

PN-ACE-765

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**ARCHITECTURAL PROGRAM
FOR THE
DEVELOPMENT OF A NEW
TRAINING CENTER
Ministry Of Water And Irrigation**

**Jordan
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**Prepared by
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1. INTRODUCTION:

The purpose of this report is to provide guidance on how to develop an effective training center within Jordan's Ministry of Water and Irrigation. It will discuss the views and opinions of concerned officials and trainers at MWI, WAJ and JVA regarding the development of a training capability at the Ministry of Water and Irrigation, and will recommend three options on how to structure the proposed training Center.

The three recommended options will be discussed by MWI, WAJ and JVA, who will, in turn, choose the most suitable one. The chosen option will form the initial basis for a pre-architectural consideration of requirements for the proposed Training Center, to be used later by architectural firms in design studies for the Center.

2. METHODOLOGY OF GATHERING REQUIRED DATA

In order to gather impressions on the potential required size of the facility, and to derive required data and to obtain views about the potential philosophy and programs of the training center, several meetings were held with heads of administrative units at MWI, WAJ and JVA, who are highly knowledgeable about the training needs of their staff. Also, relevant reports were reviewed and visits were made to other existing training centers in Amman.

3. MAJOR FINDINGS:

The following findings were derived from the above mentioned process:

3.1 Main areas for training

- a technical
- b finance and accounting
- c computer
- d management
- e English Language

3.2 Staff Training:

- a. Training for general staff needs to be prioritized in the following order: Technical, Finance & Accounting, English Computer and management
- b Training for Managers needs to be prioritized in the following order Computer, Management, Finance & Accounting, and Technical

3 3 Availability of Training Facilities in Jordan.

There are a number of Jordanian institutes that are providing academic theoretical training that could be of benefit to the Water Authority needs for staff training These institutes which include the Housing Bank Training Center, Institute of Public Administration, The Royal Scientific Society and the Jordan University Center for Consultation, Technical Services and Studies offer courses in Management, Computer and Finance and Accounting

It should be noted here the Water Authority has a Vocational Training Center for Technical Training at Marka However, this Center is currently neglected It has adequate space and potential that could be developed for use in certain workshops and technical training

3.4 Range of The Training Center:

This investigation has revealed that the following courses are needed

- a- computer training,
- b- Finance & Accounting Training
- c- Management Training
- d- Technical Training to include
 - Pumps operation and maintenance of different kinds of pumps
 - Pipes connection and plumbing of P V C , cast iron, small and large diameter pipes and pipes of sewage lines
 - Electrical Installation, maintenance and repair of electrical connections and control panels
 - Chlorination Operation and maintenance of chlorinators and way to handle big cylinders
 - Water Meters Reading, maintenance and fittings

- Materials of Construction Road/Asphalt excavation back filling layers of asphalt
- Mechanical: Maintenance and repair of vehicles, machinery and engines.
- Water quality control workshop.
- Irrigation
- Sedimentation
- Electronics

3.5 Target Groups

Target groups to benefit from the training (according to job categories)

- plant managers
- plant operators pump operators and technicians
- chemists
- meter readers
- clerical staff
- chief clerks
- engineers (serving in technical and managerial capacities)
- administrative staff (accountants and personnel)
- drivers
- casual laborers and guards
- regional and local heads of departments
- top managers

3.6 Training Needs

The training needs according to the above mentioned job categories were found to be as follows

- a All technical plant level personnel from managers down need to be trained initially in basic operations and maintenance and water treatment processes
- b Pump operators and technicians need training preventive maