To increase the GDP share of non-oil sectors to 68.8% by the end of 2000
5. To increase the private sector investment share to 53.3%
6. To develop and promote natural gas projects
7. To implement privatization programs in the service sectors
8. To control the annual average inflation rate no more than 1.0%
9. To implement strategies and programs for human resources development
10. To increase the ratio of the national labor force in the labor market

2) Evaluation of the Plan Achievements

a. Economic Balance and Sustainable Growth

a-1 Economic Balance

The government revenue fluctuated depending on the oil prices. For the Plan, the oil prices were assumed to be US$ 15 /barrel. The actual oil prices fluctuated as shown in Table 2-5. .

Table 2-5 Oil prices during Fifth Five-Year Plan Period

Year	Oil Price (US$/barrel)			Remarks
	Planned	Actual	Diference	
1996	15	19.4	4.4	Increase in demand due to good performance of international economy and slow oil production outside OPEC
1997	15	18.6	3.6	In spite of increase in demand, slight decrease due to noticeable increase in supplies
1998	15	11.9	-3.1	Considerable drop due to weak demand for oil as a result of the financial crisis of Asian coutries, increased supplies from Non-OPEC countries, non-abidance of some OPEC members to the quatas, and Iraq's resumption of oil exports
1999	15	17.4	2.4	Increase in demand due to improved performance of South East Asian countries, decrease of OPEC production and retraction of oil reserves
2000	15	26.7	11.7	Noticeable rise due to increase in demand resulting from flourishing American economy, recovery of South East Asian countries' economy and decrease in oil supply from OPEC
Average	15	18.8	3.8	

Source: "The General Framework of the Sixth Five-Year Development Plan 2001-2005" Volume I

The achieved oil prices, except for 1998, were higher than the planned prices for the plan period, and the average price was US$ 18.8 /barrel. This increase on average oil price resulted in a noticeable increase in the total actual government revenues from oil during the plan period. In spite of the achieved increase in the total government oil revenues, the actual net government oil revenues receded by about 0.9% of its planned level, after transfers to reserve, as presented in Table 2-6.

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The actual non-oil revenues recorded a noticeable increase above the planned level. This improvement is mainly attributable to the following two factors:

1. Increase in the customs duties proceeds as a result of the fiscal policies in 1998, which aimed at increasing these duties to face the decrease in oil prices.
2. Improvement in the collection of government revenues.

Table 2-6 Fiscal Balance during Fifth Five-Year Plan Period

	Revenue & Expenditure (RO m)		% Increase (B/A)
	Planned Total (A)	Actual Total (B)	
A-Revenue			
1. Current Revenue	9,987	10,066.3	0.8
1-1 Net Oil Revenue	7,453	7,384.7	-0.9
1-2 Natural Gas Revenue	332	307.0	-7.5
1-3 Other Current Revenue	2,202	2,374.6	7.8
2. Capital Revenue and Repayment	105	123.4	17.5
3. Total Revenue (1+2)	10,092	10,189.7	1.0
B-Expenditure			
4. Current Expenditure	8,696	9,407.4	8.2
5. Investment Expenditure	1,854	2,076.1	12.0
6. Participation & Support to Private Sector	80	224.3	180.4
7.Total Expenditure (4+5+6)	10,630	11,707.8	10.1
8. Surplus (+) or Deficit (-)	-538	-1,518.1	182.2

Source: "The General Framework of the Sixth Five-Year Development Plan 2001-2005" Vol. I

The actual non-oil revenues in 2000 recorded a decrease due to:

1. Retraction of the custom duties proceeds due to reduction of their values to the levels before 1998.
2. Decrease in the public organization's revenue surplus, where part of such surplus was directed to increase the reserves.

As a result of the above, the actual total government revenue for the plan period increased by 1% above the planned level. The actual total government expenditure for the plan period increased for about 10.1% above the planned one. This increase is primarily related to the expansion in the current expenditure.

As a result of the increase of the actual government expenditure by a rate higher than that recorded by the actual government revenues, the actual fiscal deficit increased remarkably, totaling about RO 1,518 million, compared to the planned deficit of RO 538 million.

However, it should be considered that Table 2-6 does not include two basic elements of the real resources available for the public finance. The first is the transfers from the gross oil revenues to the reserve funds. Secondly, the net returns on the investment of these funds. If including these two elements, the general budget recorded a total surplus for the plan period of about RO 1,096 million.

a-2 Sustainable Growth

The national economy recorded, as shown in Table 2-7, a high actual annual average growth rate of 7.6% during the plan period, compared to the planned growth rate of 4.6%. However, it should be pointed out that:

1. The petroleum activities achieved a high growth rate of 13%, compared to the planned rate of 1.1%, while the non-petroleum activities showed a slower growth rate of 3.9% than the planned rate of 6.3%. This poor performance of the non-oil sectors was due to several elements, of which the most important was the inability to implement the natural gas related industries and the privatization program.
2. The growth was not continuous, reflecting directly the fluctuation of oil prices during the plan period.

The per capita GDP in real terms increased at an annual average growth rate (AAGR) of 1.6%, applying revised estimated population based on the 2003 Census. In nominal terms, it increased at 5.7%. However, the growth was not continuous as shown in Table 2-8.

b. Economic Diversification

The plan achievement related to the economic diversification was characterized by its weakness. The non-oil production sectors recorded an annual average growth value

added (GVA) rate of 3.9% compared to the planned growth rate of 6.3% as shown in Table 2-9. The average growth rate of the commodity production sector, upon which diversification operations depend fundamentally, was significantly lower at 6.3% compared to the plan target of 13.7%. The average growth rate of the non-government service sectors was also less at 4.3% compared to 4.6% in the Plan. Among the commodity production sectors, the manufacturing sector achieved a high growth rate of 10.9%, while the agriculture and fishing sectors recorded a very low rate of 0.3%.

Due to the low growth rates of the non-oil sectors, the actual share of the non-oil sectors in GDP decreased from 58.0% in 1996 to 51.3% in 2000, which was 16.5 percentage points below the targeted level of 67.8% including the imputed financial intermediation services and import taxes.

c. Private Sector Development

The actual private sector investments during the plan period amounted to RO 1,883 million, almost half the planned amount of RO 3,900 million. Accordingly, the sector's share in the total investments was only 37.8% when compared to the planned one of 53.3%. This modest private sector performance was mainly due to the slowness in implementation of the privatization program and the development of natural gas related industries.

The "Privatization Program" was composed of 11 projects, of which the total expected amount of private sector investment was RO 1,008 million. The program included 2 projects for wastewater treatment, 3 for water supply, 2 for electricity, 3 for roads, and 1 for chemical production. The road projects were Quriat/Sur Road, Al Amrat/Bosher Road and Qurum Roudabout/Bait Al Barka Road. These road projects might be expected to attract the private sector for constructing them under BOT scheme. Including the road projects, none of the planned projects succeeded in realizing private sector participation. It may be due to low financial viability of the projects.

Related to the other objectives for human resources development, the Plan performance was good. The education services broadened tangibly. The enrollment rate increased from 96.5% to 100.9% for primary education, from 81.1% to 97% for preliminary education and from 59.3% to 72.3% for secondary education. The number of students in the high education including abroad increased from 10.3 thousand in 1995 to 31.8 thousand in 2000. And the number of girl students increased steadily.

As for the health sector, the number of hospital beds increased from 4,564 beds in 1995 to 5,190 beds in 2000. It made possible to maintain the level for the number of hospital bed at 22 beds for every 10,000 population, in spite of population increase. The number of doctors for every 10,000 population increased from 11.8 to 13.6. Immunization rates increased to 99% resulting in eradication of poliomyelitis and decrease in the cases of the known six childhood diseases to the achieved levels in advanced countries.

Table 2-7 Planned and Actual GDP Growth during Fifth Five-Year Plan Period

	Planned						Actual					
	1996	1997	1998	1999	2000	Average	1996	1997	1998	1999	2000	Average
1-Petroleum Activities												
A-Value Added	1,974	1,997	1,996	1,994	2,131	2,018	2,464.9	2,443.6	1,672.6	2,365.8	3,717.7	2,532.9
B-Growth Rate (%)	-2.3	1.2	-0.1	-0.1	6.9	1.1	22.0	-0.9	-31.6	41.4	57.1	13.0
2-Non-Petroleum Activities												
A-Value Added	3,766	4,280	4,738	4,861	4,556	4,440	3,497.9	3,758.8	3,859.7	3,789.7	4,079.4	3,797.1
B-Growth Rate (%)	12.3	13.6	10.7	2.6	-6.3	6.3	3.8	7.5	2.7	-1.8	7.6	3.9
3-Financial Intermediation Services Indirectly Measured	-124	-123	-130	-133	-131	-128	-136.1	-156.7	-178.2	-195.2	-204.0	-174.0
4-Import Taxes	47	57	67	69	62	60.4	47.6	43.8	61.7	80.3	46.1	55.9
5-Gross Domestic Product												
A-Gross Domestic Product	5,663	6,211	6,671	6,791	6,618	6,391	5,874.3	6,089.5	5,415.9	6,040.6	7,639.2	6,211.9
B-Growth Rate (%)	7.1	9.7	7.4	1.8	-2.5	4.6	10.7	3.7	-11.1	11.5	26.5	7.6

Source: "General Framework of the Fifth Five-Year Development Plan 1996-2000" and "Statistical Year Book 2003"

Table 2-8 GDP Per Capita, 1996-2000

Year	GDP at Constant Prices (OR m)	Population (Revised) (Estim.) (thousand)	GDP per Capita (Value) (OR)	GDP per Capita (AAGR) (%)
1996	4,922.8	2,167	2,272	-0.2
1997	5,226.9	2,196	2,380	4.8
1998	5,368.2	2,214	2,425	1.9
1999	5,355.6	2,238	2,393	-1.3
2000	5,649.5	2,296	2,461	2.8
Average				1.6

Source: Study Team Estimates based on revised estimated population

Table2-9 Planned and Actual GVA Growth of Non-oil Sectors during Fifth Five-Year Plan Period

	Planned						Actual					
	1996	1997	1998	1999	2000	AAGR(%)	1996	1997	1998	1999	2000	AAGR(%)
A. Commodity Production Sector												
- Mining	21	28	30	25	27	9.7	14.6	16.3	15.8	15.8	18.2	6.6
- Agriculture and Fishing	153	184	177	234	220	7.7	147.1	159.5	153.3	159.0	149.4	0.3
- Manufacturing	274	353	308	337	429	12.2	237.3	240.6	251.3	262.3	414.7	10.9
- Electricity and Water	56	62	73	85	88	12.4	53.2	66.6	67.9	71.4	77.7	9.8
- Building and Construction	202	284	328	461	369	21.7	129.9	193.8	202.0	141.2	144.8	1.0
(a) Total	706	911	916	1,142	1,133	13.7	582.1	676.8	690.3	649.7	804.8	6.3
B. Service Production Sector												
- Government Service	703	780	752	950	853	3.9	709.2	679.1	671.3	688.2	715.9	0.3
- Other Services	2,357	2,589	3,070	2,769	2,570	4.6	2,206.5	2,402.8	2,498.2	2,451.8	2,558.8	4.3
(b) Total	3,060	3,369	3,822	3,719	3,423	4.4	2,915.7	3,081.9	3,169.5	3,140.0	3,274.7	3.4
Total Non-Petro. Production (a+b	3,766	4,280	4,738	4,861	4,556	6.3	3,497.8	3,758.7	3,859.8	3,789.7	4,079.5	3.9
Imputed Financial Intermediation	-124	-123	-130	-133	-131	-0.2	-136.1	-156.7	-178.2	-195.2	-204.0	10.0
Import Taxes	47	57	67	69	62	6.6	47.6	43.8	61.7	80.3	46.1	0.4
Total Non-Petroleum GDP	3,689	4,214	4,675	4,797	4,487	6.6	3,409.3	3,645.8	3,743.3	3,674.8	3,921.6	3.6
Total GDP	5,663	6,211	6,671	6,791	6,618	4.6	5,874.3	6,089.5	5,415.9	6,040.6	7,639.2	7.6
% of Non-Petroleum GDP	65.1	67.8	70.1	70.6	67.8		58.0	59.9	69.1	60.8	51.3	

Source: "General Framework of the Fifth Five-Year Development Plan 1996-2000" and "Statistical Year Book 2003"

Table 2-10 Planned and Actual Private Sector Investment during Fifth Five-Year Plan Period

	Planned Investment						Actual Investment					
	1996	1997	1998	1999	2000	Total	1996	1997	1998	1999	2000	Total
Total Domestic Investment	994	1,482	1,986	1,734	1,125	7,321	804.5	1,074.5	1,298.8	897.1	911.7	4,986.6
Public Sector Investment	427	635	971	864	524	3,421	472.2	693.3	766.3	597.2	574.3	3,103.3
Private Sector Investment	567	847	1,015	870	601	3,900	332.3	381.2	532.5	299.9	337.4	1,883.3
Crude Oil	166	165	164	162	158	815	123.1	117.3	144.7	128.6	151.5	665.2
Natural Gas	24	135	344	297	128	928	23.0	86.0	133.5	71.8	17.0	331.3
Privatization Program	153	325	254	164	110	1,006	0.0	0.0	0.0	0.0	0.0	0.0
Other Non-Oil Activities	224	222	253	247	205	1,151	186.2	177.9	254.3	99.5	168.9	886.8
Share of Private Sector Investment (%)	57.0	57.2	51.1	50.2	53.4	53.3	41.3	35.5	41.0	33.4	37.0	37.8
Private Sector Invest. Rate (% of GDP)	10.0	13.6	15.2	12.8	9.1	12.2	5.7	6.3	9.8	5.0	4.4	6.1

Source: "General Framework of the Fifth Five-Year Development Plan 1996-2000" and "Statistical Year Book 2003"

Due to this expansion and improvement in the health services, death rates decreased noticeably. The infant mortality rate per 1,000 live births decreased from 20 in 1995 to 16.7 in 2000. The under-five mortality rate per 1,000 live births retracted from 27 to 21.7. The crude death rate per 1,000 population decreased from 6.1 to 3.65. As a result, the life expectancy at birth increased from 71 years in 1995 to 73.4 years in 2000.

2.3 Sixth Five Year Development Plan (2001-2005)

1) Objectives of the Plan

The Sixth Five Year Development Plan is the second phase within the framework of Oman Vision 2020.

The overall objectives of the Plan are as follows:

1. To ensure stability of the real average per capita income at its current level and its improvement of a target of achieving an annual growth in the GDP at constant prices at the minimum rate of not less than 3%.
2. To adopt sustainable fiscal policies through rationalizing the government spending, increasing the government revenues, particularly the non-oil revenue, and building up the government financial reserves.
3. To maintain the current low levels of inflation.
4. To raise the rate of enrollment ratio in higher education institutions and to upgrade and spread basic education.
5. To support the programs that aim at promoting the activities of the youth sector.
6. To give attention to culture and heritage.
7. To upgrade the scientific standard in the judicial field.
8. To provide suitable employment opportunities to the Omani citizens through the implementation of economically feasible and labor intensive production projects.
9. To accelerate the growth rates of targeted activities for diversification as well as raising their share in GDP.
10. To develop non-oil goods and services exports through increasing their share , quality standard, and structure
11. To develop the natural gas based industries
12. To upgrade tourism
13. To adopt transparent population policies consistent with the directives aiming at sustainability of development
14. To give special attention to the privatization program, so as to reduce the National Economy's dependence on public spending, encourage private sector investment, provide competitive environment and improve the efficiency of the National

Economy.

15. To increase the private Sector share in GDP through its participation in the Industrial Program of Natural Gas based Projects in addition to strengthening its activities in its traditional fields of investment and raising its productivity.
16. To increase private savings, encourage local and foreign investment through creation of a suitable investment climate, and expand the sector's activities.
17. To realize comparable levels of development in the different regions of the country.

2) GDP Balance and Expenditure on GDP

The Sixth Plan aims at achieving an AAGR of GDP of 4% at constant prices during the plan period. Accordingly, the GDP at constant prices will increase from RO 5,628.6 million in 2000 to RO 6,844.4 million in 2005. However, GDP at current prices is expected to grow at an AAGR of 0.6% during the plan period. That is, GDP at current prices will increase from RO 7,622.8 million in 2000 to RO 7,844.4 million in 2005. This noticeable variation is due to the assumption of US$ 18 per barrel as an average oil price for the plan period compared to US$ 26.7 per barrel for the base year 2000.

As a result, GDP per capita will decrease at an AAGR of 1.4% during the plan period. However, the negative impact of expected decrease in the oil activities on GDP will mainly be on the Government savings. Accordingly, despite the expected decline in GDP per capita at current prices, the effect of that will be limited on the standard of living of the citizen. It is expected that the per capita household consumption will increase at an AAGR of 2%.

The crude petroleum sector is expected to register a negative AAGR of 7.1%, while the non-oil sectors are expected to achieve an AAGR of 5.4%. Non-oil goods production activities will increase at an AAGR of 9.1%, while the growth rate of non-oil service production activities will not exceed 4.4%. The relative contribution of the oil activities to GDP is expected to decrease from 48.8% in 2000 to 34.7% in 2005, while the share of the non-oil activities in GDP will increase to 65.3% in 2005 from 51.2% in 2000.

As for the expenditure on GDP, public final consumption will increase from RO 1,580.2 million in 2000 to RO 1,744.7 million in 2005. This targeted increase is to meet the citizen's increasing basic needs for education, health and others. Private (household) final consumption is expected to increase at an AAGR of 4.1% from RO 3,011.6 million in 2000 to RO 3,675.1 million in 2005.

Table 2-11 GDP and Expenditure on GDP during Sixth Five-Year Plan (at current prices)

(m RO)

	Base Year 2000		2001	2002	2003	2004	2005		AAGR
	Value	%					Value	%	(%)
GDP									
1. Total Petroleum Activities	**3,719.9**	**48.8**	**2,672.3**	**2,725.3**	**2,744.1**	**2,752.0**	**2,725.0**	**34.7**	**-6.0**
1.1 Crude Petroleum	3,618.3	47.5	2,525.8	2,552.7	2,545.3	2,537.3	2,506.4	32.0	-7.1
1.2 Natural Gas	101.6	1.3	146.5	172.5	198.7	214.7	218.7	2.8	16.6
2. Total Non Petroleum Activities	**4,069.0**	**53.4**	**4,461.8**	**4,755.7**	**4,982.9**	**5,079.7**	**5,284.7**	**67.4**	**5.4**
2.1 Commodity Production Sector	795.8	10.4	942.9	1,062.5	1,131.3	1,152.6	1,227.3	15.6	9.1
2.2 Service Production Sector	3,273.3	42.9	3,518.9	3,693.2	3,851.6	3,927.0	4,057.3	51.7	4.4
Imputed Financial Services	**-212.2**	**-2.8**	**-201.5**	**-211.1**	**-225.9**	**-234.2**	**-246.4**	**-3.1**	**3.0**
Import Taxes	**46.1**	**0.6**	**72.0**	**74.0**	**76.0**	**79.0**	**81.1**	**1.0**	**12.0**
Total GDP	**7,622.8**	**100.0**	**7,004.6**	**7,343.9**	**7,577.1**	**7,676.5**	**7,844.4**	**100.0**	**0.6**
Expenditure on GDP									
1. Final onsumption	**4,591.8**	**60.2**	**4,923.6**	**5,036.5**	**5,194.6**	**5,344.4**	**5,419.8**	**69.1**	**3.4**
1.1 Public Final Consumption	1,580.2	20.7	1,757.4	1,717.6	1,709.5	1,716.7	1,744.7	22.2	2.0
1.2 Private Final Consumption	3,011.6	39.5	3,166.2	3,318.9	3,485.1	3,627.7	3,675.1	46.8	4.1
2. Gross Capital Formation	**913.0**	**12.0**	**1,176.5**	**1,408.5**	**1,536.6**	**1,328.5**	**1,237.6**	**15.8**	**6.3**
2.1 Public Investment	574.2	7.5	606.2	702.1	790.8	722.0	760.7	9.7	5.8
2.2 Private Investment	338.8	4.4	570.3	706.4	745.8	606.5	476.9	6.1	7.1
3. Surplus of Exports	**2,118.0**	**27.8**	**904.5**	**898.9**	**845.9**	**1,003.6**	**1,187.0**	**15.1**	**-10.9**
3.1 Exports	4,461.0	58.5	3,503.0	3,673.1	3,738.6	3,836.7	4,048.9	51.6	-1.9
3.2 Imports	2,343.0	30.7	2,598.5	2,774.2	2,892.7	2,833.1	2,861.9	36.5	4.1
Total Uses of GDP	**7,622.8**	**100.0**	**7,004.6**	**7,343.9**	**7,577.1**	**7,676.5**	**7,844.4**	**100.0**	**0.6**

Source: The General Framework of the Sixth Five-Year Development Plan 2001-2005

In line with the policies to expand the social services and to enhance the processes of diversifying the national economy, Gross Capital Formation (investment) is expected to increase at a high rate of 6.3% on average. Public investment will increase from RO 913.0 million in 2000 to RO 1,237.6 million in 2005 at an AAGR of 5.8%. Private investment is expected to increase from RO 338.8 million in 2000 to RO 476.9 million in 2005 at an AAGR of 7.1%.

According to the plan's assumptions related to oil export prices during its period, it is expected that net exports of goods and services (exports minus imports) will decrease at an AAGR of -10.9%, retracting its volume from RO 2,118 million in 2000 to 1,187 million in 2005.

The above-mentioned assumptions show that significant changes in the structure of expenditure on GDP will occur during the plan period.

3) Inflation

The Plan aims at maintaining the price levels and strive to reduce inflation rates to the minimum levels possible, and in view of following factors:

- The expected decline in prices of primary goods that have been based on an international level
- The expected decrease in the rates of housing rent due to the existing and forecasted significant increase in volume of housing
- The decline in some service fees such as telecommunications

The annual inflation rates, measured by changes in consumer price index in Muscat Governorate are not expected to exceed 0.5% on average during the Plan period.

4) Labor Force Balance

a. Supply of Omani Labor Force

Omani population will increase at an AAGR of 2.6% during the Plan period. Economic participation rates for the males will increase from 33% in 2000 to 40% in 2005. Female's participation is expected to increase to 9% in 2005 compared to 7% in 2000.

Based on the above assumptions, the Omani labor force is expected to grow at about 5.7% and 6.4% for females and males respectively. It is expected that about 129.4

thousand Omanis will join the labor market during the Plan period. However, the labor force supply depends on many factors, especially rates of enrollment in higher education; assumptions related to women participation and retirement policies. Considering these factors, an increase in the Omani labor force supply by 26 thousands per year on average is the maximum. The Plan document describes that the more appropriate assumption about the annual average number of Omani new entrants into the labor market will be between 20-26 thousand workers.

b. Demand for Labor Force

The additional demand for labor force depends on the following factors for different sectors: the targeted growth rates, estimated labor productivity, expected growth rates of labor productivity and rates of substitution for retirement. According to the above, it is expected that the Plan will provide about 109.2 thousand new jobs in the non-oil sectors. In view of the private sector led development strategy, the private sector is expected to provide about 93.2 thousand new employment opportunities, that is 85.3% of the total new employment opportunities. The public sector, however, is expected to provide 16 thousand additional employment opportunities in the form of additional recruitment in the health and education sectors.

In light of the Plan's objectives of Omani labor force qualification and training, in order to increase its participation in the labor force market, it is expected that the Omani labor force will receive about 73% of the additional employment opportunities. In detail, 68.6% of those created in the private sector and 100% of those in the public sector will be given to the Omani labor force.

Based on the targeted sectoral replacement rates in the Plan, it is expected that the processes of expatriate labor replacement in the Plan will provide about 10.5 thousand employment opportunities in the private sector and about 8.6 thousand in the public sector.

Accordingly, it is expected that the size of Omani labor force will increase by about 99 thousand (private sector: 74.5 thousand and public sector: 24.6 thousand). However, the increase in expatriate workers is expected not to exceed 10.2 thousand.

5) Public Finance

a. Government Revenues

The total revenue during the Plan period is expected to be RO 12,815.5 million. The

government revenue consists of two major components, an oil component that includes oil revenues and Natural Gas revenues, and a non-oil component, that involves current non-oil revenues, capital revenues and capital repayments.

a-1 Oil Component

i) Oil Revenues

The annual average oil production for the Plan period is estimated at 907.8 thousand barrels per day. Though forecasts of international prices of oil indicate stability of oil price levels at US$ 20 per barrel, the price of US$ 18 per barrel has been fixed as the oil price during the Plan period. This measure aimed at promoting financial stability and avoiding the negative impacts of sharp oil price fluctuations on the public finance and the national economy as a whole. Based on this policy, the annual average of total oil revenues is expected to be RO 1,920.4 million.

The ratio of net oil revenues to total oil revenues was fixed at 98.0%. The oil revenues equivalent to 2% will be transferred to the Oil Reserve Fund, a sum of RO 37.9 million on annual average. Any additional revenue resulting from an increase in oil price above the assumed level (US$ 18) will be transferred to the State general Reserve Fund (SGRF). The annual average of net oil revenue is expected to be RO 1,882.5 million.

ii) Natural Gas Revenues

The natural gas revenues were estimated on the assumption that they will grow at annual rate of 4% above its realized level in 2000, so as to increase from RO 73.4 million in 2000 to RO 89 million in 2005.

Table 2-12 Government Revenues during Sixth Five-Year Plan

(m RO)

	Base Year	Sixth Five-Year Development Plan (2001-2005)					
	2000	2001	2002	2003	2004	2005	Total
1. Total Oil Revenue	**1,794.4**	**1,949.0**	**1,959.0**	**1,966.1**	**1,976.3**	**1,968.0**	**9,818.4**
1.1 Net Oil Revenue	1,721.0	1,875.0	1,882.0	1,885.1	1,891.3	1,879.0	9,412.4
1.2 Natural Gas Revenue	73.4	74.0	77.0	81.0	85.0	89.0	406.0
2. Total Non-oil Revenue	**495.5**	**546.0**	**563.0**	**603.0**	**629.0**	**656.1**	**2,997.1**
2.1 Other Current Revenue	455.3	518.0	552.0	595.0	621.0	648.1	2,934.1
2.2 Capital Revenue	7.6	4.0	4.0	4.0	4.0	4.0	20.0
2.3 Capital Repayments	32.6	24.0	7.0	4.0	4.0	4.0	43.0
Total Revenue	**2,289.9**	**2,495.0**	**2,522.0**	**2,569.1**	**2,605.3**	**2,624.1**	**12,815.5**
Share of Oil Revenue (%)	**78.4**	**78.1**	**77.7**	**76.5**	**75.9**	**75.0**	**76.6**

Source: The General Framework of the Sixth Five-Year Development Plan 2001-2005

Table 2-13 Government Oil Revenues during Sixth Five-Year Plan

(m RO)

	Base Year	Sixth Five-Year Development Plan (2001-2005)					
	2000	2001	2002	2003	2004	2005	Average
Av. Daily Prod. ('000 barrels)	887.6	904.2	909.8	909.1	910.2	905.7	907.8
Av. Price (US$ per barrel)	26.7	18.0	18.0	18.0	18.0	18.0	18.0
Total Oil Revenues	**2,855.7**	**1,913.0**	**1,920.0**	**1,923.0**	**1,929.0**	**1,917.0**	**1,920.4**
Transfer	**1,134.7**	**38.0**	**38.0**	**37.9**	**37.7**	**38.0**	**37.9**
- to SGRF	1,077.7	0.0	0.0	0.0	0.0	0.0	0.0
- to Emergency Reserve	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- to Oil Reserve Fund	57.0	38.0	38.0	37.9	37.7	38.0	37.9
Net Oil Revenue	**1,721.0**	**1,875.0**	**1,882.0**	**1,885.1**	**1,891.3**	**1,879.0**	**1,882.5**
% of Net Oil Revenue	**60.3**	**98.0**	**98.0**	**98.0**	**98.0**	**98.0**	**98.0**

Source: The General Framework of the Sixth Five-Year Development Plan 2001-2005

a-2 Non-oil Component

i) Other Current Revenues

Other current revenues consist of tax revenues and non-tax revenues. Tax revenues are obtained from the following sources:

- Income tax on Omani and foreign companies and organizations
- Indirect taxes that include custom duties, commercial business practice fees, real estate transaction fees, facilities concessions, and licensing fees
- Company's contributions to vocational training projects (Labor card Fees)

Non-tax revenues include the following:

- Investment income that includes proceeds of profits earned from government investments in local and foreign establishments, proceeds of the interests realized on government's deposits, and the government loans provided to domestic and foreign bodies
- Surplus of public establishments and organizations
- Revenues from sales of electricity and water services
- Service revenues of some units that are collected in the form of fees for government provided services such as postal services, airports and seaports
- Different administrative charges, compensations, fines and penalties
- Other miscellaneous current revenues

Annual revenues of corporate profit taxes were estimated in view of the forecasts of the company's activities developed, and taking into account of the tax rate reduction. The size of the annual proceeds from labor card fees was fixed at RO 35 million, while the other items of current revenues have been estimated in light of the import forecasts and some limited income of government services and public authorities. On this basis, the other current revenues are expected to grow at an annual average rate of 7.3%.

Their volume is expected to increase from RO 455.3 million in 2000 to RO 648.1 million in 2005.

ii) Capital Revenues and Repayments

Capital revenues constitute proceeds of government land sales, and revenue from sales of government assets, such as vehicles, equipment dispensed with from time to time. Capital repayments constitute the proceeds of installment payments of loans granted by the government, proceeds set from sale of government investment shares, as well as repayment of the installments of the social housing.

The capital revenues have been set at RO 4 million annually, while the capital the capital repayments were based on the forecasts derived from the Ministry of Finance's records relating to this revenue item.

b. Government Expenditure

The total government expenditure during the Plan period is expected to be RO 13,786 million. The government expenditure consists of three major items, current expenditure, investment expenditure and participation and subsidy to private sector.

b-1. Current Expenditure

The current expenditure consists of current expenditure of government units and government share in PDO's current expenditure.

i) Current Expenditure of Government Units

The current expenditure of government units is divided into three groups: Defense and national security units' expenditure, civil ministries' expenditure, and Interests paid on loan. Total current and capital expenditure on defense and national security units will be RO 4,212 million. The annual average current expenditure for civil ministries will be RO 1,147 million, resulting in total amount of RO 5,735 million during the Plan period. This includes the eventual growth in demand for health and education services.

Total government expenditure on interests paid on loans has been fixed at its realized size of about RO 110 million in the Fifth Five Year Development Plan period, assuming that the public debt balance for the Plan period is remained in its actual level at the end of 2000.

ii) Government Share in PDO's Current Expenditure

According to the adopted financial system, 60% of current expenditure of the Company are indicated in the State's General Budget as government share in these expenditure.

b-2 Investment Expenditure

The investment expenditure consists of the following:

- Civil development expenditure
- Government share in PDO's capital expenditure
- Natural gas exploration
- Additional program for human resources development
- Gas procurement and transport cost

i) Civil development Expenditure

Priority in the program has been accorded to the broadening of accommodation of the general secondary output in higher education institutions, as well as to upgrading and spreading the basic education. A sum of RO 440 million will be allocated for the education sector in the investment program. Of this total amount, RO 265 million will come from this program, while Ro 175 million from the resources of the additional program for human resources development, in order to meet the other investment needs of the sector.

Based on the above, the annual spending for development expenditure of civil ministries has been set at RO 257 million.

ii) Government Share in PDO's Capital Expenditure

For the achievement of the targeted production of 850 thousand barrels per day, the total government share in PDO's capital expenditure is required to be RO 990 million.

iii) Natural Gas Exploration

In view of the natural gas exploration program and the resolution of the Financial Affairs and Energy Resources Council, it is expected that the total expenditure on the program will be RO 65 million during the Plan period.

Table 2-14 Government Expenditure during Sixth Five-Year Plan

(m RO)

	Base Year	Sixth Five-Year Development Plan (2001-2005)					
	2000	2001	2002	2003	2004	2005	Total
1. Current Expenditure	**2,107.6**	**2,227**	**2,175**	**2,160**	**2,163**	**2,195**	**10,920**
1.1 Defense & Security	808.6	926	860	826	799	801	4,212
1.2 Civil Ministries	1,113.5	1,108	1,120	1,140	1,169	1,198	5,735
1.3 Interest paid on Loans	107.1	110	110	110	110	110	550
1.4 Share in PDO's Expend.	78.4	83	85	84	85	86	423
2. Investment Expenditure	**476.0**	**513**	**541**	**549**	**540**	**540**	**2,683**
2.1 Civil Dev'nt Expenditure	225.3	257	257	257	258	257	1,286
2.2 Share in PDO's Cap. Inv.	191.2	197	206	202	192	193	990
2.3 Natural Gas Exploration	8.3	13	13	13	13	13	65
2.4 Additional Prog. For HRD	51.2	35	35	35	35	35	175
2.5 Gas Proc. & Trans. Cost	0.0	11	30	42	42	42	167
3. Partic. & Sub. to Private S	**72.6**	**72**	**28**	**28**	**28**	**27**	**183**
3.1 Particip. to Establ'nts	56.7	53	9	9	9	8	88
3.2 Others	15.9	19	19	19	19	19	95
Total Expenditure	**2,656.2**	**2,812**	**2,744**	**2,737**	**2,731**	**2,762**	**13,786**

Source: The General Framework of the Sixth Five-Year Development Plan 2001-2005

iv) Additional Program for Human Resources Development

The total spending in the additional program for human resources development is expected to be RO 175 million. These figures include the program's reserve in light of the estimates of proceeds from labor card fees.

v) Gas Procurement and Transport Cost

This item includes cost of purchase of natural gas from Gulf Stream Company of RO 38.8 million and cost of transport of natural gas from production sources to distribution sites of RO 128.4 million.

b-3 Participation and Subsidy to Private Sector

This involves the following:

- Lending and contribution in the form of direct financial investments
- Private sector support in various forms, such as subsidy, easy term lending, subsidy to interest rates on loans granted by ministries, subsidy to interest rates on housing loans, etc.

The provisions for lending and contributions are expected to be RO 88 million. As for private sector support, the total provisions will be RO 95 million, including reserve of RO 30 million.

c. General Budget Deficit and Means of its Finance

The total general budget deficit is to be RO 971 million. This deficit will be financed through withdrawals from the SGRF. The government revenues, on the basis of which the deficit has been calculated, do not include total resources available to the government from transfers to the reserve funds and returns of those funds. On the other hand, the size of general budget deficit depends on the assumed oil price.

When taking into account the transfers to the reserve funds, as well as the expected returns on investment of these funds, the total deficit of the public finance for the Plan period is expected to be about RO 192.3 million.

d. Public Debt

Based on the fiscal framework of the Sixth Five Year Development Plan (2000-2005)

particularly its direction that calls for exclusion of borrowing as a means for financing the general budget deficit, it is expected that the public debt indicators will improve during the Plan period. It is expected that:

- By the end of the Plan period the size of public debt will maintain the level it achieved at the beginning.
- The average debt service expressed as percentage of total government revenues and GDP during the Plan period will not exceed 12.9% and 4.5%, respectively.
- The average external public debt as percentage of exports will not exceed 6.9% during the Plan period.

These indicators of public debt are considered low, compared with other countries, and within the internationally approved safe limits for public debt.

6) Investment Program

a. Investment Program by Sector

The total investment during the Plan period amounts to RO 6,687.7 million, of which RO 3,581.8 million is implemented by the public sector and RO 3,105.9 million by the private sector, as presented in Table 2-15.

a-1 Public Sector Investment Program

The public sector investment program consists of two types of programs: A. Programs included in the State General Budget, and B. Programs not included in the State General Budget. Programs of type A are included in the item "Investment Expenditure" of the State General Budget and the total investment amount is RO 2,683 million. In the programs of type B, outside the State General Budget, "Major Industrial Projects" and "Other Investment Projects" are included.

Major industrial projects to which the public sector contributes are a. Sohar Refinery Project, b. Pipeline to Sohar and Salalah Project, c. Omani-Indian Fertilizer Project, and d. Methanol Project. The first two projects are totally owned by public sector. For the last two, foreign private sector will participate. The total cost paid by public sector is expected to be RO 791 million.

The other investments of public sector constitute the investment programs of self-financing public establishments such as Oman Telecommunication Company and Oman Oil Refinery Company.

a-2 Private Sector Investment Program

The private sector investment program consists of five categories of programs; A. Oil sector investment, B. Major industrial projects, C. Privatization program, D. Tourism projects, and E. Other investments, as follows:

i) Oil Sector Investment

The private sector investments in the oil sector in the Plan were prepared based on the PDO investment program and foreign companies' investment programs working in oil exploration and extraction activities. It is expected that the total investments of the private sector will be RO 824.9 million. The partners' share in the capital expenditures of PDO for the Plan period will be RO 660 million. And the total investments of the foreign companies in oil sector will be RO 164.9 million, of which RO 66.4 million as investments related to oil extraction and RO 98.5 million as investments in the field of oil exploration.

ii) Major Industrial Projects

The major industrial projects included in the private sector investment program are comprised of four projects. Two of these will be wholly owned by private sector, which are the Ferro-chrome Project and the Sohar Fertilizer Project. The two others (the Omani-Indian Fertilizer Project and the Methanol Project) will be owned jointly by private and public sectors, as described above.

iii) Privatization Program

Privatization policies are one of the approved basic policies in the Oman Vision 2020. The plan privatization program includes four projects. The total investment amount will be RO 378 million during the Plan period. The Barka Power and Desalination Project and the Al-Kamel Power Project will adopt the system of Build, Operate and Own (BOO). The Salalah Power Project and the Seeb and Salalah Airport Management are financed by borrowing and own capital. The ratio of financing by borrowing to the self-financing is 70:30. The borrowing requirements will be met from foreign sources. For the self-financing of the Salalah Power Project, participation in capital will be distributed between domestic private sector and foreign private sector by ratio of 19:81. For the Seeb and Salalah Airport Management Project, participation in capital will be distributed among public sector, domestic private sector and foreign private sector by ratio of 20:40:40.

Table 2-15 Investment Program in Sixth Five-Year Plan (2001-2005)

	2001	2002	2003	2004	2005	Total
Public Sector						
1. Within State General Budget	**513.0**	**541.0**	**549.0**	**540.0**	**540.0**	**2,683.0**
1.1 PDO's Capital Expenditure	197.0	206.0	202.0	192.0	193.0	990.0
1.2 Natural Gas Exploration	13.0	13.0	13.0	13.0	13.0	65.0
1.3 Gas Proc. & Transport Cost	11.0	30.0	42.0	42.0	42.0	167.0
1.4 Civil Development Expenditure	257.0	257.0	257.0	258.0	257.0	1,286.0
1.5 Additional HRD Program	35.0	35.0	35.0	35.0	35.0	175.0
2. Outside State General Budget	**93.2**	**161.1**	**241.8**	**182.0**	**220.7**	**898.8**
2.1 Major Industrial Projects	74.4	140.4	219.6	159.3	197.3	791.0
- Sohar Refinery Project	0.0	0.0	76.9	115.4	192.3	384.6
- Pipeline to Sohar/Salalah Projec	52.5	96.9	0.0	0.0	0.0	149.4
- Omani-Indian Fertilizer Project	21.9	31.1	114.1	17.1	5.0	189.2
- Methanol Project	0.0	12.4	28.6	26.8	0.0	67.8
2.2 Other Investments	18.8	20.7	22.2	22.7	23.4	107.8
Total Public Sector Investment	**606.2**	**702.1**	**790.8**	**722.0**	**760.7**	**3,581.8**
Private Sector						
1. Oil Sector	**172.8**	**180.6**	**172.4**	**155.0**	**144.1**	**824.9**
1.1 Foreign Share in PDO's C.E.	131.3	137.3	134.7	128.0	128.7	660.0
1.2 Foreign Oil Companies' C.E.	22.3	18.6	14.5	8.2	2.8	66.4
1.3 Foreign Oil Cos' Exploration	19.2	24.7	23.2	18.8	12.6	98.5
2. Major Industrial Projects	**43.9**	**114.9**	**258.1**	**141.9**	**5.0**	**563.8**
- Omani-Indian Fertilizer Project	21.9	31.1	114.1	17.1	5.0	189.2
- Methanol Project	0.0	24.7	57.2	53.4	0.0	135.3
- Ferro-chrome Project	22.0	5.0	0.0	0.0	0.0	27.0
- Sohar Fertilizer Project	0.0	54.1	86.8	71.4	0.0	212.3
3. Privatization Program	**121.5**	**183.0**	**35.5**	**19.0**	**19.0**	**378.0**
- Barka Power and Desalination	52.5	105.0	17.5	0.0	0.0	175.0
- Al-Kamel Power Project	44.0	0.0	0.0	0.0	0.0	44.0
- Salalah Power Project	25.0	60.0	0.0	0.0	0.0	85.0
- Seeb & Salalah Airport Manag'n	0.0	18.0	18.0	19.0	19.0	74.0
4. Tourism Projects	**12.0**	**10.8**	**26.0**	**32.0**	**42.0**	**122.8**
- Al-Sawadi Resort Project	0.0	0.0	15.0	20.0	30.0	65.0
- Muscat Touristic Complex	6.0	6.0	0.0	0.0	0.0	12.0
- Other 11 Projects	6.0	4.8	11.0	12.0	12.0	45.8
5. Other Investments	**220.1**	**217.1**	**253.8**	**258.6**	**266.8**	**1,216.4**
Total Private Sector Investment	**570.3**	**706.4**	**745.8**	**606.5**	**476.9**	**3,105.9**
Total Investment	**1,176.5**	**1,408.5**	**1,536.6**	**1,328.5**	**1,237.6**	**6,687.7**

Source: The General Framework of the Sixth Five-Year Development Plan 2001-2005

iv) Tourism Projects

The Sixth Five Year Development Plan attaches special attention to the development of tourism sector in order to promote the national economy production base diversification processes, and to support private sector role and provision of employment opportunities for Omani youth. In accordance with the plan directives regarding this, the private sector investment program includes 13 touristic projects. The total investment costs will be RO 122.8 million. Most of these projects will be jointly financed by the domestic and foreign private sectors.

v) Other Private Sector Investments

The other private sector investments include the sector investments in its traditional

investment area such as in housing sector, and the production activities such as agriculture, fisheries, industry, trade, transportation and others. These investments are estimated based on their historical development and assuming an annual growth rate of 9.7%.

b. Financing Sources for Investment Program

Table 2-16 shows the outline of financing sources of the investment program in the Sixth Five Year Development Plan. Of the total investment costs amounting to RO 6,687.7 million, RO 4,431.8 million will be financed from domestic sources, while RO 2,255.9 million from foreign sources. The domestic sources are divided into public sector and private sector. The respective financing sources finance projects in the forms of direct investment and loan.

The public sector investment program will be financed from public sector direct investment, domestic private sector loan, and foreign loan, for RO 3,007.3 million, RO 5 million and RO 569.5 million, respectively. The public sector direct investment occupies 84% of the total public sector investment. Sources of finance for the public sector direct investment are as follows:

- Savings of Public Sector (RO 1,712.0 million)
- Withdrawal from Reserve Fund (RO 971.0 million)
- Direct Investment of Public Enterprises and Other Public Source (RO 324.3 million)

The private sector investment program will be financed from public sector loan, domestic private sector direct investment, foreign direct investment and foreign loan, for RO 9.4 million, RO 1,410.1 million, RO 1,058.4 million and RO 628.0 million, respectively. The domestic private sector direct investment occupies 45% of the total private sector investment. And the foreign sources occupy 54% (direct investment: 34%, loan: 20%).

Table 2-16 Financing Sources of Investment Program

Sources of Finance	Investment Body		Total
	Public Sector	Private Sector	
1. Domestic Sources	**3,012.3**	**1,419.5**	**4,431.8**
1.1 Public Sector	**3,007.3**	**9.4**	**3,016.7**
- Direct Investment	3,007.3		3,007.3
- Loan		9.4	9.4
1.2 Private Sector	**5.0**	**1,410.1**	**1,415.1**
- Direct Investment		1,410.1	1,410.1
- Loan	5.0		5.0
2. Foreign Sources	**569.5**	**1,686.4**	**2,255.9**
- Direct Investment		1,058.4	1,058.4
- Loan	569.5	628.0	1,197.5
Total	**3,581.8**	**3,105.9**	**6,687.7**

Source: The General Framework of the Sixth Five-Year Development Plan 2001-2005

3. ROAD DEVELOPMENT PLANS

3.1 Road Sector in Fifth Five-Year Development Plan

During the Fifth Five-Year Development Plan (1996-2000), the road network was greatly developed although the Plan did not realize the assumed target. Paved roads reached about 8,477 kilometers in 2000 compared with 6,257kms in 1996.

The plan identified the challenges and obstacles that face the sector as the topographic relief difficulties, shortage of trained human cadre, and large volume of compensations and reorientation of public reluctance in accepting the concept of toll roads managed by private sector.

Under this plan, the investment program for the road sector totaled about RO 204.9 million of which only RO 123.1 million were actually spent with an implementation rate of 60%. The main characteristics of the Plan are as follows:

1) Objectives:

- Conservation and maintenance of various roads, bridges and supporting structures
- Construction and completion of a group of roads in the different Wilayats.
- Encouragement of the private sector to finance, establish and manage some new road projects, where feasible.

2) Polices and Mechanism:

- Preparing structural design and cost for construction and maintenance projects and including them in the Plan within sufficient time.
- Giving priority to maintenance of existing roads to maintain their performance
- Giving priority to construction of internal roads in some Wilayats where no such roads exist
- Encouraging the private sector to finance, construct and manage some of high projects under toll system
- Charging the private sector with the responsibility of maintaining unmade roads
- Completing some important remaining sections of main roads subject to viability and available fund,
- Comparing maintenance cost of both private sector and government to choose the best alternatives.

3) Major Projects

The budget allocated for important projects that were implemented under the Plan are:

- Routine maintenance of paved roads: RO 18.8 million
- Rehabilitation of Nizwa / Thamrait: RO 4.9
- Construction of Phase 2 of Rusayl / Nizwa road: RO 25.0
- Al-Wusta region roads: RO 6.6
- Pavement of Bakha / Tibyat road in Musandam: RO 4.9
- Pavement of Dama Wa Tayeen main road: RO 2.3

3.2 Road Sector in Sixth Five-Year Development Plan

The main characteristics of the Sixth Five-Year Development Plan (2001-2005) are as follows:

1) Objectives:

- Completion of main roads network that connects the Sultanate's major regions as well as with neighboring countries
- Connecting Wilayats and main development regions with each other and with the main road network through the establishment of the secondary roads network
- Completion of connecting areas of Wilayats and populated centers with each other through the completion of the internal local roads network
- Construction of new weather graded roads to complete connecting villages with each other and development of social and commercial links among them.
- Continuance of establishing and maintenance of asphalt, graded and graveled roads for existing and future networks
- Reducing road accidents by adopting high standards of design and raising its absorption capability regarding dualism and other technical systems
- Omanization of technical human cadre in the road sector
- Encouraging the private sector to participate in financing, constructing and managing new road projects wherever feasible
- Consideration for geographic distribution for road projects to achieve balanced regional development and encourage private sector to direct its investments to different regions
- Necessity of integrating road projects with other related sectoral programs and plans, especially the industrial, agricultural, and port projects.

2) Polices and Mechanism:

- Preparing structural design and cost for construction and maintenance projects and including them in the Ministry's Plan
- Giving priority to construction of internal roads in some Wilayats where no such roads exist
- Continuance of assigning the responsibility of maintaining graded, gravel and asphalt roads to the private sector and provision of suitable investment climate to encourage private sector to construct alternative roads.
- Completing some important remaining sections of main roads subject to viability and available fund resources.

3) Major Projects

The road sector appropriations in the development program of this plan totaled RO 143.9 million, including about RO 81.3 as approbations for new projects. The important projects under the plan include:

- Al Rustaq (Batinah) / Muscan (A'Dhahira) road	RO	7.0 million
- Ibri / Saudi Arabia road		5.2
- Al Ain / Ibri road		5.0
- Rehabilitation of Nizwa/Thamarait (Phase-1)		7.0
- Rehabilitation of South Al Batinah road		6.0
- Annual routine maintenance for unpaved roads		23.5
- Annual maintenance for paved roads		10.9

4. HIGHWAY MASTER PLAN 1985

A study was conducted in 1983 to 1985, with financial assistance by the World Bank, to provide the basis for the Third 5-Year (1986 – 1990) Highway Master Plan. The Final Report of this study was submitted in April 1985. Although the fundamental objective of this study was to prepare a highway master plan to be implemented in 1986 – 1990 period, projects for the period of 1991 – 2000 were also proposed. Review and updating of this master plan is one of the task items of this Study.

4.1 Scope-of-Work for the Study

According to the Final Report, the scope, or the requirement, of the study can be summarized as follows:

(i) Master Plan is to include paved roads, gravel roads and significant track roads.
(ii) The prospective program of highway investment is to be updated, on an annual basis, for five years 1986 – 1990.
(iii) The DGR is to be assisted in the implementation, gathering and maintaining of data for road planning, especially traffic data and related information.
(iv) The highway user cost study is to be updated annually if required, and is to include user costs on track roads, gravel roads and paved roads.
(v) Estimates are to be provided of annual budget allocations, as required.

4.2 Study Roads

In the study, the roads in the Sultanate were classified into three (3) classes:

- Main (Primary) Roads: Trunk roads
- Secondary Roads: Important connector roads, major developmental roads etc
- Tertiary Roads: Important local access roads, feeder and village roads, agricultural roads etc

The roads to be evaluated in the study were;

- Main roads
- Secondary roads
- Gravel roads and track roads which constitute part of national road network

According to the report of the study, main roads in the Sultanate are numbered with two digits while secondary and tertiary roads were numbered with five (5) digits. However, there were no explanation on how main (primary) roads, secondary and tertiary roads were classified.

The report stated that the Ministry of communications (DGR) was currently attempting to classify every road in the network on the basis of the above mentioned classification system. However, there do not seem to have been such classifications available up to today. Also, there were no explanations how the gravel and track roads to be evaluated in the study were selected.

The roads in Muscat Governorate were excluded from the study roads.

4.3 Priority Projects

In total, 44 projects, presented in Appendix 2-1, were proposed. These projects included paving of Wilayat roads but did not clearly state whether these roads should be classified as national roads or should remain to be classified as Wilayat roads.

These projects were categorized into three (3) groups depending on the priorities. Thirteen (13) projects with a total length of 735 km, including paving of Wilayat track roads with a total length of 202 km, were categorized as the first priority projects to be implemented in the period of 1986 – 1990. Another eleven (11) projects with a total length of 821 km were categorized as second priority projects, also to be implemented in the period of 1986 - 1990. Still another twenty (20) projects with a total length of 1,638 km were categorized as the third, or low, priority projects, to be implemented in the period of 1991 - 2000.

Table 4-1 summarizes the projects listed in the Master Plan 85. Figure 4–1 shows the locations of these projects

Table 4-1 Summary of Projects Proposed in Highway Master Plan 1985

Priority of Projects	No. of Projects	Total Length (km)	Total Cost (OR million)	Implementation Period
First Priority	13	735	211.48	1986 – 1990
Second Priority	11	821	204.99	1986 – 1990
Third (Low) Priority	20	1,638	466.99	1991 – 2000
Total	44	3,194	883.46	

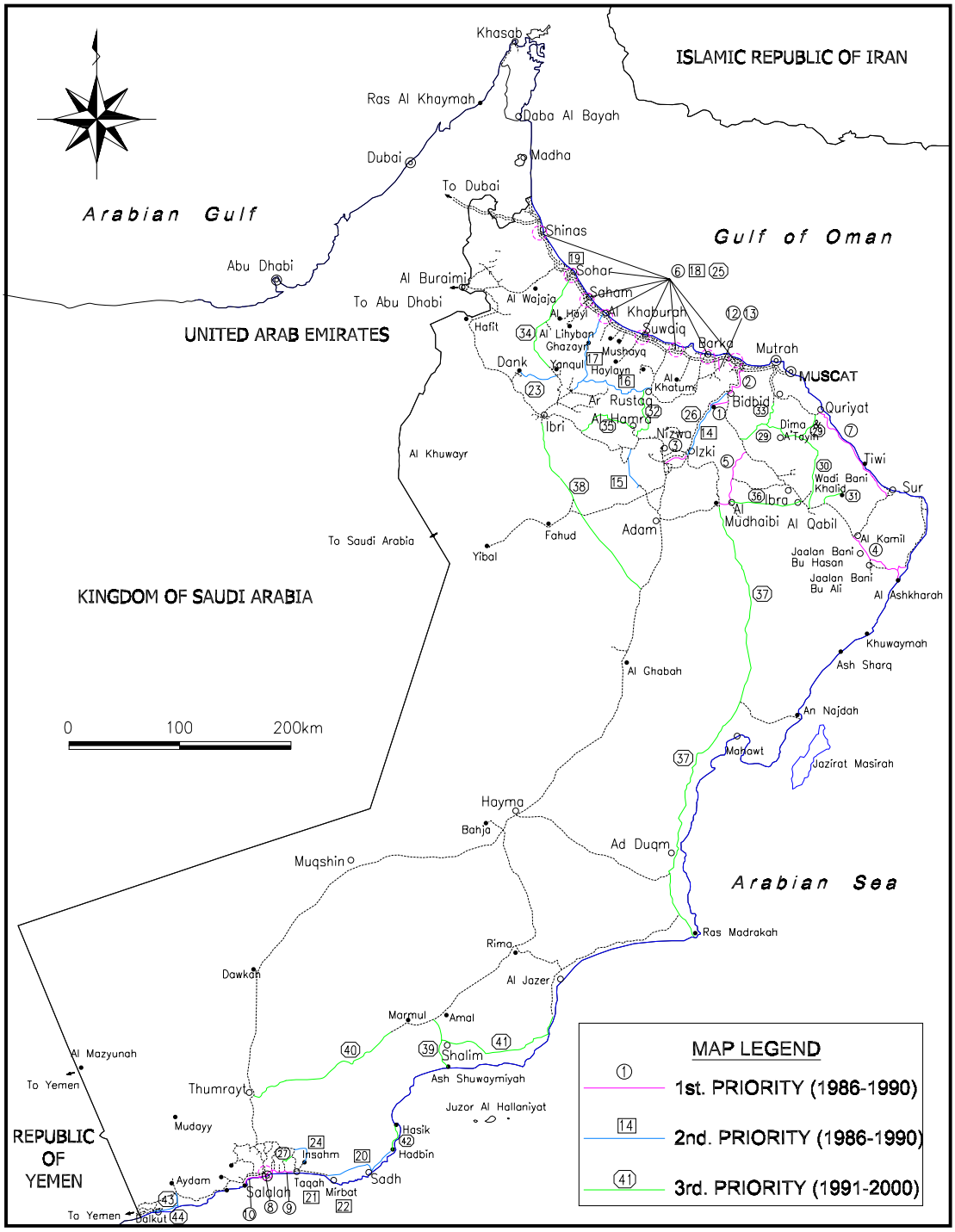


Figure 4-1 Project Locations in Highway Master Plan 1985

4.4 Project Selection and Prioritization

In general, there was no explanation on how the candidate projects were identified. Some projects were proposed by the Ministry of Communication (at that time) and some projects seem to have been proposed by the consultant for the study.

According to the report, the candidate projects were screened by "professional judgment" on potential socio-economic benefits. Then current traffic volume was used as the threshold criteria for the warrant of the projects. The criteria used for prioritizing the projects were as follows:

Minor town and Wilayat roads improvement projects

Minimum traffic volume (of 1984) = 600 vehicles per day (vpd): This criterion was adopted taken into consideration the benefit accruing from improvement of pavement.

Major (road) improvement projects

(i) For widening from 2-lane, 2-way road to divided 4-lane highway: Minimum traffic volume = 14,400 vpd: This criterion was adopted to maintain the Level of Service (LOS) of "D" defined in the AASHTO's Highway Capacity Manual (HCM) of 1965[1], or better, for 2-lane, 2-way roads.

(ii) Grade separations to be provided under on of the following criteria:

- Total ADT at least 10,000 vpd
- Total peak hour traffic volume 2,000 vph; traffic volume of intersecting road > 500 vph
- A highway with design hour traffic volume at least 800 vph; traffic volume of intersecting road > 200 vph
- A road with design hour traffic volume at least 500 vph; traffic volume of intersecting road > 750 vph

Economic analyses were also carried out to assess the projects. Then the projects were ranked in two categories; one in the order of economic benefits (NPV and B/C ratio) and another in the order of traffic volume. Among ten (10) projects nominated by the consultant of the study, only four (4) showed economic benefit with Net Present Value (NPV) of positive (+) value. The rest (6 projects) showed negative (-) NPV. (See

[1] AASHTO's Highway Capacity Manual (HCM) and Level of Service: HCM of AASHTO (American Association of State Highway and Transport Officials) is widely used in the world as the standard for highway planning. "LOS D" is adopted in many countries as the lowest (worst) allowable level (of traffic congestion).

Subsection 4.5 for more on economic evaluation.)

Although it was not stated explicitly, it is interpreted that nine (9) projects which satisfy the criteria for traffic volume, as described above, do not yield positive economic benefit. Likewise four (4) projects nominated for strategic/political/ social reasons are not considered to yield positive NPV. Further, twenty (20) projects were nominated for various reasons but there were limited quantitative descriptions of economic benefits.

Four (4) projects were nominated for strategic/political/social warrants. The factors considered were such as access to military posts and social environmental aspects, without explanations on how these factors were considered.

The report states that these projects were ranked in accordance with the economic benefits (NPV) and traffic volume, without explanations on how the ranking by traffic volume and the tanking by the economic benefits were compared. Also there were no explanations on how the First Priority and Second Priority projects were selected from the project nominated by the consultant and the Ministry.

4.5 Project Cost

The total cost of the first, second and third priority projects, excluding the cost for land acquisition, were estimated at OR 883.46 million (see Table 4 -1). The total cost for the first and second priority projects to be implemented in the 5-year period of 1986 – 1990 was OR 416.47 million. This amount is more than two times of that of 5th 5-year Development Plan (OR 204.9 million) and nearly three times of that of 6th 5-year Development Plan.

Actually, the report states "the 1986 – 1990 budget is unlikely to be sufficient to include all Priority 1 and 2 projects; in fact it is unlikely to exceed OR 200 million".

Construction Cost

Unit construction costs (per km) of roads were estimated based on the current contract prices for the types of the terrain, pavement structure and pavement width. These costs varied from RO 115,000 for flat/gently rolling terrain to RO 635,000 for extremely mountainous terrain.

Maintenance cost

Maintenance costs of paved and unpaved roads were estimated to be included in the Maintenance Master Plan which was prepared as a separate, but correlated, study. The

maintenance cost of unpaved road was estimated at RO 1,060 per year while maintenance cost of AC surface roads were estimated at RO 4,350 per year. In the calculation sheets of economic analysis, however, the maintenance const for unpaved road was shown to be from RO 850 to RO 3,320. It is noticed that the maintenance costs used in the economic analysis was different from those shown in the section of "Unit Costs for Road Construction and Maintenance Activities".

4.6 Economic Evaluation

Net Present Value (NPV) with a discount rate of 10 % was calculated for each priority projects. The report states that benefits to generated traffic were assumed to be 50 % of normal MVOC (motor vehicle operating cost) saving. The report also states that generated traffic was generally estimated at 50 – 150 % of normal traffic. However, only three (3) cases presented in the report included estimation of generated traffic. The percentage of the generated traffic to the normal traffic ranged from 19 % 37 %, which are different from those described above.

Unquantifiable benefits, such as change in market structure, correction of regional imbalance and social benefits, were discussed, but not taken into consideration for prioritizing the projects.

At any rate, the result of calculation of NPVs showed only four (4) projects, indicating that NPV (B/C as well) alone cannot be effective criterion for prioritizing the project. The largest NPV was OR 12.9 million for 66 km-length section of Al Kamil – Bilad Bani Bu Ali – Al Ashkarah and B/C ratio for this section was calculated to be 1.325. The project to be ranked first from viewpoint of economic benefit was AC pavement for 18 km-length Luzuq –Samail road whose B/C ratio and NPV were estimated at 1.760 and OR 8.9 million, respectively.

4.7 Traffic Study

By March 1985, 163 permanent traffic counting stations had been established. According to the report, however, no up-to-date data of traffic counts were given to the consultant of the study, and the data measured in 1983 at 111 stations were used as the basic data of traffic volume.

As for OD data, the information obtained through the OD survey conducted in 1980 (only OD survey actually conducted in the Sultanate up to the time of the study) were used.

Heaviest traffic estimated for 1984 was 35,064 vpd on Mutrah – Seeb Highway. Traffic volumes on other sections were estimated less than 20,000 vpd for 1984.

4.8 Implementation Schedule

Implementation schedule or phasing plan was not prepared. The report explained the reason for not providing implementation schedule as the following:

"The master plan priorities based on economic/traffic evaluation do not correspond in many cases with Ministry preferences. This situation was discussed with the Director General (Technical Affairs) who commented that any attempt to determine construction phasing and related annual budget allocations would be academic and of no practical use to the Ministry at this stage. It was also commented that the Ministry already have their own well-established procedures for budget preparation."

Accordingly, estimates for annual expenditure for planned projects were not presented.

4.9 Achievements

Present statuses of these projects are shown in Appendix 2-1. Table 4-2 summarizes these statuses. As can be seen in the table, some of the projects are still not yet implemented. As can be seen in the table, overall progress is delayed from the schedule. Figure 4-2 shows locations of completed, on-going and not-started projects.

Table 4-2 Present Status of M/P-1985 Projects

Priority of Projects	No. of Projects	No. of Completed Projects		No. of On-going Projects	No. of Projects Yet to be Started
		'86 – '90	90 – '03		
1st Priority	13	4	8	0	1
2nd Priority	11	1	7	2	1
3rd Priority	20	0	7	5	8

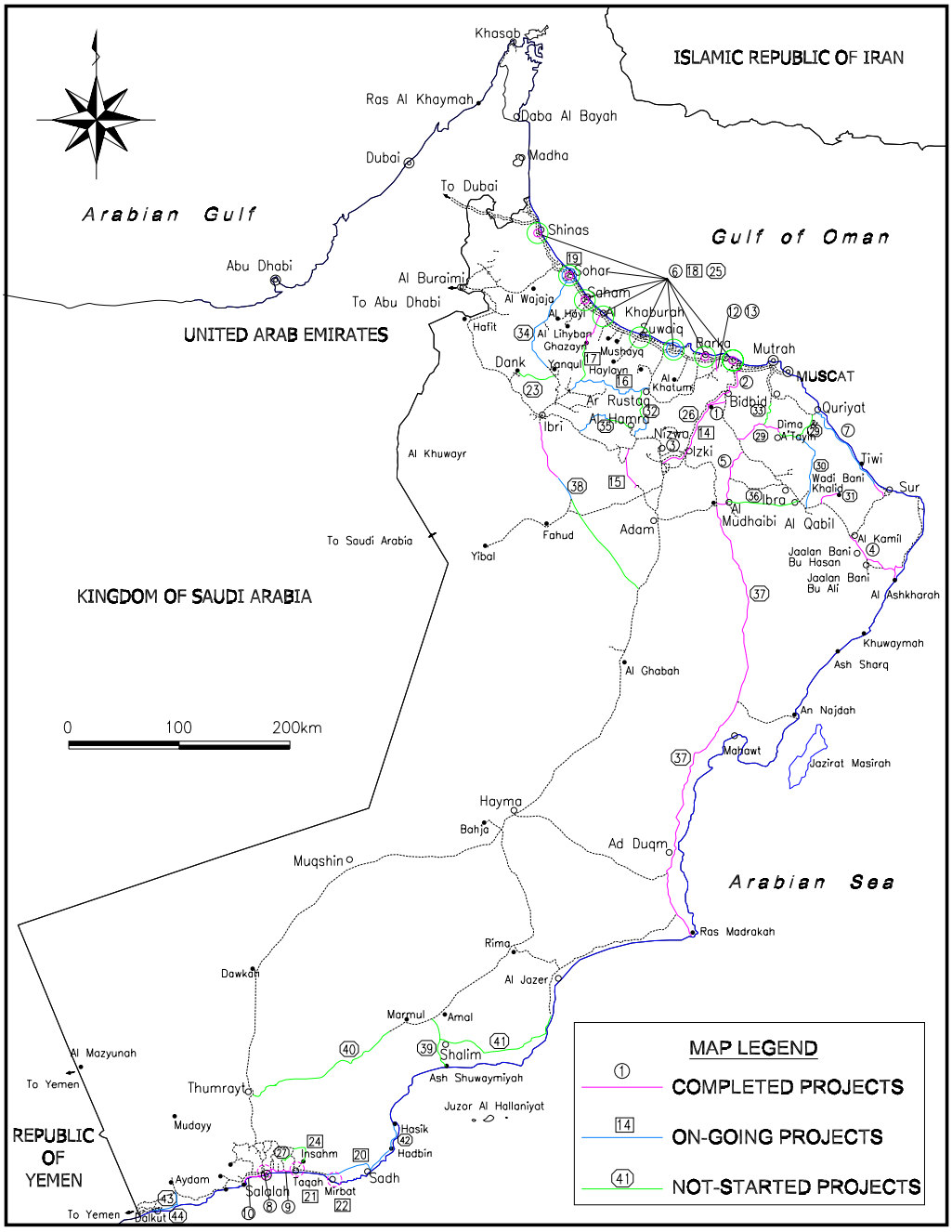


Figure 4-2 Locations of Completed, On-Going and Not-Started Projects

5. JICA ROAD DEVELOPMENT STUDY - 1995

From January 1994 to January 1995, the Study on the Road Development Project in the Sultanate of Oman was undertaken. The Study was conducted by the Government of Japan that entrusted the study to JICA. The final report of the Study is consisting of three Volumes. Volume I is Executive Summary, Volume II is Feasibility Study on Construction of Flyovers and Pedestrian Underpasses and Volume III is a Maintenance and Rehabilitation Study on Nine Existing Bridges.

5.1 Background of the Study

The study area was focused on the Batinah Highway (National Road No.1). This road is the major expressway stretching about 274 km from the capital Muscat to Khatmat Milahah along the Gulf of Oman. Then, it continues as Route No.5 from Aqr to the national boundary with U.A.E. at Wadi Hatta for a total distance of about 358 km. The major problems on this highway at the time of this Study are:

- Pedestrian safety
- Bridge deterioration

5.2 Objective of the Study

Based on the identified problems on the highway, the objectives of the study are:

- To carry out a feasibility study on construction of flyovers and pedestrian underpasses on the Batinah Highway located along the northern coast in order to obtain smooth flow of traffic and road safety.
- To carry out soundness tests including inspection and load test of nine of the existing bridges (45 bridges in total).
- To establish the maintenance and rehabilitation plan for the existing bridge.

5.3 Main Findings

1) Population

In December 1993, the first population census was taken. The Oman population based on the initial results of this census was about 2.018 million out of which more than half were living in Capital Area and Batinah Region. The Annual Average Growth Rate (AAGR) of population was estimated at 3.5% but it is forecasted to decline somewhat in the future. The annual average growth in the Batinah Region (Study Area) was

estimated in 1993 to be about 2.4%.

2) Present Transport Condition

Roads are the only means of land transport. Sea and air transport are gradually expanding but their shares in domestic transport are nominal. There are Seeb International Airport and two ports Qaboos and Raysut mostly for handling international cargo.

In 1970 there were only 10 km of paved roads and 1,817 km of unpaved roads. By 1990, there were 5,000 km of all-season paved roads and 20,000 km of unpaved roads. There was steady growth in paved roads after 1975. Among the total paved roads, 426 km was dual carriageway. The majority or 94.2% are public roads under the MOC and while the remaining were under the MOD and PDO.

Under the Study, the roads are classified into 3 categories as follow:

i. Major International Highway (Connecting major cities and connecting Oman with neighboring countries)
ii. International Arterial Road (Connecting the Capital City of Muscat and major cities with other towns and service centers in the country)
iii. Interurban and Local Access Road (Facilitating the Local Traffic movement and connecting to development areas, industrial estates and mines.

3) Traffic Volumes and Car Ownership

The car ownership in 1992 was found to be 12.75 veh./100 people (1 veh./7.84 person). This rate was moderate compare with Japan or other Gulf-Countries. The rate of increase was more rapid after 1985 and it was stabilized at 9% after 1989.

The highest ADT was counted at Bait Al Barakah R/A with 21,000 veh/day. The ADT was generally decreased along the Batinah Highway as the distance from Muscat increased. After Al Khaburah ADT increased slightly to about 11,200 veh/day but decline again towards Aqr to about 5,500 veh/day.

The highest demand of traffic volumes towards the inland area 7,280 veh/day was found on route No.13 from Baraka to Rustaq, followed by 5,229 veh/day on route No.11 from Muladdah to Rustaq. The ADT on route No.8 was about 8900 veh/day, route No.9 was about 4000 veh/day and route No.7 was about 3900 veh/day.

4) Travel Speed

The average travel speed on the Batinah Highway was computed as 99.7 km/hr or about 100 km/hr. There were no significant delays caused by stopping at junctions or R/As; that means traffic flow was free of any major congestion. The average spot speed of all vehicle types was about 112 km/hr. The analyses showed that only about 55% of the passenger cars followed the speed limit of 120 km/hr and only 7% of light trucks and 3% of medium or heavy trucks exceeded this limit. The cumulative speed distribution of all vehicles showed that the speed limit of 120 km/hr corresponded to 70% that means about 30% of vehicles were running over the speed limit.

At R/A it was found in average that the vehicle speed as it approached the R/A decreased to about 90 km/hr as it crossed the 1st sign post and down to 58 km/hr at the entry point to R/A. Within the R/A, travel speed varied from 30 km/hr to 60 km/hr with an average of 55 km/hr.

5) Generated and Attracted Trips

The average trip rate was relatively low at about 2.02 vehicle-trips/days. Travel demand between Batinah Region and Muscat was estimated at 18,240 trips/day and 6,030 trips/day between Batinah and UAE.

6) Truck Loading

The maximum gross truck load was 60 ton. The maximum axle load was 17.6 ton. The average gross load for heavy trucks, medium trucks and light trucks were 40.84, 33.60 and 15.24 tons, respectively.

7) Traffic Accidents

High speed (31.4%), negligence (27.2%) and poor driving habits (25.5%) were the three most prominent causes of traffic accidents. Alcohol (11.5%) and fatigue (1.6%) came as 4th and 5th reasons. The poor road conditions represented only 1.2%, the poor vehicle condition represented only 0.7% and the psychological condition represented 0.9%.

8) Future Traffic Demand

Traffic and vehicles ownership are likely to increase gradually up to year 2000 but at faster rate after 2000 and up to 2010 before stabilizing to a certain level. Vehicle registration was expected to increase by about 3.6 times to a total of about 975,000

vehicles by the year 2010 from 1983 level of 270,680 vehicles. The car ownership rate of 1 veh/7.8 persons was expected to rise to 1 veh/3.5 persons. Traffic growth based on past annual traffic growth rate was 4.66% that means future demand is about 2.2 times the estimated present volume of 69,892 veh/day. However, the study adopted a rate of 2.9 times based on likely increase in trip rate by vehicles expected in future due to increased mobility of people as observed in many developed countries. The study also considered the development of traffic due to completion of the two roads Ibri to Khaburah and Rustaq. The ADT was estimated at about 210,170 veh/day by year 2010.

9) Design Criteria

i. Geometric Design

The study was based on Highway Design Standards, Volume 1, General - 1986. The American and Japanese Standards are referred to for items not covered in the Government's Standards. Table 5-1 shows the recommended geometric design standard.

ii. Design Live Load

Many bridges have been constructed since 1970. Design Standard of different countries was adopted such as AASHTO (HS20), BS (45HB), FS (BC30), etc. Therefore, bridges have different loading capacities. Under this condition, a design standard for road structures was determined by MOC. The design loads consisted from the truck loading and lane loading under three type of loading as 40-ton truck, lane loading and 60-ton truck. The loading of 60-ton truck by Omani standard was slightly heavier than that of BS-HA standard. The Omani live loading systems will be one of the heaviest loading systems in the world.

The investigation showed that the RC bridges constructed about 20 years ago were already deteriorated and need repair. However, it is not economically feasible to bring the load capacity of existing bridges up to satisfy the new loading standard. It was recommended to mange traffic control for heavily loaded vehicles.

iii. Traffic Capacity

The road traffic capacity was calculated based on Table 5-2.

The calculation of capacity for roundabouts in Oman is based on the guidelines prepared by the British Transport and Research Laboratories.

Table 5-1 Geometric Design Standard

Item	Unit	Batinah Highway	Rampway
Terrain		Flat	Flat
Design Speed	km/hr	120	80
Stopping Sight Distance	m	200	115
Lane Width	m	3.75	3.5
Number of Lanes		4	1 or 2
Median Width	m	12.4	
Inner Shoulder	m	1.2	0.75
Outer Shoulder	m	2.00	2.00
Minimum Radius	m	585	230
Min. Radius without Transition Curve	m	1,000	1,000
Maximum Gradient	%	3 (5)	
Minimum Vertical Curve Length	m	Function of speed, grades and stopping distance.	
Super-elevation	%	8	8
Vertical Clearance	m	5.5	5.5

Table 5-2 Road Design Criteria

Description		Batinah Highway	Interchange Ramp
Design Speed (km/hr)		120	80
Terrain of Grade		Flat	Flat
Capacity under Ideal Condition (pcu/hr/lane)		2,000	2,000
Design Level Design of Service		B	C
Coefficient of Service Level		0.8	0.8
Maximum Service Flow Rate (pcu/hr/lane)		1,600	1,600
Width of Lane (m)		3.75	3.50
Lateral Clearance	Roadside	2.00	2.00
	Median	0.75	0.75
Heavy Vehicles	Ratio of H.V. %	10	10
	Composite Passenger Car Equivalency	1.7	1.7
Coefficient	Width of Lane	1.0	1.0
	Lateral Clearance	1.0	1.0
	Heavy Vehicle	0.91	0.91
	Driver Population	1.0	1.0
	Total	0.91	0.91
Service Flow Rate (veh/hr/lane)		1,500	1,500
Design Hourly Volume Ratio (%)		8%	10%
Directional Distribution Ratio		60%	60%
Design Daily Capacity (veh/day/lane)		15,000	12,000

10) Major Proposed Projects

i. Construction of 8 flyovers over the roundabouts at the following locations:

a. Baraka R/A
b. Sohar R/A
c. Naseem Garden R/a
d. Al Muladdah Junction
e. Saham R/A
f. Khaburah R/A
g. Al Hijari Junction
h. Bait Al Barakah R/A

Figure 5-1 presents the proposed location of these flyovers.

ii. Construction of 12 pedestrian underpasses as follows:

a. Al Billah
b. Al Tarif
c. Al Qart
d. Al Tharmad
e. Bataha Hilal
f. Al Khadra
g. Dhyan-2
h. Al Bidayah
i. Hilat Al Rawashid
j. Mujaz As Sughra
k. Liwa
l. Liwa-3

iii. Rehabilitation of 9 bridges along roads numbers 1, 7, 13, 15, 21 and 23. The bridge locations are shown also in Figure 5-1.

Because of financial problem and construction limit, no flyovers have yet been constructed. One pedestrian underpass at Al Bidaya has already been constructed. Another pedestrian underpass near Shinas has been also constructed and another one is under construction.

A study on the rehabilitation of bridges is currently in progress which includes 5 bridges of the 9 bridges studied as mentioned on the DGR Study Summary Sheet 405/96.

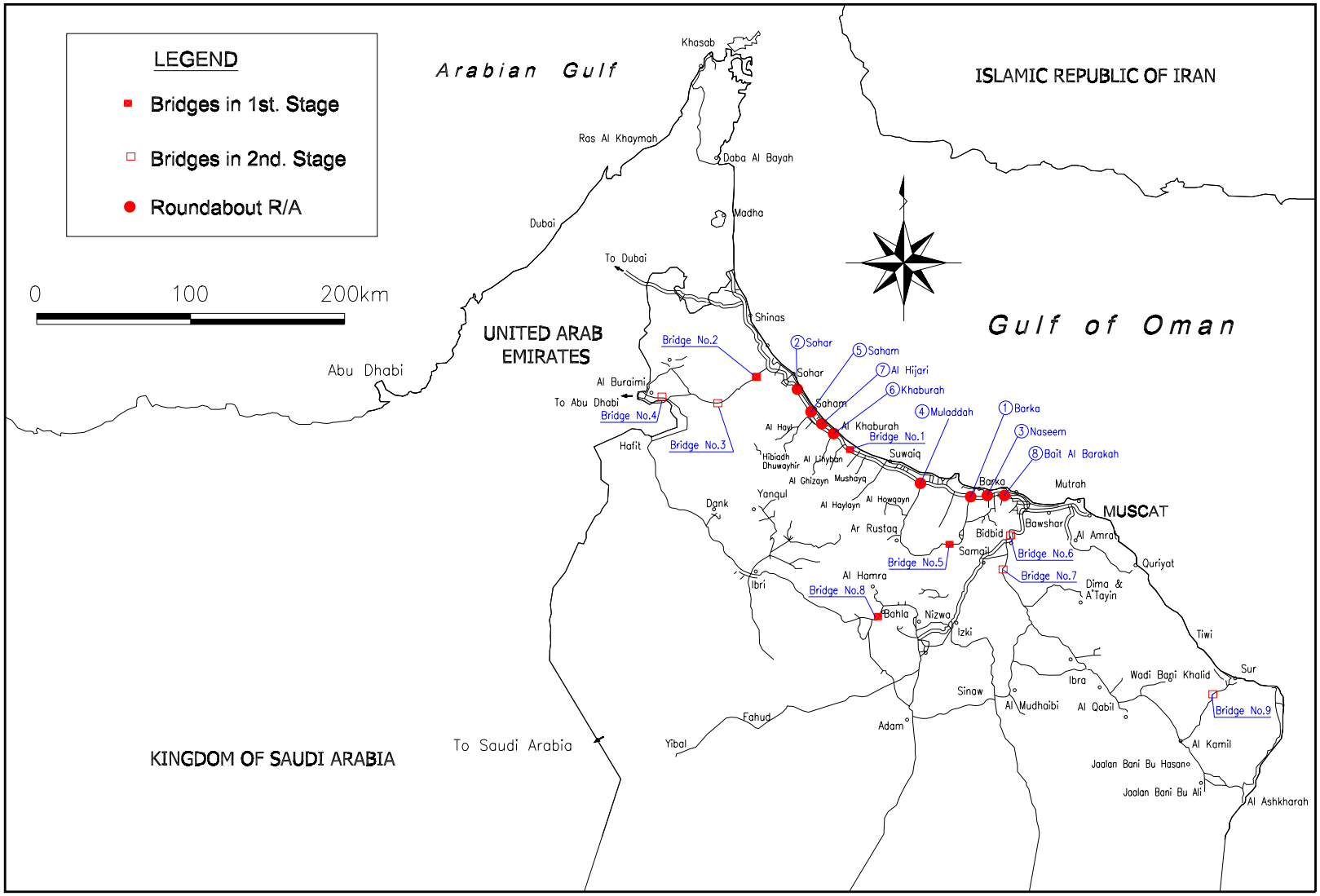


Figure 5-1 Interchanges and Bridges Location Map

6. REGIONAL AND URBAN PLANNING

6.1 Administrative Functions

Administratively, the Sultanate if Oman is divided into three Governorates and five regions. All of these eight administrative areas are divided into Wilayats and there are a total of 59 Wilayats in the Sultanate. Governorates as special autonomies have Governors who are almost equal to ministers, but regions do not have a regional headperson. All Wilayats, either under Governorates or regions have Wali who is under the Ministry of Interior. Governors and Walis have administrative functions in areas under their jurisdiction regarding the social aspects. Infrastructure aspects belong to concerned ministries while local services are implemented through the Municipalities, which are under the Ministry of Regional Municipalities

The main Governmental ministries responsible for providing infrastructural services are:

- Ministry of Transport and Communications
- Ministry of Regional Municipalities, Water Resources and Environment
- Ministry of Housing, Electricity and Water

In addition, other regional development authorities responsible for planning and development tasks in specially identified areas, under ministerial policies and in coordination with other ministries, are:

Muscat Municipality: under the Royal Sultan's Diwaan *(Palace)* to provide municipal services and public works in Muscat Governorate

Office of the Minister of State and Dhofar Governor: to provide municipal services and public works in Dhofar Governorate.

Office of Sohar Development: under the Royal Sultan's Diwaan to provide municipal services and public works in Wilayet Sohar.

6.2 Regional Planning Hierarchy

A Supreme Committee for Town Planning (SCTP) was established in 1985 under Royal Decree 27/85 to be responsible for the tasks of urban and regional planning instead of distributing such responsibilities between several ministries and agencies. The SCTP prepared unified planning policy, criteria and guidelines that are required to identify

sizes and characteristics of development projects on national, regional and local levels. In Oman, the concept of regional development is based on the development of different service centers in each region that are composed of the following types:

1. Regional Center: serves a group of Wilayat, Main and Local Services Centers, villages and localities under their jurisdiction.
2. Main Services Center: is mostly a Wilayat center or large city selected based on its population density and geographical location from the Regional Center. It is connected to a Regional Center and serves a group of Local Services Centers, villages and localities.
3. Local Services Center: is connected to a Regional or Main Services Center and serves local populated areas such as villages and localities.

The hierarchical planning for populated centers is based on the strategy of developing main services centers, rather than the strategies of concentrated development on spatial development with scattered investments in regional base. This strategy gives the optimum size for socioeconomic projects integrated for designated areas based on population distribution and available resources.

Regional Centers are planned to have a population of more than 50,000 inhabitants. Main Services Centers are mostly represented by Wilayat center, city center or local rural village collectives with a population of more than 10,000 inhabitants. Local Services Centers have almost the same classification with a population less than 10,000 inhabitants. Figure 6-1 presents the regional and other service centers in Oman as identified by the SCTP.

6.3 Regional Planning Criteria

The established criteria for planning of such development centers have the following two dimensions:

Locational Dimension: These criteria depend on the hierarchy of populated areas in the region to efficiently connect such areas with services centers and to develop new centers that accelerate development.

Sectorial Dimension: This classification aims to connect regional development, as presented in the locational dimension, with sectorial development in order to achieve targets and policies of socioeconomic activities.

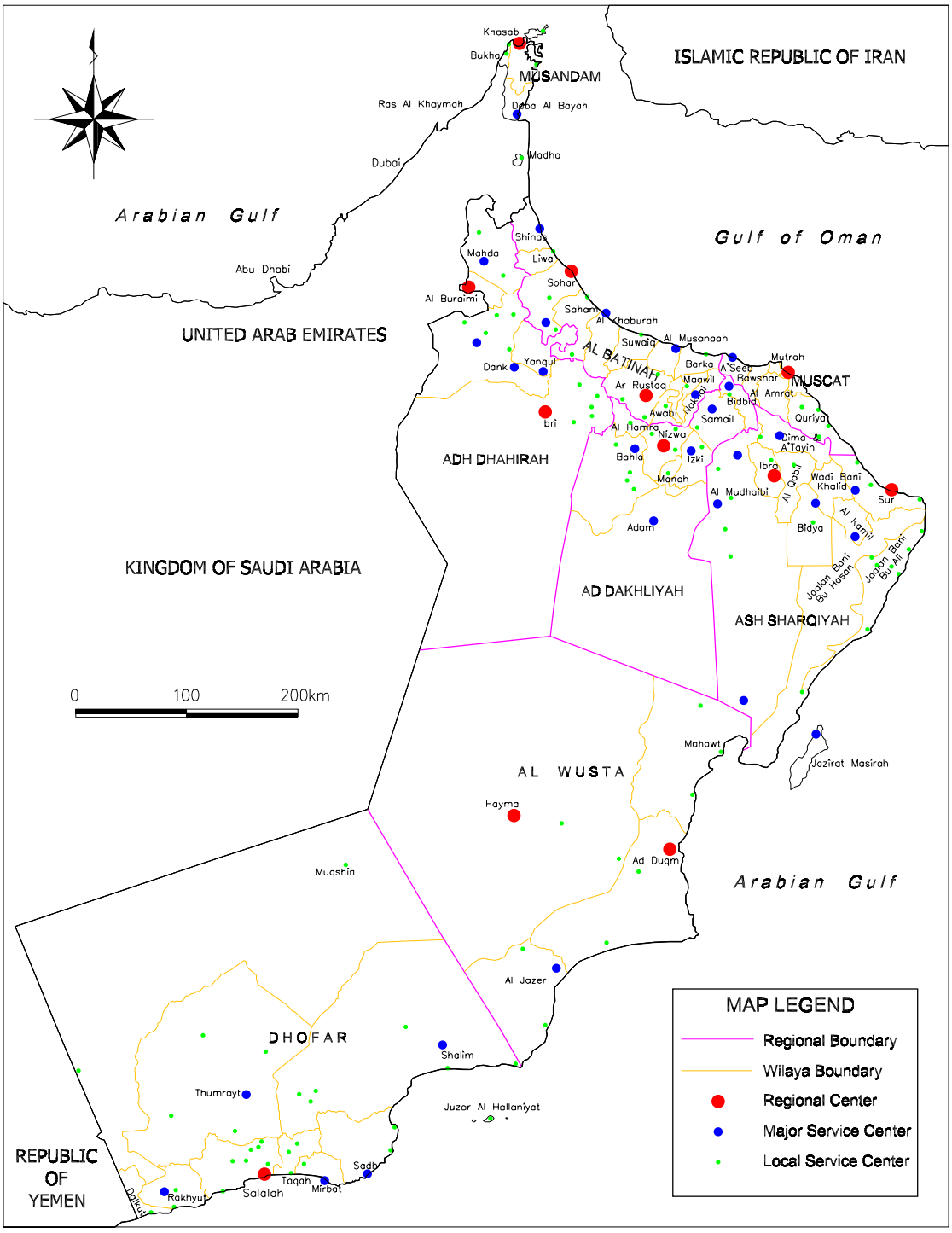


Figure 6-1 Regional, Main and Local Services Centers

Figure 6-2 presents the established administrative hierarchy flow for urban and regional planning in Oman.

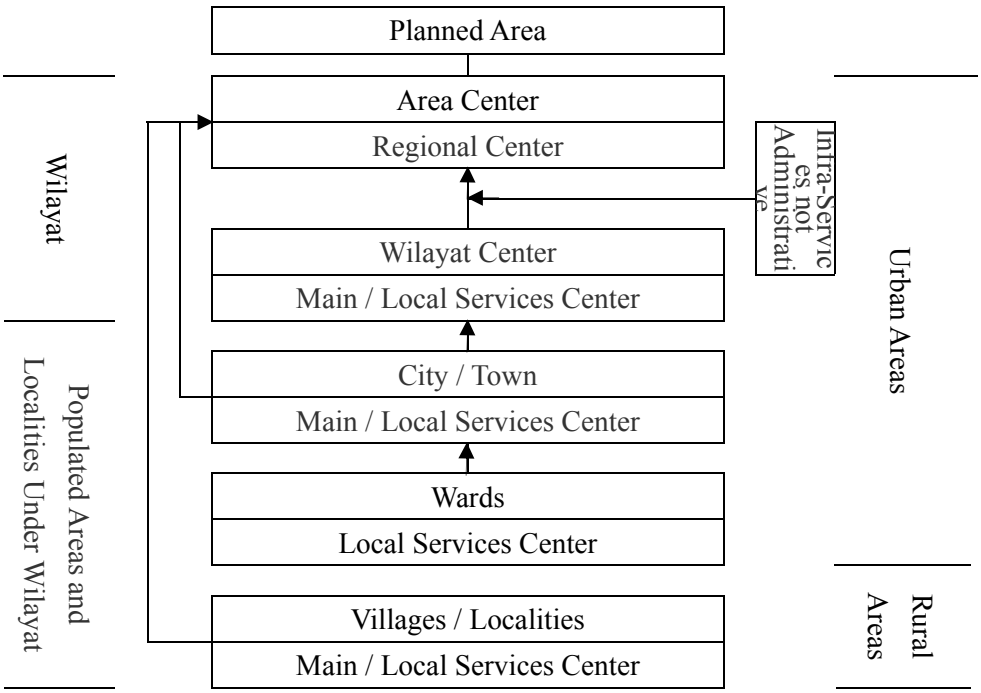


Figure 6-2 Administrative Hierarchy of Planning

7. TOLL ROAD STUDIES

At the border lines with neighboring countries, a fee of RO 2.0 for light vehicles and RO 5.0 for large vehicles is collected from entering vehicles to be used for the maintenance of roads in the Sultanate. That means there is a concept to collect money that can be used for the development of the road network. On the other hand, there are no toll roads in the country, but there are two candidate projects under DGR to be operated by applying a toll scheme. In addition, there is another candidate road project for toll operation which is Bauchar – Al Amerat Road located under the jurisdiction of Muscat Governorate.

7.1 New Batinah Expressway

The planned New Batinah Expressway, with a length of about 270 kilometers, is one of the important road projects that are under study by the Directorate General of Roads and the Supreme Committee of Town Planning as well. It is still under planning stage to select the optimum alignment which will be parallel to the existing Batinah highway that runs on the coastal area west of Muscat. The Feasibility Study on the project (1998) discussed the validity of financing the new expressway by public sharing company as a toll road. Under the study, it was assumed that the toll will constitute the sole source of revenue for the construction of the expressway. Maintenance and operating costs are assumed to be paid by the Government. Here, the construction cost includes also the cost of land expropriation.

Revenues are calculated based on the projected vehicle-kilometers on the toll road as used in the economic analysis, and by applying an average toll scenario of RO 0.012 per kilometer, which is based on a closed system approach. Trips on the road that do not have alternative route are not subject to a toll fee and are estimated to deduct about 5% of the total cost.

The financial analysis was done based on the assumption of keeping the existing highway as free of charge and the traffic diversion rates were concluded based on the above toll fee. Several alternatives were tested and the preliminary conclusions showed that an alternative of a single carriageway gives the best FIRR of 16%. While the dual carriageway gives 9%. Economically, the two alternatives give an EIRR of 27% and 22% respectively. A financial sensitivity analysis of 25% cost increase and revenue decrease gives 10% and 5% for the two alternatives.

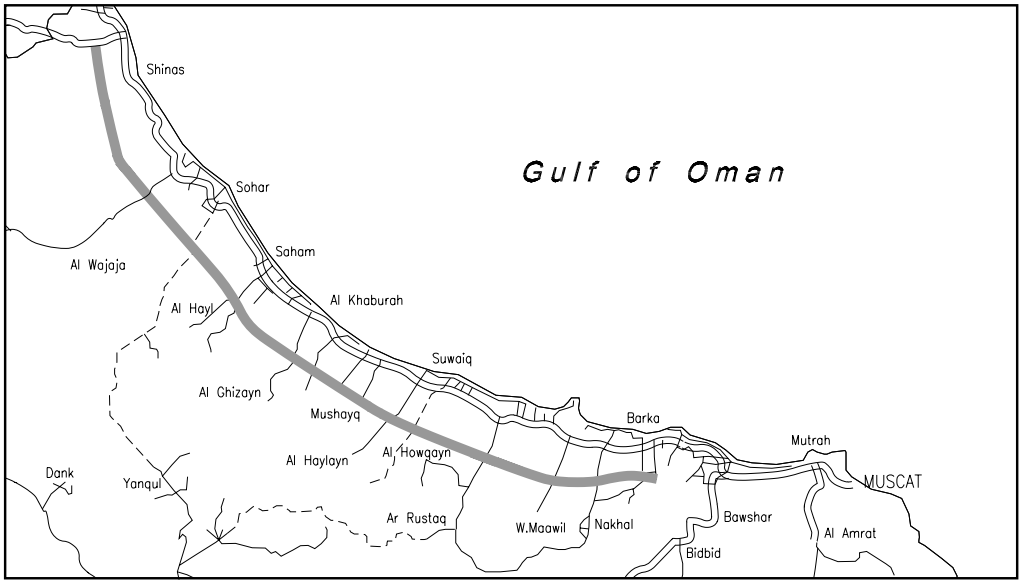


Figure 7-1 New Batinah Expressway

7.2 Qurayyat – Sur Highway

This highway is another candidate project to apply toll system in Oman and it is recently under-construction as 4-lane dual carriageway with a total length of about 90 kilometers. A long segment of the existing highway from Muscat to Qurayyat is still 2-lane single carriage way and it is planned to be also dual carriageway in the near future to provide 4-lane highway from Muscat up to the port city of Sur. In addition, Muscat Governorate is planning to construct a new coastal road as the shortest connection from Muscat to Qurayyat.

The feasibility study on the project (1997) considers that the purpose of the tolling is to create a system in which costs are allocated rationally to different classes of vehicles and to create revenue to match more closely the cost of providing roadway services.

For a road with a single carriageway, which is Scenario-1 in the study, toll rates between RO 2.0 for light vehicles and 4.0 for heavy vehicles were proposed by the Wali of both Sur and Qurayyat. These rates are less than the savings in fuel cost for a trip of 150 kilometers or about 8-21% of the total highway user cost for the different categories of vehicles. The project was proposed to be operated through the establishment of a concession company that can sell the roadside lands for commercial and recreational development projects in order to reduce borrowings.

Based on the traffic demand and the toll rates, the toll of RO 2.0 was found to be not

acceptable for investors as it will take 11 years to repay the initial investment. It was suggested that a toll of RO 3.5 for the first 8 years will be more realistic to so that the investment can be paid from the very first year. Then, the toll can be reduced to RO 2.0 from the 9th year to coincide with the repayment of substantial portion of the loan. This case gives an FIRR of 15.41%. Otherwise, support from the Government will be required.

When selecting Scenario-2 in which the road will have dual carriageway 14 years after the initial opening, a constant toll of RO 3.5 for private cars is proposed for the total period of concession. This rate, however, may not be acceptable by the road users. To overcome this problem, the study made some suggestions that require the support of the Government in getting soft loans, providing infrastructure bonds or bearing half of the interest costs. Applying a lower toll rate of RO 2.00 for the first 8 years gives a lower FIRR of 12.98% than that of the RO 3.5 with an FIRR of 16.16%.

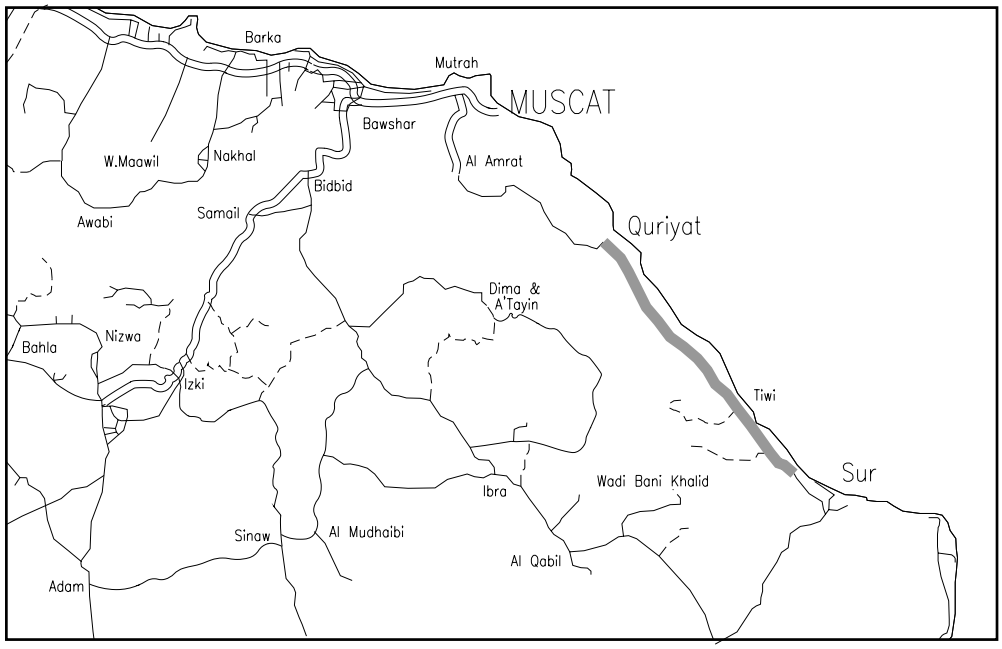


Figure 7-2 Qurayyat – Sur Highway

7.2 Bowshar – Al Amrat Road

This road belongs to Muscat Government not DGR, and it is included here as a candidate toll road project subject to the same logistical system in the country as any other toll road. The feasibility study on the project road (1998) proposed the two alternatives of; (a) surface road with mountainous section of 9.5 kilometers and a total length of 21.5 kilometers, and (b) tunnel route with a tunnel section of 3.2 kilometers and a total length of 13.9 kilometers.

Initial calculations were carried out with toll rates of RO 0.1, 0.2 and 0.3 for light vehicles on the whole road, and it would be doubled for heavy vehicles. Results of the initial analysis revealed that at the highest revenue would be with the toll RO 0.2 for the surface route alternative. As for the tunnel route, the toll rate of RO 0.3 gives the highest revenue.

The project, however, was found to be financially not viable for the private sector as all the financial indicators are negative for all alternatives. The project will not be able to generate sufficient revenue to pay even the interest on loans required to finance its implementation. Therefore, it was concluded that the only way by which the project can be implemented is by the Government providing the necessary capital for the construction of the road.

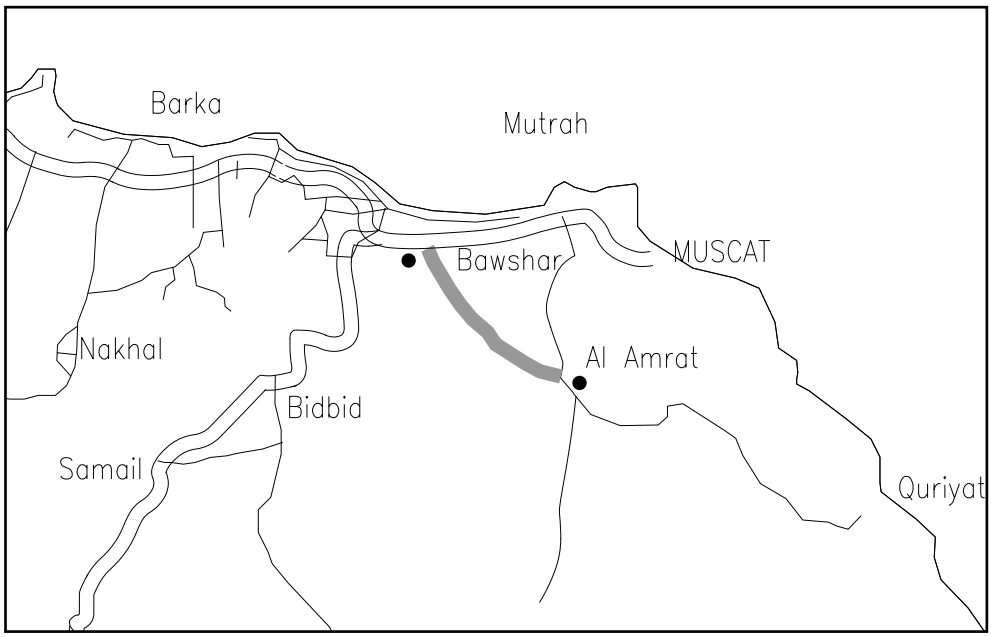


Figure 7-3 Bowshar – Al Amrat Road

8. PORT DEVELOPMENT STUDIES

8.1 Related Studies

Recently, feasibility studies have been done on Salalah Port, Sohar Port, Khasab Port and Duqm Port. In addition, feasibility study on the expansion of Qaboos Port is on-going. A more comprehensive study on the National Ports Development Strategy is to be on start. Table 8-1 presents the related studies.

Table 8-1 Related Studies

Port	Consultants executed the Study	Progress
Qaboos Port	Halcrow, UK	To be submitted soon
Salalah Port	The Overseas Coastal Area Development Institute of Japan and Sanyo Techno Marine, INC.	Submitted
Sohar Port	Halcrow and WS-Atkins	Submitted
Khasab Port	WS-Atkins	Submitted
Duqm Port	Posfold Haskoning, Khatib & Alami & Partners and Al-Barkah for Fconomic Consultancy	Submitted
Comprehensive Development Strategy	Not decided yet	To start soon

Most of the feasibility studies have been prepared. Hereafter, following up of those studies are examined.

8.2 Priority Ports

1) Priority Ports and Issues

The Government considers that the development of a group of six ports, presented in Table 8-2, has a high priority for future potential. Each port has different role assignment. Those assignments are discussed in this section.

2) Facilities

Facilities of each port are described in Table 8-3 focusing on the length of berth and water depth.

Table 8-2 Major Ports

Port	Major Function	Issues
Qaboos Port	Leading Port of the Country	- Necessity of additional berths mainly for container cargos - Necessity of a berth for tourist boats
Salalah Port	Transshipping Port	- Necessity of facility improvement to become winner of transshipping port competition in the area - Establishment of FTZ adjacent to the port
Sohar Port	Industrial Port	- Establishment of sharing policy with the Qaboos Port - Establishment of gateway function to Gulf countries - Establishment of supporting facilities to Industrial development
Khasab Port	Regional Development Port	- How to contribute to betterment of the basis of their livelihood
Duqm Port	Regional Development Port	- How to contribute to regional development
Shinas Port	Commercial Port	- Reinforcement of trading function with Iran

8.3 Sultan Qaboos Port

The port handled 200,000TEU in 2002. There was an increase of 149% comparing with the amount of 2001. The Government has interest to reinforce transshipping capability of the Qaboos Port mainly to destinations in Gulf area. The total demand of transshipping for the Gulf area is estimated as 4,000,000TEU per annum.

Present facilities of the Port are fully operating and the improvements of facilities are urgently required. The development plan is being established and it will be reported in April, 2004. In this plan, reclamation of east side of the existing port is proposed for developing container handling facilities while the present port to be converted exclusively for the use of general cargo ships and tourist boats.

Incidentally construction of the Sohal Port is nearly finished. How to share port activities between the Qaboos Port and the Sohar Port shall be studied.

Table 8-3 Facilities of Each Port

Port		Qaboos	Salalah	Sohar	Khasab	Shinas	Duqm	Fahal	Sur
Condition*		Operat	Operat	Const.	Impr.	Transf	Plan	Operate	Operat
Channel		-13	-16	-16.5	-10	-4.5	-12	N/R	N/R
Berth									
Multi	L*-m	470					380		
	D**-	-13					-7.5		
Multi	L*-m	366							
	D**-	-10.9							
Gen. Cargo	L*-m	228	600						
	D**-	-11	-10						
Gen. Cargo	L*-m	564	575						
	D**-	-9.6	-3						
Bulk Cargo	L*-m			810					
	D**-			-16					
	L*-m	457		290					
	D**-	-4		-16					
Royal Use	L*-m	507							
	D**-	-4							
Container	L*-m		1260	700					
	D**-		-16	-16					
RORO	L*-m		519						
	D**-		-10						
Oil Jetty	L*-m		130						
	D**-		-12						
LNG Jetty	DWT								125,00
	L*-m						240		
Guard	D**-						-8		
Fishry	L*-m						500		
	D**-						-5		
Pontoon									
General	L*-m				105	100			
	D**-				-10	-4.5			
Fishery	L*-m				100				
	D**-				-5				
	L*-m				35				
	D**-				-10				
Buoy	Buoy							3 buoys	
Dry Dock	L*-m						800		
	D**-						-10		

Note: * Operat: On Operation
Const: On Construction
Impr: Improvement
Transf: Transforming from Fishery Port
Plan: Planning Phase

8.4 Salalah Port

Transshipping volume is estimated to reach 2,000,000TEU in 2003. It was big jump comparing to handling volume 1,500,000TEU in 2002 and it is noteworthy that the 2,000,000TEU is over capacity of Salalah Port, which is 1,760,000TEU.

In addition it, some shipping companies transferred from the Aden Port (APL) and the Dubai Port (China Shipping Co., but partly).

The Government decided to improve port capacity and develop FTZ to support transshipping capability of the port. Outline of these improvements are as follows;

Port Facilities:
Berth: 2 berths, total 700m
Depth in water along the berth: -18m
Depth in water along the channel: -18.5m
Breakwater: 2.4km

Free Trade Zone (FTZ):
Establishment of Management body: Salalah Free Zone Co. with 100% government capital
Construction: Scheduled to start from June/July of 2004

8.5 Sohar Port

This is the first industrial port in Oman. Secondary purposes are to complement activities of the Qaboos Port and work as gateway of Gulf countries. The operation will start in 2004.

8.6 Other Ports

Other ports excluding the Fahal Port which is specialized for crude oil loading are planned to develop regional economy or improve living standard.

8.7 Consideration from Road Network Study

Large amount of import goods are transported from Dubai by land. When the Sohar Port or the Qaboos Port becomes a gateway of the Gulf countries, land transport flow may change in a considerable amount.

When the Sohar Port takes over the import/export done by the Qaboos Port at present, it affects land transport volume between Masucat and Sahar.

Other ports developing for regional development purpose needs local road betterment to connect to the Ports.

After the Port network is established domestic sea transport shall be considered. Especially because the most of commodities are imported, domestic transshipping system seems to be reasonable. From the commodity transport point of view, the system of port development is major concerned.

APPENDIX 2-1

Wadi's Characteristics of Selected Catchments

APPENDIX 2-1

WADI'S CHARACTERISTICS OF SELECTED CATCHMENTS

In order to achieve the ultimate goals of the Study, selected catchment's areas of the seven regions have been chosen highlighting the prevailing water resources impact on the development of road network in the Sultanate of Oman and its characteristics in flood design and planning. Table 2-1 presents a list of installed flood gauges in Oman from which data applied in this section is iuntroduced.

2.1 Musandam Region (Wadi Khasab's Catchment)

The Musandam Governorate is separated from the rest of the Sultanate by UAE territories for about 70 kms. The population is sparse and scattered in small coastal/mountainous settlements. There are four major towns in Musandam. These are Khasab, Diba, Bukha and Madha. Khasab has been selected as a representative wadi catchment of the region for detailed analysis. Location of Khasab town and catchment are shown in Figure 2-1. The catchment covers an area of about 368 km^2.

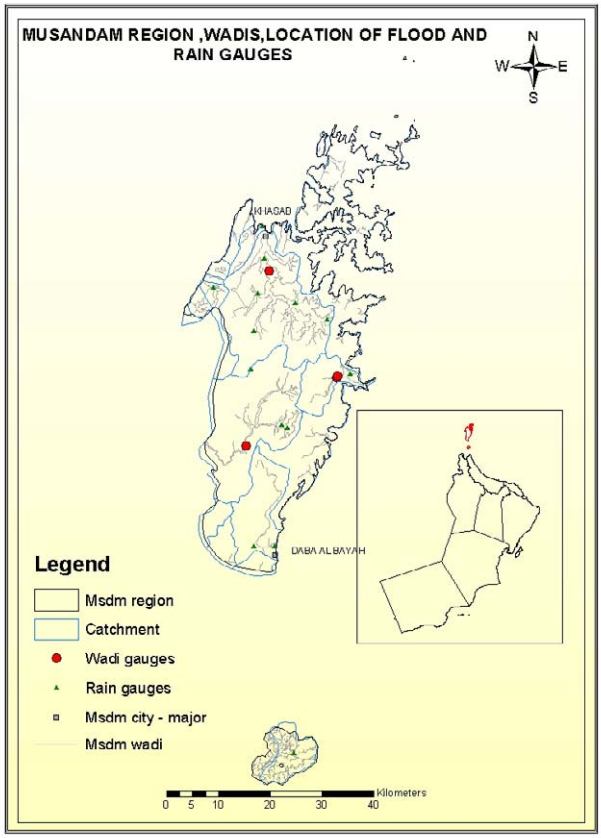


Figure 2-1 Location of Khasab Catchment

Table 2-1 Flood Gauges in Oman

No.	Station	Wadi	Station ID	Region
MM1	Salhad	Al Bih	DD250664AD	Musandam
MM2	Khasab	Khasab	DD295021AD	Musandam
MM3	Limah	Nataba	DD368975AD	Musandam
MM4	Bayah	Khabb Sh	DD245145AD	Musandam
SS3	Ajib	Hatta	DC237976AD	N Batinah
SS4	Shinas	Hatta	DC434816AD	N Batinah
SS5	Sabakh	Fizh	DC417300AD	N Batinah
SS6	Dawanij	Fizh	DC514700AD	N Batinah
SS7	Bayda	B Umar Gh	DB496929AD	N Batinah
SS8	Mulayinah	Al Jizi	DB388507AD	N Batinah
SS9	Sohar	Al Jizi	DB698772AD	N Batinah
SS10	Yanbu	Salahi	DM578762AD	N Batinah
SS10	Riqqah	Hilti	DB576043AD	N Batinah
SS12	Hayl	Ahin	DB554869AD	N Batinah
SS13	M Kabirah	Ahin	DB872977AD	N Batinah
SS14	Khishdah 1	Ahin	DB875654AD	N Batinah
SS15	Khishdah 2	Ahin	DB875650AD	N Batinah
SK1	Fujayl	Sarami	DB747538AD	N Batinah
SK2	Saham	Sarami	DB869846AD	N Batinah
SK3	Lihban	Bani Umar	DB839224AD	N Batinah
SK4	Ghuzayn	Hawasinah	DB938385AD	N Batinah
SK5	Khaburah	Hawasinah	EB057335AD	N Batinah
SK6	Houqain	B Ghafir	EM304474AD	S Batinah
SK7	F as Saidi	B Ghafir	EB304504AD	S Batinah
SK8	Suwayq 1	B Ghafir	EB431349AD	S Batinah
SK9	Suwayq 2	B Ghafir	EM431747AD	S Batinah
SK10	Tabaqah	Sahtan	EL381641AD	S Batinah
SK11	Fara	Fara	EA479986AD	S Batinah
SK12	Mazahit	Far	EA496507AD	S Batinah
SK13	Tarif 1	Fara	EM622638AD	S Batinah
SK14	Tarif 2	Fara	EM622881AD	S Batinah
SK15	Musanaah	Fara	EM626741AD	S Batinah
BK1	Awabi	Awabi	EL574613AD	S Batinah
BK2	Ghubrah	Sabt	EA770960AD	S Batinah
BK3	Hajar	Al Abyadh	EL697332AD	S Batinah
BK4	Al Abyadh	Al Abyadh	EA698596AD	S Batinah
BK5	Bu Abali 1	B Kharus	EB722408AD	S Batinah
BK6	Bu Abali 2	B Kharus	EM723612AD	S Batinah
BK7	Afi	Afi	EL895407AD	S Batinah
BK8	Hifri	Ma'awil	EM824206AD	S Batinah
SA1	Dasir	Al 'Uqq	FA160968AD	Muscat
SA2	Al Khawd	Al Khawd	FB104840AD	Muscat
MU1	Rusayl	Jaba	FB201263AD	Muscat
MU2	Muaskar	Aiden	FB208640AD	Muscat
MU3	Hammam	Lansab	FA395799AD	Muscat
MU4	Bajariyah	Aday	FB505467AD	Muscat
YT1	Hajir 1	Jannah	FA580672AD	Muscat
YT2	Hajir 2	Haym	FA583530AD	Muscat
YT3	Hajir 3	Manzariyah	FA585595AD	Muscat
YT4	Hajir 4	Mayh	FA596055AD	Muscat
YT5	Habubiyah 1	Hayfadh	FA777631AD	Muscat
YT6	Ma'awil	Sarin	FA775288AD	Muscat
YT7	Habubiyah 2	Sarin	FA776239AD	Muscat
YT8	Quriyat	Miglas	FA877343AD	Muscat
YT9	Bayyad	Tayyin	FA740974AD	Muscat
YT11	Mazara	Dayqah	FA950420AD	Muscat
YT13	Al Ghaf	Dayqah	FA968370AD	Muscat
YT15	Dibab	Arabiyin	GA057335AD	Muscat
YT16	Qalhat	Hilm	GA413121AD	Sharqiyah
SU1	Sur	Rafsah	GV497083AD	Sharqiyah
BA2	Ibra	Ibra	FA507887AD	Sharqiyah
BA10	Sabt	B Khalid	GV189810AD	Sharqiyah
BA12	Al Wafi	Didu	GK350499AD	Sharqiyah
BA14	Bani Bu Ali	Batha	GK336887AD	Sharqiyah
AH1	Samad	Samad	FA128240AD	Sharqiyah
AH2	Sanaw 1	Batha	FV086879AD	Sharqiyah
AH3	Sanaw 2	Andam	EV989372AD	Sharqiyah
AH5	Izki	Halfayn	EA738426AD	Dakhliyah
AH7	Al Mawz	Muaydin	EA638772AD	Dakhliyah
AH8	Saiq	Sayh	EA655108AD	Dakhliyah
AH13	Nizwa	Al Abyadh	EA546034AD	Dakhliyah
AH14	Adam	Kalbu	EV686593AD	Dakhliyah
AH15	Adam 2	Adam	EV539735AD	Dakhliyah
UM1	Ghafat	Kawr	EA144301AD	Dakhliyah
UM2	Al Hamra	Misfah	EA350697AD	Dakhliyah
UM3	Bahla	Bahla	EA330729AD	Dakhliyah
UM4	Adam 4	Umayri	EV394690AD	Dakhliyah
MS1	Sulayf	Lusayl	DA561519AD	Dhahirah
MS2	Ibri	Ibri	DA479073AD	Dhahirah
MS3	Tanam	Al Ayn	DA467001AD	Dhahirah
MS4	Subaykhi	Jifrah	DA380054AD	Dhahirah
MS5	Masharub	Bila	DA299426AD	Dhahirah
MS6	Dank 1	Bila	DA199915AD	Dhahirah
MS7	Yanqul	Yanqul	DB502785AD	Dhahirah
MS8	Dank 2	Dank	DB206512AD	Dhahirah
MS9	Khubayb	Khubayb	DB210788AD	Dhahirah
MS10	Dank 3	Dank	DB103374AD	Dhahirah
MS11	Al Fatah	Al Fatah	DB123785AD	Dhahirah
MS12	Sunaynah	Al Fatah	DB014723AD	Dhahirah
MS13	Fayyad	Ajran	DB151787AD	Dhahirah
MH1	Buraymi	Al Ayn	CB973852AD	Dhahirah
MH2	Mahdah	Mahdah	CB899534AD	Dhahirah
MH3	Sharm	Sharm	CC907987AD	Dhahirah
MH4	Nuway	Sharm	CN915047AD	Dhahirah
SH1	Falls	Darbat	BD298272AD	Salalah
SH2	Taqah 2	Darbat	BD286800AD	Salalah
SH4	Mamurah	Rzat	BD095279AD	Salalah
SH5	Salalah 1	Sahalnawt	AD997284AD	Salalah
SH6	Salalah 2	Jarziz	AD980966AD	Salalah
NA3	Thumrait 1	Dhahban	BE059867AD	Najd
NA4	Thumrait 2	Andur	BE561976AD	Najd
	Rumaylah	Fizh	DC514682AD	N Batinah
	Liwa	B Umar Gh	DC515077AD	N Batinah
	Buraik	Shafan	DB959875AD	N Batinah
	Uwaydat	Diyan	EB249000AD	S Batinah
	Habubiyah 2	Sarin	FA776239AD	Muscat
	Ma'awil	Sarin	FA775288AD	Muscat
	Buwayrid	Didu	GK269191AD	Sharqiyah
	Hamdah	B Khalid	GK269191AD	Sharqiyah

The catchment is largely covered by rocks, which form hills with cliffs along the coast rising up to an elevation of 2,000 m in the northwest and the southwest. The overall average gradient of the wadi bed is one in 17.5 (5.7%) and in the plains is one in 100 (1%).

The region experiences two seasons; a summer season from May to October with temperatures averaging around 40° C, and a winter season from November to April with temperatures averaging around 25° C (General Soil Map of Oman).

Annual rainfall is shown in Figure 2-2. The annual rainfall ranges from 130 mm to 237 mm in the catchment. The average annual rainfall in the catchment is 195.5 mm and the average annual rainfall of Khasab rain gauge is also 195.5 mm.

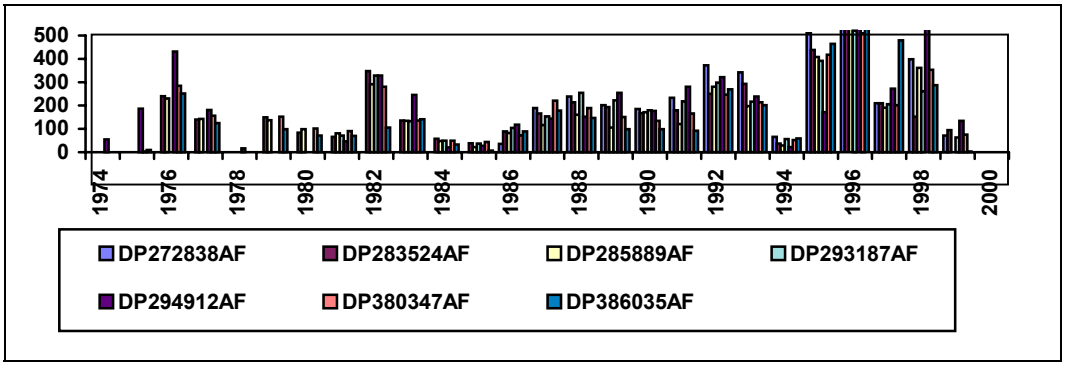


Figure 2-2 Khasab Stations' Annual Rainfall

Figure 2-3 shows the statistical analysis of the rainfall for the Khasab catchment which is based on a linear relationship of probabilities, and rainfall events. Of the 22 years of annual rainfall records at Khasab, the mean annual rainfall of 195.5 mm was exceeded in eight events, and nine events were below normal. There is about a 50 percent probability that the rainfall in any year will either be normal or above normal.

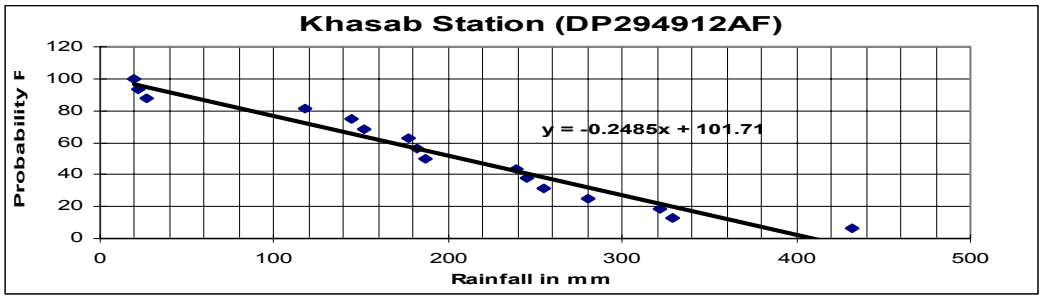


Figure 2-3 Probability of Rainfall at Khasab

Wadi flow data recorded at Khasab Wadi Gauge (command area 250 km^2) located at the recharge dam site is presented in Figure 2-4. Wadi flow records are available from 1980 to 1992 excluding the years 1989 to 1991. On an average, approximately 4.5 to 5 percent of the rainfall is normally recorded as wadi flow at the dam gauge. During the period of records, an average of 1.05 Mm^3 surface flows passed through the gauge or was received in the dam. A 50% infiltration from the dam bed is estimated to recharge the alluvial aquifer in addition to normal recharge from rainfall.

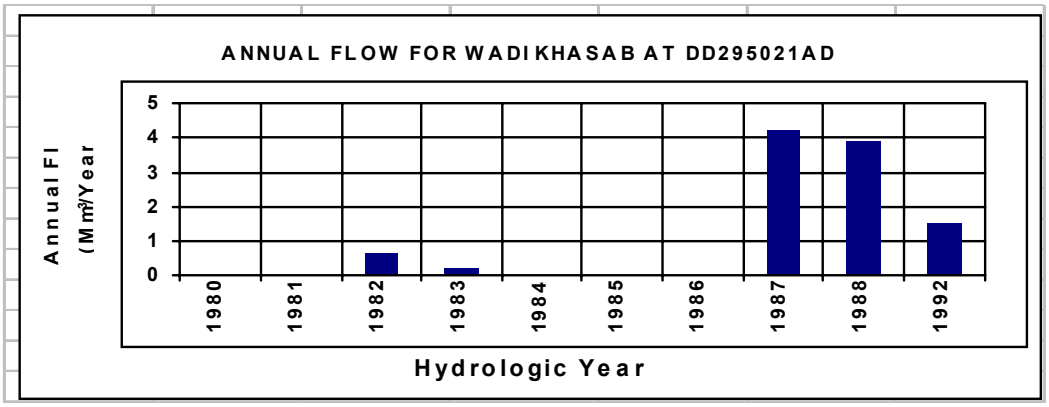


Figure 2-4 Flow Recorded at Khasab Wadi Gauge

Total runoff:

The total catchment area for Wadi Khasab above Khasab dam is 368 km^2. There is a flood control safety dam in Wadi Khasab, located upstream of the Khasab town area. Infiltration from rainfall and runoff adds to the groundwater reservoir in the upper catchment, and moves downstream as through flow into the wellfield and then finally into the sea. The throughput is estimated to be sufficient to ward off any seawater intrusion.

a. Rainfall

- Average rainfall in the catchment is estimated at 195.5 mm.
- Volume of water received in the catchment (368 km^2) as rain = 71.944 Mm^3/year

b. Surface Run-off

- Run-off generated from rainfall in hard rock area (268 km^2) =11.085 Mm^3/year.
- Run-off generated from rainfall in alluvial area (100 km^2) =1.955 Mm^3/year.
- Total runoff in the catchment = 15.040 Mm^3/year

2.2 Al Batinah Region

Al Batinah Region is characterized by a large number of wadis. Figure 2-5 shows the locations of wadis in the region.

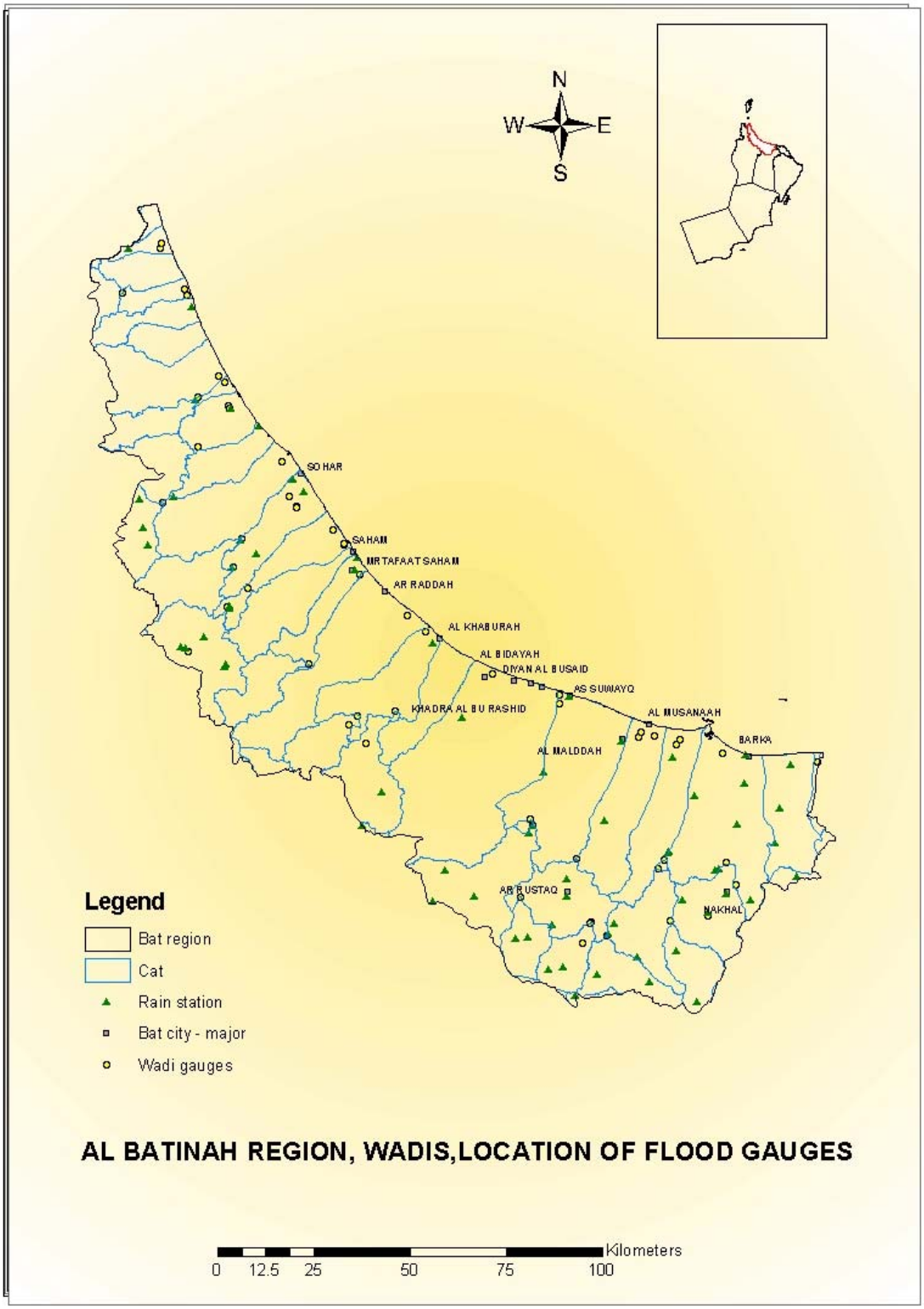


Figure 2-5 Locations of Wadis at Al Batinah Region

1) Wadi Barka's Catchment

The coastal town of Barka is one of six wilayats under the Southern Al Batinah region, and contributes a significant proportion of the agricultural products to the prosperous Batinah region located along the northern coast of the Sultanate of Oman. Barka is located about 100 km from Muscat and 140 km from Sohar. Wadi Ma'awil mainly drains through the wilayat. Wadi Ma'awil is one of the major north-flowing wadis joining the Gulf of Oman at about 6 km west of Barka town. The catchment covers an area of about 1,300 km^2. The hills in the south have steep slopes with little soil cover and are generally devoid of any vegetation. However, valley floors and their banks are inhabited, and have agriculture developed on terraces. The highest elevation on the southern border is Jabal (2,138 m above sea level) and the average gradient of the Wadi Ma'awil is 1 in 23 or 4.2%. Wadi Barka is shown in Figure 2-6.

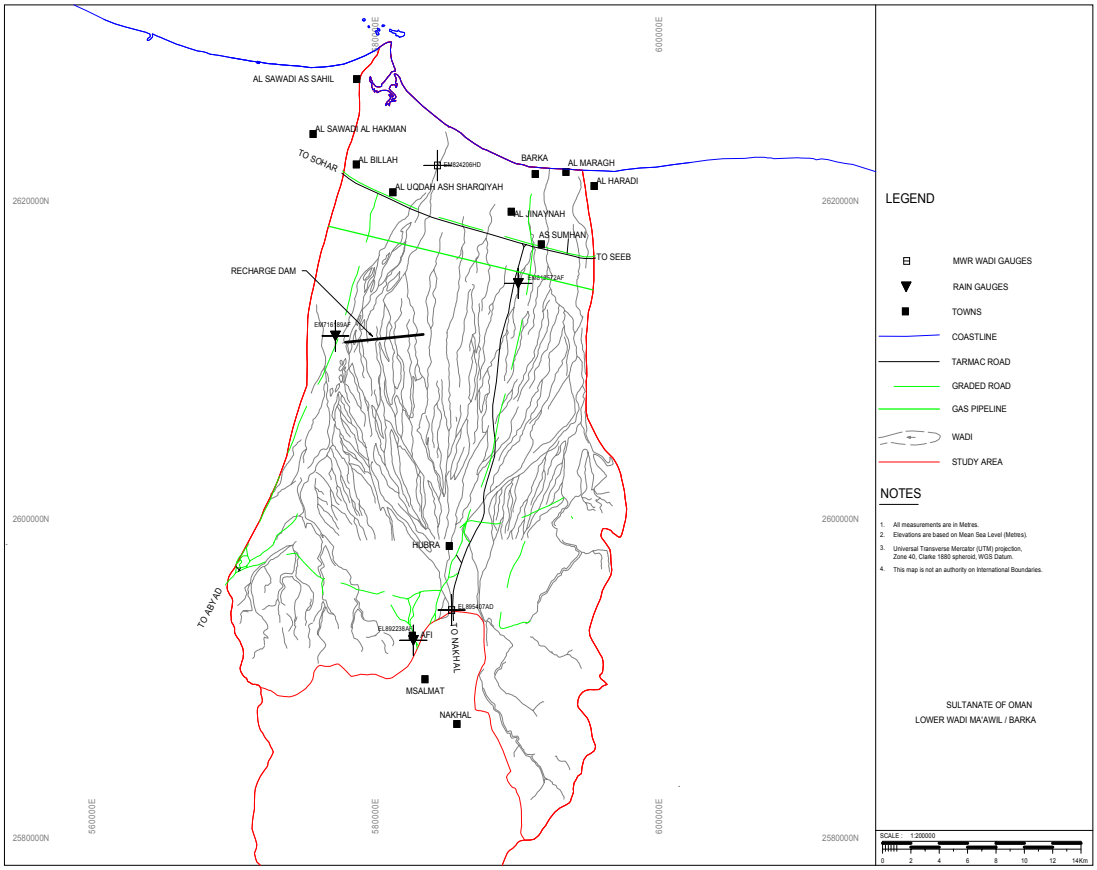


Figure 2.6 Locations of Hydrological Stations - Wadi Barka

Three rain gauges namely Barka (EM819572AF), Al Afi (EL892238AF), and Al Tawiyah (EL783573AF) are located in the lower catchment, whereas the rain gauge at Al Khatum (EM716189AF) is located in the upper catchment. The annual rainfall in the lower catchment ranges from 0 mm to 358.6 mm. The average annual rainfall in the lower

catchment is 91.3 mm. Annual rainfalls recorded at all the rain gauges is shown in Figure 2-7.

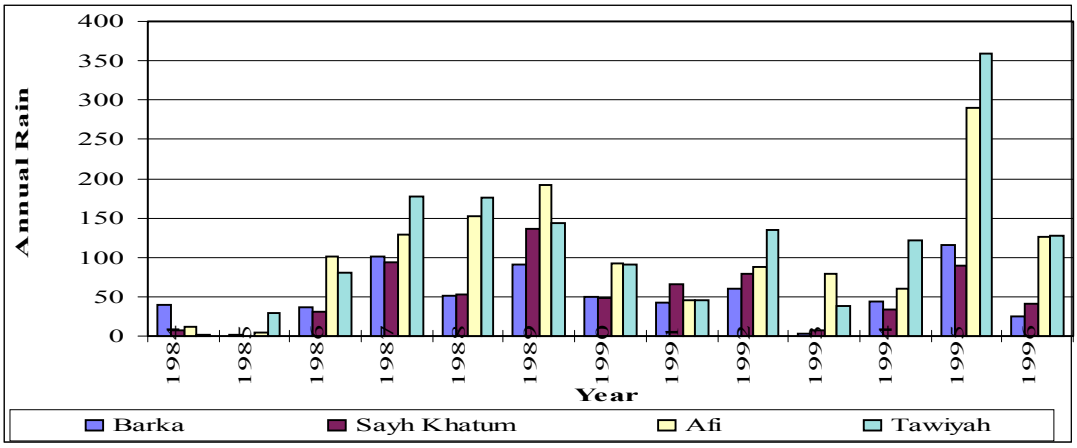


Figure 2-7 Annual Rainfall - Wadi Ma'awil Catchment Rain Gauges

Table 2-2 summarises the probabilities of exceedence.

Table 2-2 Probabilities of Exceedence

	Rainfall in mm			
Probability of Exceedence	Barka EM819572AF	Khatum EM716189AF	Al Afi EL892238AF	Tawiyah EL783573AF
10 percent	103	112	225	266
25 percent	85	92	184	215
50 percent	56	58	116	130
75 percent	26	24	47	46
90 percent	8	3.5	7	0
Probability of mean annual rainfall	1 time in every 2 years (54 %)	1 time in every 2 years (54 %)	1 time in every 2 years (54 %)	1 time in every 2 years (54 %)

Table 2-3 shows the frequency analysis of the rainfall for the rain gauges in Wadi Ma'awil catchment which is based on a linear relationship of probabilities and rainfall events.

Table 2-3 Rainfall Frequency Analysis - Wadi Ma'awil Rain Gauges

Years of Repetition	Annual Rainfall in mm (Barka)	Annual Rainfall in mm (Khatum)	Annual Rainfall in mm (Afi)	Annual Rainfall in mm (Tawiyah)
2	48	52	100	130
5	96	92	165	170
10	110	116	120	285
20	>115	>135	250	>358

There are two wadi gauges in this area. The wadi gauge at Al Afi (EL895407AD) is at the entrance of the lower catchment of Wadi Ma'awil and wadi gauge at Al Hufri

(EM824208AD) is almost at the farthest end of the catchment before wadi Ma'awil debounces into the sea. The average annual wadi flow measured at each site is summarised in Table 2-4.

Table 2-4 Average Wadi Flow - Wadi Ma'awil Lower Catchment

Station	Site ID	Average Discharge (M m^3/y) up to 1990
Near Hufri	EM824206AD	1.939714
Near Al Afi	EL895407AD	2.108857

The data for the two wadi gauges can not be compared as a recharge enhancement dam was built in 1991 between these two gauges. However, analysis of data prior to 1991 indicates that approximately 1.47 Mm^3/year (43% of the wadi flow entering from Afi wadi gauge) wadi flow on an average was lost to the infiltration and evaporation between the two gauges excluding the contribution of rainfall towards the wadi flow between these two stations.

Figure 2-8 shows the flood frequency curve, of peak-over threshold (POT), in cum/s, Wadi Ma'awil. The return period of wadi flow shows the amount of runoff that will be expected within a given period of time and demonstrates the relationship between POT in cum/s of runoff and return period in years. Frequency analysis illustrated in Figure 2-9 shows the locations of flood gauges in Al Batinah Region.

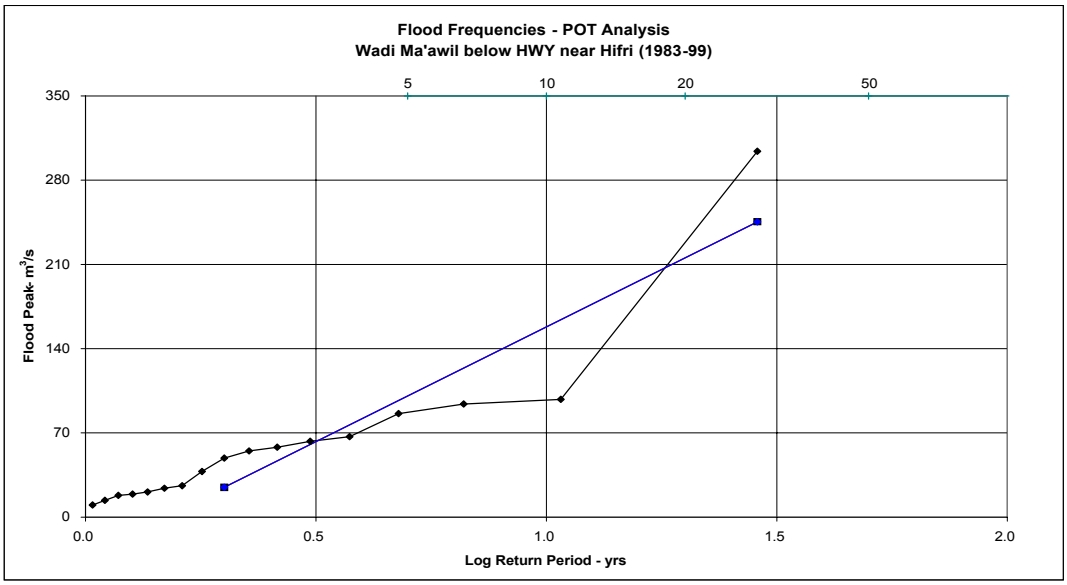


Figure 2-8 Flood Frequency Curve of POT in cum/s - Wadi Ma'awil

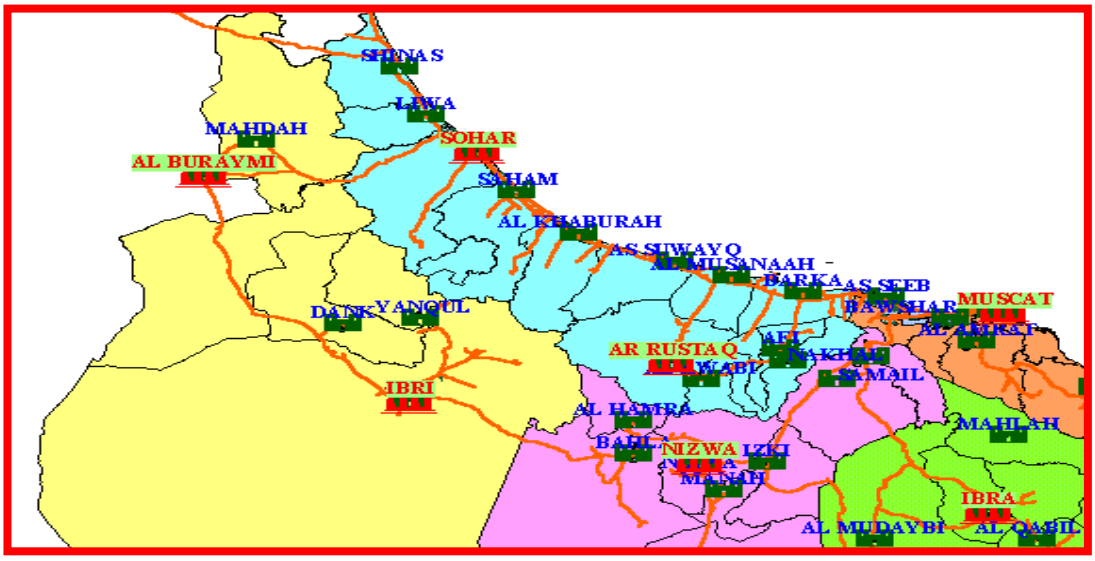


Figure 2.10-9 Location of Flood Gauges in Al Batinah Region

2) Wadi Jizzi Catchment, Sohar

The catchment area of Wadi Jizzi covers an area of approximately 1,150 km^2. The Wadi Jizzi catchment area is inhabited by people living in small villages and towns. Most of the population lives on the coastal plains of the Batinah which have two important towns in the Wadi Jizzi catchment. They are Sallan and Sohar. The Sohar Wilayat Centre hosts all the Government offices, schools and a hospital. These facilities are located along the main road which passes through the centre of the Town. Sohar is the most important town in the Al Batinah region.

The Wadi Jizzi emerges from the eastern limbs of Al Hajar al Gharbi (Northern Oman Mountains), and flows in a northeasterly direction. The wadi discharges to the Gulf of Oman at Ras Sallan.

The catchment's characteristics embrace two major sections:

The upper catchment area covers the western mountainous terrain of water to the Jizzi catchment (633 km^2). The upper catchment embraces of the mountainous terrain and has many tributaries contributing to Wadi Jizzi. The upper catchment is characterised by mountains, and steep and narrow incised valleys into which the modern wadi channels are cut.

The lower catchment area embraces the lower eastern piedmont and coastal plains of Wadi Jizzi (517 km^2). The lower catchment comprises the piedmont and the coastal plain and has only two tributaries, namely Wadi Barghah and Wadi Yanbu. The Batinah Plain

forms the lower portion of the catchment, where the wadis are broader and become braided before coalescing again as they breach the coastal strip. About 30% of the catchment area is alluvial (soft rock) and 70% is occupied by hard rock.

The highest elevation in Al Hajar Al Gharbi (within the catchment) is 1,602 m above mean seal level (amsl) and the lowest point at the coastal alluvial plain where it is at mean sea level. The elevation in the upper catchment ranges from 350 to 1,600 m amsl, from 350 to 1,379 m amsl in the piedmont zone and 15 m amsl in the coastal plain.

The average gradient of the Wadi Jizzi in the upper catchment is 1 in 60 (1.66%) 16.6 m per km, in the piedmont zone 1 in 103.5 (0.966%) or 9.66 m per km and in the coastal plain 1 in 200 (0.5%) or 5 m per km.

The average annual rainfall of Jizzi catchment ranges from about 100 mm in the lower catchment to 120 mm in the upper catchment. Mountainous regions above 1,000 m receive in excess of 200 mm/yr and more than 300 mm/yr in areas located above 2,000 m (Meteorological Reports; Ministry of Communications, Sultanate of Oman.

Annual rainfall is shown in Figure 2-10. The average annual rainfall for stations ranges from 100 mm to 164 mm in the catchment.

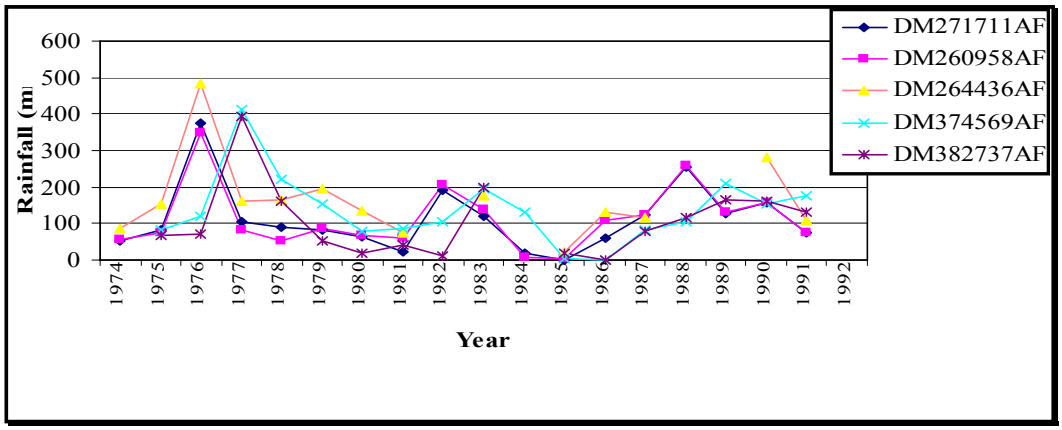


Figure 2-10 Rainfall Analysis - Wadi Jizzi Catchment

Most of the precipitation occurs between December and March and is sourced by Mediterranean frontal systems approaching the area from the northwest. A second source for precipitation is local convective storm cells that form over the mountains during very hot summers and cause short and heavy rainfall mostly in the mountains (Orographic rain). Tropical cyclones that originate either in the southeastern Arabia Sea or in the Bay of Bengal approach the area occasionally, causing heavy precipitation for several days.

Because of the strong monsoon airstreams that parallels the Arabian Sea coastline during summer and winter, however, southeastern air masses normally do not reach the northern Arabian Coast. The frequency of southern cyclonic rainfall is estimated at once every 2 to 5 years in southern and central Oman and once every 5 to 10 years in northern Oman. In July 1995, a tropical cyclone reached the Arabian Peninsula from the southeast, causing intensive rainfall all along the coast of Oman with decreasing rainfall intensity from south to north. At several coastal weather stations, the total rainfall in July produced a new extreme record for the month. In southern Oman, a weather station near Salalah recorded a total rainfall of 135 mm for July 1995, compared to a long-term mean July value of 9.1 mm.

As in most arid regions, evaporation rates are extremely high, with long-term mean daily evaporation rates estimated from open pan experiments as 5 to 15 mm/day, depending on altitude and surface exposure（Gibb and Partners 1976, Stanger 1986). The average annual rainfall ranges from 100 mm in the lower catchment, to 120 mm in the upper catchment. Annual rainfall is shown in Figure 2-11, the average annual rainfall for stations ranges from 100 mm to 164 mm in the catchment. The mountainous area of higher altitude attracts more rainfall than the surrounding areas.

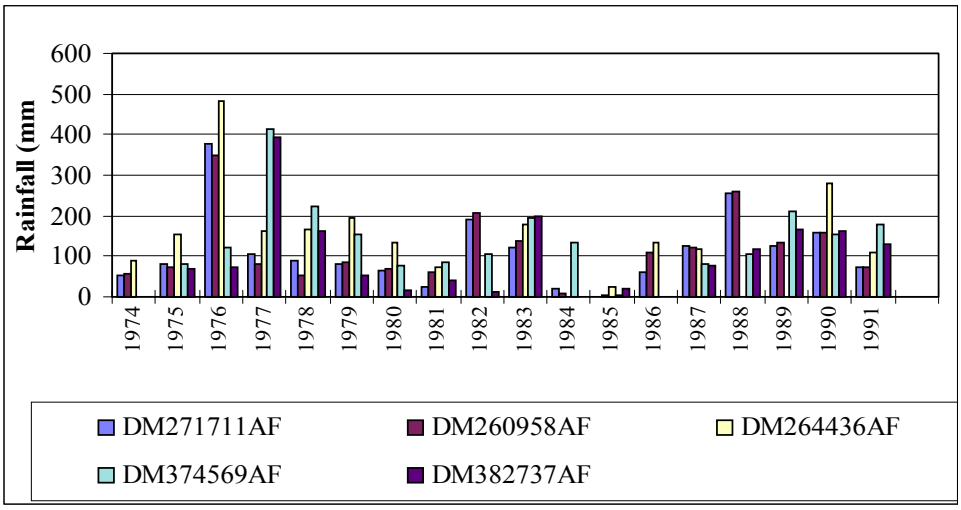


Figure 2-11 Average Annual Rainfall

Table 2-5 summarises the probability analysis of the annual rainfall, for all the stations of the available data in Wadi Jizzi catchment.

Table 2-5 Annual Rainfall Probability Analysis, Wadi Jizzi Catchment

Years of Repetition	Rainfall in mm/year			
	Hayl	Kitnah	Daqiq	Al Hayl
	DM271711AF	DM260958AF	DM264436AF	DM382737AF
2	120	125	180	77
5	227	216	227	166
10	261	251	250	198
20	280	262	267	312
50	292	275	280	*
100	295	278	290	*

Table 2-6 presents the frequency analysis for the rainfall stations in Wadi Jizzi Catchment.

Table 2-6 Frequency Analysis for Rain Gauge Stations, Wadi Jizzi

Rainfall Stations	Recorded Hydrological years	Mean Rainfall	No.of events exceeding mean Rainfall	No. of events below mean Rainfall
Hayl (DM271711AF)	18	111.7	7	11
Kitnah (DM260958AF)	18	113.2	7	11
Daqiq (DM264436AF)	14	162.5	5	9
Far (DM374569AF)	17	136.5	7	10
Al Hayl (DM382737AF)	16	102.1	7	9

The annual runoff is calculated as a fraction of the total average rainfall for the catchment area. Figure 2-12 shows the yearly runoff for both wadi gauges. The mean annual flow for Wadi Jizzi at Mulayinah gauge was 15.20 Mm^3 and 6.77 Mm^3 at Sohar gauge. In 1996, maximum annual flow of 50 Mm^3 was recorded at Mulayinah and 46.5 Mm^3 at Sohar gauge in 1988.

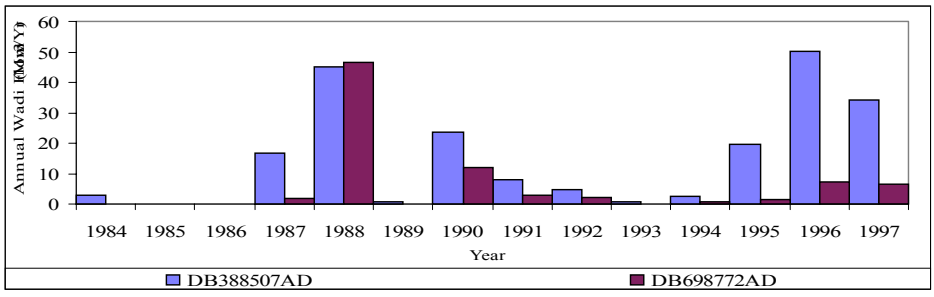


Figure 2-12 Annual Flow Analysis - Wadi Jizzi Catchment

A probability analysis is based on the linear relationship between events. Return period of annual flow is presented in Figures 2-13 and 2-14. The regression analysis shows that an annual flow of 36.8 Mm^3 is expected at Mulayinah once in every 5 years and has a probability of 20 percent.

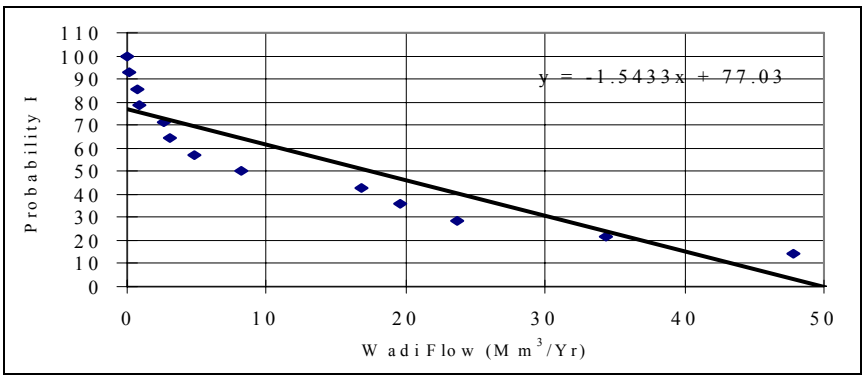


Figure 2-13 Probability Analysis - Wadi Flow at Jizzi near Mulayinah

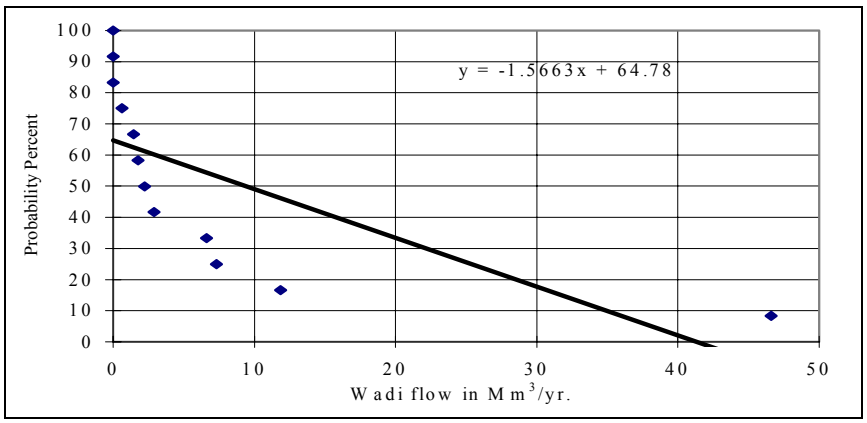


Figure 2-14 Probability Analysis - Wadi Flow at Jizzi

Figure 2-15 shows the flood frequency curve, of POT, in cum/s, for Wadi Jizzi, near Sohar. The return period of wadi flow shows the amount of runoff that will be expected within a given period of time.

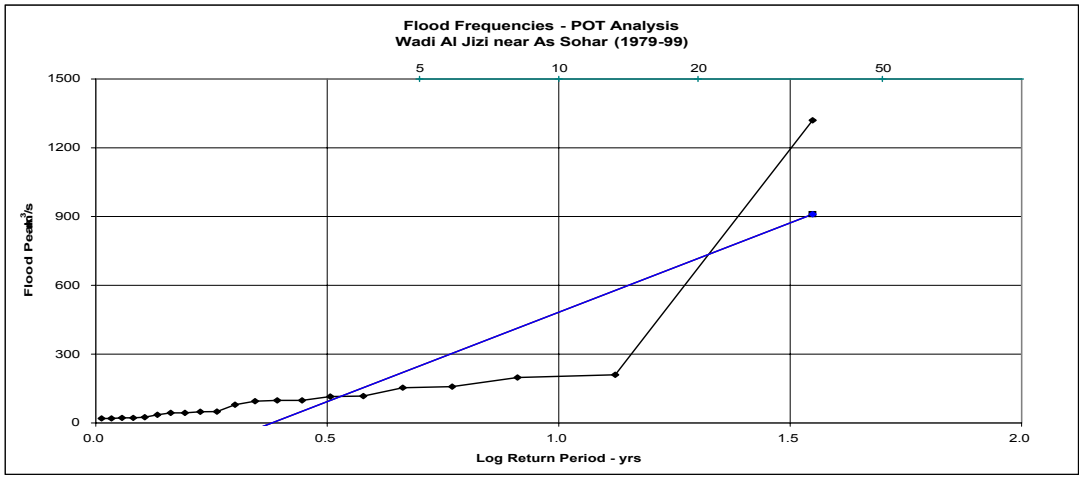


Figure 2-15 Flood Frequency Curve of POT in cum/s - Wadi Jizzi

2.3 Al Wusta Region (Wadi Rawnab Catchment)

The Rawnab catchment as shown in Figure 2-16, is located about 720 km south-west of Muscat and 165 km south-east of Hayma. Wadi Rawnab is the largest wadi system joining the Arabian Sea in southern Al Wusta Region. Wadi Rawnab falls in the Al Wusta Region where very limited potable groundwater is available from the fresh water lens overlying regional saline groundwater in the hyper-arid environments of Al Wusta Region in Central Oman.

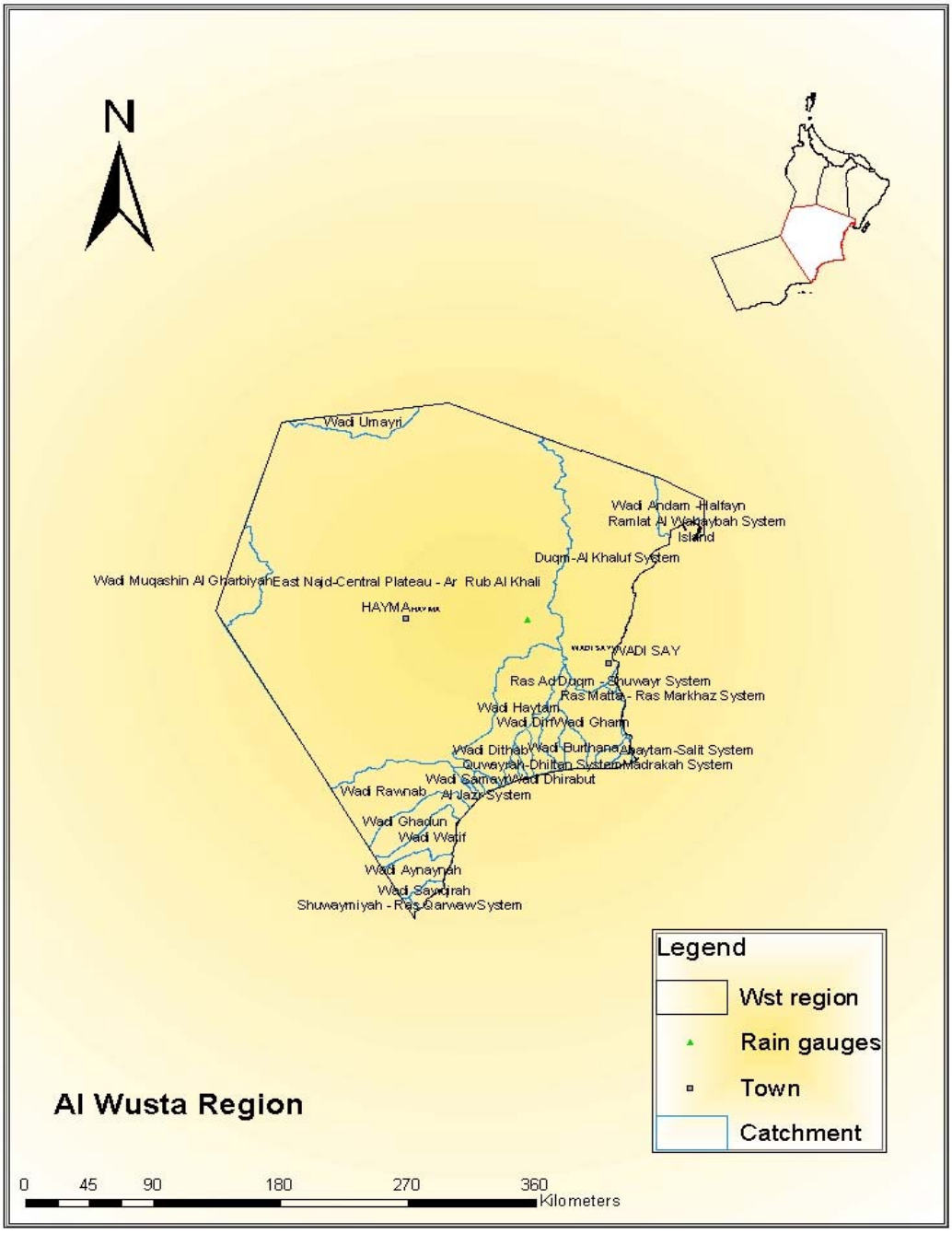


Figure 2-16 Location of Wadi Rawnab south Al Wusta Region

The Wadi Rawnab occupies the south-eastern portion of the broad low central plateau of Oman with Al Huqf in the north, Jabal Dhofar in the south, Ar Rub Al Khali on the west and Arabian Sea on the east. The catchment covers an area of about 4,288 km^2.

Three distinct physiographic divisions namely the plateau, the gorge tract and the coastal plain have been identified in the catchment. The average gradient of the Wadi Rawnab bed in the plateau is 1 in 558 m (0.179%), 1 in 613 m (0.163%) in the gorge tract and 1 in 250 m (0.4%) in the coastal tract.

Evaluation of monthly mean temperatures for meteorological station at Marmul shows very high temperature variations between summer and winter months with highest temperature recorded for the month of August. Humidity is low throughout the summer months and remains high during the winter months. The region experiences a hyper arid climate with an annual average rainfall estimated as between 20 mm and 50 mm with two seasons - the summer from May to October when the mean temperatures range around 34 ^oC and the winter from November to April when the mean temperatures are about 22 ^oC (General Soil Map of Oman).

Annual rainfall and rainfall probabilities for Yalooni are shown in Figure 2-17. The average annual rainfall in the Al Wusta region is 51 mm.

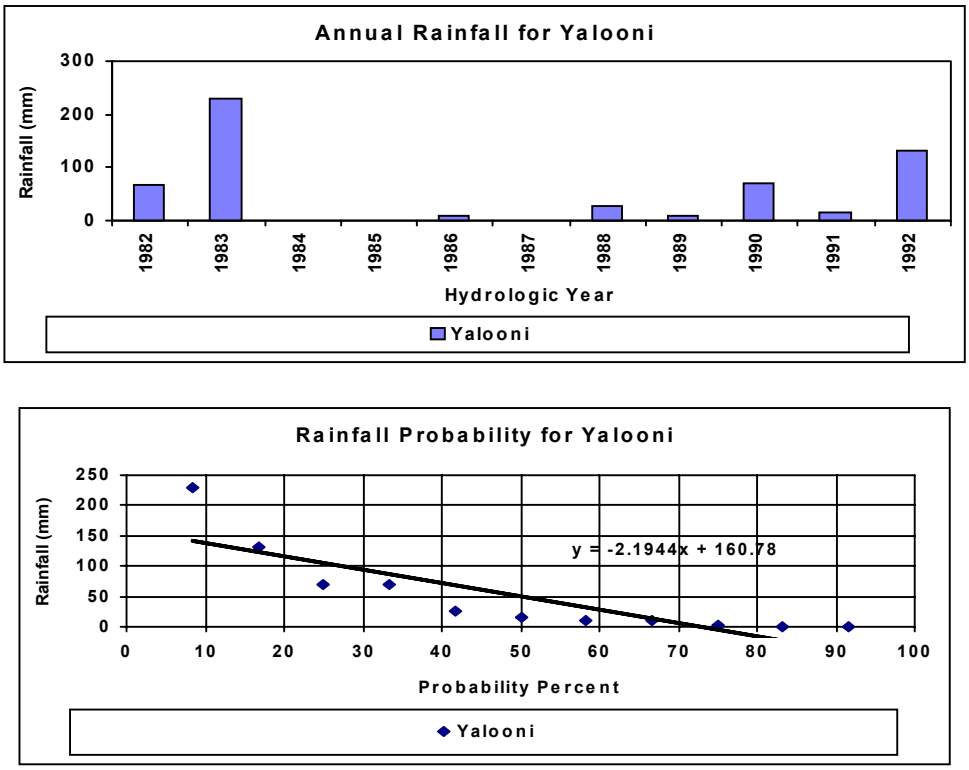


Figure 2-17 Rainfall Analysis - Rain Gauge in Wadi Rawnab Catchment

Table 2-7 summarizes the probabilities of the rainfall recorded at Yalooni rain gauge station, the nearest station to the Wadi Rawnab catchment.

Table 2-7 Annual Rainfall Probability - Wadi Rawnab Catchment

Probability of Exceedence	Rainfall in mm
10 percent	138
25 percent	107
50 percent	52
75 percent	--
90 percent	--
Probability of mean annual rainfall	51 mm or 1 time in every 3 years (36 %)

Linear regression puts a relationship between the cumulative distribution and the actual value of the event. Table 2-8 shows the frequency analysis of the rainfall for Yalooni.

Table 2-8 Rainfall Frequency Analysis - Wadi Rawnab Catchment

Return Period (Years)	Annual rainfall (mm / year)
2	51
5	117
10	139
20	150

The mean annual rainfall of 51 mm was exceeded 4 times and 7 times below normal. There is about 36 percent probability that the rainfall in any year will either be normal or exceed the annual mean.

2.10.4 Ad Dakhliyah Region (Wadi Samail Catchment)

The town of Samail is located along Wadi Samail, about 95 km south-west of Muscat. It is an important Wilayat of the Interior Region (Administrative Unit) of the Sultanate of Oman. The catchment covers an area of approximately 35 km^2. The highest elevation within the catchment is 700 m above mean sea level (amsl) and the lowest point, at the confluence with Wadi Samail, the trunk stream, is approximately 450 m amsl. The Sharjat Al Ebrahimiya tributary is 12 km in length and its average gradient is 1 in 50 (0.02) or 20 m per km and that for the main Wadi Samail channel is 1 in 120 (0.008).

The meteorological station nearest to the sub-catchment is located at Seeb International Airport for which records from 1977 are available. The average monthly temperature ranges from 22^0C in January to 36^0C in June. The rainfall analysis for the station FL072717AF is shown in Figure 2-19. Figure 2-20 shows the probabilities of the rainfall for Samail rain gauge.

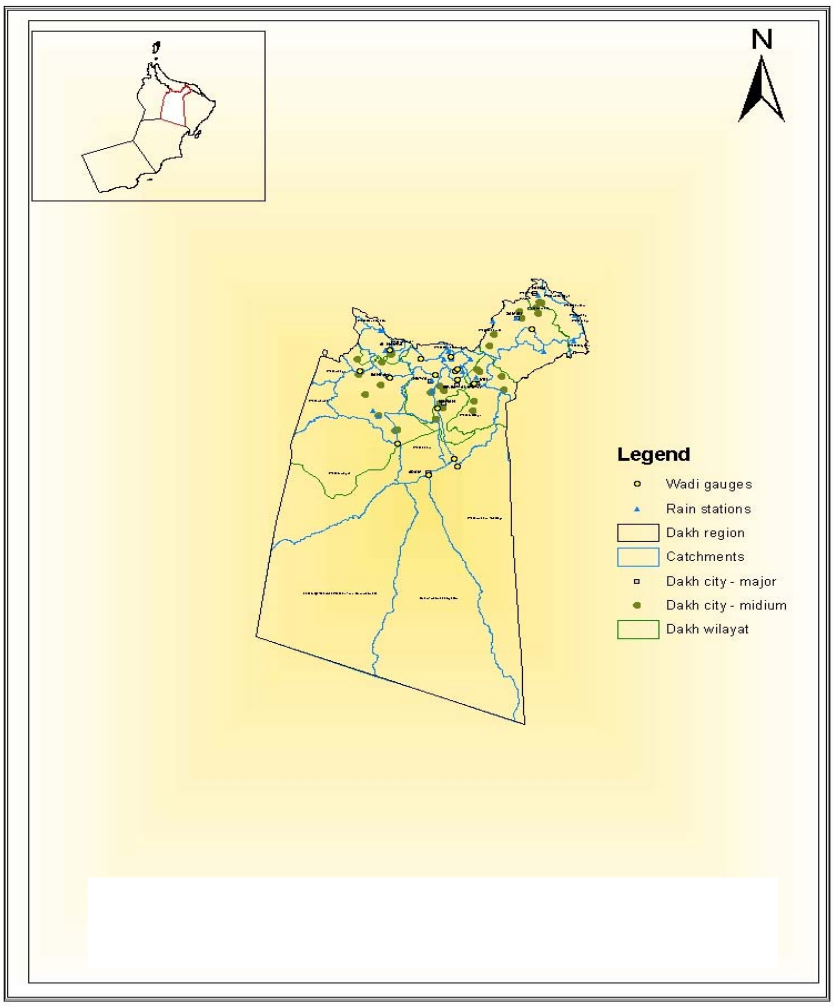


Figure 2-18 Location of Wadi Samail Catchment in Ad Dakhliyah Region

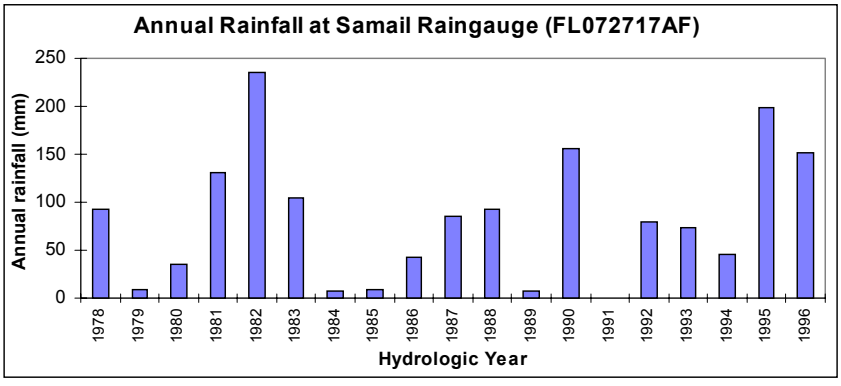


Figure 2-19 Rainfall Analysis - Samail Rain Gauge

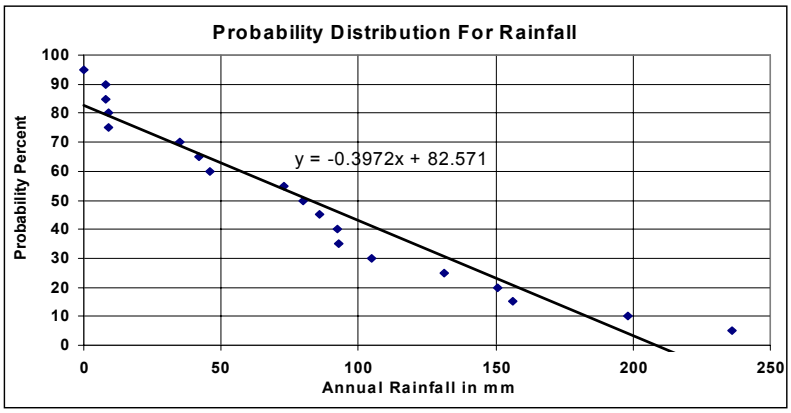


Figure 2-20 Rainfall Probability-Samail Rain Gauge

Table 2-9 shows the frequency analysis of the rainfall for the Samail Rain Gauge which is based on a linear relationship of probabilities and rainfall events.

Table 2-9 Frequency Analysis - Samail Rain Gauge

Return Period (in Years)	Rainfall at Samail (mm / year)
2	81
5	156
10	181
20	194
50	201
100	204

The mean annual rainfall for Sharjat Al Ebrahimiya catchment is estimated at 115 mm (MRMEWR, 1995). The nearest wadi gauge to the Sharjat Al Ebrahimiya catchment is a gauge at Al Dasr (FA160968AD) in Wadi Uqq catchment. Figure 2-21 shows the annual wadi flows.

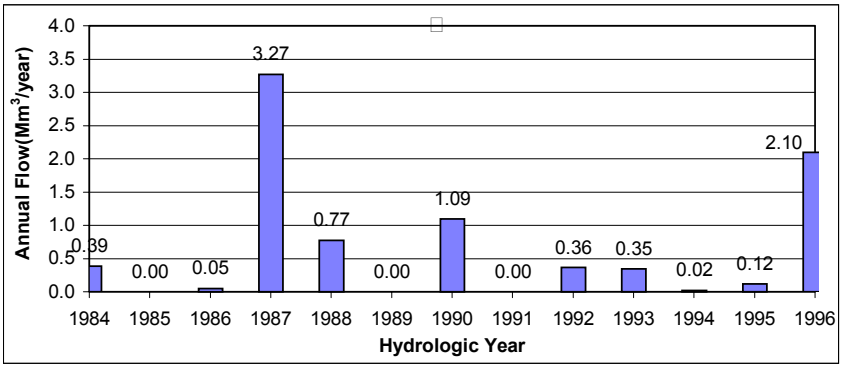


Figure 2-21 Annual Wadi Flow - Al Dasr Wadi Gauge

Results of the probability analysis of the wadi flow at Bahla wadi gauge is presented in Table 2-10.

Table 2-10 Probability Analysis for Runoff - Dasr Wadi Gauge

Probability of exceedence	Runoff in Mm^3
10 percent	2.8
25 percent	1.3
50 percent	0
75 percent	0
90 percent	0
Probability of mean annual rainfall and runoff	0.65 Mm^3, or once in every 3 years

Frequency analysis is based on the linear relationship between an event and return period of annual flow is summarised in Table 2-11.

Table 2-11 Wadi Flow Frequency Analysis, Al Dasr Wadi Gauge

Return Period in Years	Annual Flow at Al Dasr in Years Mm^3/year
2	0.3
5	1.6
10	2.9
20	4.3
50	6.0
100	7.4

Mean annual run-off volume for Sharjat Al Ebrahimiya catchment which is 0.182 Mm^3 and can reach up to 0.91 Mm^3 during the maximum rainfall period.

Total Runoff

1. The total catchment area for Sharjat Al Ebrahimiya sub-catchment is 35 km^2. Infiltration from rainfall and runoff adds to the groundwater reservoir and moves downstream as throughflow into the wellfield and then finally into the Wadi Samail main channel area. About 75% of the catchment area (26 km^2) is occupied by the ophiolites (hard rocks) and 25% area (9 km^2) by the wadi beds, alluvium and the weathered rocks. There are no wadis flowing into the catchment.

A. Rainfall.

1. Average rainfall in the catchment is estimated at 115 mm.
2. Volume of water received in the catchment (35 km^2) as rain = 4.025 Mm^3/year

B. Surface Run-off

1. Run-off generated from rainfall in hard rock area (26 km^2) = 0.75 Mm^3/year

2. Run-off generated from rainfall in alluvial area (9 km^2) = 0.1025 Mm^3/year

Total runoff in the catchment = 0.8525 Mm^3/year

2.5 Adh Dhahirah Region (Wadi Mahdah Catchment)

The town of Mahdah is an important Wilayat Centre of the Adh Dhahirah region. It is about 284 kms (crow fly distance) north-west of Muscat and bounded in the east by Al Hajar Al Gharbi of the Northern Oman Mountains, and in the west by the United Arab Emirates.The Wadi Mahdah lies to the south of Wadi Kahal. Wadi Mahdah catchment and covers an area of about 364 km^2.

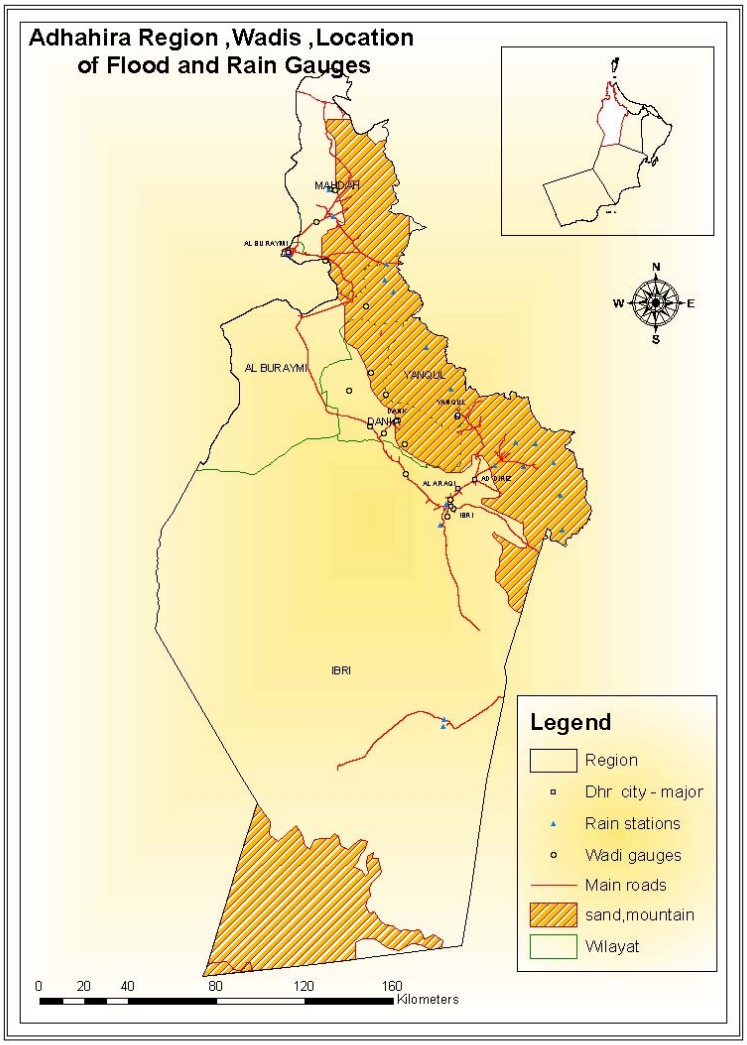


Figure 2-22 Adh Dhahirah Region - Wadi Mahdah Catchment

The upper catchment comprises of a mountainous region (81 km^2) and a piedmont zone (167 km^2). The piedmont zone is underlain by the deformed rock exposures (35 km^2) and alluvial plains (132 km^2). The mountainous terrain is rugged and complex and rises to a

maximum elevation of 1,100 m at the eastern boundary of the catchment. The steep and bare rock surfaces in the mountains play a major hydrologic role in collecting and distributing surface runoff that is a principal source of recharge to downstream alluvial aquifers.

The highest elevation in Al Hajar Al Gharbi (within the catchment) is 1,100 m and the lowest point at the Mahdah alluvial fan is approximately 330 m. The elevation ranges from 600 m to 1,100 m from the mountain front to the mountain. The elevation from the mountain front to Piedmont zone ranges from 500 m to 600 m. The elevation from the Piedmont zone to wadi alluvium up to Mahdah Gap ranges from 400 m to 500 m. The average gradient of the Wadi Mahdah from the base of the mountains to the Mahdah Gap is 1 in 69 (1.45%) or 14.5 m per km. The average gradient of the Wadi Mahdah from the Mahdah Gap to the UAE border is 1 in 101 (0.98%) or 9.8 m per km.

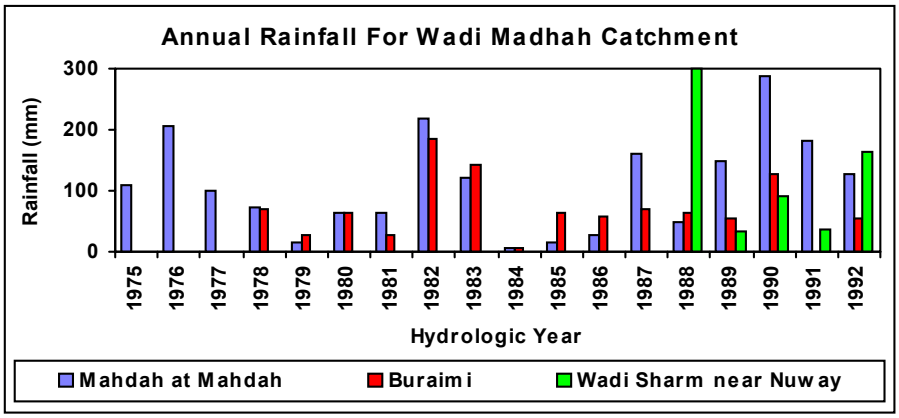
The region experiences an arid climate with two seasons: a summer season from May to October with mean temperatures range around 36 ^{o}C and a winter season from November to April with mean temperatures around 21.5 ^{o}C (General Soil Map of Oman).

Annual rainfall and probabilities for the existing rainfall stations are shown in Figure 2.10-23. The average annual rainfall in the region ranges from 72.1 mm to 125.2 mm and the average annual rainfall in the Mahdah catchment is 109.9 mm. The figure shows also that the rainfall probability patterns for Buraimi and Mahdah are quite similar.

Table 2-12 shows the frequency analysis of the rainfall for the Mahda and Buraimi Rain Gauges which is based on a linear relationship of probabilities and rainfall events.

Figure 2-24 shows the annual wadi flow and frequency analysis for Wadi Mahdah. An interpretation of the data is made for 10 years of hydrological data collection. Mean annual flow for Wadi Mahdah is 1.25 Mm^3. In 1988 a maximum annual flow of 7.69 Mm^3 was recorded.

The return period of wadi flow shows the amount of runoff that will be expected within a given period of time. Frequency analysis illustrated in Figure 2-24 shows a linear regression relationship between annual volumes of runoff and return period in years. Probability analysis for the annual runoff of Wadi Mahdah is given in Table 2-13.



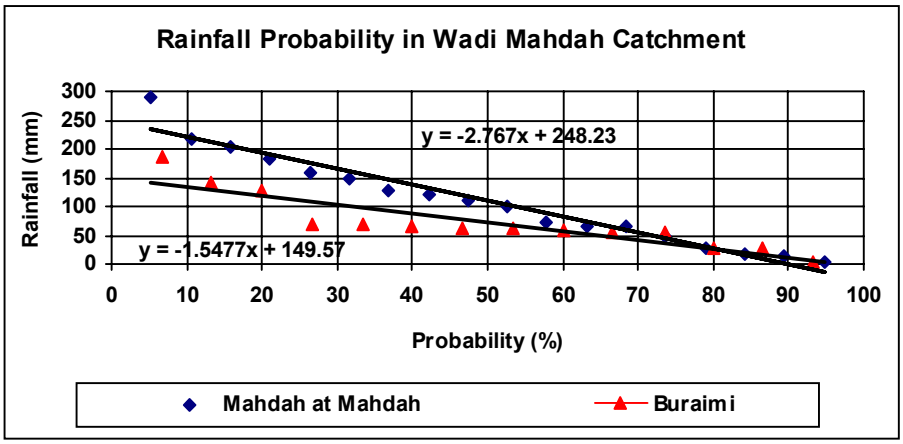


Figure 2-23 Rainfall Analysis - Wadi Mahdah Catchment

Table 2-12 Frequency Analysis for Mahdah and Buraimi Rain Gauges

Return Period in Years	Annual Rainfall in mm/yr	
	Mahdah	Buraimi
2	110	72
5	193	118
10	221	134
20	234	142
50	243	146
100	245	148

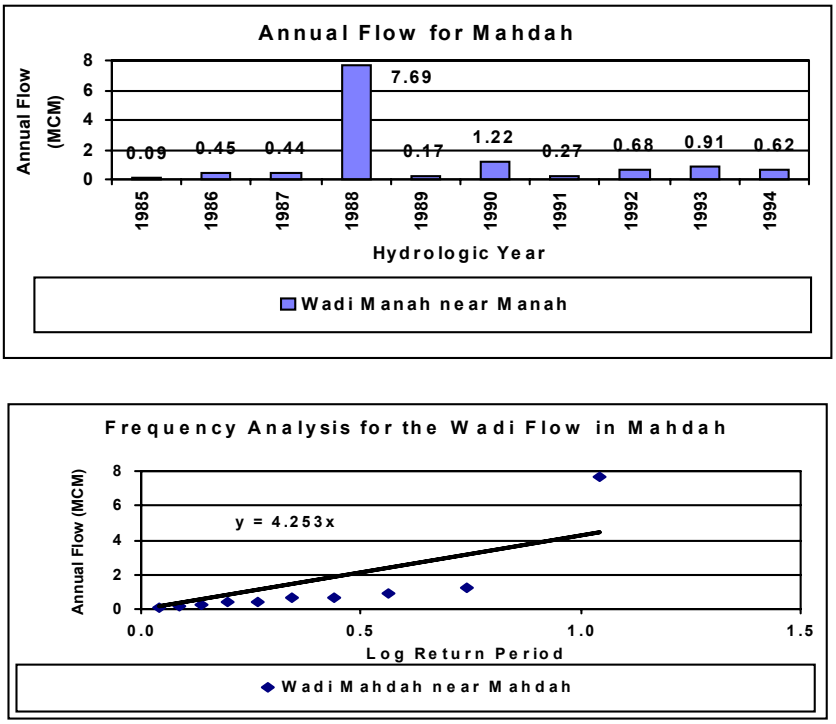


Figure 2-24 Wadi Flow Analyses- Wadi Mahdah Catchment

Table 2-13 Probability Analyses for Runoff - Wadi Mahdah Catchment

Probability	Runoff in Mm^3 (CB899534AD)
10 percent	4.25
25 percent	2.56
50 percent	1.28
75 percent	0.53
90 percent	0.19
Probability of mean rainfall and runoff	1.25 Mm^3 or once in 2 years

Frequency analysis is based on the linear relationship between events and the return period of annual flow, and is presented in Table 2-14 which shows the occurrence of events for runoff and their probability of repetition. The regression analysis shows that an annual flow of 4.25 Mm^3 is expected once in 10 years, and has a probability of 10%. The table also shows the runoff for other years of repetition.

Table 2-14 Frequency Analysis for Wadi Flow - Wadi Mahdah Catchment

Years of Repetition	Annual Flow in Mm^3
2	1.28
5	2.97
10	4.25
20	5.53
50	7.23
100	8.51

Figure 2-25 shows the flood frequency curve of POT for wadi Mahdah, in cum/s. The return period of wadi flow shows the amount of runoff that will be expected within a given period of time. Frequency analysis illustrated in the figure demonstrates the relationship between POT in cum/s of runoff, and return period in years.

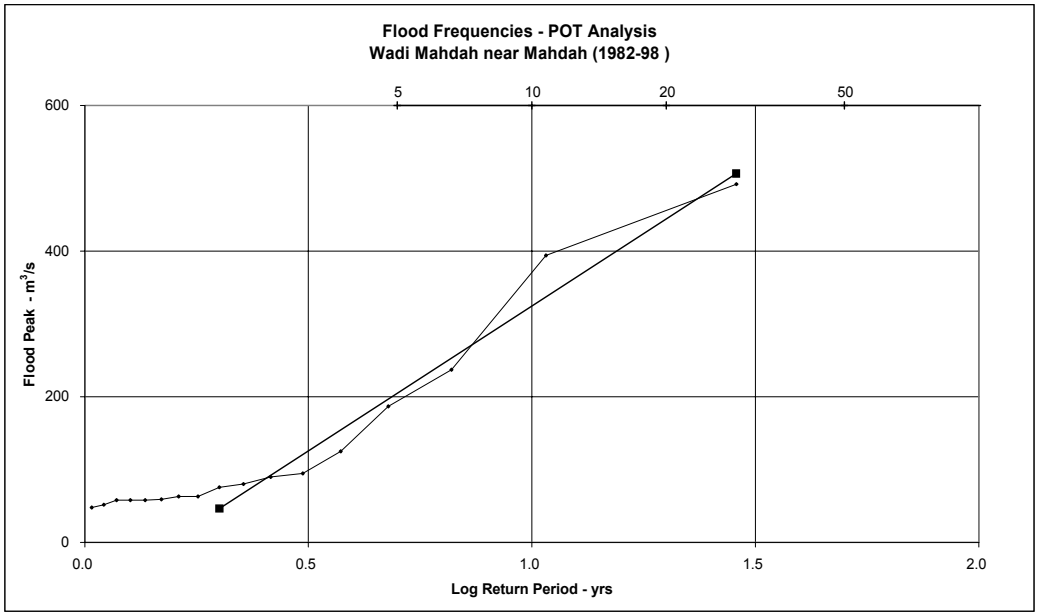


Figure 2-25 Flood Frequency Curve of POT in cum/s - Wadi Mahdah

2.6 Ash Sharqiyah Region (Wadi Ibra Catchment)

The town of Ibra is one of eleven Wilayat Centres under the Ash Sharqiyah Region. Ibra is located about 178 km from Muscat and 161 km from Sur. Wadi Masrun, as shown in Figure 2-26, is a tributary joining the Wadi Ibra, which is itself a tributary of the Wadi Al Batha drainage system.

Wadi Masrun is a sub-catchment of the south east flowing Wadi Al Batha system which joins the Arabian Sea in the east coast of Sharqiyah Region at Ras ash Sharik and Ras Qumaylah. The Masrun catchment covers an area of about 95 km^2. The highest elevation in the sub-catchment is 834 m above sea level and the average gradient of the Wadi Masrun is 1 in 31 or 3.2 percent.

Physiographically, the catchment can be divided into upper mountainous (20%) and lower alluvial plains catchments (80%). The annual rainfall ranges from 36 to 329 mm. Annual rainfall recorded at the both rain gauges is shown in Figure 2-27. The average annual rainfall in Wadi Masrun catchment is 110 mm.

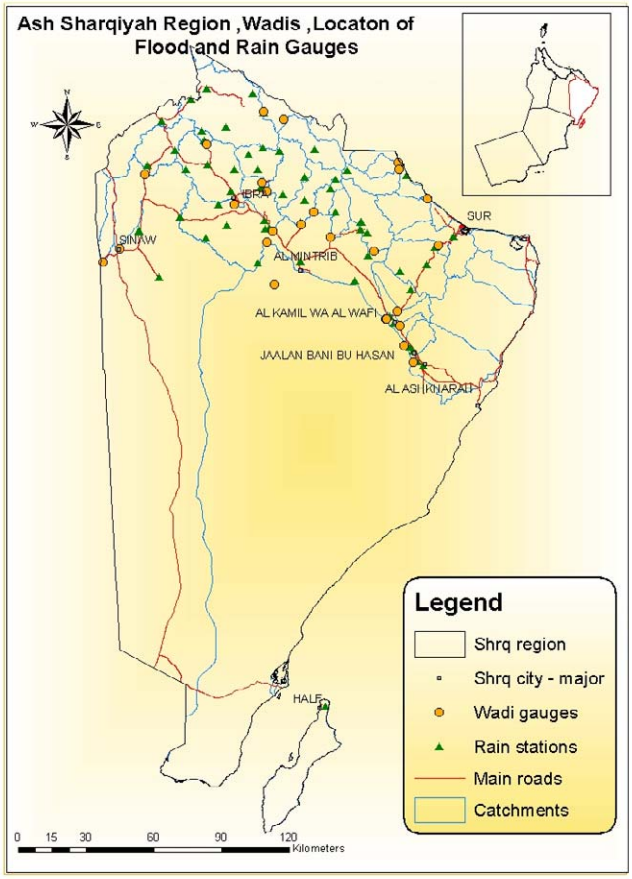


Figure 2-26 Wadi Masrun - Ash Sharqiyah Region

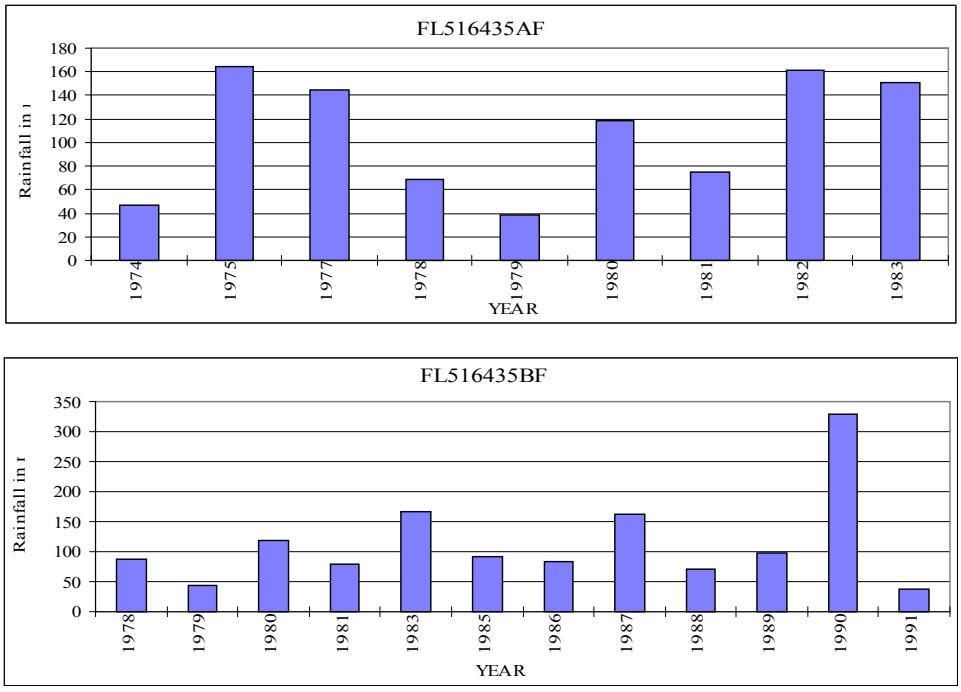


Figure 2-27 Annual Rainfall - Ibra Rain Gauges

Figure 2-28 shows the probabilities of the rainfall for the rain gauges in the neighbourhood of Wadi Masrun catchment.

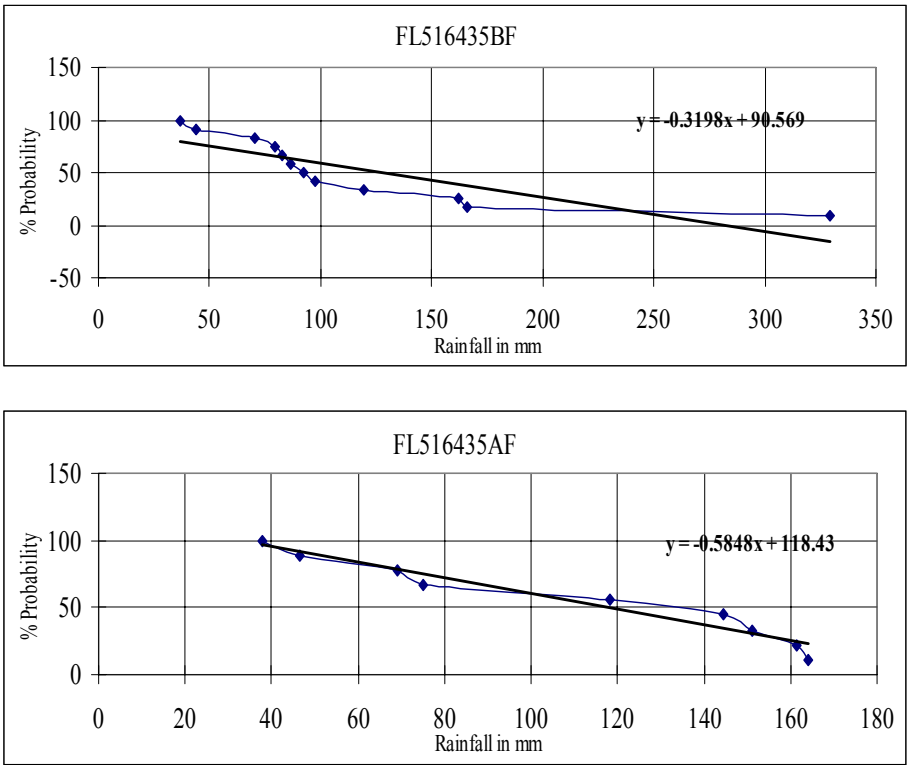


Figure 2-28 Rainfall Probability - Ibra Rain Gauges

Figure 2-29 shows the results of flood frequency of POT in cum/s for Wadi Ibra.

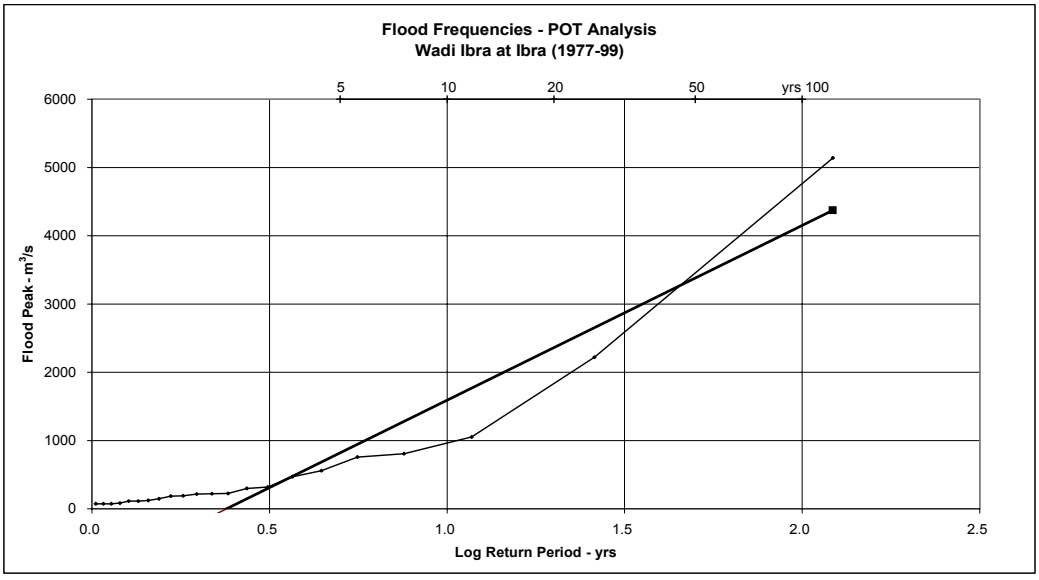


Figure 2-29 Flood Frequency of POT in cum/s - Wadi Ibra

Total runoff:

1. The total catchment area for Wadi Masrun catchment is 95 km^2. Infiltration from rainfall and runoff adds to the groundwater reservoir and moves downstream as throughflow into the wellfield and then finally into the Wadi Ibra main channel area. Almost the entire area is covered by the alluvium.

A. Rainfall.

1. Average rainfall in the catchment is estimated at 110 mm.
2. Volume of water received in the catchment (95 km^2) as rain = 10.45 Mm^3/year

B. Surface Run-off

1. Run-off generated from rainfall = 1.045 Mm^3/year

Total runoff in the catchment = 1.045 Mm^3/year

2.10.7 Dhofar Region (Wadi Darbat Catchment)

Wadi Darbat is one of the major wadis draining Jabal Qara to the southern side and joining the Arabian Sea. The towns of Taqah and Mirbat are located in the coastal region and outside Wadi Darbat catchment. The town of Taqah is about 35 km in the east of Salalah town.

The southern boundary of the catchment lies at about 7 km north of the coast line. In its western side, the wadi catchment has a tubular extension which provides an exit to the sea at Khwar Rawri, about 5 km east of Taqah. The catchment area of Wadi Darbat, shown in Figure 2-30, is approximately 440 km^2. The highest point in the catchment is Jabal Humran (elevation 1,470 m) in the north of Mirbat town. The tributaries of Wadi Darbat mainly flow in east- west direction before joining each other to form Wadi Darbat. The average slope of the wadi profile is about 30%. Wadi Darbat is one of the most scenic catchments in the Sultanate having two major water falls; the upper with a 70 m drop and the lower with a 100 m drop, as well as permanent water pools of water fed by karstic springs and the Khwar Rawri near the sea.

The Darbat pools lie between upper and lower water falls at an elevation of approximately 200 m amsl and are located 8 to 12 km north of the coast. There are three pools, the lower, middle and the upper. The lower and middle pools are 300 to 400 m long and are separated by about 250 m long stretch of wadi bed. The lower pool is only about a kilometre upstream of the lower water fall.

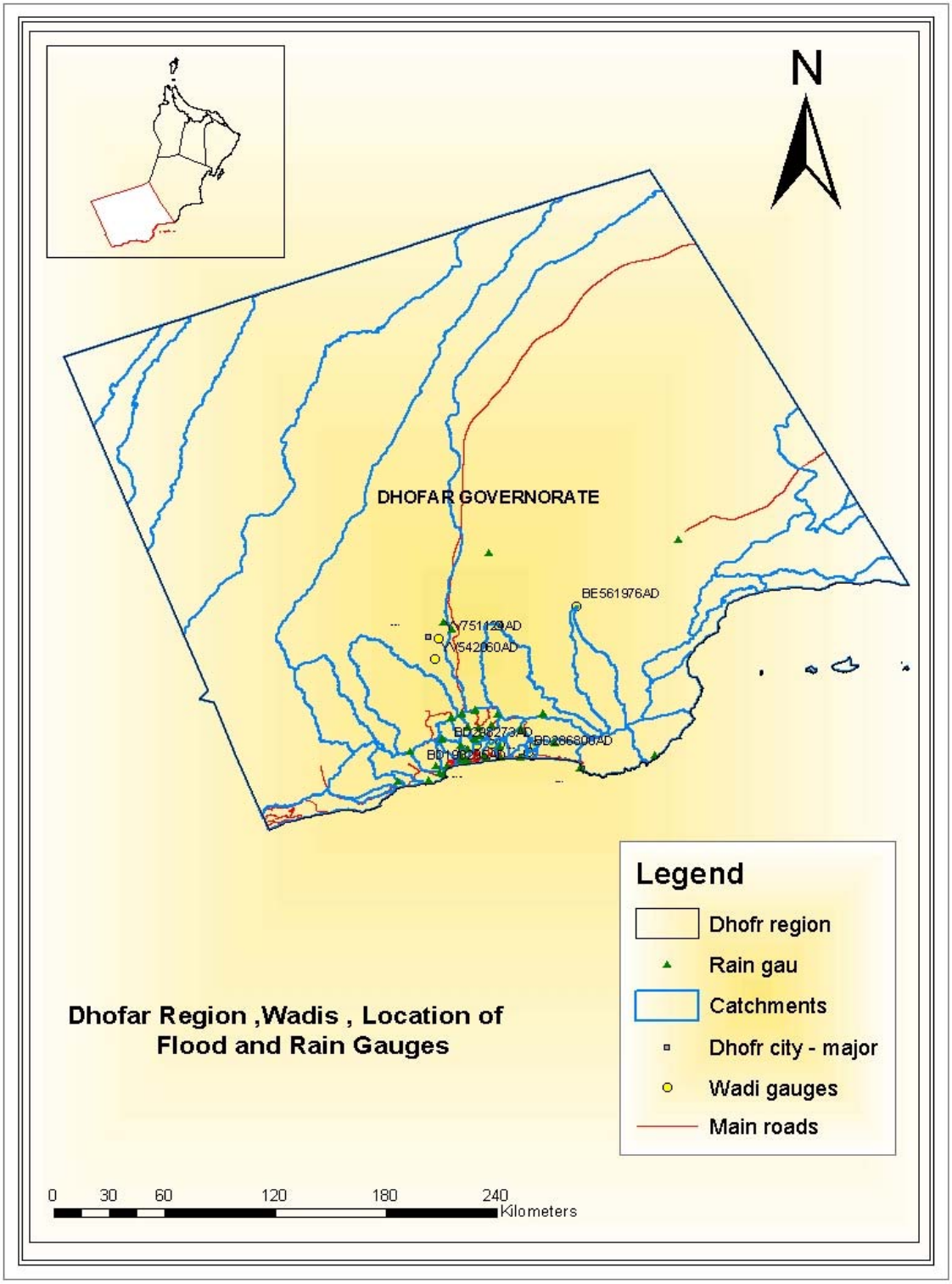


Figure 2-30 Dhofar Region - Wadi Darbat Catchment

The upper pool is the largest of the pools, about 1.3 km long and contains an estimated 110,000 m^3 of fresh water. The sizes of pools keep fluctuating depending on the season, availability of surface water and position of groundwater table intersection point (spring). However, base flow between the pools fluctuates but all base flow is lost in the wadi bed within 200 m downstream from the lower pool. The water is lost in the cavernous limestones occupying the area.

The hydrological set up in southern Dhofar is different from the rest of Oman and the Arabian Peninsula. The location of the coastal mountain range combined with the winds coming from south (Indian Ocean) and bound for the north and in the north-west, under favourable orgraphic situations, has brought about this difference.

Generally, Oman experiences an arid climate like the rest of the peninsula. However, during the period from June to September, the southern coastal mountain range intercepts the moisture-laden southerly winds (blowing towards the north) bringing about a drop in temperature. This orgraphic effect causes an adiabatic change forcing the moisture to condense, giving rise to a thick cloud of fog covering the jabal and the jabal front. This phenomenon is called "the Khareef" in southern Dhofar in the summer season. With the end of the Khareef, the fog clouds disappear and the climate gradually warms up, reverting to arid conditions.

Monthly mean temperatures are taken with reference to the nearest meteorological station at Salalah. There is not much variation in mean monthly temperatures. The monthly temperatures remain around 28^0C in summer and around 22^0 C in winter. The two seasons are clearly separated by the Monsoon (Khareef) season which lasts for two months, i.e. July and August and the mean temperature almost drops to the winter temperatures.

Experiments conducted have shown that the fog interception represents 49% to 85% of the total precipitation in the mountain area and 15% of the total precipitation in the foothills. In addition to "Khareef" precipitation, heavy showers and occasional cyclonic storms occur during the rest of the year, particularly in March, May, October and November.

The average annual rainfall varies from 110 mm at Salalah to 225 mm at Madinat Al Haq in the western part of the upper catchment of Wadi Darbat. The rainfall tends to decrease towards the west. Hence, an average of 150 mm for the entire upper catchment is assumed whereas 110 mm is taken for the lower catchment.

Wadi Darbat is the major wadi in the catchment. Wadis Jelab and Wadi Thaahaak join together to form Wadi Ghidat which in the downstream is joined by Wadi Kidhayl.

Downstream of this confluence, the main channel is called the Wadi Darbat. In Wadi Darbat, there are two major water falls and three perennial pools of water which are partly fed by the base flow and partly by the springs located within the pools. However, a major sinkhole is located within 200 m downstream from the southern most pool. Within a kilometre of the sinkhole are situated the famous Darbat waterfalls. MRMEWR has installed two wadi gauging stations; one upstream of the sinkholes (Station A, BD 298273AD, Drainage area 394 km^2) and the other in the downstream near the road, before wadi joins the sea at Khwar Rawri (Station B, BD 286800AD, Drainage area 418 km^2). The wadi flow data for the later wadi gauge has been recorded since October 1984, and for the former gauge, from October 1984. The data are shown in Figure 2-31.

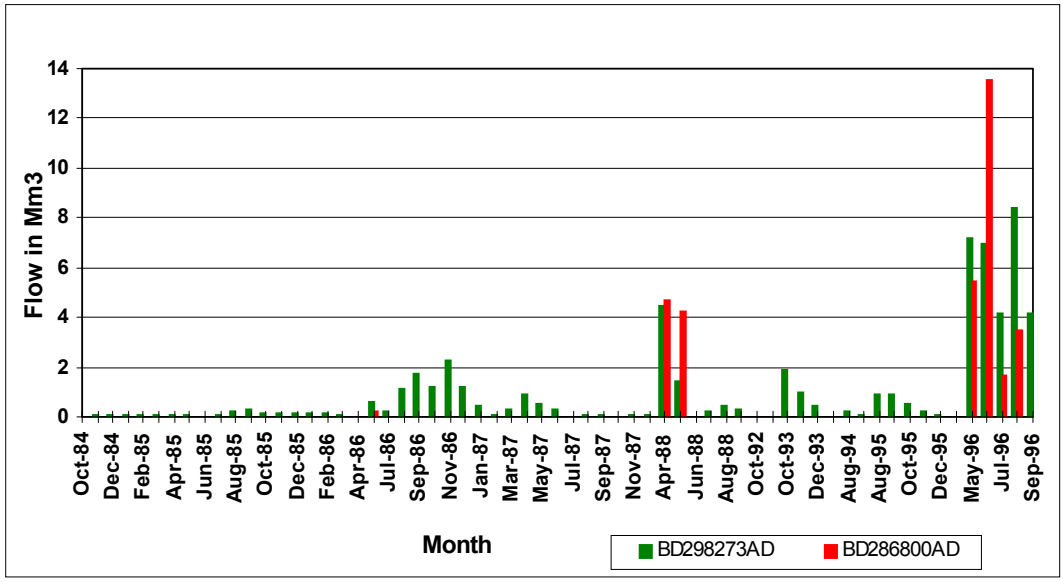


Figure 2-31 Wadi Flow Records - Wadi Darbat Catchment

A comparison of the flow data for the common period on monthly basis shows a big difference between the upper wadi gauge and the lower wadi gauge indicating a major loss in between the two gauges.

APPENDIX 3-1

The Historical & Tourism Locations in Sultanate of Oman

APPENDIX 3-1

The Historical & Tourism Locations in Sultanate of Oman

No.	Type	Place
Muscat Governorate		
1	**Beaches** 1-Al- Qurom Beach 2- Qantab Beach	Muscat
2	**Castles** Quriyat Castle	Quriyat
3	**Museums** 1- Museums of Natural Science 2- Al- Zubair House	Al-Khowair Muscat
4	**Gardens** Natural Al- Qoram Garden	Al-Qoram
5	**Wellheads** Ayn Ghalah	Bowshar
6	**Wadis** Wadi Al- Mazara	Quriyat
7	**Markets** Muttrah Market	Muttrah
Dhofar Governorate		
1	**Historical** 1-Al- Balid 2-Samharam	Salalh Salalh
2	**Wellheads & Wadis** Ayn Sahnot	Salalah
3	**Caves** Tieq Cave	Salalah
4	**Shrines** Prophet Ayub Graveyard	Salalah
5	**Beaches** 1- Khur Al- Balied 2- Al- Maghsail Beach	Salalah
6	**Mountains** Atien Mountain	Salalah
7	**Museums** Salalah Museum	Salalah
8	**Castles & Forts** 1- Marbat Castle 2-Taqa Castle	Marbat Taqa
Al- Batinah Region		
1	**Old Villages** Al- Aliya Village	Al-Awabi

No.	Type	Place
2	**Wadis** 1- Wadi Bani Kharus 2- Wadi Bani Awef and Al- Huqaun 3- Wadi Al- Abiyadh	 Wilayat Al-Awabi1 Wilayat Al-Rustaq Wilayat Nakhal
3	**Wellheads** 1- Ayn Al- Thuwara 2- Ayn Al- Kasfaa	 Nakhal Al-Rustaq
4	**Sport Yards** Bullfight (Corrida)	 Barka + Suhar
5	**Beaches** Al- Sawadi Beach	 Al- Sawadi
7	**Gardens** Al- Nasim Garden	 Barka
8	**Castles & Forts** 1- Nakhal Fort 2- Ar Ruataq Fort 3- Al- Hazm Castle	 Nakhal Al-Rostaq Al-Rostaq
A′Sharqiya Region		
1	**Wadis** 1- Wadi Bani Khalid 2- Wadi Shaab	 Wadi Bani Khalid Tawi Wadi Al-Shab
2	**Parks & Beaches** 1- Ras al- Hadd Beach 2- Al- Shkhara Beach	 Wilayat Sur Wilayat Jaalan Bani Bu Ali
3	**Historical** 1- Al- Manzafa Village 2- Qalhat Chronicle city 3- Ras Al- Jens	 Wilayat Ibra Sur Sur
4	**Ramalt Wahiba (Sahara/ Desert)** Al- Huwiya	 Walayat Biddiyah
8	Chelonian Protégé in Raas Al-Hade region	Sur
9	**Castles & Forts** 1- Bilad Sur Castle 2- Ras Al- Hadd Castle 3- Al- Mantrab Castle	 Sur Sur Walayat Biddiyah
A'Dhakhiliyah Region		
1	**Wadis** 1- Wad Tanuf 2- Wad Al- Mayydin	 Nizwa
2	**Fountainheads** 1- Dars Fountainhead	 Nizwa
3	**Villages & Old Mosques** 1- Musfat Al- Abrien 2- Old Bahal Compositor	 Al- Hamra Bahla

No.	Type	Place
4	**Markets** Nizwa Market	 Nizwa
5	**Castles & Forts** 1- Nizwa Fort 2- Bahla Fort 3- Jibreen Castle 4- Bayt Al- Redida Castle	 Walayat Nizwa Bahla Nizwa Nizwa
6	**Caves** 1- Al- Hutaa Cave 2- Al- Falahy Cave 3- Jardan Cave	 Al- Hamra Nizwa Izki
8	**Mountains** 1- Al- Jabal Al- Akhdhar 2- Jabal Shams	
A'Dhahirah Region		
1	**Wadis** 1- Wadi Dham 2- Wadi Fada	
2	**Historical** 1- Bat Graveyard 2- Al- Ayn Heritage 3- Al- Slif Fort 4- Ibri Castle 5- Al- Khandaq Castle 6- Al- Aswad Castle	 Wilayat Ibri Al-Buraimi Al-Buraimi
Al- Wusta Region		
1	**Islands** Mahut Island	 Wilayat Mahut
2	**Beaches** 1-Raas Ruwais 2-Raas Madraka Beach	 Wilayat Mahut Wilayat Al- Jazir
Musandam Governorate		
1	**Wadis** Khasab Gulf - Shisat - Kamzar	 Wilayat Khasab
2	**Parks & Beaches** 1- Natural Greensward Park 2- Khur Al- Najd	 Wilayat Khasab
3	**Castles & Forts** 1-Khasab Castle 2- Bakha Castle 3- Dabaa Castle	 Wilayat Khasab Wilayat Bukha Wilayat Daba
4	**Islands** Musandam	 Wilayat Khasab

APPENDIX 4-1

SUMMARY OF TRAFFIC LAW

Appendix 4-1

SUMMARY OF TRAFFIC LAW

The Traffic Law of the Sultanate of Oman was issued in the Official Gazette No.504, June 5th, 1993. The Law Rule Execution was issued in Gazette No.620, April 1st, 1998. Amendment of Traffic Law was issued in Gazette No.700, August 1st 2001. The Traffic Law and its pleading realization are issued in Arabic language. Hereafter a summary of main aspects are presented.

1. Vehicle Registration

As mentioned in Clause 2 of the Traffic Law:

1) It is not allowed for any motorized vehicles to use the roads before it will be registered and obtained a license except the following vehicles as mentioned in the Traffic Law amendment:

   a. Motorized vehicles belong to the Sultan
   b. Motorized vehicles registered in military authorities and having military plate
   c. Motorized vehicles of visitors, travelers and foreigner tourists
   d. Motorized vehicles that making temporary trips to the Sultan of Oman for passengers or goods transport
   e. Motorized vehicles having plate numbers under registration

The vehicle plates are classified to 13 types as mentioned in the Law Rule Execution having different colors which are:

Type	Background	Lettering
1. Private	Yellow	black
2. Taxi	Red	White
3. Commercial	Black	White
4. Rental	White	Black
5. Driving Education	Reddish brown	White
6. Governmental	White	Red
7. Diplomatic	Bright white	Black
8. Council	Orange	Black
9. United Nation	Light blue	White
10. Agricultural Tractor	Green	Black
11. Motorcycle	Depends on the type of plate	

12. Export	Blue	White
13. Inspection	Green	White

There are five plate sizes as follows:

1. Normal plate 36 x 16 cm
2. Small plate 31 x 13 cm
3. Medium plate 36 x 13 cm
4. Large plate 45.5 x 13 cm
5. Motorcycle plate 17 x 13 cm

2) Condition of Vehicle Registration

a. Should be registered in Traffic Department and get a specified number.
b. Satisfy the safety requirements
c. To be inspected at the Traffic Department according to the assigned schedule. The license is valid for one (1) year except Governmental vehicles, agricultural tractors and small tractors for boats and horses transport do not need renewal. Private cars may be licensed for two (2) years.
d. It is not allowed to license the right steering wheel.
e. The maximum bus dimensions are 10m length, 2.6m width and 4.2m height.
f. The maximum truck dimensions are 12m length increase to 17m in case of truck with tractor and 27m width. It can be excluded from this conditions by the department agreement the trucks working out side the urbanized areas.
g. The maximum total weight of the heavy vehicle is 46 tons. This limit can be increased with exception load permission along a specified path.
h. The maximum single axle weight is 13 tons.
i. The maximum weight of tandem-axle is depended on the axle spacing as follows:

Axle Spacing (m)	Max. Weight (tons)
0.9	14.7
1.0	16.1
1.1	17.5
1.2	18.9
1.3	20.3
1.35 to 2.5	21.0

j. The private car will be inspected after 10 years. That means only old models have to be checked yearly.

k. The Vehicle yearly registration fees are as follows:

Vehicle engine up to 1500 CC	RO 15
1500 CC to 3000 CC	RO 20
3000 CC to 4500 CC	RO 30
> 4500 CC	RO 50
Tractor	RO 40
Truck < 3 ton	as engine size above
Truck 3 – 5 ton	RO 120
Truck > 5 ton	RO 180
Motorcycle	RO 10
Passenger transport	RO 1.5/passenger

2. Driving Licenses System

As stated by Clause 21 it is not allowed to drive any motorized vehicle without getting a driving license from the traffic department except:

- The persons have a driving license from military and police departments for driving only their authorized vehicles after testing them by those authorities' technical departments.
- The residences having international or foreigner license under same deal agreement with their countries.
- Visitors and tourists who have international driving licenses of foreigner valid license as stated on the pleading realization.

1) Types of Driving License are:

a. Light vehicle driving license: allow the drive of vehicle up to 6 ton total weight.
b. Heavy vehicle driving license: allow the drive of vehicle > 6 ton total weight.
c. Tools driving license: allow its carrier to drive the tool allowed on the license.
d. Motorcycle driving license' allow the drive of any type of motorcycles.

2) The minimum age to apply to license is 18 years old. The General Inspector has the right to exclude this condition based on his judgment.

3) In case of driving a vehicle with high speed, careless, drunk, under drug, illegal overtaking or in dangerous manner that lead to kill or injured a person for a recovery period more than ten days the plenty will be jailed for at least one year and maximum up to five years.

4) It is not allowed for any workshop to carry out maintenance for a vehicle sheared in an accident without permission from the police traffic department.

5) It is not allowed to start study of vehicle driving before getting permission.

6) Driving School should get license from traffic police department.

7) The validation of driving license is as follows:

Light vehicles:	10 years
Heavy vehicles:	6 years
Mechanical tools:	6 years
Motorcycle:	10 years

8) It is allowed to issue permanent license only for Oman citizenship after 10 years for non professional driver, medically fit and his driving record agree with Clause 50.

9) The driving license can be withdrawal for three months if the total penalty points become 12 points within two years, drunk drivers (80 mgm/100 mm ratio).

10) The fee of the driving licenses are:

Light vehicle:	RO 20
Heavy vehicle:	RO 10
Mechanical tools:	RO 10
Motorcycle:	RO 15
Permanent:	RO 50

11) The fee of driving education are:

Driving study permission:	RO 3
Renewal of driving study permission:	RO 3
Driving Test:	RO 5

12) The penalties are divided into four sets as follow:

- Set 1: penalty	from RO 50 to 75
- Set 2: penalty	from RO 35 to 50
- Set 3: penalty	from RO 15 to 30
- Set 4: penalty	from RO 5 to 10.

13) Over speed penalty points are:

Set 1: Over speed 80 km/hr	3 points
Set 2: Over speed 50 km/hr to 80 km/hr	2 points
Set 3: Over speed 35 km/hr to 50 km/hr	0 points
Set 4: Over speed 15 km/hr to 35 km/hr	0 points

APPENDIX 4-2

ROADS INVENTORY

1. List of Primary Roads
2. List of Secondary Roads
3. List of Primary Roads Having Shoulder Width Less Than 2 Meter
4. List of Secondary Roads Having Shoulder Width Less than 1 Meter
5. List of Primary Roads Needs AC Overlay
6. List of Secondary Roads Needs AC Overlay
7. List of Bridges
8. Assessment of Bridges Conditions
9. Maps of Road Inventory Survey

Road Inventory Record Items

Item	Classification
Road Class	0: Primary, 99: Secondary
Type	D: Dual Carriageway, S: Single carriageway
In / Out	I: Inbound (going to Muscat) O: Outbound (going out of Muscat)
Terrain	M: Mountainous, R: Rolling, F: Flat
Roadside Land Use	R: Residential, C: Commercial, I: Industrial, D: Desert, A: Agricultural, U: Unused (Waste Land)
Carriageway Type	AC: Asphalt Concrete, ST: Surface Treatment, CC: Cement Concrete, G: Gravel, E: Earth
Condition	G: Good, F: Fair, B: Bad, VB: Very Bad
Median Division	Write width of median if exist, write N if non-existent
Shoulder/Sidewalk Type	P: Paved, G: Gravel, E: Earth
Embankment/Cut	E: Embankment, C: Cut, C/F: Cut and Fill, F: Flat
Drainage Type	PC: Precast Concrete, CL: Concrete Lined, GR: Grouted Riprap, NL: No Lining, WO: Without Side Ditch/Drainage
Substandard Alignment	Record section length with R<30m or i>10%
Wadi	IC: Irish Crossing, L: Running in longitudinal direction of the road
Safety Barrier	CB: Concrete Barrier, GR: Guard Rail
Drainage Structure	PC: Pipe Culvert, BC: Box Culvert, IB: Irish Bridge
Side Slope Protection	MR: Mortar Riprap, LR: Loose Riprap, GB: Gabion

1. List of Primary Roads

	Road Class	No.	Road No.	Type	In/Out	Sec. No.	Sub-Sec	From	To	Km	Terrain	Land USE	C Type	C W(m)	C Cond.	Median(m)	S Type	S W(m)
p	0	1	1	D	I	1	1	-	7.5	7.5	F	U	AC	7.0	G	4.5	P	0.5
p	0	2	1	D	I	1	1	7.5	10.0	2.5	F	A	AC	7.0	G	4.5	P	0.5
p	0	3	1	D	I	1	2	10.0	20.6	10.6	F	A	AC	7.0	G	4.5	P	0.5
p	0	4	1	D	I	2	1	-	10.0	10.0	F	A	AC	7.0	G	10.0	P	2.7
p	0	5	1	D	I	2	2	10.0	20.0	10.0	F	A	AC	7.0	G	10.0	P	2.7
p	0	6	1	D	I	2	3	20.0	30.0	10.0	F	A	AC	7.0	G	10.0	P	2.7
p	0	7	1	D	I	2	4	30.0	40.0	10.0	F	C	AC	7.0	G	10.0	P	2.7
p	0	8	1	D	I	2	5	40.0	45.0	5.0	F	C	AC	7.0	G	10.0	P	2.7
p	0	9	1	D	I	2	5	45.0	48.0	3.0	F	I	AC	7.0	G	10.0	P	2.7
p	0	10	1	D	I	3	1	-	10.0	10.0	F	R	AC	7.5	G	7.5	P	2.0
p	0	11	1	D	I	3	2	10.0	20.0	10.0	F	R	AC	7.5	G	7.5	P	2.0
p	0	12	1	D	I	3	3	20.0	30.0	10.0	F	R	AC	7.5	G	7.5	P	2.0
p	0	13	1	D	I	3	4	30.0	40.0	10.0	F	R	AC	7.5	G	7.5	P	2.0
p	0	14	1	D	I	3	5	40.0	50.0	10.0	F	R	AC	7.5	G	7.5	P	2.0
p	0	15	1	D	I	3	6	50.0	60.0	10.0	F	R	AC	7.5	G	7.5	P	2.0
p	0	16	1	D	I	3	7	60.0	70.0	10.0	F	R	AC	7.5	G	7.5	P	2.0
p	0	17	1	D	I	3	8	70.0	74.4	4.4	F	R	AC	7.5	G	7.5	P	2.0
p	0	18	1	D	I	4	1	-	1.8	1.8	F	C	AC	7.5	F	7.5	P	2.0
p	0	19	1	D	I	4	1	1.8	10.0	8.2	F	R	AC	7.5	F	7.5	P	2.0
p	0	20	1	D	I	4	2	10.0	20.0	10.0	F	R	AC	7.5	F	7.5	P	2.0
p	0	21	1	D	I	4	3	20.0	30.0	10.0	F	R	AC	7.5	F	7.5	P	2.0
p	0	22	1	D	I	4	4	30.0	40.0	10.0	F	R	AC	7.5	F	7.5	P	2.0
p	0	23	1	D	I	4	5	40.0	50.0	10.0	F	R	AC	7.5	F	7.5	P	2.0
p	0	24	1	D	I	4	6	50.0	56.8	6.8	F	R	AC	7.5	F	7.5	P	2.0
p	0	25	1	D	I	5	1	-	4.5	4.5	F	A	AC	7.0	F	10.0	E	2.5
p	0	26	1	D	I	5	2	4.5	6.5	2.0	F	C	AC	7.0	F	10.0	E	2.5
p	0	27	1	D	I	5	3	6.5	10.0	3.5	F	A	AC	7.0	F	10.0	E	2.5
p	0	28	1	D	I	5	4	10.0	20.0	10.0	F	A	AC	7.0	F	10.0	E	2.5
p	0	29	1	D	I	5	5	20.0	30.0	10.0	F	A	AC	7.0	F	10.0	E	2.5
p	0	30	1	D	I	5	6	30.0	33.2	3.2	F	A	AC	7.0	F	10.0	E	2.5
p	0	31	1	D	I	6	1	-	1.5	1.5	F	C	AC	7.0	F	9.0	P	2.5
p	0	32	1	D	I	6	1	1.5	10.0	8.5	F	A	AC	7.0	F	9.0	P	2.5
p	0	33	1	D	I	6	2	10.0	21.3	11.3	F	A	AC	7.0	F	9.0	P	2.5
p	0	34	1	D	O	1	1	-	10.1	10.1	F	A	AC	7.0	G	3.5	P	1.6
p	0	35	1	D	O	1	2	10.1	20.6	10.5	F	A	AC	7.0	G	3.0	P	2.0
p	0	36	1	D	O	2	1	-	7.5	7.5	F	I	AC	7.0	G	11.0	E	2.0
p	0	37	1	D	O	2	2	7.5	17.5	10.0	F	A	AC	7.0	F	7.5	E	1.8
p	0	38	1	D	O	2	3	17.5	33.5	16.0	F	A	AC	7.0	G	7.5	E	1.0
p	0	39	1	D	O	2	4	33.5	48.0	14.5	F	A	AC	7.0	G	8.0	E	8.0
p	0	40	1	D	O	3	1	-	10.0	10.0	F	R	AC	7.5	G	7.5	P	2.0
p	0	41	1	D	O	3	2	10.0	20.0	10.0	F	R	AC	7.5	G	7.5	P	2.0
p	0	42	1	D	O	3	3	20.0	30.0	10.0	F	R	AC	7.5	G	7.5	P	2.0

p	0	43	1	D	O	3	4	30.0	40.0	10.0	F	R	AC	7.5	G	7.5	P	2.0
p	0	44	1	D	O	3	5	40.0	50.0	10.0	F	R	AC	7.5	G	7.5	P	2.5
p	0	45	1	D	O	3	6	50.0	57.8	7.8	F	R	AC	7.5	G	8.5	P	3.5
p	0	46	1	D	O	3	6	57.8	60.0	2.2	F	R	AC	7.5	G	7.5	P	2.0
p	0	47	1	D	O	3	7	60.0	70.0	10.0	F	R	AC	7.5	G	7.5	G	2.5
p	0	48	1	D	O	3	8	70.0	74.4	4.4	F	R	AC	7.5	G	7.5	G	2.0
p	0	49	1	D	O	4	1	-	10.0	10.0	F	R	AC	7.5	G	7.5	P	2.0
p	0	50	1	D	O	4	2	10.0	20.0	10.0	F	R	AC	7.5	G	7.5	P	2.0
p	0	51	1	D	O	4	3	20.0	25.0	5.0	F	R	AC	7.5	G	7.5	P	2.0
p	0	52	1	D	O	4	4	25.0	30.0	5.0	F	R	AC	7.5	G	7.5	P	2.0
p	0	53	1	D	O	4	5	30.0	40.0	10.0	F	R	AC	7.5	G	7.5	P	2.0
p	0	54	1	D	O	4	6	40.0	46.0	6.0	F	R	AC	7.5	G	7.5	P	2.0
p	0	55	1	D	O	4	7	46.0	48.0	2.0	F	C	AC	7.5	G	7.5	P	2.0
p	0	56	1	D	O	4	8	48.0	50.0	2.0	F	R	AC	7.5	G	7.5	P	2.0
p	0	57	1	D	O	4	9	50.0	55.0	5.0	F	R	AC	7.5	G	7.5	P	2.0
p	0	58	1	D	O	4	10	55.0	56.8	1.8	F	C	AC	7.5	G	7.5	P	2.0
p	0	59	1	D	O	5	1	-	6.3	6.3	F	R	AC	7.0	G	8.0	P	2.0
p	0	60	1	D	O	5	2	6.3	6.7	0.4	F	U	AC	7.0	F	8.0	P	1.0
p	0	61	1	D	O	5	3	6.7	7.5	0.8	F	R	AC	7.0	G	8.0	P	2.0
p	0	62	1	D	O	5	4	7.5	7.6	0.1	F	U	AC	7.0	G	8.0	P	1.0
p	0	63	1	D	O	5	5	7.6	18.7	11.1	F	R	AC	7.0	G	8.0	P	2.0
p	0	64	1	D	O	5	6	18.7	19.7	1.0	F	U	AC	7.0	G	8.0	P	2.0
p	0	65	1	D	O	5	7	19.7	24.8	5.1	F	R	AC	7.0	G	8.0	P	2.0
p	0	66	1	D	O	5	8	24.8	27.5	2.7	F	R	AC	7.0	G	8.0	P	2.0
p	0	67	1	D	O	5	9	27.5	28.9	1.4	F	R	AC	7.0	G	8.0	P	2.0
p	0	68	1	D	O	5	10	28.9	29.1	0.3	F	U	AC	7.0	G	8.0	P	1.8
p	0	69	1	D	O	5	11	29.1	33.2	4.1	F	R	AC	7.0	G	8.0	P	2.0
p	0	70	1	D	O	6	1	-	2.0	2.0	F	R	AC	7.0	G	8.0	P	2.5
p	0	71	1	D	O	6	2	2.0	3.5	1.5	F	R	AC	7.0	G	8.0	P	2.0
p	0	72	1	D	O	6	3	3.5	7.1	3.6	F	R	AC	7.0	G	8.0	P	1.8
p	0	73	1	D	O	6	4	7.1	7.2	0.1	F	U	AC	7.0	F	8.0	P	1.0
p	0	74	1	D	O	6	5	7.2	8.0	0.8	F	R	AC	7.0	F	8.0	P	1.8
p	0	75	1	D	O	6	6	8.0	8.2	0.2	F	U	AC	7.0	F	8.0	P	1.0
p	0	76	1	D	O	6	7	8.2	8.7	0.5	F	R	AC	7.0	F	8.0	P	1.8
p	0	77	1	D	O	6	8	8.7	9.0	0.3	F	U	AC	7.0	F	8.0	P	1.0
p	0	78	1	D	O	6	9	9.0	13.7	4.7	F	R	AC	7.0	G	8.0	P	2.0
p	0	79	1	D	O	6	10	13.7	14.0	0.3	F	U	AC	7.0	G	8.0	P	3.3
p	0	80	1	D	O	6	11	14.0	16.1	2.1	F	R	AC	7.0	G	8.0	P	2.0
p	0	81	1	D	O	6	12	16.1	16.3	0.2	F	U	AC	7.0	F	8.0	P	1.0
p	0	82	1	D	O	6	13	16.3	18.9	2.6	F	R	AC	7.0	G	8.0	P	2.0
p	0	83	1	D	O	6	14	18.9	19.1	0.2	F	U	AC	7.0	F	8.0	P	1.0
p	0	84	1	D	O	6	15	19.1	19.8	0.7	F	R	AC	7.0	G	8.0	P	2.0
p	0	85	1	D	O	6	16	19.8	20.0	0.2	F	U	AC	7.0	G	8.0	P	1.8

p	0	86	1	D	O	6	17	20.0	21.3	1.3	F	R	AC	7.0	G	8.0	P	2.0
p	0	320	5	D	I	1	1	-	1.5	1.5	M	U	AC	7.0	G	4.0	P	2.5
p	0	321	5	D	I	1	2	1.5	10.0	8.5	M	U	AC	7.0	G	4.0	G	2.5
p	0	322	5	D	I	1	3	10.0	15.8	5.8	F	U	AC	7.0	G	6.0	G	2.5
p	0	323	5	D	I	1	4	15.8	18.9	3.1	F	U	AC	7.0	G	1.5		
p	0	324	5	D	I	1	5	18.9	22.3	3.4	F	U	AC	7.0	G	8.0	P	2.0
p	0	325	5	D	O	1	1	-	9.5	9.5	F	D	AC	7.0	G	8.0	P	3.1
p	0	326	5	D	O	1	2	9.5	14.1	4.6	F	U	AC	7.0	F	8.0	P	4.8
p	0	327	5	D	O	1	3	14.1	14.7	0.6	F	U	AC	7.0	G	18.0	P	2.5
p	0	328	5	D	O	1	4	14.7	16.8	2.1	F	U	AC	7.0	G	3.5	G	2.5
p	0	329	5	D	O	1	5	16.8	19.9	3.1	M	U	AC	7.0	G	3.5	G	2.5
p	0	330	5	D	O	1	6	19.9	22.3	2.4	M	U	AC	7.0	G	3.5	P	2.5
p	0	350	7	S	B	1	1	-	9.4	9.4	F	U	AC	7.0	G	-	G	2.0
p	0	351	7	S	B	1	2	9.4	15.5	6.1	F	U	AC	7.0	G	-	G	2.0
p	0	352	7	S	B	1	3	15.5	17.6	2.1	F	U	AC	7.0	G	-	G	2.0
p	0	353	7	S	B	1	4	17.6	26.5	8.9	F	U	AC	7.0	G	-	G	2.0
p	0	354	7	S	B	1	5	25.5	29.8	4.3	F	U	AC	7.0	G	-	G	2.0
p	0	355	7	S	B	1	6	29.8	39.5	9.7	F	U	AC	7.0	G	-	G	2.0
p	0	356	7	S	B	1	7	39.5	44.5	5.0	F	R	AC	7.0	G	-	G	2.0
p	0	357	7	S	B	1	8	44.5	50.6	6.1	F	R	AC	7.0	G	-	G	2.0
p	0	358	7	S	B	2	1	-	7.1	7.1	F	D	AC	7.0	F	-	P	2.5
p	0	359	7	S	B	2	2	7.1	17.1	10.0	F	D	AC	7.0	F	-	P	2.5
p	0	360	7	S	B	2	3	17.1	21.3	4.2	F	A	AC	7.0	F	-	P	2.5
p	0	361	7	S	B	2	4	21.3	23.5	2.2	M	D	AC	7.0	G	-	P	2.5
p	0	362	7	S	B	2	5	23.5	33.5	10.0	F	D	AC	7.0	G	-	P	2.5
p	0	363	7	S	B	2	6	33.5	37.4	3.9	F	A	AC	7.0	G	-	P	2.5
p	0	364	7	S	B	4	1	-	10.0	10.0	F	I	AC	7.0	G	-	P	2.3
p	0	365	7	S	B	4	2	10.0	20.0	10.0	F	D	AC	7.0	G	-	P	2.3
p	0	366	7	S	B	4	3	20.0	25.2	5.2	F	A	AC	7.0	G	-	P	2.3
p	0	396	8	S	B	1	2	10.0	20.0	10.0	F	D	AC	7.0	F	-	E	1.0
p	0	397	8	S	B	1	3	20.0	30.0	10.0	F	D	AC	7.0	F	-	E	1.0
p	0	398	8	S	B	1	4	30.0	40.0	10.0	F	U	AC	7.0	F	-	E	1.0
p	0	399	8	S	B	1	5	40.0	45.0	5.0	F	U	AC	7.0	F	-	E	1.0
p	0	400	8	S	B	1	6	45.0	48.0	3.0	F	U	AC	7.0	F	-	E	1.0
p	0	401	8	S	B	2	1	-	2.8	2.8	F	D	AC	7.0	G	-	E	1.0
p	0	402	8	S	B	2	2	2.8	56.2	53.4	M	D	E	7.0	B	-		
p	0	403	8	S	B	2	3	56.2	61.2	5.0	F	D	AC	7.0	G	-	E	1.0
p	0	404	8	S	B	3	1	-	10.0	10.0	F	D	AC	6.0	F	-	E	1.0
p	0	405	8	S	B	3	2	10.0	20.0	10.0	F	D	AC	6.0	F	-	E	1.0
p	0	406	8	S	B	3	3	20.0	30.0	10.0	F	D	AC	6.0	F	-	E	1.0
p	0	407	8	S	B	3	4	30.0	32.0	2.0	F	D	AC	7.0	F	-	E	1.0
p	0	479	13	S	B	1	1	-	2.5	2.5	F	R	AC	7.5	G	-	P	2.5
p	0	480	13	S	B	1	2	2.5	10.0	7.5	F	U	AC	7.5	G	-	P	2.5

p	0	481	13	S	B	1	3	10.0	16.0	6.0	F	U	AC	7.5	F	-	P	2.5
p	0	482	13	S	B	1	4	16.0	17.5	1.5	F	U	AC	7.5	G	-	P	2.5
p	0	483	13	S	B	1	5	17.5	20.0	2.5	F	U	AC	7.5	G	-	P	2.5
p	0	484	13	S	B	1	6	20.0	25.0	5.0	F	U	AC	7.5	G	-	P	2.5
p	0	485	13	S	B	1	7	25.0	30.0	5.0	F	U	AC	7.5	G	-	P	2.5
p	0	486	13	S	B	1	8	30.0	30.4	0.4	F	R	AC	7.5	G	-	P	2.5
p	0	487	13	S	B	2	1	-	1.6	1.6	F	R	AC	7.5	G	-	P	2.0
p	0	488	13	S	B	2	2	1.6	10.0	8.4	F	U	AC	7.5	F	-	P	2.0
p	0	489	13	S	B	2	3	10.0	13.0	3.0	F	U	AC	7.5	F	-	P	2.0
p	0	490	13	S	B	2	4	13.0	20.0	7.0	R	U	AC	7.5	G	-	P	2.0
p	0	491	13	S	B	2	5	20.0	30.0	10.0	R	U	AC	7.5	G	-	P	2.0
p	0	492	13	S	B	2	6	30.0	35.2	5.2	R	U	AC	7.5	G	-	P	2.0
p	0	493	13	S	B	3	1	-	3.0	3.0	R	R	AC	7.5	G	-	P	2.5
p	0	494	13	S	B	3	2	3.0	10.0	7.0	F	U	AC	7.5	G	-	P	2.5
p	0	495	13	S	B	3	3	10.0	14.0	4.0	F	U	AC	7.5	G	-	P	2.5
p	0	496	13	S	B	3	4	14.0	18.1	4.1	F	R	AC	7.5	G	-	P	2.5
p	0	517	15	D	I	1	1	-	5.0	5.0	R	U	AC	7.5	G	4.0	P	1.8
p	0	518	15	D	I	1	2	5.0	6.5	1.5	M	U	AC	7.5	G	4.0	P	1.8
p	0	519	15	D	I	1	3	6.5	10.0	3.5	F	U	AC	7.5	G	4.0	P	1.8
p	0	520	15	D	I	1	4	10.0	14.0	4.0	F	U	AC	7.5	G	4.0	P	1.8
p	0	521	15	D	I	1	5	14.0	20.0	6.0	R	U	AC	7.5	G	4.0	P	1.8
p	0	522	15	D	I	1	6	20.0	24.0	4.0	F	C	AC	7.5	G	4.0	P	1.8
p	0	523	15	D	I	1	7	24.0	26.0	2.0	R	I	AC	7.5	G	4.0	P	1.8
p	0	524	15	D	I	1	8	26.0	30.0	4.0	F	U	AC	7.5	G	4.0	P	1.8
p	0	525	15	D	I	1	9	30.0	34.8	4.8	F	U	AC	7.5	G	4.0	P	1.8
p	0	526	15	D	I	2	4	7.2	11.4	4.2	F	U	AC	7.3	G	4.0	P	2.5
p	0	527	15	D	I	2	5	11.4	13.4	2.0	F	U	AC	7.3	G	0.7	P	2.5
p	0	528	15	D	I	2	6	13.4	20.0	6.6	F	U	AC	7.3	G	4.0	P	2.5
p	0	529	15	D	I	2	7	20.0	25.7	5.7	R	U	AC	7.3	G	4.0	P	2.5
p	0	530	15	D	I	2	8	25.7	26.5	0.8	R	U	AC	7.3	G	0.7	P	2.5
p	0	531	15	D	I	2	9	26.5	30.0	3.5	R	U	AC	7.3	G	4.0	P	2.5
p	0	532	15	D	I	2	10	30.0	32.0	2.0	R	U	AC	7.3	G	4.0	P	2.5
p	0	533	15	D	I	2	11	32.0	33.0	1.0	M	D	AC	7.3	G	0.7	P	2.5
p	0	534	15	D	I	2	12	33.0	40.0	7.0	R	U	AC	7.3	G	4.0	P	2.5
p	0	535	15	D	I	2	13	40.0	45.0	5.0	R	U	AC	7.3	G	4.0	P	2.5
p	0	536	15	D	I	2	14	45.0	50.0	5.0	F	U	AC	7.5	G	4.0	P	2.5
p	0	537	15	D	I	2	15	50.0	60.0	10.0	R	U	AC	7.5	G	4.0	P	2.5
p	0	538	15	D	I	2	16	60.0	62.0	2.0	F	A	AC	7.5	G	4.0	P	2.5
p	0	539	15	D	I	2	17	62.0	63.0	1.0	R	U	AC	7.5	G	4.0	P	2.5
p	0	540	15	D	I	2	18	63.0	70.0	7.0	F	U	AC	7.5	G	4.0	P	2.5
p	0	541	15	D	I	2	19	70.0	72.0	2.0	R	U	AC	7.5	G	4.0	P	2.5
p	0	542	15	D	O	1	1	-	5.0	5.0	F	R	AC	7.5	G	4.0	P	2.0
p	0	543	15	D	O	1	2	5.0	8.0	3.0	F	U	AC	7.5	G	4.0	P	2.0

p	0	544	15	D	O	1	3	8.0	10.0	2.0	F	I	AC	7.5	G	4.0	P	2.0
p	0	545	15	D	O	1	4	10.0	12.0	2.0	F	U	AC	7.5	G	4.0	P	2.0
p	0	546	15	D	O	1	5	12.0	13.0	1.0	F	C	AC	7.5	G	4.0	P	2.0
p	0	547	15	D	O	1	6	13.0	20.0	7.0	R	U	AC	7.5	G	4.0	P	2.0
p	0	548	15	D	O	1	7	20.0	28.0	8.0	F	U	AC	7.5	G	4.0	P	2.0
p	0	549	15	D	O	1	8	28.0	30.0	2.0	F	U	AC	7.5	G	4.0	P	2.0
p	0	550	15	D	O	1	9	30.0	34.0	4.0	F	U	AC	7.5	G	4.0	P	2.0
p	0	551	15	D	O	1	10	34.0	34.8	0.8	F	C	AC	7.5	G	4.0	P	2.0
p	0	552	15	D	O	2	1	-	10.0	10.0	R	D	AC	7.3	G	4.0	P	2.5
p	0	553	15	D	O	2	2	10.0	12.0	2.0	R	D	AC	7.3	G	4.0	P	2.5
p	0	554	15	D	O	2	3	12.0	13.9	1.9	R	A	AC	7.3	G	0.7	P	2.5
p	0	555	15	D	O	2	4	13.9	20.0	6.1	R	U	AC	7.3	G	4.0	P	2.5
p	0	556	15	D	O	2	5	20.0	24.0	4.0	R	U	AC	7.5	G	4.0	P	2.5
p	0	557	15	D	O	2	6	24.0	30.0	6.0	F	U	AC	7.5	G	4.0	P	2.5
p	0	558	15	D	O	2	7	30.0	37.0	7.0	F	U	AC	7.5	G	4.0	P	2.5
p	0	559	15	D	O	2	8	37.0	40.0	3.0	R	U	AC	7.5	G	4.0	P	2.5
p	0	560	15	D	O	2	9	40.0	50.0	10.0	R	U	AC	7.5	G	4.0	P	2.5
p	0	561	15	D	O	2	10	50.0	60.0	10.0	F	U	AC	7.5	G	4.0	P	2.5
p	0	562	15	D	O	2	11	60.0	61.0	1.0	F	U	AC	7.5	G	4.0	P	2.5
p	0	563	15	D	O	2	12	61.0	64.8	3.8	F	A	AC	7.5	G	4.0	P	2.5
p	0	564	15	S	B	2	1	-	4.0	4.0	F	R	AC	6.5	F	-	E	2.0
p	0	565	15	S	B	2	2	4.0	5.0	1.0	F	R	AC	6.5	F	-	P	1.2
p	0	566	15	S	B	2	3	5.0	7.2	2.2	F	R	AC	6.5	F	-	E	2.0
p	0	567	15	S	B	3	1	-	0.5	0.5	F	D	AC	7.0	F	-	E	2.0
p	0	568	15	S	B	3	2	0.5	3.3	2.8	F	D	AC	7.0	F	-	E	2.0
p	0	569	15	S	B	3	3	3.3	3.6	0.3	F	D	AC	7.0	F	-	P	1.5
p	0	570	15	S	B	3	4	3.6	5.7	2.1	F	D	AC	7.0	F	-	E	2.0
p	0	571	15	S	B	3	5	5.7	6.7	1.0	R	A	AC	7.0	F	-	P	1.5
p	0	572	15	S	B	3	6	6.7	9.8	3.1	F	R	AC	7.0	F	-	E	2.0
p	0	573	15	S	B	3	7	9.8	10.1	0.3	F	D	AC	7.0	F	-	P	1.5
p	0	574	15	S	B	3	8	10.1	10.5	0.4	F	D	AC	7.0	F	-	G	2.0
p	0	575	15	S	B	3	9	10.5	10.9	0.4	F	D	AC	7.0	F	-	P	1.5
p	0	576	15	S	B	3	10	10.9	11.8	0.9	F	D	AC	7.0	F	-	G	2.5
p	0	577	15	S	B	3	11	11.8	12.0	0.2	F	D	AC	7.0	F	-	P	1.5
p	0	578	15	S	B	3	12	12.0	16.3	4.3	F	D	AC	7.0	F	-	G	2.5
p	0	579	15	S	B	3	13	16.3	16.4	0.1	F	D	AC	7.0	F	-	G	2.5
p	0	580	15	S	B	3	14	16.4	17.2	0.8	F	R	AC	7.0	G	-	P	1.5
p	0	581	15	S	B	3	15	17.2	17.7	0.5	F	R	AC	7.0	F	-	E	2.0
p	0	582	15	S	B	3	16	17.7	23.0	5.3	F	R	AC	7.0	F	-	G	2.5
p	0	657	17	S	B	1	1	-	5.0	5.0	F	R	AC	7.0	G	-	P	5.0
p	0	658	17	S	B	1	2	5.0	10.0	5.0	F	U	AC	7.0	G	-	P	5.0
p	0	659	17	S	B	1	3	10.0	15.4	5.4	F	U	AC	7.0	G	-	P	5.0
p	0	682	21	S	B	2	1	-	10.0	10.0	F	A	AC	7.0	G	-	P	2.3

p	0	683	21	S	B	2	2	10.0	20.0	10.0	F	D	AC	7.0	G	-	P	2.3
p	0	684	21	S	B	2	3	20.0	30.0	10.0	F	D	AC	7.0	G	-	P	2.3
p	0	685	21	S	B	2	4	30.0	40.0	10.0	F	D	AC	7.0	G	-	P	2.3
p	0	686	21	S	B	2	5	40.0	50.0	10.0	F	D	AC	7.0	G	-	P	2.3
p	0	687	21	S	B	2	6	50.0	60.0	10.0	F	D	AC	7.0	G	-	P	2.3
p	0	688	21	S	B	2	7	60.0	70.0	10.0	F	D	AC	7.0	G	-	P	2.3
p	0	689	21	S	B	2	8	70.0	76.1	6.1	F	D	AC	7.0	G	-	P	2.3
p	0	690	21	D	I	3	1	-	11.7	11.7	F	R	AC	7.0	G	2.0	P	2.5
p	0	691	21	D	O	3	1	-	11.7	11.7	F	R	AC	7.0	G	2.0	P	2.5
p	0	692	21	S	B	4	1	-	10.0	10.0	F	U	AC	7.0	F	-	G	2.5
p	0	693	21	S	B	4	2	10.0	20.0	10.0	F	U	AC	7.0	F	-	G	2.5
p	0	694	21	S	B	4	3	20.0	30.0	10.0	F	U	AC	7.0	F	-	DST	2.5
p	0	695	21	S	B	4	4	30.0	40.0	10.0	F	U	AC	7.0	F	-	DST	2.5
p	0	696	21	S	B	5	1	-	2.7	2.7	F	R	AC	7.5	G	-	P	2.0
p	0	697	21	S	B	5	2	2.7	13.0	10.3	F	R	AC	7.5	F	-	DST	2.5
p	0	698	21	S	B	5	3	13.0	20.5	7.5	F	U	AC	7.5	F	-	DST	2.5
p	0	699	21	S	B	5	4	20.5	22.1	1.6	R	U	AC	7.5	F	-	DST	2.5
p	0	700	21	S	B	5	5	22.1	32.1	10.0	F	U	AC	7.5	F	-	DST	2.5
p	0	701	21	S	B	5	6	32.1	39.0	6.9	F	U	AC	7.5	F	-	DST	2.5
p	0	702	21	S	B	5	7	39.0	40.4	1.4	R	R	AC	7.5	F	-	DST	2.5
p	0	703	21	S	B	5	8	40.4	50.4	10.0	F	U	AC	7.5	F	-	DST	2.5
p	0	704	21	S	B	5	9	50.4	60.4	10.0	F	U	AC	7.5	F	-	DST	2.5
p	0	705	21	S	B	5	10	60.4	70.4	10.0	F	U	AC	7.5	F	-	DST	2.5
p	0	706	21	S	B	5	11	70.4	80.8	10.4	F	U	AC	7.5	F	-	DST	2.5
p	0	707	21	S	B	5	12	80.8	90.8	10.0	F	U	AC	7.5	F	-	DST	2.5
p	0	708	21	S	B	5	13	90.8	97.0	6.2	F	U	AC	7.5	F	-	DST	2.5
p	0	709	21/1/1	S	B	0	1	-	10.0	10.0	F	D	AC	7.0	G	-	E	1.7
p	0	710	21/1/1	S	B	0	2	10.0	20.0	10.0	F	D	AC	7.0	G	-	E	1.7
p	0	711	21/1/1	S	B	0	3	20.0	23.5	3.5	F	D	AC	7.0	G	-	E	1.7
p	0	746	23	S	B	1	1	-	6.8	6.8	F	R	AC	7.5	G	-	P	2.5
p	0	747	23	S	B	1	2	6.8	10.0	3.3	F	R	AC	7.5	G	-	P	2.5
p	0	748	23	S	B	1	3	10.0	18.5	8.5	F	U	AC	7.5	G	-	P	2.5
p	0	749	23	S	B	1	4	18.5	20.0	1.5	M	U	AC	7.5	G	-	P	2.5
p	0	750	23	S	B	1	5	20.0	21.8	1.8	M	U	AC	7.5	G	-	P	5.0
p	0	751	23	S	B	1	6	21.8	30.0	8.2	M	U	AC	7.5	G	-	P	5.0
p	0	752	23	S	B	1	7	30.0	40.0	10.0	R	U	AC	7.5	G	-	P	5.0
p	0	753	23	S	B	1	8	40.0	50.0	10.0	F	U	AC	7.5	G	-	P	5.0
p	0	754	23	S	B	1	9	50.0	52.0	2.0	F	U	AC	7.5	G	-	P	5.0
p	0	755	23	S	B	2	1	-	4.0	4.0	F	U	AC	7.4	B	-	P	2.4
p	0	756	23	S	B	2	2	4.0	9.3	5.3	F	U	AC	7.4	B	-	P	2.4
p	0	757	23	S	B	2	3	9.3	16.7	7.4	F	U	AC	7.5	B	-	P	2.5
p	0	758	23	S	B	2	4	16.7	18.8	2.1	R	U	AC	7.5	B	-	P	2.5
p	0	759	23	S	B	2	5	18.8	27.9	9.1	F	U	AC	7.5	B	-	P	2.5

p	0	760	23	S	B	2	6	27.9	28.1	0.2	F	U	AC	7.5	B	-	P	2.5
p	0	761	23	S	B	2	7	28.1	39.1	11.0	F	U	AC	7.5	B	-	P	2.5
p	0	762	23	S	B	2	8	39.1	50.5	11.4	F	R	AC	7.4	B	-	P	2.4
p	0	763	23	S	B	2	9	50.5	54.9	4.4	F	R	AC	7.4	B	-	P	2.4
p	0	764	23	S	B	3	1	-	10.0	10.0	F	R	AC	3.8	G	-	P	2.0
p	0	765	23	S	B	3	2	10.0	17.3	7.3	F	R	AC	3.8	G	-	E	2.0
p	0	766	23	S	B	3	3	17.3	27.3	10.0	F	R	AC	3.8	F	-	E	2.0
p	0	767	23	S	B	3	4	27.3	32.3	5.0	F	R	AC	3.8	F	-	E	2.0
p	0	768	23	S	B	3	5	32.3	40.8	8.5	F	R	AC	3.8	F	-	E	2.0
p	0	769	23	S	B	3	6	40.8	47.3	6.5	F	C	AC	3.8	F	-	E	2.0
p	0	770	23	S	B	3	7	47.3	57.3	10.0	F	U	AC	3.8	F	-	E	2.0
p	0	771	23	S	B	3	8	57.3	67.3	10.0	F	U	AC	3.8	F	-	E	2.0
p	0	772	23	S	B	3	9	67.3	75.2	7.9	F	D	AC	3.8	F	-	E	2.0
p	0	773	23	S	B	4	1	-	10.0	10.0	F	D	AC	3.8	B	-	P	2.0
p	0	774	23	S	B	4	2	10.0	20.0	10.0	F	D	AC	3.8	B	-	P	2.0
p	0	775	23	S	B	4	3	20.0	25.5	5.5	F	D	AC	3.8	B	-	E	2.0
p	0	776	23	S	B	4	4	25.5	32.7	7.2	F	D	AC	3.8	B	-	E	2.0
p	0	777	23	S	B	4	5	32.7	40.0	7.4	F	D	AC	3.8	B	-	E	2.0
p	0	778	23	S	B	4	6	40.0	42.8	2.8	F	R	AC	3.8	B	-	E	2.0
p	0	779	23	S	B	5	1	-	10.0	10.0	F	R	AC	3.8	B	-	E	2.0
p	0	780	23	S	B	5	2	10.0	20.0	10.0	R	R	AC	3.8	B	-	E	2.0
p	0	781	23	S	B	5	3	20.0	31.9	11.9	R	U	AC	3.8	B	-	E	2.0
p	0	782	23	S	B	6	1	-	5.0	5.0	F	R	AC	3.8	B	-	P	2.5
p	0	783	23	S	B	6	2	5.0	8.9	3.9	F	R	AC	3.8	B	-	E	2.5
p	0	784	23	S	B	6	3	8.9	9.8	0.9	F	U	AC	3.8	B	-	E	2.5
p	0	785	23	S	B	6	4	9.8	10.8	1.0	F	U	AC	3.8	B	-	E	2.5
p	0	786	23	S	B	6	5	10.8	19.6	8.8	R	U	AC	3.8	B	-	E	2.5
p	0	888	29/1/1	S	B	0	1	-	6.7	6.7	F	U	AC	7.0	F	-	P	2.0
p	0	889	29/1/1	S	B	0	2	6.7	16.7	10.0	F	U	AC	7.0	G	-	P	2.0
p	0	890	29/1/1	S	B	0	3	16.7	26.7	10.0	F	U	AC	7.0	G	-	P	2.0
p	0	891	29/1/1	S	B	0	4	26.7	37.1	10.4	F	U	AC	7.0	G	-	P	2.0
p	0	892	29/1/1	S	B	0	5	37.1	47.0	9.9	F	U	AC	7.0	G	-	P	2.0
p	0	893	29/1/1	S	B	0	6	47.0	57.0	10.0	F	U	AC	7.0	G	-	P	2.0
p	0	894	29/1/1	S	B	0	7	57.0	67.0	10.0	F	U	AC	7.0	G	-	P	2.0
p	0	895	29/1/1	S	B	0	8	67.0	77.0	10.0	F	U	AC	7.0	G	-	P	2.0
p	0	896	29/1/1	S	B	0	9	77.0	90.0	13.0	F	U	AC	7.0	G	-	P	2.0
p	0	897	29/1/1	S	B	0	10	90.0	102.0	12.0	F	U	AC	7.0	G	-	P	2.0
p	0	917	31	S	B	1	1	-	4.0	4.0	F	C	AC	7.0	F	-	P	2.3
p	0	918	31	S	B	1	2	4.0	10.0	6.0	F	U	AC	7.0	F	-	P	2.3
p	0	919	31	S	B	1	3	10.0	17.0	7.0	F	U	AC	7.0	F	-	P	2.3
p	0	920	31	S	B	1	4	17.0	18.0	1.0	F	R	AC	7.0	F	-	P	2.3
p	0	921	31	S	B	1	5	18.0	20.0	2.0	F	U	AC	7.0	F	-	P	2.3
p	0	922	31	S	B	1	6	20.0	30.0	10.0	F	U	AC	7.0	B	-	P	2.3

p	0	923	31	S	B	1	7	30.0	40.0	10.0	F	U	AC	7.0	B	-	P	2.3
p	0	924	31	S	B	1	8	40.0	41.3	1.3	F	U	AC	7.0	B	-	P	2.3
p	0	925	31	S	B	1	9	41.3	50.0	8.7	F	U	REHABILITATION		N	-		
p	0	926	31	S	B	1	10	50.0	52.6	2.6	F	U	REHABILITATION		N	-		
p	0	927	31	S	B	1	11	52.6	54.0	1.4	F	U	AC	7.0	F	-	P	2.3
p	0	928	31	S	B	1	12	54.0	60.0	6.0	F	R	AC	7.0	F	-	P	2.3
p	0	929	31	S	B	2	1	-	10.0	10.0	F	D	AC	7.5	G	-	P	2.3
p	0	930	31	S	B	2	2	10.0	20.0	10.0	F	D	AC	7.5	G	-	P	2.3
p	0	931	31	S	B	2	3	20.0	21.8	1.8	F	D	AC	7.5	G	-	P	2.3
p	0	932	31	S	B	2	3	21.8	30.0	8.2	F	D	REHABILITATION		N	-		
p	0	933	31	S	B	2	4	30.0	32.0	2.0	F	D	REHABILITATION		N	-		
p	0	934	31	S	B	2	4	32.0	40.0	8.0	F	D	AC	7.5	F	-	P	2.3
p	0	935	31	S	B	2	5	40.0	50.0	10.0	F	D	AC	7.5	F	-	P	2.3
p	0	936	31	S	B	2	6	50.0	52.0	2.0	F	D	AC	7.5	F	-	P	2.3
p	0	937	31	S	B	2	6	52.0	60.0	8.0	F	D	AC	7.5	G	-	P	2.3
p	0	938	31	S	B	2	7	60.0	70.0	10.0	F	D	AC	7.5	G	-	P	2.3
p	0	939	31	S	B	2	8	70.0	80.0	10.0	F	D	AC	7.5	G	-	P	2.3
p	0	940	31	S	B	2	9	80.0	90.0	10.0	F	D	AC	7.5	G	-	P	2.3
p	0	941	31	S	B	2	10	90.0	100.0	10.0	F	D	AC	7.5	G	-	P	2.3
p	0	942	31	S	B	2	11	100.0	110.0	10.0	F	D	AC	7.5	G	-	P	2.3
p	0	943	31	S	B	2	12	110.0	120.0	10.0	F	D	AC	7.5	G	-	P	2.3
p	0	944	31	S	B	3	1	-	5.3	5.3	F	U	AC	7.5	B	-	P	2.1
p	0	945	31	S	B	3	2	5.3	6.3	1.0	F	U	AC	7.5	B	-	P	2.1
p	0	946	31	S	B	3	3	6.3	12.6	6.3	F	U	AC	7.5	B	-	P	2.1
p	0	947	31	S	B	3	4	12.6	13.3	0.7	F	U	AC	7.5	B	-	P	2.1
p	0	948	31	S	B	3	5	13.3	16.7	3.4	F	U	AC	7.5	B	-	P	2.1
p	0	949	31	S	B	3	6	16.7	17.7	1.0	F	U	AC	7.5	B	-	P	2.1
p	0	950	31	S	B	3	7	17.7	26.5	8.8	F	U	AC	7.5	B	-	P	2.1
p	0	951	31	S	B	4	1	-	10.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	952	31	S	B	4	2	10.0	20.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	953	31	S	B	4	3	20.0	30.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	954	31	S	B	4	4	30.0	40.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	955	31	S	B	4	5	40.0	50.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	956	31	S	B	4	6	50.0	60.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	957	31	S	B	4	7	60.0	70.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	958	31	S	B	4	8	70.0	90.0	20.0	F	D	AC	8.0	B	-	P	2.0
p	0	959	31	S	B	4	9	80.0	90.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	960	31	S	B	4	10	90.0	100.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	961	31	S	B	4	11	100.0	108.0	8.0	F	D	AC	8.0	F	-	P	2.0
p	0	962	31	S	B	5	1	-	10.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	963	31	S	B	5	2	10.0	20.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	964	31	S	B	5	3	20.0	30.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	965	31	S	B	5	4	30.0	40.0	10.0	F	D	AC	8.0	F	-	P	2.0

p	0	966	31	S	B	5	5	40.0	50.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	967	31	S	B	5	6	50.0	60.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	968	31	S	B	5	7	60.0	70.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	969	31	S	B	5	8	70.0	80.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	970	31	S	B	5	9	80.0	90.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	971	31	S	B	5	10	90.0	100.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	972	31	S	B	5	11	100.0	110.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	973	31	S	B	5	12	110.0	120.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	974	31	S	B	5	13	120.0	130.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	975	31	S	B	5	14	130.0	140.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	976	31	S	B	5	15	140.0	150.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	977	31	S	B	5	16	150.0	160.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	978	31	S	B	5	17	160.0	170.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	979	31	S	B	5	18	170.0	180.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	980	31	S	B	5	19	180.0	190.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	981	31	S	B	6	1	-	10.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	982	31	S	B	6	2	10.0	20.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	983	31	S	B	6	3	20.0	30.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	984	31	S	B	6	4	30.0	40.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	985	31	S	B	6	5	40.0	50.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	986	31	S	B	6	6	50.0	60.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	987	31	S	B	6	7	60.0	70.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	988	31	S	B	6	8	70.0	80.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	989	31	S	B	6	9	80.0	90.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	990	31	S	B	6	10	90.0	100.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	991	31	S	B	6	11	100.0	104.0	4.0	F	D	AC	8.0	F	-	P	2.0
p	0	992	31	S	B	7	1	-	10.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	993	31	S	B	7	2	10.0	20.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	994	31	S	B	7	3	20.0	30.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	995	31	S	B	7	4	30.0	40.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	996	31	S	B	7	5	40.0	50.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	997	31	S	B	7	6	50.0	60.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	998	31	S	B	7	7	60.0	70.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	999	31	S	B	7	8	70.0	80.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	1000	31	S	B	7	9	80.0	90.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	1001	31	S	B	7	10	90.0	100.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	1002	31	S	B	7	11	100.0	110.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	1003	31	S	B	7	12	110.0	120.0	10.0	F	D	AC	8.0	F	-	P	2.0
p	0	1004	31	S	B	8	1	-	7.0	7.0	M	U	AC	7.0	F	-	P	1.5
p	0	1005	31	D	I	9	1	-	2.1	2.1	M	U	AC	7.0	G	4.0	P	2.5
p	0	1006	31	D	I	9	2	2.1	14.0	11.9	F	A	AC	7.0	G	4.0	P	2.5
p	0	1007	31	D	O	9	1	-	11.9	11.9	M	A	AC	7.0	G	4.0	P	2.5
p	0	1008	31	D	O	9	2	11.9	14.0	2.1	M	U	AC	7.0	G	4.0	P	2.5

p	0	1009	31	S	B	9	3	14.0	30.7	16.7	M	U	AC	8.0	F	-	P	1.5
p	0	1022	32	S	B	1	1	-	3.0	3.0	F	C	AC	7.0	G	-	P	0.5
p	0	1023	32	S	B	1	2	3.0	10.0	7.0	F	U	AC	7.0	G	-	P	0.5
p	0	1024	32	S	B	1	3	10.0	20.0	10.0	F	U	AC	7.0	G	-	P	0.5
p	0	1025	32	S	B	1	4	20.0	30.0	10.0	F	U	AC	7.0	G	-	P	0.5
p	0	1026	32	S	B	1	5	30.0	40.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1027	32	S	B	1	6	40.0	50.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1028	32	S	B	1	7	50.0	60.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1029	32	S	B	1	8	60.0	70.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1030	32	S	B	1	9	70.0	80.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1031	32	S	B	1	10	80.00	90.00	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1032	32	S	B	1	11	90.0	100.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1033	32	S	B	1	12	100.0	110.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1034	32	S	B	1	13	110.0	120.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1035	32	S	B	1	14	120.0	130.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1036	32	S	B	1	15	130.0	140.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1037	32	S	B	1	16	###	###	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1038	32	S	B	1	17	###	160.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1039	32	S	B	1	18	###	###	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1040	32	S	B	1	19	170.0	180.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1041	32	S	B	1	20	180.0	190.0	10.0	F	D	AC	7.0	G	-	P	2.3
p	0	1042	32	S	B	2	1	-	10.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1043	32	S	B	2	2	10.0	20.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1044	32	S	B	2	3	20.0	30.0	10.0	F	D	AC	7.0	F	-	P	0.5
p	0	1045	32	S	B	2	4	30.0	37.0	7.0	F	D	AC	7.0	F	-	P	0.5
p	0	1046	32	S	B	2	5	37.0	40.0	3.0	R	D	AC	7.0	F	-	P	0.5
p	0	1047	32	S	B	2	6	40.0	48.0	8.0	F	D	AC	7.0	F	-	P	0.5
p	0	1048	32	S	B	2	7	48.0	50.0	2.0	R	D	AC	7.0	F	-	P	0.5
p	0	1049	32	S	B	2	8	50.0	60.0	10.0	F	D	AC	7.0	F	-	P	0.5
p	0	1050	32	S	B	2	9	60.0	70.0	10.0	F	D	AC	7.0	F	-	P	0.5
p	0	1051	32	S	B	2	10	70.0	80.0	10.0	F	D	AC	7.0	F	-	P	0.5
p	0	1052	32	S	B	2	11	80.0	88.0	8.0	R	D	AC	7.0	F	-	P	0.5
p	0	1053	32	S	B	2	12	88.0	100.0	12.0	F	D	AC	7.0	F	-	P	0.5
p	0	1054	32	S	B	2	13	100.0	110.0	10.0	F	D	AC	7.0	F	-	P	0.5
p	0	1055	32	S	B	2	14	100.0	110.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1056	32	S	B	2	15	###	###	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1057	32	S	B	2	16	###	###	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1058	32	S	B	2	17	130.0	140.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1059	32	S	B	2	18	###	###	4.0	R	D	AC	7.0	G	-	P	0.5
p	0	1060	32	S	B	2	19	144.0	150.0	6.0	F	D	AC	7.0	G	-	P	0.5
p	0	1061	32	S	B	2	20	150.0	156.0	6.0	F	D	AC	7.0	G	-	P	0.5
p	0	1062	32	S	B	2	21	156.0	160.0	4.0	F	D	AC	7.0	G	-	P	2.0
p	0	1063	32	S	B	2	22	160.0	164.0	4.0	F	C	AC	7.0	G	-	P	0.5

p	0	1064	32	S	B	3	1	-	10.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1065	32	S	B	3	2	10.0	20.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1066	32	S	B	3	3	20.0	30.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1067	32	S	B	3	4	30.0	40.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1068	32	S	B	3	5	40.0	50.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1069	32	S	B	3	6	50.0	60.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1070	32	S	B	3	7	60.0	70.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1071	32	S	B	3	8	70.0	78.5	8.5	R	U	AC	7.0	G	-	P	0.5
p	0	1088	32/2/2	S	B	0	1	-	10.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1089	32/2/2	S	B	0	2	10.0	20.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1090	32/2/2	S	B	0	3	20.0	30.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1091	32/2/2	S	B	0	4	30.0	40.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1092	32/2/2	S	B	0	5	40.0	50.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1093	32/2/2	S	B	0	6	50.0	60.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1094	32/2/2	S	B	0	7	60.0	70.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1095	32/2/2	S	B	0	8	70.0	73.0	3.0	F	D	AC	7.0	G	-	P	0.5
p	0	1096	32/2/2	S	B	0	8	73.0	80.0	7.0	F	R	AC	7.0	G	-	P	0.5
p	0	1097	32/2/2	S	B	0	9	80.0	90.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1098	32/2/2	S	B	0	10	90.0	92.0	2.0	F	R	AC	7.0	G	-	P	0.5
p	0	1099	32/2/2	S	B	0	10	92.0	100.0	8.0	F	D	AC	7.0	G	-	P	0.5
p	0	1100	32/2/2	S	B	0	11	100.0	110.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1101	32/2/2	S	B	0	12	110.0	120.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1102	32/2/2	S	B	0	13	120.0	130.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1103	32/2/2	S	B	0	15	140.0	150.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1104	32/2/2	S	B	0	16	150.0	160.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1105	32/2/2	S	B	0	17	160.0	170.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1106	32/2/2	S	B	0	18	170.0	180.0	10.0	F	D	AC	7.0	G	-	P	0.5
p	0	1107	32/2/2	S	B	0	19	180.0	185.0	5.0	F	R	AC	7.0	G	-	P	0.5
p	0	1108	32/2/2	S	B	0	20	185.0	186.0	1.0	R	U	AC	7.0	G	-	E	0.5
p	0	1109	32/2/2	S	B	0	21	186.0	187.0	1.0	R	U	UC		N	-		
p	0	1110	32/2/2	S	B	0	22	187.0	191.0	4.0	R	R	AC	7.0	G	-	P	0.5
p	0	1120	33	S	B	1	1	-	7.0	7.0	F	A	AC	7.5	F	-	P	2.8

p	0	1121	33	S	B	1	2	7.0	9.2	2.2	F	R	AC	7.5	F	-	P	2.8
p	0	1122	33	S	B	1	3	9.2	10.7	1.5	F	R	AC	7.5	F	-	P	2.8
p	0	1123	33	S	B	1	4	10.7	17.7	7.0	F	A	AC	7.5	F	-	P	2.8
p	0	1124	33	S	B	2	1	-	2.4	2.4	F	U	AC	7.5	F	-	P	2.8
p	0	1125	33	S	B	2	2	2.4	12.4	10.0	F	A	AC	7.5	F	-	P	2.8
p	0	1126	33	S	B	2	3	12.4	19.3	6.9	F	A	AC	7.5	F	-	P	2.8
p	0	1127	33	S	B	2	4	19.3	29.3	10.0	F	U	AC	7.5	F	-	P	2.8
p	0	1128	33	S	B	2	5	29.3	37.8	8.5	F	U	AC	7.5	F	-	P	2.8
p	0	1129	33	S	B	3	1	-	7.7	7.7	F	A	AC	7.5	F	-	P	2.8
p	0	1130	33	S	B	3	2	7.7	17.7	10.0	F	R	AC	7.5	F	-	P	2.8
p	0	1213	41	S	B	1	1	-	106.6	106.6	F	U	G	6.0	F	-	E	1.0
p	0	1218	43	S	B	1	1	-	140.0	140.0	F	D	G	6.0	F	-	G	1.0
p	0	1221	47	D	O	1	1	-	3.4	3.4	F	I	AC	7.3	F	4.0	P	2.2
p	0	1222	47	D	O	1	2	3.4	11.2	7.8	F	I	AC	7.3	F	4.0	P	2.2
p	0	1223	47	D	I	1	1	-	7.8	7.8	F	I	AC	7.3	F	4.0	P	2.2
p	0	1224	47	D	I	1	2	7.8	11.2	3.4	F	I	AC	7.3	F	4.0	P	2.2
p	0	1225	47	S	B	2	1	-	17.0	17.0	F	U	AC	6.0	F	-	P	2.0
p	0	1226	47	S	B	2	2	17.0	28.7	11.7	M	U	AC	6.0	F	-	P	2.0
p	0	1227	47	S	B	3	1	-	5.0	5.0	M	U	AC	6.0	F	-	P	1.5
p	0	1228	47	S	B	3	2	5.0	27.0	22.0	M	U	AC	9.0	F	-	P	0.5
p	0	1229	47	S	B	3	3	27.0	53.8	26.8	F	U	AC	7.0	F	-	P	1.5
p	0	1230	47	S	B	4	1	-	15.3	15.3	M	U	AC	6.5	F	-	P	1.5
p	0	1231	47	S	B	5	1	-	19.8	19.8	M	U	AC	6.0	F	-	E	1.0

2. List of Secondary Roads

	Road Class	No.	Road No.	Type	In/Out	Sec. No.	Sub-Sec	From	To	Km	Terrain	Land USE	C Type	C W(m)	C Cond.	Median(m)	S Type	S W(m)
s	99	103	1/3/3	S	B	0	1	-	2.6	2.6	F	R	AC	7.0	G	-	P	1.5
s	99	104	1/3/3	S	B	0	2	2.6	10.0	7.4	F	U	AC	7.0	F	-	E	1.5
s	99	105	1/3/3	S	B	0	3	10.0	12.0	2.0	F	R	AC	7.0	F	-	E	1.5
s	99	106	1/3/3	S	B	0	4	12.0	14.3	2.3	F	U	AC	7.0	G	-	P	0.5
s	99	107	1/3/3	S	B	0	5	14.3	15.2	0.9	F	R	AC	7.0	G	-	P	0.5
s	99	108	1/3/3	S	B	0	6	15.2	20.0	4.8	F	U	AC	7.0	G	-	P	0.5
s	99	109	1/3/3	S	B	0	7	20.0	22.0	2.0	F	U	AC	7.0	G	-	P	0.5
s	99	110	1/3/3	S	B	0	8	22.0	31.0	9.0	R	U	AC	7.0	G	-	P	0.5
s	99	156	1/4/4	S	B	0	1	-	0.3	0.3	F	R	AC	T	G	-	E	2.0
s	99	157	1/4/4	S	B	0	2	0.3	1.3	1.0	F	U	AC	T	G	-	E	2.0
s	99	158	1/4/4	S	B	0	3	1.3	2.2	0.9	F	A	AC	T	G	-	E	2.0
s	99	159	1/4/4	S	B	0	4	2.2	4.0	1.8	F	A	AC	T	G	-	E	2.0
s	99	160	1/4/4	S	B	0	5	4.0	10.0	6.0	F	U	AC	T	G	-	E	2.0
s	99	161	1/4/4	S	B	0	6	10.0	20.0	10.0	F	U	AC	7.0	G	-	E	2.0
s	99	162	1/4/4	S	B	0	7	20.0	30.0	10.0	F	U	AC	7.0	G	-	E	2.0
s	99	163	1/4/4	S	B	0	8	30.0	32.0	2.0	F	U	AC	7.0	G	-	E	2.0
s	99	164	1/4/4	S	B	0	9	32.0	35.4	3.4	R	U	AC	7.0	G	-	E	2.0
s	99	165	1/4/5	S	B	0	1	-	2.0	2.0	F	U	G	7.5	G	-	P	2.0
s	99	166	1/4/5	S	B	0	2	2.0	2.4	0.4	F	R	AC	7.5	G	-	P	2.0
s	99	184	1/5/4	S	B	0	1	-	0.2	0.2	F	C	AC	7.0	F	-	P	1.5
s	99	185	1/5/4	S	B	0	2	0.2	1.1	0.9	F	U	AC	7.0	F	-	P	1.5
s	99	186	1/5/4	S	B	0	3	1.1	2.7	1.6	F	U	AC	7.0	F	-	P	1.5
s	99	187	1/5/4	S	B	0	4	2.7	8.7	6.0	F	U	AC	7.0	F	-	P	1.5
s	99	188	1/5/4	S	B	0	5	8.7	10.0	1.3	F	U	AC	7.0	F	-	P	1.5
s	99	189	1/5/4	S	B	0	6	10.0	15.0	5.0	F	U	AC	7.0	F	-	P	1.5
s	99	190	1/5/4	S	B	0	7	15.0	20.0	5.0	F	U	AC	7.0	F	-	G	1.5
s	99	191	1/5/4	S	B	0	8	20.0	26.3	6.3	F	U	AC	7.0	F	-	G	1.5
s	99	236	2	S	B	1	1	-	1.5	1.5	F	R	AC	7.0	G	3.0	P	2.2
s	99	237	2	S	B	1	2	1.5	2.7	1.2	R	U	AC	7.0	G	-	P	1.2
s	99	238	2	S	B	1	3	2.7	2.8	0.1	R	U	AC	7.0	G	-	P	1.2
s	99	239	2	S	B	1	4	2.8	3.9	1.1	M	U	AC	7.0	G	-	P	1.2
s	99	240	2	S	B	1	5	3.9	4.6	0.7	M	U	AC	7.0	G	-	P	1.2
s	99	241	2	S	B	1	6	4.6	5.6	1.0	M	U	AC	7.0	G	-	P	1.2
s	99	242	2	S	B	1	7	5.6	6.7	1.1	R	U	AC	7.0	G	-	P	1.2
s	99	243	2	S	B	1	8	6.7	9.0	2.3	R	U	AC	7.0	G	-	P	1.2
s	99	244	2	S	B	1	9	9.0	9.8	0.8	M	U	AC	7.0	G	-	P	1.2
s	99	245	2	S	B	1	10	9.8	10.0	0.2	M	U	AC	7.0	G	-	P	1.2
s	99	246	2	S	B	1	11	10.0	11.6	1.6	M	U	AC	7.0	G	-	P	1.2
s	99	247	2	S	B	1	12	11.6	12.4	0.8	F	R	AC	7.0	G	-	P	2.2
s	99	248	2	S	B	2	1	-	0.5	0.5	F	R	AC	7.0	G	-	P	2.2
s	99	249	2	S	B	2	2	0.5	2.5	2.0	F	U	AC	7.0	G	-	P	1.5
s	99	250	2	S	B	2	3	2.5	3.0	0.5	F	U	AC	7.0	G	-	P	1.5

s	99	251	2	S	B	2	4	3.0	4.2	1.2	M	U	AC	7.0	G	-	E	1.5
s	99	252	2	S	B	2	5	4.2	4.9	0.7	R	U	AC	7.0	G	-	E	1.5
s	99	253	2	S	B	2	6	4.9	6.5	1.6	R	U	AC	12.0	G	5.0	P	2.2
s	99	254	2	S	B	2	7	6.5	7.7	1.2	R	U	AC	7.0	G	-	P	1.2
s	99	255	2	S	B	2	9	7.7	9.1	1.4	F	R	AC	12.0	G	5.0	P	1.0
s	99	256	2	S	B	3	1	-	1.2	1.2	F	R	AC	7.0	G	-	P	2.5
s	99	257	2	S	B	3	2	1.2	2.1	0.9	F	R	AC	7.0	F	-	G	1.0
s	99	258	2	S	B	3	3	2.1	3.3	1.2	F	R	AC	7.0	F	-	G	1.0
s	99	259	2	S	B	3	4	3.3	4.5	1.2	F	R	AC	7.0	G	-	E	2.0
s	99	260	2	S	B	3	5	4.5	4.6	0.1	R	U	AC	7.0	G	-	P	2.0
s	99	261	2	S	B	3	6	4.6	4.9	0.3	R	U	AC	7.0	G	-	P	1.6
s	99	262	2	S	B	3	7	4.9	6.2	1.3	R	U	AC	7.0	G	-	P	1.5
s	99	263	2	S	B	3	9	6.2	8.0	1.8	M	U	AC	7.0	G	-	P	1.5
s	99	264	2	S	B	3	10	8.0	8.3	0.4	M	U	AC	11.0	G	-	P	1.5
s	99	265	2	S	B	3	11	8.3	10.0	1.7	M	U	AC	7.0	G	-	P	1.5
s	99	266	2	S	B	3	12	10.0	10.9	0.9	M	U	AC	7.0	G	-		0.0
s	99	267	2	S	B	3	13	10.9	11.3	0.4	M	U	AC	7.0	G	-		0.0
s	99	268	2	S	B	3	14	11.3	11.8	0.5	M	U	AC	7.0	G	-		0.0
s	99	269	2	S	B	3	15	11.8	12.4	0.6	M	U	AC	7.0	G	-		0.0
s	99	270	2	S	B	3	16	12.4	12.8	0.5	M	U	AC	7.0	G	-		0.0
s	99	271	2	S	B	3	17	12.8	13.5	0.7	M	U	AC	7.0	G	-	P	1.2
s	99	272	2	S	B	3	18	13.5	13.7	0.3	M	U	AC	7.0	G	-	P	1.2
s	99	273	2	S	B	3	19	13.7	14.2	0.5	M	U	AC	7.0	G	-	P	1.2
s	99	274	2	S	B	3	20	14.2	14.4	0.2	M	U	AC	7.0	G	-	P	1.2
s	99	275	2	S	B	3	21	14.4	14.9	0.6	M	U	AC	7.0	G	-	P	1.2
s	99	276	2	S	B	3	22	14.9	15.1	0.2	M	U	AC	7.0	G	-	P	1.2
s	99	277	2	S	B	3	23	15.1	17.3	2.2	M	U	AC	7.0	G	-	P	1.2
s	99	278	2	S	B	3	24	17.3	17.9	0.6	M	U	AC	7.0	G	-	P	1.2
s	99	279	2	S	B	3	25	17.9	18.6	0.7	M	U	AC	7.0	G	-	P	1.2
s	99	280	2	S	B	3	26	18.6	19.5	0.9	M	U	AC	7.0	G	-	P	1.2
s	99	281	2	S	B	3	27	19.5	20.2	0.7	F	R	AC	7.0	G	-	P	1.2
s	99	282	2	S	B	3	28	20.2	21.4	1.2	F	R	AC	7.0	G	-	P	1.2
s	99	283	2	S	B	3	29	21.4	21.6	0.2	F	R	AC	7.0	G	-	P	1.2
s	99	284	2	S	B	4	1	-	2.4	2.4	F	R	E	3.0	B	-		0.0
s	99	285	2	S	B	4	2	2.4	3.2	0.8	F	U	E	3.0	F	-		0.0
s	99	286	2	S	B	4	3	3.2	8.3	5.1	F	U	E	3.0	F	-		0.0
s	99	287	2	S	B	4	4	8.3	10.0	1.7	F	U	E	3.0	F	-		0.0
s	99	288	2	S	B	4	5	10.0	13.7	3.7	F	U	E	3.0	F	-		0.0
s	99	289	2	S	B	4	6	13.7	14.5	0.8	F	U	E	3.0	F	-		0.0
s	99	290	2	S	B	4	7	14.5	16.0	1.5	F	U	E	3.0	F	-		0.0
s	99	291	2	S	B	4	8	16.0	17.5	1.5	M	U	E	3.0	VB	-		0.0
s	99	292	2	S	B	4	9	17.5	18.3	0.8	M	U	E	3.0	VB	-		0.0
s	99	293	2	S	B	4	10	18.3	18.8	0.6	M	U	E	3.0	F	-		0.0

s	99	294	2	S	B	4	11	18.8	20.0	1.2	M	U	E	3.0	F	-		0.0
s	99	295	2	S	B	4	12	20.0	21.2	1.2	M	U	E	3.0	F	-		0.0
s	99	296	2	S	B	4	13	21.2	24.1	2.9	M	U	E	3.0	F	-		0.0
s	99	297	2	S	B	4	14	24.1	28.8	4.7	M	U	E	3.0	F	-		0.0
s	99	298	2	S	B	4	15	28.8	30.0	1.2	M	U	E	3.0	F	-		0.0
s	99	299	2	S	B	4	16	30.0	30.4	0.4	M	U	E	3.0	F	-		0.0
s	99	300	2	S	B	4	17	30.4	34.8	4.4	M	U	E	3.0	F	-		0.0
s	99	301	2	S	B	4	18	34.8	35.5	0.7	M	U	E	3.0	F	-		0.0
s	99	302	2	S	B	4	19	35.5	36.8	1.3	M	U	E	3.0	F	-		0.0
s	99	303	2	S	B	4	20	36.8	38.6	1.8	M	U	E	3.5	F	-		0.0
s	99	304	2	S	B	4	21	38.6	40.0	1.4	M	U	E	3.5	F	-		0.0
s	99	305	2	S	B	4	22	40.0	49.5	9.5	M	U	E	4.5	F	-		0.0
s	99	306	2	S	B	4	23	49.5	50.3	0.8	M	U	E	4.0	F	-		0.0
s	99	307	2	S	B	4	24	50.3	50.8	0.5	F	U	E	3.5	F	-		0.0
s	99	308	2	S	B	4	25	50.8	53.8	3.0	F	U	E	3.5	F	-		0.0
s	99	309	2	S	B	4	26	53.8	54.1	0.3	F	U	E	3.5	F	-		0.0
s	99	310	2	S	B	4	27	54.1	55.3	1.2	F	U	E	3.5	F	-		0.0
s	99	311	2	S	B	4	28	55.3	55.9	0.6	F	U	E	3.5	F	-		0.0
s	99	312	2	S	B	4	29	55.9	56.9	1.0	F	U	E	3.5	F	-		0.0
s	99	313	2	S	B	4	30	56.9	57.8	0.9	F	U	E	3.5	F	-		0.0
s	99	314	2	S	B	5	1	-	8.1	8.1	F	R	AC	6.0	G	-	P	0.5
s	99	315	2	S	B	5	2	8.1	15.6	7.5	F	U	E	6.0	B	-	NIL	0.0
s	99	316	2	S	B	5	3	15.6	34.1	18.5	R	U	E	6.0	B	-	NIL	0.0
s	99	317	2	S	B	5	4	34.1	45.5	11.4	M	U	E	5.0	B	-	NIL	0.0
s	99	318	3	S	B	1	1	-	7.4	7.4	F	D	AC	7.0	G	-	E	2.0
s	99	319	3	S	B	1	2	7.4	10.2	2.8	F	D	AC	7.0	G	-	E	2.0
s	99	331	5/2/1	S	B	0	1	-	10.0	10.0	R	U	AC	7.0	G	-	E	0.5
s	99	332	5/2/1	S	B	0	2	10.0	12.2	2.2	M	U	AC	7.0	G	-	E	0.5
s	99	333	5/2/1	S	B	0	3	12.0	14.3	2.3	R	U	AC	7.0	G	-	E	0.5
s	99	334	5/2/1	S	B	0	4	14.3	16.3	2.0	M	U	AC	7.0	G	-	E	0.5
s	99	335	5/2/1	S	B	0	5	16.3	20.1	3.8	R	U	AC	7.0	G	-	E	0.5
s	99	336	5/2/1	S	B	0	6	20.1	22.9	2.8	M	U	AC	7.0	G	-	E	0.5
s	99	337	5/2/1	S	B	0	7	22.9	27.7	4.8	R	U	AC	7.0	G	-	E	0.5
s	99	338	5/2/1	S	B	0	8	27.7	30.6	2.9	R	U	AC	7.0	G	-	E	0.5
s	99	339	5/2/1	S	B	0	9	30.6	34.4	3.8	F	U	AC	7.0	G	-	E	0.5
s	99	340	5/2/1	S	B	0	10	34.4	39.4	5.0	R	U	AC	7.0	G	-	E	0.5
s	99	341	5/2/1	S	B	0	11	39.4	41.7	2.3	M	U	AC	7.0	G	-	E	0.5
s	99	342	5/2/1	S	B	0	12	41.7	45.7	4.0	R	U	AC	7.0	G	-	E	0.5
s	99	343	5/2/1	S	B	0	13	45.7	46.8	1.1	M	U	AC	7.0	G	-	E	0.5
s	99	344	5/2/1	S	B	0	14	46.8	56.8	10.0	R	U	AC	7.0	G	-	E	0.5
s	99	345	5/2/1	S	B	0	15	56.8	60.0	3.2	R	U	AC	7.0	G	-	E	0.5
s	99	367	7/2/1	S	B	0	1	-	0.7	0.7	F	R	AC	7.0	G	-	P	2.6
s	99	368	7/2/1	S	B	0	2	0.7	4.6	3.9	F	A	AC	7.0	G	-	P	2.6

s	99	369	7/2/1	S	B	0	3	4.6	14.6	10.0	F	U	AC	7.0	F	-	P	2.6
s	99	370	7/2/1	S	B	0	4	14.6	21.5	6.9	F	U	AC	7.0	F	-	P	2.6
s	99	376	7/2/2	S	B	0	1	-	1.8	1.8	F	A	AC	7.0	G	-	P	2.0
s	99	377	7/2/2	S	B	0	2	1.8	11.8	10.0	F	D	AC	7.0	G	-	P	2.0
s	99	378	7/2/2	S	B	0	3	11.8	13.8	2.0	R	D	AC	7.0	G	-	P	2.0
s	99	379	7/2/2	S	B	0	4	13.8	14.9	1.1	M	D	AC	7.0	G	-	P	2.0
s	99	380	7/2/2	S	B	0	5	14.9	23.6	8.7	F	D	AC	7.0	G	-	P	2.0
s	99	381	7/2/2	S	B	0	6	23.6	25.6	2.0	M	D	AC	7.0	G	-	P	2.0
s	99	382	7/2/2	S	B	0	7	25.6	26.3	0.7	F	D	AC	7.0	G	-	P	2.0
s	99	385	7/3/2	S	B	0	1	-	10.0	10.0	F	D	E	4.0	B	-	E	1.0
s	99	386	7/3/2	S	B	0	2	10.0	20.0	10.0	F	D	E	4.0	B	-	E	1.0
s	99	387	7/3/2	S	B	0	3	20.0	24.2	4.2	F	D	E	4.0	B	-	E	1.0
s	99	388	7/3/2	S	B	0	4	24.2	27.0	2.8	F	D	E	3.5	B	-	E	1.0
s	99	389	7/3/2	S	B	0	5	27.0	37.0	10.0	F	A	E	5.0	B	-	E	1.0
s	99	390	7/3/2	S	B	0	6	37.0	47.0	10.0	R	A	E	5.0	B	-	E	1.0
s	99	391	7/3/2	S	B	0	7	47.0	57.0	10.0	R	A	E	6.0	B	-	E	1.0
s	99	392	7/3/2	S	B	0	8	57.0	67.0	10.0	R	A	E	6.0	B	-	E	1.0
s	99	393	7/3/2	S	B	0	9	67.0	71.8	4.8	F	A	E	6.0	B	-	E	1.0
s	99	394	7/3/2	S	B	0	10	71.8	76.6	4.9	F	A	AC	7.0	F	-	E	1.0
s	0	395	8	S	B	1	1	-	10.0	10.0	F	D	AC	7.0	F	-		0.0
s	99	409	8/3/3	S	B	0	1	-	2.8	2.8	F	D	AC	8.0	F	-	P	1.0
s	99	410	8/3/3	S	B	0	2	2.8	9.4	6.6	M	D	E		F	-		0.0
s	99	411	8/3/3	S	B	0	3	9.4	10.6	1.2	F	D	AC	7.0	F	-	E	1.0
s	99	412	8/3/3	S	B	0	4	10.6	52.0	41.4	M	D	E		F	-		0.0
s	99	413	8/3/3	S	B	0	5	52.0	63.0	11.0	M	D	E		B	-		0.0
s	99	414	9	S	B	1	1	-	10.0	10.0	F	D	AC	7.0	F	-	E	1.5
s	99	415	9	S	B	1	2	10.0	19.0	9.0	F	D	AC	7.0	F	-	E	1.5
s	99	416	9	S	B	1	3	19.0	21.2	2.2	F	R	AC	7.0	F	-	P	2.0
s	99	417	9	S	B	2	1	-	77.5	77.5	M	U	UC		N	-		0.0
s	99	418	9	S	B	3	1	-	10.0	10.0	F	D	AC	7.0	G	-	E	1.5
s	99	419	9	S	B	3	2	10.0	18.8	8.8	F	D	AC	7.0	G	-	E	1.5
s	99	420	9	S	B	4	1	-	3.2	3.2	F	C	AC	7.0	F	-	P	2.0
s	99	421	9	S	B	4	2	3.2	10.2	7.0	F	R	AC	7.0	F	-	P	1.0
s	99	422	9	S	B	4	3	10.2	19.0	8.8	F	D	AC	7.0	F	-	P	1.0
s	99	437	9/3/1	S	B	0	1	-	1.0	1.0	F	R	AC	7.0	G	-	P	1.5
s	99	438	9/3/1	S	B	0	2	1.0	1.9	0.9	F	R	AC	7.0	G	-	P	1.5
s	99	439	9/3/1	S	B	0	3	1.9	7.0	5.1	F	U	AC	7.0	G	-	P	1.5
s	99	440	9/3/1	S	B	0	4	7.0	8.5	1.5	F	A	AC	7.0	G	-	P	1.5
s	99	441	9/3/1	S	B	0	5	8.5	9.2	0.7	F	U	AC	7.0	G	-	P	1.5
s	99	442	9/3/1	S	B	0	6	9.2	10.0	0.8	F	A	AC	7.0	G	-	P	1.5
s	99	443	9/3/1	S	B	0	7	10.0	13.5	3.5	F	A	AC	7.0	G	-	P	1.5
s	99	444	9/3/1	S	B	0	8	13.5	15.5	2.0	F	U	AC	7.0	G	-	P	1.5
s	99	445	9/3/1	S	B	0	9	15.5	16.5	1.0	F	R	G	9.0	F	-		0.0

s	99	446	9/3/1	S	B	0	10	16.5	18.1	1.6	F	A	E	3.0	F	-		0.0
s	99	447	9/3/1/I	S	B	0	1	-	10.0	10.0	F	U	AC	7.0	G	-	E	1.0
s	99	448	9/3/1/I	S	B	0	2	10.0	17.4	7.4	F	U	AC	7.0	G	-	E	1.0
s	99	449	9/3/1/I	S	B	0	3	17.4	18.5	1.1	F	A	AC	7.0	G	-	E	1.0
s	99	450	9/3/1/I	S	B	0	4	18.5	19.9	1.4	F	U	AC	7.0	G	-	E	1.0
s	0	454	10	S	B	1	1	-	72.0	72.0	M	D	E		B	-		0.0
s	0	455	11	S	B	1	1	-	1.0	1.0	F	R	AC	7.0	G	-	G	1.5
s	0	456	11	S	B	1	2	1.0	10.0	9.0	F	U	AC	7.0	F	-	G	1.5
s	0	457	11	S	B	1	3	10.0	20.0	10.0	F	U	AC	7.0	G	-	G	1.5
s	0	458	11	S	B	1	4	20.0	24.0	4.0	F	U	AC	7.0	G	-	G	1.5
s	0	459	11	D	I	2	1	-	10.0	10.0	F	R	AC	7.5	G	7.0	P	2.5
s	0	460	11	D	I	2	2	10.0	12.6	2.6	F	R	AC	7.5	G	7.0	P	2.5
s	0	461	11	D	I	2	3	12.6	15.6	3.0	F	U	AC	7.5	G	7.0	P	2.5
s	0	462	11	D	I	2	4	15.6	16.2	0.6	F	R	AC	7.5	G	7.0	P	2.5
s	0	463	11	D	O	2	1	-	0.6	0.6	F	R	AC	7.5	G	7.0	G	1.0
s	0	464	11	D	O	2	2	0.6	3.6	3.0	F	U	AC	7.5	G	7.0	G	1.0
s	0	465	11	D	O	2	3	3.6	6.2	2.6	F	R	AC	7.5	G	7.0	G	1.0
s	0	466	11	D	O	2	4	6.2	16.2	10.0	F	R	AC	7.5	G	7.0	G	1.0
s	0	467	11	S	B	3	1	-	0.5	0.5	F	R	AC	7.0	G	-	E	2.0
s	0	468	11	S	B	3	2	0.5	2.5	2.0	R	U	AC	7.0	G	-	E	2.0
s	0	469	11	S	B	3	3	2.5	3.4	0.9	F	R	AC	7.0	G	-	P	2.0
s	99	497	13/1/1	S	B	0	1	-	6.7	6.7	F	U	AC	7.0	F	-	P	1.5
s	99	498	13/1/1	S	B	0	2	6.7	10.0	3.3	F	U	AC	7.0	F	-	E	1.5
s	99	499	13/1/1	S	B	0	3	10.0	20.0	10.0	F	U	AC	7.0	F	-	E	1.5
s	99	500	13/1/1	S	B	0	4	20.0	23.0	3.0	F	U	AC	7.0	F	-	G	1.5
s	99	506	13/1/1/III	S	B	0	1	-	0.5	0.5	F	U	AC	7.0	F	-	E	1.0
s	99	507	13/1/1/III	S	B	0	2	0.5	2.5	2.0	R	U	AC	7.0	F	-	E	1.0
s	99	508	13/1/1/III	S	B	0	3	2.5	10.0	7.5	R	U	AC	6.0	F	-	E	1.0
s	99	509	13/1/1/III	S	B	0	4	10.0	10.2	0.2	F	R	AC	6.0	F	-	E	1.0
s	99	510	13/1/1/III	S	B	0	5	10.2	17.4	7.2	R	U	E	7.0	B	-		0.0
s	99	511	13/1/1/III	S	B	0	6	17.4	19.3	1.9	M	U	E	7.0	B	-		0.0
s	99	583	15/2/1	S	B	0	1	-	1.8	1.8	F	R	AC	7.0	F	-	P	2.0
s	99	584	15/2/1	S	B	0	2	1.8	7.6	5.8	F	R	AC	7.0	F	-	P	2.0
s	99	585	15/2/1	S	B	0	3	7.6	9.3	1.7	F	A	AC	7.0	F	-	P	2.0
s	99	586	15/2/1	S	B	0	4	9.3	13.6	4.3	F	A	AC	7.0	F	-	P	2.0
s	99	587	15/2/1	S	B	0	5	13.6	17.3	3.7	F	A	AC	7.0	F	-	P	2.0
s	99	588	15/2/1	S	B	0	6	17.3	19.6	2.3	F	A	AC	7.0	F	-	P	2.0
s	0	660	17	S	B	2	1	-	1.5	1.5	F	R	AC	3.5	G	-	P	4.0
s	0	661	17	S	B	2	2	1.5	33.0	31.5	F	U	UC		N	-		0.0
s	0	662	17	S	B	3	1	-	10.0	10.0	F	U	AC	7.0	G	-	P	3.0
s	0	663	17	S	B	3	2	10.0	20.0	10.0	F	U	AC	7.0	G	-	P	3.0
s	0	664	17	S	B	3	3	20.0	22.0	2.0	F	R	AC	7.0	G	-	P	3.0
s	0	665	17	S	B	3	4	22.0	27.0	5.0	F	U	AC	7.0	G	-	P	3.0

s	0	666	17	S	B	3	5	27.0	29.0	2.0	F	R	AC	7.0	G	-	P	3.0
s	0	667	17	S	B	3	6	29.0	30.0	1.0	F	U	AC	7.0	G	-	P	3.0
s	0	668	17	S	B	3	7	30.0	34.0	4.0	F	U	AC	7.0	G	-	P	3.0
s	0	669	17	S	B	3	8	34.0	36.0	2.0	F	R	AC	7.0	G	-	P	3.0
s	0	670	17	S	B	3	9	36.0	40.0	4.0	F	U	AC	3.5	G	-	P	1.5
s	0	671	17	S	B	3	10	40.0	50.0	10.0	F	U	AC	3.5	G	-	P	1.5
s	0	672	17	S	B	3	11	50.0	60.0	10.0	F	U	AC	3.5	G	-	P	1.5
s	0	673	17	S	B	3	12	60.0	64.6	4.6	F	U	AC	3.5	G	-	P	1.5
s	99	714	21/5/1	S	B	0	1	-	10.0	10.0	F	U	UC		N	-		0.0
s	99	715	21/5/1	S	B	0	2	10.0	20.0	10.0	F	U	UC		N	-		0.0
s	99	716	21/5/1	S	B	0	3	20.0	22.0	2.0	F	R	UC		N	-		0.0
s	99	717	21/5/1	S	B	0	4	22.0	26.0	4.0	F	U	UC		N	-		0.0
s	99	718	21/5/1	S	B	0	5	26.0	29.0	3.0	F	R	G	10.0	F	-		0.0
s	99	719	21/5/1	S	B	0	6	29.0	30.0	1.0	F	U	G	10.0	F	-		0.0
s	99	720	21/5/1	S	B	0	7	30.0	34.0	4.0	F	U	G	10.0	F	-		0.0
s	99	721	21/5/1	S	B	0	8	34.0	40.0	6.0	M	U	G	10.0	F	-		0.0
s	99	727	21/5/3/I	S	B	0	1	-	10.0	10.0	F	U	AC	7.0	B	-	DST	1.5
s	99	728	21/5/3/I	S	B	0	2	10.0	14.3	4.3	F	U	AC	7.0	B	-	DST	1.5
s	99	729	21/5/3/I	S	B	0	3	14.3	24.8	10.5	F	U	AC	7.0	G	-	P	0.5
s	99	730	21/5/3/I/1	S	B	0	1	-	10.0	10.0	F	U	AC	7.0	G	-	P	0.5
s	99	731	21/5/3/I/1	S	B	0	2	10.0	20.0	10.0	F	U	AC	7.0	G	-	P	0.5
s	99	732	21/5/3/I/1	S	B	0	3	20.0	21.7	1.7	F	U	AC	7.0	G	-	P	0.5
s	99	733	21/5/4	S	B	0	1	-	3.8	3.8	F	R	AC	7.0	F	-	G	2.5
s	99	734	21/5/4	S	B	0	2	3.8	13.8	10.0	F	U	ST	7.0	B	-	P	1.5
s	99	735	21/5/4	S	B	0	3	13.8	26.3	12.5	F	U	ST	7.0	B	-	P	1.5
s	99	787	23/2/1	S	B	0	1	-	3.4	3.4	F	U	G		G	-		0.0
s	99	788	23/2/1	S	B	0	2	3.4	11.0	7.6	F	U	AC	3.8	G	-	E	1.5
s	99	789	23/2/1	S	B	0	3	11.0	20.0	9.0	F	U	AC	3.8	G	-	E	1.5
s	99	790	23/2/1	S	B	0	4	20.0	21.9	1.9	F	U	AC	3.8	G	-	E	1.5
s	99	791	23/2/1	S	B	0	5	21.9	22.0	0.1	M	U	G		G	-		0.0
s	99	792	23/2/1	S	B	0	6	22.0	23.0	1.0	F	U	AC		F	-		0.0
s	99	793	23/2/1	S	B	0	7	23.0	25.0	2.0	F	R	AC	2.5	F	-	P	0.5
s	99	794	23/2/1	S	B	0	8	25.0	30.0	5.0	R	U	UC		N	-		0.0
s	99	795	23/2/1	S	B	0	9	30.0	35.0	5.0	R	U	UC		N	-		0.0
s	99	796	23/2/1	S	B	0	10	35.0	36.0	1.0	R	U	UC		N	-		0.0
s	99	797	23/2/1	S	B	0	11	36.0	37.6	1.6	F	U	UC		N	-		0.0
s	99	798	23/2/2	S	B	0	1	-	5.0	5.0	F	R	AC	3.0	G	-	P	0.5
s	99	799	23/2/2	S	B	0	2	5.0	7.4	2.4	F	R	AC	3.0	G	-	P	0.5
s	99	800	23/2/2	S	B	0	3	7.4	10.0	2.6	M	U	G		B	-		0.0
s	99	801	23/2/2	S	B	0	4	10.0	14.8	4.8	M	U	G		B	-		0.0
s	99	802	23/3/1	S	B	0	1	-	5.0	5.0	F	R	AC	3.0	B	-	P	5.0
s	99	803	23/3/1	S	B	0	2	5.0	7.8	2.8	F	R	AC	3.0	B	-	P	0.5
s	99	807	23/3/2	S	B	0	1	-	10.0	10.0	M	D	G		B	-		0.0

s	99	808	23/3/2	S	B	0	2	10.0	20.0	10.0	M	D	G		B	-		0.0
s	99	809	23/3/2	S	B	0	3	20.0	30.0	10.0	M	D	G		B	-		0.0
s	99	810	23/3/2	S	B	0	4	30.0	40.0	10.0	M	D	G		B	-		0.0
s	99	811	23/3/2	S	B	0	5	40.0	50.0	10.0	M	D	G		B	-		0.0
s	99	812	23/3/2	S	B	0	6	50.0	60.0	10.0	R	D	G		B	-		0.0
s	99	813	23/3/2	S	B	0	7	60.0	70.0	10.0	R	D	G		B	-		0.0
s	99	814	23/3/2	S	B	0	8	70.0	80.0	10.0	R	D	G		B	-		0.0
s	99	824	23/4/1	S	B	0	1	-	4.7	4.7	F	D	AC	3.5	G	-	E	1.0
s	99	825	23/4/1	S	B	0	2	4.7	10.0	5.3	F	D	AC	3.5	G	-	P	1.0
s	99	826	23/4/1	S	B	0	3	10.0	12.6	2.6	M	D	AC	3.5	G	-	E	1.0
s	99	827	23/4/1	S	B	0	4	12.6	13.8	1.2	M	D	AC	3.5	G	-	E	1.0
s	99	828	23/4/1	S	B	0	5	13.8	14.6	0.8	M	D	AC	3.5	G	-	E	1.0
s	99	829	23/4/1	S	B	0	6	14.6	16.0	1.4	M	D	AC	3.5	G	-	E	1.0
s	99	830	23/4/1	S	B	0	7	16.0	18.5	2.5	M	D	AC	3.5	G	-	E	1.0
s	99	831	23/4/1	S	B	0	8	18.5	22.0	3.5	M	D	AC	3.5	G	-	E	1.0
s	99	832	23/4/1	S	B	0	9	22.0	23.0	1.0	M	D	AC	3.5	G	-	P	1.0
s	99	835	27	S	B	1	1	-	7.5	7.5	F	A	AC	7.5	G	-	P	2.0
s	99	836	27	S	B	1	2	7.5	13.0	5.5	F	A	AC	7.5	G	-	P	2.0
s	99	837	27	S	B	1	3	13.0	16.1	3.1	R	U	AC	7.5	G	-	P	2.0
s	99	838	27	S	B	1	4	16.1	29.2	13.1	F	U	AC	7.5	G	-	P	2.0
s	99	839	27	S	B	1	5	29.2	42.8	13.6	F	U	AC	7.5	G	-	P	2.0
s	99	840	27	S	B	1	6	42.8	60.0	17.2	F	U	AC	7.5	G	-	P	2.0
s	99	841	27	S	B	2	1	-	10.0	10.0	F	D	AC	7.0	G	-	P	2.0
s	99	842	27	S	B	2	2	10.0	20.0	10.0	F	D	AC	7.0	G	-	P	2.0
s	99	843	27	S	B	2	3	20.0	30.0	10.0	F	D	AC	7.0	G	-	P	2.0
s	99	844	27	S	B	2	4	30.0	40.0	10.0	F	D	AC	7.0	G	-	P	2.0
s	99	845	27	S	B	2	5	40.0	50.0	10.0	F	D	AC	7.0	G	-	P	2.0
s	99	846	27	S	B	2	6	50.0	59.4	9.4	F	D	AC	7.0	G	-	P	2.0
s	99	856	28	S	B	1	1	-	10.0	10.0	F	U	AC	7.5	G	-	P	1.9
s	99	857	28	S	B	1	2	10.0	20.4	10.4	F	U	AC	7.5	G	-	P	1.9
s	99	858	28	S	B	1	3	20.4	30.5	10.1	F	U	AC	7.5	G	-	P	1.9
s	99	859	28	S	B	1	4	30.5	40.4	9.9	F	U	AC	7.5	G	-	P	1.9
s	99	860	28	S	B	1	5	40.4	51.9	11.5	F	U	AC	7.5	G	-	P	1.9
s	99	861	29	D	O	1	1	-	2.9	2.9	F	C	AC	8.5	F	4.0	P	2.0
s	99	862	29	D	I	1	1	-	2.9	2.9	F	C	AC	8.5	F	4.0	P	2.0
s	99	863	29	S	B	1	2	2.9	9.3	6.4	F	D	AC	7.0	F	-	P	2.0
s	99	864	29	S	B	2	1	-	2.8	2.8	F	C	AC	7.0	F	-	P	2.0
s	99	865	29	S	B	2	2	2.8	10.0	7.2	F	D	AC	7.0	F	-	P	1.0
s	99	866	29	S	B	2	3	10.0	20.0	10.0	F	D	AC	7.0	F	-	P	1.0
s	99	867	29	S	B	2	4	20.0	30.0	10.0	F	D	AC	7.0	F	-	P	1.0
s	99	868	29	S	B	2	5	30.0	40.0	10.0	F	D	AC	7.0	F	-	P	1.0
s	99	869	29	S	B	2	6	40.0	50.0	10.0	F	D	AC	7.0	F	-	P	1.0
s	99	870	29	S	B	2	7	50.0	56.4	6.4	F	D	AC	7.0	F	-	P	1.0

s	99	871	29	S	B	2	8	56.4	60.0	3.6	M	D	E		B	-		0.0
s	99	872	29	S	B	2	9	60.0	89.9	29.9	M	D	E		B	-		0.0
s	99	873	29	S	B	3	1	-	10.0	10.0	F	D	AC	8.0	F	-	E	1.0
s	99	874	29	S	B	3	2	10.0	20.0	10.0	F	D	AC	8.0	F	-	E	1.0
s	99	875	29	S	B	3	3	20.0	30.0	10.0	F	D	AC	8.0	F	-	E	1.0
s	99	876	29	S	B	3	4	30.0	39.0	9.0	F	D	AC	8.0	F	-	E	1.0
s	99	877	29	S	B	4	1	-	10.0	10.0	F	D	G	10.0	F	-	E	1.0
s	99	878	29	S	B	4	2	10.0	20.0	10.0	F	D	G	10.0	F	-		0.0
s	99	879	29	S	B	4	3	20.0	30.0	10.0	F	D	G	10.0	F	-		0.0
s	99	880	29	S	B	4	4	30.0	40.0	10.0	F	D	G	10.0	F	-		0.0
s	99	881	29	S	B	4	5	40.0	50.0	10.0	F	D	G	10.0	F	-		0.0
s	99	882	29	S	B	4	6	50.0	60.0	10.0	F	D	G	10.0	F	-		0.0
s	99	883	29	S	B	4	7	60.0	70.0	10.0	F	D	G	10.0	F	-		0.0
s	99	884	29	S	B	4	8	70.0	80.0	10.0	F	D	G	10.0	F	-		0.0
s	99	885	29	S	B	4	9	80.0	90.0	10.0	F	D	G	10.0	F	-	E	1.0
s	99	886	29	S	B	4	10	90.0	100.0	10.0	F	D	G	10.0	F	-	E	1.0
s	99	887	29	S	B	4	11	100.0	109.3	9.3	F	D	G	10.0	F	-	E	1.0
s	99	898	29/2/1	S	B	0	1	-	10.0	10.0	F	D	AC	8.0	G	-	E	1.0
s	99	899	29/2/1	S	B	0	2	10.0	20.0	10.0	F	D	AC	8.0	G	-	E	1.0
s	99	900	29/2/1	S	B	0	3	20.0	30.0	10.0	F	D	AC	8.0	G	-	E	1.0
s	99	901	29/2/1	S	B	0	4	30.0	40.0	10.0	F	D	AC	8.0	G	-	E	1.0
s	99	902	29/2/1	S	B	0	5	40.0	45.4	5.4	F	D	AC	8.0	G	-	E	1.0
s	99	903	29/2/1	S	B	0	6	45.4	55.4	10.0	F	D	AC	8.0	G	-	E	1.0
s	99	904	29/2/1	S	B	0	7	55.4	65.0	9.6	F	D	AC	8.0	G	-	E	1.0
s	99	905	29/3/1	S	B	0	1	-	10.0	10.0	F	D	AC	8.0	G	-	G	2.0
s	99	906	29/3/1	S	B	0	2	10.0	20.0	10.0	F	D	AC	8.0	G	-	G	2.0
s	99	907	29/3/1	S	B	0	3	20.0	30.0	10.0	F	D	AC	8.0	G	-	G	2.0
s	99	908	29/3/1	S	B	0	4	30.0	40.0	10.0	F	D	AC	8.0	G	-	G	2.0
s	99	909	29/3/1	S	B	0	5	40.0	41.5	1.5	F	D	AC	8.0	G	-	G	2.0
s	99	910	29/3/1	S	B	0	6	41.5	42.5	1.0	F	D	AC	8.0	G	-	G	2.0
s	99	911	29/3/1	S	B	0	7	42.5	50.0	7.5	F	C	AC	8.0	G	-	G	2.0
s	99	912	29/3/1	S	B	0	8	50.0	60.0	10.0	F	D	AC	8.0	G	-	G	2.0
s	99	913	29/3/1	S	B	0	9	60.0	70.0	10.0	F	U	AC	8.0	F	-	G	2.0
s	99	914	29/3/1	S	B	0	10	70.0	80.0	10.0	F	U	AC	8.0	F	-	G	2.0
s	99	915	29/3/1	S	B	0	11	80.0	90.0	10.0	F	U	AC	8.0	F	-	G	2.0
s	99	916	29/3/1	S	B	0	12	90.0	93.0	3.0	F	U	AC	8.0	F	-	G	2.0
s	99	1072	32/1/2	S	B	0	1	-	10.0	10.0	F	D	AC	7.0	G	-	P	0.5
s	99	1073	32/1/2	S	B	0	2	10.0	16.0	6.0	F	D	AC	7.0	G	-	P	0.5
s	99	1074	32/1/2	S	B	0	3	16.0	20.0	4.0	F	R	AC	7.0	G	-	P	0.5
s	99	1075	32/1/2	S	B	0	4	20.0	30.0	10.0	F	D	AC	7.0	G	-	P	0.5
s	99	1076	32/1/2	S	B	0	5	30.0	40.0	10.0	F	D	AC	7.0	G	-	P	0.5
s	99	1077	32/1/2	S	B	0	6	40.0	50.0	10.0	F	D	AC	7.0	G	-	P	0.5
s	99	1078	32/1/2	S	B	0	7	50.0	60.0	10.0	F	D	AC	7.0	G	-	P	0.5

s	99	1079	32/1/2	S	B	0	8	60.0	70.0	10.0	F	U	AC	7.0	G	-	P	2.3
s	99	1080	32/1/2	S	B	0	9	70.0	74.0	4.0	F	U	AC	7.0	G	-	P	2.3
s	99	1111	32/3/2/I	S	B	0	1	-	10.0	10.0	F	D	AC	7.0	G	-	P	0.5
s	99	1112	32/3/2/I	S	B	0	2	10.0	20.0	10.0	F	D	AC	7.0	G	-	P	0.5
s	99	1113	32/3/2/I	S	B	0	3	20.0	30.0	10.0	F	D	AC	7.0	G	-	P	0.5
s	99	1114	32/3/2/I	S	B	0	4	30.0	34.0	4.0	F	D	AC	7.0	G	-	P	0.5
s	99	1115	32/3/2/I	S	B	0	4	34.0	35.5	1.5	R	U	AC	7.0	G	-	P	2.0
s	99	1116	32/3/2/I	S	B	0	4	37.5	40.0	2.5	F	D	AC	7.0	G	-	P	0.5
s	99	1117	32/3/2/I	S	B	0	5	40.0	48.0	8.0	F	D	AC	7.0	G	-	P	0.5
s	99	1118	32/3/2/I	S	B	0	5	48.0	50.0	2.0	F	I	AC	7.0	G	-	P	0.5
s	99	1119	32/3/2/I	S	B	0	6	50.0	54.6	4.6	F	D	AC	7.0	G	-	P	0.5
s	99	1131	33/2/1	S	B	0	1	-	13.6	13.6	F	U	AC	6.0	G	-	P	1.0
s	0	1132	35	S	B	1	1	-	5.0	5.0	F	R	AC	3.8	G	-	E	2.0
s	0	1133	35	S	B	1	2	5.0	7.2	2.2	F	R	AC	3.8	G	-	E	2.0
s	0	1134	35	S	B	1	3	7.2	17.0	9.8	F	R	AC	3.8	G	-	E	2.0
s	0	1135	35	S	B	1	4	17.0	27.0	10.0	F	R	AC	3.8	G	-	E	2.0
s	0	1136	35	S	B	1	5	27.0	28.6	1.6	F	R	AC	3.8	G	-	E	1.5
s	0	1137	35	S	B	2	1	-	10.0	10.0	F	U	AC	3.7	G	-	E	2.0
s	0	1138	35	S	B	2	2	10.0	15.0	5.0	F	U	AC	3.7	G	-	E	2.0
s	0	1139	35	S	B	2	3	15.0	20.0	5.0	F	U	AC	3.8	G	-	E	2.0
s	0	1140	35	S	B	2	4	20.0	30.0	10.0	F	U	AC	3.8	G	-	E	2.0
s	0	1141	35	S	B	2	5	30.0	35.5	5.5	F	U	AC	3.8	G	-	E	2.0
s	99	1148	35/2/2	S	B	0	1	-	8.0	8.0	F	D	AC	3.3	G	-	E	1.5
s	99	1149	35/2/2	S	B	0	2	8.0	10.0	2.0	F	D	AC	3.3	G	-	E	1.5
s	99	1150	35/2/2/I	S	B	0	1	-	10.0	10.0	F	D	G	12.0	F	-		0.0
s	99	1151	35/2/2/I	S	B	0	2	10.0	20.0	10.0	F	D	G	12.0	F	-		0.0
s	99	1152	35/2/2/I	S	B	0	3	20.0	30.0	10.0	M	D	G	12.0	F	-		0.0
s	99	1153	35/2/2/I	S	B	0	4	30.0	40.0	10.0	M	D	G	12.0	F	-		0.0
s	99	1154	35/2/2/I	S	B	0	5	40.0	50.0	10.0	M	D	G	12.0	B	-		0.0
s	99	1155	35/2/2/I	S	B	0	6	50.0	60.0	10.0	M	D	G	12.0	B	-		0.0
s	99	1156	35/2/2/I	S	B	0	7	60.0	70.0	10.0	M	D	G	12.0	F	-		0.0
s	99	1157	35/2/2/I	S	B	0	8	70.0	80.2	10.2	M	D	G	12.0	F	-		0.0
s	99	1158	37	S	B	1	1	-	10.0	10.0	F	D	AC	12.0	G	-	P	0.5
s	99	1159	37	S	B	1	2	10.0	20.0	10.0	F	D	AC	12.0	G	-	P	0.5
s	99	1160	37	S	B	1	3	20.0	30.0	10.0	F	D	AC	12.0	G	-	P	0.5
s	99	1161	37	S	B	1	4	30.0	40.0	10.0	F	D	AC	12.0	G	-	P	0.5
s	99	1162	37	S	B	1	5	40.0	50.0	10.0	F	D	AC	12.0	G	-	P	0.5
s	99	1163	37	S	B	1	6	50.0	60.0	10.0	F	D	AC	12.0	G	-	P	0.5
s	99	1164	37	S	B	1	7	60.0	70.0	10.0	F	D	AC	12.0	G	-	P	0.5
s	99	1165	37	S	B	1	8	70.0	80.0	10.0	F	D	AC	12.0	G	-	P	0.5
s	99	1166	37	S	B	1	9	80.0	90.0	10.0	F	D	AC	12.0	G	-	P	0.5
s	99	1167	37	S	B	1	10	90.0	100.0	10.0	F	D	AC	12.0	G	-	P	0.5
s	99	1168	37	S	B	1	11	100.0	110.0	10.0	F	D	AC	12.0	G	-	P	0.5

s	99	1169	37	S	B	1	12	110.0	120.0	10.0	F	D	AC	12.0	G	-	P	0.5
s	99	1170	37	S	B	1	13	120.0	130.0	10.0	F	D	AC	12.0	G	-	P	0.5
s	99	1171	37	S	B	1	14	130.0	140.0	10.0	F	D	AC	12.0	G	-	P	0.5
s	99	1172	37	S	B	1	15	140.0	150.0	10.0	F	D	AC	12.0	G	-	P	0.5
s	99	1173	37	S	B	1	16	150.0	157.7	7.7	F	D	AC	12.0	G	-	P	0.5
s	99	1174	39	S	B	1	1	-	10.0	10.0	F	D	AC	8.0	F	-	G	2.0
s	99	1175	39	S	B	1	2	10.0	11.4	1.4	F	D	AC	8.0	F	-	G	2.0
s	99	1176	39	S	B	2	1	-	1.1	1.1	F	I	AC	8.0	F	-	E	2.5
s	99	1177	39	S	B	2	2	1.1	3.1	2.0	F	U	AC	8.0	F	-	ST	2.5
s	99	1178	39	S	B	2	3	3.1	10.0	6.9	F	U	AC	8.0	F	-	ST	2.5
s	99	1179	39	S	B	2	4	10.0	10.6	0.6	F	U	AC	8.0	F	-	ST	2.5
s	99	1180	39	S	B	2	5	10.6	20.0	9.5	F	U	AC	8.0	F	-	ST	2.5
s	99	1181	39	S	B	2	6	20.0	30.0	10.0	F	U	AC	8.0	F	-	E	2.5
s	99	1182	39	S	B	2	7	30.0	33.2	3.2	F	U	AC	8.0	F	-	E	2.5
s	99	1183	39	S	B	3	1	-	10.0	10.0	F	D	AC	8.0	B	-	ST	2.8
s	99	1184	39	S	B	3	2	10.0	20.0	10.0	F	D	AC	8.0	F	-	ST	2.8
s	99	1185	39	S	B	3	3	20.0	28.7	8.7	F	D	AC	8.0	F	-	ST	2.8
s	99	1186	39	S	B	3	4	28.7	30.0	1.3	F	D	AC	8.0	F	-	ST	2.8
s	99	1187	39	S	B	3	5	30.0	40.0	10.0	F	D	AC	8.0	F	-	ST	2.8
s	99	1188	39	S	B	3	6	40.0	50.0	10.0	F	D	AC	8.0	F	-	ST	2.8
s	99	1189	39	S	B	3	7	50.0	53.0	3.0	F	D	AC	8.0	F	-	ST	2.8
s	99	1190	39	S	B	4	1	-	121.0	121.0	F	D	UC	9.5	F	-		0.0
s	99	1191	39	S	B	4	2	121.0	122.3	1.3	F	D	ST	8.5	F	-		0.0
s	99	1192	39	S	B	4	3	122.3	126.3	4.0	F	D	G	9.5	F	-		0.0
s	99	1193	39	S	B	4	4	126.3	135.0	8.8	F	D	ST	9.0	F	-		0.0
s	99	1194	39	S	B	4	5	135.0	143.0	8.0	F	D	G	9.0	F	-		0.0
s	99	1195	39	S	B	4	6	143.0	147.3	4.3	F	D	ST	9.0	F	-		0.0
s	99	1196	39/1/1	S	B	0	1	-	10.0	10.0	F	D	AC	8.0	F	-	G	2.5
s	99	1197	39/1/1	S	B	0	2	10.0	20.0	10.0	F	D	AC	8.0	F	-	G	2.5
s	99	1198	39/1/1	S	B	0	3	20.0	30.0	10.0	F	D	AC	8.0	F	-	G	2.5
s	99	1199	39/1/1	S	B	0	4	30.0	40.0	10.0	F	D	AC	8.0	F	-	G	2.5
s	99	1200	39/1/1	S	B	0	5	40.0	50.0	10.0	F	D	AC	8.0	F	-	G	2.5
s	99	1201	39/1/1	S	B	0	6	50.0	60.0	10.0	F	D	AC	8.0	F	-	G	2.5
s	99	1202	39/1/1	S	B	0	7	60.0	70.0	10.0	F	D	AC	8.0	F	-	G	2.5
s	99	1203	39/1/1	S	B	0	8	70.0	80.0	10.0	F	D	AC	8.0	F	-	G	2.5
s	99	1204	39/1/1	S	B	0	9	80.0	90.0	10.0	F	D	AC	8.0	F	-	G	2.5
s	99	1205	39/1/1	S	B	0	10	90.0	100.0	10.0	F	D	AC	8.0	F	-	G	2.5
s	99	1206	39/1/1	S	B	0	11	100.0	110.0	10.0	F	D	AC	8.0	F	-	G	2.0
s	99	1207	39/2/1	S	B	0	1	-	10.0	10.0	F	I	AC	8.0	F	-	E	2.5
s	99	1208	39/2/1	S	B	0	2	10.0	20.0	10.0	F	I	AC	8.0	F	-	E	1.5
s	99	1209	39/2/1	S	B	0	3	20.0	30.0	10.0	F	I	AC	8.0	F	-	E	1.5
s	99	1210	39/2/1	S	B	0	4	30.0	40.0	10.0	F	I	AC	8.0	F	-	E	1.5
s	99	1211	39/2/1	S	B	0	5	40.0	50.0	10.0	F	D	AC	8.0	F	-	E	1.5

s	99	1212	39/2/1	S	B	0	6	50.0	59.0	9.0	F	D	AC	8.0	F	-	E	1.5
s	99	1215	42	S	B	1	1	-	10.0	10.0	F	D	G	9.0	F	-	E	2.5
s	99	1216	42	S	B	1	2	10.0	20.0	10.0	F	D	G	9.0	F	-	E	2.5
s	99	1217	42	S	B	1	3	20.0	25.0	5.0	F	D	G	9.0	F	-	E	2.5
s	99	1219	45	S	B	1	1	-	23.0	23.0	M	U	AC	7.0	G	-	P	0.5
s	99	1220	45	S	B	2	1	-	190.0	190.0	F	D	UC		N	-		0.0
s	99	1240	47/1/1/II	S	B	0	1	-	39.0	39.0	M	U	AC	6.0	F	-	P	1.5
s	99	1241	47/1/1/II	S	B	0	2	39.0	43.4	4.4	M	U	AC	6.0	B	-	P	1.5
s	99	1244	47/1/2	S	B	0	1	-	8.0	8.0	F	I	AC	7.0	F	-	P	1.5
s	99	1245	47/1/2	S	B	0	2	8.0	10.4	2.4	F	I	AC	7.0	F	-	E	1.0
s	99	1248	47/3/1	S	B	0	1	-	14.0	14.0	F	U	AC	6.5	F	-	E	1.0
s	99	1254	49	D	I	1	1	-	14.2	14.2	F	A	AC	7.0	G	4.0	P	2.5
s	99	1255	49	D	I	2	2	14.2	17.9	3.7	F	A	AC	7.0	G	4.0	P	1.8
s	99	1256	49	D	O	3	1	-	14.7	14.7	F	U	AC	6.0	F	4.0	E	1.5
s	99	1257	49	D	O	4	2	14.7	17.9	3.2	F	R	AC	6.0	F	4.0	P	1.5
s	99	1258	49	S	B	1	1	-	0.6	0.6	F	A	AC	7.0	G	4.0	P	2.0
s	99	1259	49	S	B	1	2	0.6	3.7	3.1	F	A	AC	7.0	F	-	E	1.0
s	99	1260	49	S	B	1	3	3.7	10.5	6.8	F	A	AC	7.0	G	4.0	P	2.5
s	99	1261	49	S	B	1	4	10.5	12.1	1.6	F	U	AC	7.0	F	-	P	2.5
s	99	1262	49	S	B	2	1	-	35.5	35.5	F	U	AC	6.0	F	-	P	1.5
s	99	1265	49/1/1/II	S	B	0	1	-	21.2	21.2	M	U	AC	6.0	B	-	P	1.5
s	99	1266	49/1/1/II	S	B	0	2	21.2	46.0	24.8	M	U	AC	6.0	G	-	P	1.5
s	99	1269	49/2/1	S	B	0	1	-	19.0	19.0	M	U	AC	6.0	B	-	P	1.5

3. List of Primary Roads Having Shoulder Width Less Than 2 Meter

	Road Class	No.	Road No.	Type	In/Out	Sec. No.	Sub-Sec	From	To	Km	Terrain	Land USE	C Type	C W(m)	C Cond.	Median(m)	S Type
p	0	1	1	D	I	1	1	-	7.5	7.5	F	U	AC	7.0	G	4.5	P
p	0	2	1	D	I	1	1	7.5	10.0	2.5	F	A	AC	7.0	G	4.5	P
p	0	3	1	D	I	1	2	10.0	20.6	10.6	F	A	AC	7.0	G	4.5	P
p	0	34	1	D	O	1	1	-	10.1	10.1	F	A	AC	7.0	G	3.5	P
p	0	37	1	D	O	2	2	7.5	17.5	10.0	F	A	AC	7.0	F	7.5	E
p	0	38	1	D	O	2	3	17.5	33.5	16.0	F	A	AC	7.0	G	7.5	E
p	0	60	1	D	O	5	2	6.3	6.7	0.4	F	U	AC	7.0	F	8.0	P
p	0	62	1	D	O	5	4	7.5	7.6	0.1	F	U	AC	7.0	G	8.0	P
p	0	68	1	D	O	5	10	28.9	29.1	0.3	F	U	AC	7.0	G	8.0	P
p	0	72	1	D	O	6	3	3.5	7.1	3.6	F	R	AC	7.0	G	8.0	P
p	0	73	1	D	O	6	4	7.1	7.2	0.1	F	U	AC	7.0	F	8.0	P
p	0	74	1	D	O	6	5	7.2	8.0	0.8	F	R	AC	7.0	F	8.0	P
p	0	75	1	D	O	6	6	8.0	8.2	0.2	F	U	AC	7.0	F	8.0	P
p	0	76	1	D	O	6	7	8.2	8.7	0.5	F	R	AC	7.0	F	8.0	P
p	0	77	1	D	O	6	8	8.7	9.0	0.3	F	U	AC	7.0	F	8.0	P
p	0	81	1	D	O	6	12	16.1	16.3	0.2	F	U	AC	7.0	F	8.0	P
p	0	83	1	D	O	6	14	18.9	19.1	0.2	F	U	AC	7.0	F	8.0	P
p	0	85	1	D	O	6	16	19.8	20.0	0.2	F	U	AC	7.0	G	8.0	P
p	0	396	8	S	B	1	2	10.0	20.0	10.0	F	D	AC	7.0	F	-	E
p	0	397	8	S	B	1	3	20.0	30.0	10.0	F	D	AC	7.0	F	-	E
p	0	398	8	S	B	1	4	30.0	40.0	10.0	F	U	AC	7.0	F	-	E
p	0	399	8	S	B	1	5	40.0	45.0	5.0	F	U	AC	7.0	F	-	E
p	0	400	8	S	B	1	6	45.0	48.0	3.0	F	U	AC	7.0	F	-	E
p	0	401	8	S	B	2	1	-	2.8	2.8	F	D	AC	7.0	G	-	E
p	0	403	8	S	B	2	3	56.2	61.2	5.0	F	D	AC	7.0	G	-	E
p	0	404	8	S	B	3	1	-	10.0	10.0	F	D	AC	6.0	F	-	E
p	0	405	8	S	B	3	2	10.0	20.0	10.0	F	D	AC	6.0	F	-	E
p	0	406	8	S	B	3	3	20.0	30.0	10.0	F	D	AC	6.0	F	-	E
p	0	407	8	S	B	3	4	30.0	32.0	2.0	F	D	AC	7.0	F	-	E
p	0	517	15	D	I	1	1	-	5.0	5.0	R	U	AC	7.5	G	4.0	P
p	0	518	15	D	I	1	2	5.0	6.5	1.5	M	U	AC	7.5	G	4.0	P
p	0	519	15	D	I	1	3	6.5	10.0	3.5	F	U	AC	7.5	G	4.0	P
p	0	520	15	D	I	1	4	10.0	14.0	4.0	F	U	AC	7.5	G	4.0	P
p	0	521	15	D	I	1	5	14.0	20.0	6.0	R	U	AC	7.5	G	4.0	P
p	0	522	15	D	I	1	6	20.0	24.0	4.0	F	C	AC	7.5	G	4.0	P
p	0	523	15	D	I	1	7	24.0	26.0	2.0	R	I	AC	7.5	G	4.0	P
p	0	524	15	D	I	1	8	26.0	30.0	4.0	F	U	AC	7.5	G	4.0	P
p	0	525	15	D	I	1	9	30.0	34.8	4.8	F	U	AC	7.5	G	4.0	P
p	0	565	15	S	B	2	2	4.0	5.0	1.0	F	R	AC	6.5	F	-	P
p	0	569	15	S	B	3	3	3.3	3.6	0.3	F	D	AC	7.0	F	-	P
p	0	571	15	S	B	3	5	5.7	6.7	1.0	R	A	AC	7.0	F	-	P

p	0	573	15	S	B	3	7	9.8	10.1	0.3	F	D	AC	7.0	F	-	P
p	0	575	15	S	B	3	9	10.5	10.9	0.4	F	D	AC	7.0	F	-	P
p	0	577	15	S	B	3	11	11.8	12.0	0.2	F	D	AC	7.0	F	-	P
p	0	709	21/1/1	S	B	0	1	-	10.0	10.0	F	D	AC	7.0	G	-	E
p	0	710	21/1/1	S	B	0	2	10.0	20.0	10.0	F	D	AC	7.0	G	-	E
p	0	711	21/1/1	S	B	0	3	20.0	23.5	3.5	F	D	AC	7.0	G	-	E
p	0	1004	31	S	B	8	1	-	7.0	7.0	M	U	AC	7.0	F	-	P
p	0	1009	31	S	B	9	3	14.0	30.7	16.7	M	U	AC	8.0	F	-	P
p	0	1022	32	S	B	1	1	-	3.0	3.0	F	C	AC	7.0	G	-	P
p	0	1023	32	S	B	1	2	3.0	10.0	7.0	F	U	AC	7.0	G	-	P
p	0	1024	32	S	B	1	3	10.0	20.0	10.0	F	U	AC	7.0	G	-	P
p	0	1025	32	S	B	1	4	20.0	30.0	10.0	F	U	AC	7.0	G	-	P
p	0	1026	32	S	B	1	5	30.0	40.0	10.0	F	D	AC	7.0	G	-	P
p	0	1027	32	S	B	1	6	40.0	50.0	10.0	F	D	AC	7.0	G	-	P
p	0	1028	32	S	B	1	7	50.0	60.0	10.0	F	D	AC	7.0	G	-	P
p	0	1029	32	S	B	1	8	60.0	70.0	10.0	F	D	AC	7.0	G	-	P
p	0	1030	32	S	B	1	9	70.0	80.0	10.0	F	D	AC	7.0	G	-	P
p	0	1031	32	S	B	1	10	80.00	90.00	10.0	F	D	AC	7.0	G	-	P
p	0	1032	32	S	B	1	11	90.0	100.0	10.0	F	D	AC	7.0	G	-	P
p	0	1033	32	S	B	1	12	100.0	110.0	10.0	F	D	AC	7.0	G	-	P
p	0	1034	32	S	B	1	13	110.0	120.0	10.0	F	D	AC	7.0	G	-	P
p	0	1035	32	S	B	1	14	120.0	130.0	10.0	F	D	AC	7.0	G	-	P
p	0	1036	32	S	B	1	15	130.0	140.0	10.0	F	D	AC	7.0	G	-	P
p	0	1037	32	S	B	1	16	140.0	150.0	10.0	F	D	AC	7.0	G	-	P
p	0	1038	32	S	B	1	17	150.0	160.0	10.0	F	D	AC	7.0	G	-	P
p	0	1039	32	S	B	1	18	160.0	170.0	10.0	F	D	AC	7.0	G	-	P
p	0	1040	32	S	B	1	19	170.0	180.0	10.0	F	D	AC	7.0	G	-	P
p	0	1042	32	S	B	2	1	-	10.0	10.0	F	D	AC	7.0	G	-	P
p	0	1043	32	S	B	2	2	10.0	20.0	10.0	F	D	AC	7.0	G	-	P
p	0	1044	32	S	B	2	3	20.0	30.0	10.0	F	D	AC	7.0	F	-	P
p	0	1045	32	S	B	2	4	30.0	37.0	7.0	F	D	AC	7.0	F	-	P
p	0	1046	32	S	B	2	5	37.0	40.0	3.0	R	D	AC	7.0	F	-	P
p	0	1047	32	S	B	2	6	40.0	48.0	8.0	F	D	AC	7.0	F	-	P
p	0	1048	32	S	B	2	7	48.0	50.0	2.0	R	D	AC	7.0	F	-	P
p	0	1049	32	S	B	2	8	50.0	60.0	10.0	F	D	AC	7.0	F	-	P
p	0	1050	32	S	B	2	9	60.0	70.0	10.0	F	D	AC	7.0	F	-	P
p	0	1051	32	S	B	2	10	70.0	80.0	10.0	F	D	AC	7.0	F	-	P
p	0	1052	32	S	B	2	11	80.0	88.0	8.0	R	D	AC	7.0	F	-	P
p	0	1053	32	S	B	2	12	88.0	100.0	12.0	F	D	AC	7.0	F	-	P
p	0	1054	32	S	B	2	13	100.0	110.0	10.0	F	D	AC	7.0	F	-	P
p	0	1055	32	S	B	2	14	100.0	110.0	10.0	F	D	AC	7.0	G	-	P
p	0	1056	32	S	B	2	15	110.0	120.0	10.0	F	D	AC	7.0	G	-	P

p	0	1057	32	S	B	2	16	120.0	130.0	10.0	F	D	AC	7.0	G	-	P
p	0	1058	32	S	B	2	17	130.0	140.0	10.0	F	D	AC	7.0	G	-	P
p	0	1059	32	S	B	2	18	140.0	144.0	4.0	R	D	AC	7.0	G	-	P
p	0	1060	32	S	B	2	19	144.0	150.0	6.0	F	D	AC	7.0	G	-	P
p	0	1061	32	S	B	2	20	150.0	156.0	6.0	F	D	AC	7.0	G	-	P
p	0	1063	32	S	B	2	22	160.0	164.0	4.0	F	C	AC	7.0	G	-	P
p	0	1064	32	S	B	3	1	-	10.0	10.0	F	D	AC	7.0	G	-	P
p	0	1065	32	S	B	3	2	10.0	20.0	10.0	F	D	AC	7.0	G	-	P
p	0	1066	32	S	B	3	3	20.0	30.0	10.0	F	D	AC	7.0	G	-	P
p	0	1067	32	S	B	3	4	30.0	40.0	10.0	F	D	AC	7.0	G	-	P
p	0	1068	32	S	B	3	5	40.0	50.0	10.0	F	D	AC	7.0	G	-	P
p	0	1069	32	S	B	3	6	50.0	60.0	10.0	F	D	AC	7.0	G	-	P
p	0	1070	32	S	B	3	7	60.0	70.0	10.0	F	D	AC	7.0	G	-	P
p	0	1071	32	S	B	3	8	70.0	78.5	8.5	R	U	AC	7.0	G	-	P
p	0	1088	32/2/2	S	B	0	1	-	10.0	10.0	F	D	AC	7.0	G	-	P
p	0	1089	32/2/2	S	B	0	2	10.0	20.0	10.0	F	D	AC	7.0	G	-	P
p	0	1090	32/2/2	S	B	0	3	20.0	30.0	10.0	F	D	AC	7.0	G	-	P
p	0	1091	32/2/2	S	B	0	4	30.0	40.0	10.0	F	D	AC	7.0	G	-	P
p	0	1092	32/2/2	S	B	0	5	40.0	50.0	10.0	F	D	AC	7.0	G	-	P
p	0	1093	32/2/2	S	B	0	6	50.0	60.0	10.0	F	D	AC	7.0	G	-	P
p	0	1094	32/2/2	S	B	0	7	60.0	70.0	10.0	F	D	AC	7.0	G	-	P
p	0	1095	32/2/2	S	B	0	8	70.0	73.0	3.0	F	D	AC	7.0	G	-	P
p	0	1096	32/2/2	S	B	0	8	73.0	80.0	7.0	F	R	AC	7.0	G	-	P
p	0	1097	32/2/2	S	B	0	9	80.0	90.0	10.0	F	D	AC	7.0	G	-	P
p	0	1098	32/2/2	S	B	0	10	90.0	92.0	2.0	F	R	AC	7.0	G	-	P
p	0	1099	32/2/2	S	B	0	10	92.0	100.0	8.0	F	D	AC	7.0	G	-	P
p	0	1100	32/2/2	S	B	0	11	100.0	110.0	10.0	F	D	AC	7.0	G	-	P
p	0	1101	32/2/2	S	B	0	12	110.0	120.0	10.0	F	D	AC	7.0	G	-	P
p	0	1102	32/2/2	S	B	0	13	120.0	130.0	10.0	F	D	AC	7.0	G	-	P
p	0	1103	32/2/2	S	B	0	15	140.0	150.0	10.0	F	D	AC	7.0	G	-	P
p	0	1104	32/2/2	S	B	0	16	150.0	160.0	10.0	F	D	AC	7.0	G	-	P
p	0	1105	32/2/2	S	B	0	17	160.0	170.0	10.0	F	D	AC	7.0	G	-	P
p	0	1106	32/2/2	S	B	0	18	170.0	180.0	10.0	F	D	AC	7.0	G	-	P
p	0	1107	32/2/2	S	B	0	19	180.0	185.0	5.0	F	R	AC	7.0	G	-	P
p	0	1108	32/2/2	S	B	0	20	185.0	186.0	1.0	R	U	AC	7.0	G	-	E
p	0	1110	32/2/2	S	B	0	22	187.0	191.0	4.0	R	R	AC	7.0	G	-	P
p	0	1227	47	S	B	3	1	-	5.0	5.0	M	U	AC	6.0	F	-	P
p	0	1228	47	S	B	3	2	5.0	27.0	22.0	M	U	AC	9.0	F	-	P
p	0	1229	47	S	B	3	3	27.0	53.8	26.8	F	U	AC	7.0	F	-	P
p	0	1230	47	S	B	4	1	-	15.3	15.3	M	U	AC	6.5	F	-	P
p	0	1231	47	S	B	5	1	-	19.8	19.8	M	U	AC	6.0	F	-	E

4. List of Secondary Roads Having Shoulder Width Less than 1 Meter

	Road Class	No.	Road No.	Type	In/Out	Sec. No.	Sub-Sec	From	To	Km	Terrain	Land USE	C Type	C W(m)	C Cond.	Median(m)	S Type	S W(m)
s	99	106	1/3/3	S	B	0	4	12.0	14.3	2.3	F	U	AC	7.0	G	-	P	0.50
s	99	107	1/3/3	S	B	0	5	14.3	15.2	0.9	F	R	AC	7.0	G	-	P	0.50
s	99	108	1/3/3	S	B	0	6	15.2	20.0	4.8	F	U	AC	7.0	G	-	P	0.50
s	99	109	1/3/3	S	B	0	7	20.0	22.0	2.0	F	U	AC	7.0	G	-	P	0.50
s	99	110	1/3/3	S	B	0	8	22.0	31.0	9.0	R	U	AC	7.0	G	-	P	0.50
s	99	266	2	S	B	3	12	10.0	10.9	0.9	M	U	AC	7.0	G	-		0.00
s	99	267	2	S	B	3	13	10.9	11.3	0.4	M	U	AC	7.0	G	-		0.00
s	99	268	2	S	B	3	14	11.3	11.8	0.5	M	U	AC	7.0	G	-		0.00
s	99	269	2	S	B	3	15	11.8	12.4	0.6	M	U	AC	7.0	G	-		0.00
s	99	270	2	S	B	3	16	12.4	12.8	0.5	M	U	AC	7.0	G	-		0.00
s	99	314	2	S	B	5	1	-	8.1	8.1	F	R	AC	6.0	G	-	P	0.50
s	99	331	5/2/1	S	B	0	1	-	10.0	10.0	R	U	AC	7.0	G	-	E	0.50
s	99	332	5/2/1	S	B	0	2	10.0	12.2	2.2	M	U	AC	7.0	G	-	E	0.50
s	99	333	5/2/1	S	B	0	3	12.0	14.3	2.3	R	U	AC	7.0	G	-	E	0.50
s	99	334	5/2/1	S	B	0	4	14.3	16.3	2.0	M	U	AC	7.0	G	-	E	0.50
s	99	335	5/2/1	S	B	0	5	16.3	20.1	3.8	R	U	AC	7.0	G	-	E	0.50
s	99	336	5/2/1	S	B	0	6	20.1	22.9	2.8	M	U	AC	7.0	G	-	E	0.50
s	99	337	5/2/1	S	B	0	7	22.9	27.7	4.8	R	U	AC	7.0	G	-	E	0.50
s	99	338	5/2/1	S	B	0	8	27.7	30.6	2.9	R	U	AC	7.0	G	-	E	0.50
s	99	339	5/2/1	S	B	0	9	30.6	34.4	3.8	F	U	AC	7.0	G	-	E	0.50
s	99	340	5/2/1	S	B	0	10	34.4	39.4	5.0	R	U	AC	7.0	G	-	E	0.50
s	99	341	5/2/1	S	B	0	11	39.4	41.7	2.3	M	U	AC	7.0	G	-	E	0.50
s	99	342	5/2/1	S	B	0	12	41.7	45.7	4.0	R	U	AC	7.0	G	-	E	0.50
s	99	343	5/2/1	S	B	0	13	45.7	46.8	1.1	M	U	AC	7.0	G	-	E	0.50
s	99	344	5/2/1	S	B	0	14	46.8	56.8	10.0	R	U	AC	7.0	G	-	E	0.50
s	99	345	5/2/1	S	B	0	15	56.8	60.0	3.2	R	U	AC	7.0	G	-	E	0.50
s	0	395	8	S	B	1	1	-	10.0	10.0	F	D	AC	7.0	F	-		0.00
s	99	792	23/2/1	S	B	0	6	22.0	23.0	1.0	F	U	AC		F	-		0.00
s	99	793	23/2/1	S	B	0	7	23.0	25.0	2.0	F	R	AC	2.5	F	-	P	0.50
s	99	798	23/2/2	S	B	0	1	-	5.0	5.0	F	R	AC	3.0	G	-	P	0.50
s	99	799	23/2/2	S	B	0	2	5.0	7.4	2.4	F	R	AC	3.0	G	-	P	0.50
s	99	803	23/3/1	S	B	0	2	5.0	7.8	2.8	F	R	AC	3.0	B	-	P	0.50
s	99	1072	32/1/2	S	B	0	1	-	10.0	10.0	F	D	AC	7.0	G	-	P	0.50
s	99	1073	32/1/2	S	B	0	2	10.0	16.0	6.0	F	D	AC	7.0	G	-	P	0.50
s	99	1074	32/1/2	S	B	0	3	16.0	20.0	4.0	F	R	AC	7.0	G	-	P	0.50
s	99	1075	32/1/2	S	B	0	4	20.0	30.0	10.0	F	D	AC	7.0	G	-	P	0.50
s	99	1076	32/1/2	S	B	0	5	30.0	40.0	10.0	F	D	AC	7.0	G	-	P	0.50
s	99	1077	32/1/2	S	B	0	6	40.0	50.0	10.0	F	D	AC	7.0	G	-	P	0.50
s	99	1078	32/1/2	S	B	0	7	50.0	60.0	10.0	F	D	AC	7.0	G	-	P	0.50
s	99	1111	32/3/2/I	S	B	0	1	-	10.0	10.0	F	D	AC	7.0	G	-	P	0.50
s	99	1112	32/3/2/I	S	B	0	2	10.0	20.0	10.0	F	D	AC	7.0	G	-	P	0.50

s	99	1113	32/3/2/I	S	B	0	3	20.0	30.0	10.0	F	D	AC	7.0	G	-	P	0.50
s	99	1114	32/3/2/I	S	B	0	4	30.0	34.0	4.0	F	D	AC	7.0	G	-	P	0.50
s	99	1116	32/3/2/I	S	B	0	4	37.5	40.0	2.5	F	D	AC	7.0	G	-	P	0.50
s	99	1117	32/3/2/I	S	B	0	5	40.0	48.0	8.0	F	D	AC	7.0	G	-	P	0.50
s	99	1118	32/3/2/I	S	B	0	5	48.0	50.0	2.0	F	I	AC	7.0	G	-	P	0.50
s	99	1119	32/3/2/I	S	B	0	6	50.0	54.6	4.6	F	D	AC	7.0	G	-	P	0.50
s	99	1158	37	S	B	1	1	-	10.0	10.0	F	D	AC	12.0	G	-	P	0.50
s	99	1159	37	S	B	1	2	10.0	20.0	10.0	F	D	AC	12.0	G	-	P	0.50
s	99	1160	37	S	B	1	3	20.0	30.0	10.0	F	D	AC	12.0	G	-	P	0.50
s	99	1161	37	S	B	1	4	30.0	40.0	10.0	F	D	AC	12.0	G	-	P	0.50
s	99	1162	37	S	B	1	5	40.0	50.0	10.0	F	D	AC	12.0	G	-	P	0.50
s	99	1163	37	S	B	1	6	50.0	60.0	10.0	F	D	AC	12.0	G	-	P	0.50
s	99	1164	37	S	B	1	7	60.0	70.0	10.0	F	D	AC	12.0	G	-	P	0.50
s	99	1165	37	S	B	1	8	70.0	80.0	10.0	F	D	AC	12.0	G	-	P	0.50
s	99	1166	37	S	B	1	9	80.0	90.0	10.0	F	D	AC	12.0	G	-	P	0.50
s	99	1167	37	S	B	1	10	90.0	100.0	10.0	F	D	AC	12.0	G	-	P	0.50
s	99	1168	37	S	B	1	11	100.0	110.0	10.0	F	D	AC	12.0	G	-	P	0.50
s	99	1169	37	S	B	1	12	110.0	120.0	10.0	F	D	AC	12.0	G	-	P	0.50
s	99	1170	37	S	B	1	13	120.0	130.0	10.0	F	D	AC	12.0	G	-	P	0.50
s	99	1171	37	S	B	1	14	130.0	140.0	10.0	F	D	AC	12.0	G	-	P	0.50
s	99	1172	37	S	B	1	15	140.0	150.0	10.0	F	D	AC	12.0	G	-	P	0.50
s	99	1173	37	S	B	1	16	150.0	157.7	7.7	F	D	AC	12.0	G	-	P	0.50
s	99	1219	45	S	B	1	1	-	23.0	23.0	M	U	AC	7.0	G	-	P	0.50

5. List of Primary Roads Needs AC Overlay

	Road Class	No.	Road No.	Type	In/Out	Sec. No.	Sub-Sec	From	To	Km	Terrain	Land USE	C Type	C W(m)	C Cond.	Median(m)	S Type	S W(m)
p	0	755	23	S	B	2	1	-	4.0	4.0	F	U	AC	7.4	B	-	P	2.4
p	0	756	23	S	B	2	2	4.0	9.3	5.3	F	U	AC	7.4	B	-	P	2.4
p	0	757	23	S	B	2	3	9.3	16.7	7.4	F	U	AC	7.5	B	-	P	2.5
p	0	758	23	S	B	2	4	16.7	18.8	2.1	R	U	AC	7.5	B	-	P	2.5
p	0	759	23	S	B	2	5	18.8	27.9	9.1	F	U	AC	7.5	B	-	P	2.5
p	0	760	23	S	B	2	6	27.9	28.1	0.2	F	U	AC	7.5	B	-	P	2.5
p	0	761	23	S	B	2	7	28.1	39.1	11.0	F	U	AC	7.5	B	-	P	2.5
p	0	762	23	S	B	2	8	39.1	50.5	11.4	F	R	AC	7.4	B	-	P	2.4
p	0	763	23	S	B	2	9	50.5	54.9	4.4	F	R	AC	7.4	B	-	P	2.4
p	0	773	23	S	B	4	1	-	10.0	10.0	F	D	AC	3.8	B	-	P	2.0
p	0	774	23	S	B	4	2	10.0	20.0	10.0	F	D	AC	3.8	B	-	P	2.0
p	0	775	23	S	B	4	3	20.0	25.5	5.5	F	D	AC	3.8	B	-	E	2.0
p	0	776	23	S	B	4	4	25.5	32.7	7.2	F	D	AC	3.8	B	-	E	2.0
p	0	777	23	S	B	4	5	32.7	40.0	7.4	F	D	AC	3.8	B	-	E	2.0
p	0	778	23	S	B	4	6	40.0	42.8	2.8	F	R	AC	3.8	B	-	E	2.0
p	0	779	23	S	B	5	1	-	10.0	10.0	F	R	AC	3.8	B	-	E	2.0
p	0	780	23	S	B	5	2	10.0	20.0	10.0	R	R	AC	3.8	B	-	E	2.0
p	0	781	23	S	B	5	3	20.0	31.9	11.9	R	U	AC	3.8	B	-	E	2.0
p	0	782	23	S	B	6	1	-	5.0	5.0	F	R	AC	3.8	B	-	P	2.5
p	0	783	23	S	B	6	2	5.0	8.9	3.9	F	R	AC	3.8	B	-	E	2.5
p	0	784	23	S	B	6	3	8.9	9.8	0.9	F	U	AC	3.8	B	-	E	2.5
p	0	785	23	S	B	6	4	9.8	10.8	1.0	F	U	AC	3.8	B	-	E	2.5
p	0	786	23	S	B	6	5	10.8	19.6	8.8	R	U	AC	3.8	B	-	E	2.5
p	0	922	31	S	B	1	6	20.0	30.0	10.0	F	U	AC	7.0	B	-	P	2.3
p	0	923	31	S	B	1	7	30.0	40.0	10.0	F	U	AC	7.0	B	-	P	2.3
p	0	924	31	S	B	1	8	40.0	41.3	1.3	F	U	AC	7.0	B	-	P	2.3
p	0	944	31	S	B	3	1	-	5.3	5.3	F	U	AC	7.5	B	-	P	2.1
p	0	945	31	S	B	3	2	5.3	6.3	1.0	F	U	AC	7.5	B	-	P	2.1
p	0	946	31	S	B	3	3	6.3	12.6	6.3	F	U	AC	7.5	B	-	P	2.1
p	0	947	31	S	B	3	4	12.6	13.3	0.7	F	U	AC	7.5	B	-	P	2.1
p	0	948	31	S	B	3	5	13.3	16.7	3.4	F	U	AC	7.5	B	-	P	2.1
p	0	949	31	S	B	3	6	16.7	17.7	1.0	F	U	AC	7.5	B	-	P	2.1
p	0	950	31	S	B	3	7	17.7	26.5	8.8	F	U	AC	7.5	B	-	P	2.1
p	0	958	31	S	B	4	8	70.0	90.0	20.0	F	D	AC	8.0	B	-	P	2.0

Length (km) = 217.0 all 2-lane no dual

6. List of Secondary Roads Needs AC Overlay

	Road Class	No.	Road No.	Type	In/Out	Sec. No.	Sub-Sec	From	To	Km	Terrain	Land USE	C Type	C W(m)	C Cond.	Median(m)	S Type	S W(m)
s	99	291	2	S	B	4	8	16.0	17.5	1.5	M	U	E	3.0	VB	-		0.0
s	99	292	2	S	B	4	9	17.5	18.3	0.8	M	U	E	3.0	VB	-		0.0
s	99	315	2	S	B	5	2	8.1	15.6	7.5	F	U	E	6.0	B	-	NIL	0.0
s	99	316	2	S	B	5	3	15.6	34.1	18.5	R	U	E	6.0	B	-	NIL	0.0
s	99	317	2	S	B	5	4	34.1	45.5	11.4	M	U	E	5.0	B	-	NIL	0.0
s	99	385	7/3/2	S	B	0	1	-	10.0	10.0	F	D	E	4.0	B	-	E	1.0
s	99	386	7/3/2	S	B	0	2	10.0	20.0	10.0	F	D	E	4.0	B	-	E	1.0
s	99	387	7/3/2	S	B	0	3	20.0	24.2	4.2	F	D	E	4.0	B	-	E	1.0
s	99	388	7/3/2	S	B	0	4	24.2	27.0	2.8	F	D	E	3.5	B	-	E	1.0
s	99	389	7/3/2	S	B	0	5	27.0	37.0	10.0	F	A	E	5.0	B	-	E	1.0
s	99	390	7/3/2	S	B	0	6	37.0	47.0	10.0	R	A	E	5.0	B	-	E	1.0
s	99	391	7/3/2	S	B	0	7	47.0	57.0	10.0	R	A	E	6.0	B	-	E	1.0
s	99	392	7/3/2	S	B	0	8	57.0	67.0	10.0	R	A	E	6.0	B	-	E	1.0
s	99	393	7/3/2	S	B	0	9	67.0	71.8	4.8	F	A	E	6.0	B	-	E	1.0
s	99	413	8/3/3	S	B	0	5	52.0	63.0	11.0	M	D	E		B	-		0.0
s	99	510	13/1/1/III	S	B	0	5	10.2	17.4	7.2	R	U	E	7.0	B	-		0.0
s	99	511	13/1/1/III	S	B	0	6	17.4	19.3	1.9	M	U	E	7.0	B	-		0.0
s	99	727	21/5/3/I	S	B	0	1	-	10.0	10.0	F	U	AC	7.0	B	-	DST	1.5
s	99	728	21/5/3/I	S	B	0	2	10.0	14.3	4.3	F	U	AC	7.0	B	-	DST	1.5
s	99	734	21/5/4	S	B	0	2	3.8	13.8	10.0	F	U	ST	7.0	B	-	P	1.5
s	99	735	21/5/4	S	B	0	3	13.8	26.3	12.5	F	U	ST	7.0	B	-	P	1.5
s	99	800	23/2/2	S	B	0	3	7.4	10.0	2.6	M	U	G		B	-		0.0
s	99	801	23/2/2	S	B	0	4	10.0	14.8	4.8	M	U	G		B	-		0.0
s	99	802	23/3/1	S	B	0	1	-	5.0	5.0	F	R	AC	3.0	B	-	P	5.0
s	99	803	23/3/1	S	B	0	2	5.0	7.8	2.8	F	R	AC	3.0	B	-	P	0.5
s	99	807	23/3/2	S	B	0	1	-	10.0	10.0	M	D	G		B	-		0.0
s	99	808	23/3/2	S	B	0	2	10.0	20.0	10.0	M	D	G		B	-		0.0
s	99	809	23/3/2	S	B	0	3	20.0	30.0	10.0	M	D	G		B	-		0.0
s	99	810	23/3/2	S	B	0	4	30.0	40.0	10.0	M	D	G		B	-		0.0
s	99	811	23/3/2	S	B	0	5	40.0	50.0	10.0	M	D	G		B	-		0.0
s	99	812	23/3/2	S	B	0	6	50.0	60.0	10.0	R	D	G		B	-		0.0
s	99	813	23/3/2	S	B	0	7	60.0	70.0	10.0	R	D	G		B	-		0.0
s	99	814	23/3/2	S	B	0	8	70.0	80.0	10.0	R	D	G		B	-		0.0
s	99	871	29	S	B	2	8	56.4	60.0	3.6	M	D	E		B	-		0.0
s	99	872	29	S	B	2	9	60.0	89.9	29.9	M	D	E		B	-		0.0
s	99	1154	35/2/2/I	S	B	0	5	40.0	50.0	10.0	M	D	G	12.0	B	-		0.0
s	99	1155	35/2/2/I	S	B	0	6	50.0	60.0	10.0	M	D	G	12.0	B	-		0.0
s	99	1183	39	S	B	3	1	-	10.0	10.0	F	D	AC	8.0	B	-	ST	2.8
s	99	1241	47/1/1/II	S	B	0	2	39.0	43.4	4.4	M	U	AC	6.0	B	-	P	1.5
s	99	1265	49/1/1/II	S	B	0	1	-	21.2	21.2	M	U	AC	6.0	B	-	P	1.5
s	99	1269	49/2/1	S	B	0	1	-	19.0	19.0	M	U	AC	6.0	B	-	P	1.5

Length 371.6 Km

7. List of Bridges

List of Bridges on Service

Bridge No.	Road Name	Stationing	Span		Total Length (m)
			No.	Length (m)	
1a	Aqr-Seeb (Sea Side)	74+150 from Aqr R/A (Saham)	2	15	30
1b	Aqr-Seeb (Mountain Side)	74+150 from Aqr R/A (Saham)	2	15	30
2a	Aqr-Seeb (Sea Side)	138+450 from Aqr R/A (Dhiyan)	6	15	90
2b	Aqr-Seeb (Mountain Side)	138+450 from Aqr R/A (Dhiyan)	6	15	90
3a	Wadi Hatta (Aqr-Al Wajajah), (Sea side)	22+100 from Aqr R/A (Wajajah)	3	25+30+25	80
3b	Wadi Hatta (Aqr-Al Wajajah), (Mountain Side)	22+100 from Aqr R/A (Wajajah)	3	25+30+25	80
4	Wadi Al Jizzi-Mahda	4+400 from Wadi Jizzi Road Junction	9	15	135
5	Falaj Al Qabail-Al Buraimi	5+008 from Falaj Al Qabli R/A	3	8+15+8	31
6	Falaj Al Qabail-Al Buraimi	15+453 from Falaj Al Qabail R/A	6	8+(4x15)+8	76
7	Falaj Al Qabail-Al Buraimi	17+537 from Falaj Al Qabli R/A	5	8+(3x15)+8	61
8	Falaj Al Qabail-Al Buraimi	19+340 from Falaj Al Qabail R/A	5	8+(3x15)+8	61
9	Falaj Al Qabail-Al Buraimi	21+048 from Falaj Al Qabail R/A	4	8+(2x15)+8	46
10	Falaj Al Qabail-Al Buraimi	27+573 from Falaj Al Qabail R/A	12	8+(10x15)+8	166
11	Falaj Al Qabail-Al Buraimi	29+700 from Falaj Al Qabail R/A	20	8+(18x15)+8	286
12	Falaj Al Qabail-Al Buraimi	30+481 from Falaj Al Qabail R/A	18	8+(16x15)+8	256
13	Falaj Al Qabail-Al Buraimi	31+517 from Falaj Al Qabli R/A	7	8+(5x15)+8	91
14	Falaj Al Qabail-Al Buraimi	32+355 from Falaj Al Qabail R/A	11	8+(9x15)+8	151
15	Falaj Al Qabail-Al Buraimi	35+874 from Falaj Al Qabail R/A	11	8+(9x15)+8	151
16	Falaj Al Qabail-Al Buraimi	36+763 from Falaj Al Qabli R/A	9	8+(7x15)+8	121
17	Falaj Al Qabail-Al Buraimi	37+657 from Falaj Al Qabli R/A	11	8+(9x15)+8	151
18	Falaj Al Qabail-Al Buraimi	40+392 from Falaj Al Qabail R/A	10	8+(8x15)+8	136
19	Falaj Al Qabail-Al Buraimi	43+819 from Falaj Al Qabail R/A	15	8+(13x15)+8	211
20	Falaj Al Qabail-Al Buraimi	47+350 from Falaj Al Qabli R/A	3	8+15+8	31
21	Falaj Al Qabail-Al Buraimi	48+460 from Falaj Al Qabli R/A	7	8+(5x15)+8	91
22	Falaj Al Qabail-Al Buraimi	49+382 from Falaj Al Qabli R/A	9	8+(7x15)+8	121
23	Falaj Al Qabail-Al Buraimi	51+705 from Falaj Al Qabli R/A	5	8+(3x15)+8	61

Bridge No.	Road Name	Stationing	Span		Total Length (m)
			No.	Length (m)	
24	Falaj Al Qabail-Al Buraimi	52+570 from Falaj Al Qabail R/A	7	8+(5x15)+8	91
25	Falaj Al Qabail-Al Buraimi	53+272 from Falaj Al Qabli R/A	5	8+(3x15)+8	61
26	Falaj Al Qabail-Al Buraimi	55+068 from Falaj Al Qabail R/A	8	8+(6x15)+8	106
27	Falaj Al Qabail-Al Buraimi	56+040 from Falaj Al Qabail R/A	5	8+(3x15)+8	61
28	Falaj Al Qabail-Al Buraimi	67+450 from Falaj Al Qabail R/A	4	8+(2x15)+8	46
29	Falaj Al Qabail-Al Buraimi	68+819 from Falaj Al Qabail R/A	5	8+(3x15)+8	61
30	Falaj Al Qabail-Al Buraimi	71+906 from Falaj Al Qabli R/A	5	8+(3x15)+8	61
31	Falaj Al Qabail-Al Buraimi	73+198 from Falaj Al Qabail R/A	6	8+(4x15)+8	76
32	Falaj Al Qabail-Al Buraimi	75+174 from Falaj Al Qabli R/A	6	8+(4x15)+8	76
33	Falaj Al Qabail-Al Buraimi	82+716 from Falaj Al Qabail R/A	8	8+(6x15)+8	106
34	Falaj Al Qabail-Al Buraimi	00+186 from Buraimi R/A at Wadi Agran	7	8+(5x15)+8	91
Total Bridge Length of Sector A (m)					3,670
35	Baraka-A'Rustaq	36+400 from Barka R/A	7	7x15	105
36	Baraka-A'Rustaq	40+400 from Barka R/A	4	4x15	60
37	Baraka-A'Rustaq	54+850 from Barka R/A	3	3x15	45
38	Baraka-A'Rustaq	57+800 from Barka R/A	3	3x15	45
39	Baraka-A'Rustaq	58+650 from Barka R/A	3	3x15	45
40	Baraka-A'Rustaq	59+650 from Barka R/A	3	3x15	45
41	Rusayl-Nizwa	27+860 from Rusayl R/A	6	6x30	180
42	Rusayl-Nizwa	30+300 from Rusayl R/A	3	3x15	45
43	Rusayl-Nizwa	33+300 from Rusayl R/A	3	3x15	45
44	Rusayl-Nizwa	76+879 from Rusayl R/A	3	3x15	45
45	Rusayl-Nizwa	144+048 from Rusayl R/A	9	9x15	135
46	Nizwa-Ibri	38+050 from Wali's Office Nizwa	9	9x15	135
47	Nizwa-Ibri	68+475 from Wali's Office Nizwa	3	3x15	45
48	Bidbid-Sur	16+300 from Bidbid Interchange	10	20.4+(8x21) +20.4	208.8

Bridge No.	Road Name	Stationing	Span		Total Length (m)
			No.	Length (m)	
49	Bidbid-Sur	18+900 from Bidbid Interchange	7	20.4+(5x21) +20.4	145.8
50	Bidbid-Sur	19+300 from Bidbid Interchange	7	20.4+(5x21) +20.4	145.8
51	Bidbid-Sur	28+600 from Bidbid Interchange	9	20.4+(7x21) +20.4	187.8
52	Bidbid-Sur	235+300 from Bidbid Interchange	16	20.4+(14x21) +20.4	334.8
53	Bidbid-Sur	240+300 from Bidbid Interchange	8	20.4+(6x21) +20.4	166.8
54	Bidbid-Sur	241+300 from Bidbid Interchange	9	20.4+(7x21) +20.4	187.8
55	Bidbid-Sur	243+500 from Bidbid Interchange	3	20.4+21 +20.4	61.8
56	Bidbid-Sur	243+800 from Bidbid Interchange	12	20.4+(10x21) +20.4	250.8
57	Bidbid-Sur	247+000 from Bidbid Interchange	7	20.4+(5x21) +20.4	145.8
58	Bidbid-Sur	249+100 from Bidbid Interchange	7	20.4+(5x21) +20.4	145.8
59	Taqa-Mirbat	04+935 (Near Taqa)	4	4x30	120
Total Bridge Length of Sector B (m)					3076.8
Total Length of Bridges in both Sectors (m)					6746.8

8. Assessment of Bridges Conditions

General Characteristics and Overall Assessment of Bridges

Bridge No.	Road Name	Bridge Type	Total Length (m)	Carriage-way Width (m)	No of Lanes	Side-walk Width (m)	Construction Year	Design Load	Overall Assessment
1a	Aqr-Seeb (Sea Side)	Rectangular Precast beam with continuous RC slab	30	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Bad
1b	Aqr-Seeb (Mountain Side)	Rectangular Precast beam with continuous RC slab	30	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Bad
2a	Aqr-Seeb (Sea Side)	Rectangular Precast beam with continuous RC slab	90	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Bad
2b	Aqr-Seeb (Mountain Side)	Rectangular Precast beam with continuous RC slab	90	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Bad
3a	Wadi Hatta (Aqr-Al Wajajah), (Sea side)	Steel girders with continuous RC slab	80	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Very Bad
3b	Wadi Hatta (Aqr-Al Wajajah), (Mountain Side)	Steel girders with continuous RC slab	80	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Very Bad
4	Wadi Al Jizzi-Mahda	Rectangular Precast beam with continuous RC slab	135	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
5	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	31	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
6	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	76	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
7	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	61	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
8	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	61	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
9	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	46	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
10	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	166	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
11	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	286	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
12	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	256	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
13	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	91	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
14	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	151	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
15	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	151	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
16	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	121	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
17	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	151	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
18	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	136	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
19	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	211	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
20	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	31	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
21	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	91	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
22	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	121	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
23	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	61	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
24	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	91	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair

Bridge No.	Road Name	Bridge Type	Total Length (m)	Carriage-way Width (m)	No of Lanes	Side-walk Width (m)	Construction Year	Design Load	Overall Assessment
25	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	61	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
26	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	106	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
27	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	61	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
28	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	46	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
29	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	61	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
30	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	61	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
31	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	76	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
32	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	76	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
33	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	106	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
34	Falaj Al Qabail-Al Buraimi	Rectangular Precast beam with continuous RC slab	91	8.60	2	2x0.50	75-77	AASHTO, HS20-44, 32 t	Fair
35	Baraka-A'Rustaq	Precast beam with intermediate RC top slab	105	7.50	2	2x1.68	80-82	AASHTO, HS20-44, 32 t	Bad
36	Baraka-A'Rustaq	Precast beam with intermediate RC top slab	60	7.50	2	2x1.68	80-82	AASHTO, HS20-44, 32 t	Bad
37	Baraka-A'Rustaq	Precast beam with intermediate RC top slab	45	7.50	2	2x1.68	80-82	AASHTO, HS20-44, 32 t	Bad
38	Baraka-A'Rustaq	Precast beam with intermediate RC top slab	45	7.50	2	2x1.68	80-82	AASHTO, HS20-44, 32 t	Bad
39	Baraka-A'Rustaq	Precast beam with intermediate RC top slab	45	7.50	2	2x1.68	80-82	AASHTO, HS20-44, 32 t	Bad
40	Baraka-A'Rustaq	Precast beam with intermediate RC top slab	45	7.50	2	2x1.68	80-82	AASHTO, HS20-44, 32 t	Bad
41	Rusayl-Nizwa	Precast beam with continuous RC slab	180	7.76	2	2x1.25	75-77	British 45 HB	Fair
42	Rusayl-Nizwa	Precast beam with intermediate RC top slab	45	8.00	2	2x1.1	75-77	British 45 HB	Fair
43	Rusayl-Nizwa	Precast beam with intermediate RC top slab	45	8.00	2	2x1.1	75-77	British 45 HB	Fair
44	Rusayl-Nizwa	Precast beam with intermediate RC top slab	45	8.15	2	2x1.1	75-77	British 45 HB	Good
45	Rusayl-Nizwa	Precast beam with semi-continuous RC slab	135	8.00	2	2x1.05	75-77	British 45 HB	Fair
46	Nizwa-Ibri	Precast beam with semi-continuous RC slab	135	8.00	2	2x1.05	79-81	British 45 HB	Fair
47	Nizwa-Ibri	Precast beam with semi-continuous RC slab	45	8.00	2	2x1.035	79-81	British 45 HB	Fair
48	Bidbid-Sur	Rectangular precast prestressed beam with continuous RC slab supported on Precast blocks	208.8	7.50	2	2x1.68	75-77	French BC 30 ton	Fair
49	Bidbid-Sur	Rectangular precast beam with continuous RC slab supported on Precast blocks	145.8	7.50	2	2x1.68	75-77	French BC 30 ton	Fair
50	Bidbid-Sur	Rectangular Precast beam with continuous RC slab supported on Precast blocks	145.8	7.50	2	2x1.68	75-77	French BC 30 ton	Fair

Bridge No.	Road Name	Bridge Type	Total Length (m)	Carriage-way Width (m)	No of Lanes	Side-walk Width (m)	Construction Year	Design Load	Overall Assessment
51	Bidbid-Sur	Rectangular Precast beam with continuous RC slab supported on Precast blocks	187.8	7.50	2	2x1.68	75-77	French BC 30 ton	Fair
52	Bidbid-Sur	Rectangular Precast beam with continuous RC slab supported on Precast blocks	334.8	7.50	2	2x1.68	75-77	French BC 30 ton	Fair
53	Bidbid-Sur	Rectangular Precast beam with continuous RC slab supported on Precast blocks	166.8	7.50	2	2x1.68		French BC 30 ton	Fair
54	Bidbid-Sur	Rectangular Precast beam with continuous RC slab supported on Precast blocks	187.8	7.50	2	2x1.68	75-77	French BC 30 ton	Fair
55	Bidbid-Sur	Rectangular Precast beam with continuous RC slab supported on Precast blocks	61.8	7.50	2	2x1.68	75-77	French BC 30 ton	Fair
56	Bidbid-Sur	Rectangular Precast beam with continuous RC slab supported on Precast blocks	250.8	7.50	2	2x1.68		French BC 30 ton	Fair
57	Bidbid-Sur	Rectangular Precast beam with continuous RC slab supported on Precast blocks	145.8	7.50	2	2x1.68		French BC 30 ton	Fair
58	Bidbid-Sur	Rectangular Precast beam with continuous RC slab supported on Precast blocks	145.8	7.50	2	2x1.68		French BC 30 ton	Fair
59	Taqa-Mirbat	Rectangular Precast beam with continuous RC slab supported on Precast blocks	120	7.50	2	2x1.68		French BC 30 ton	Fair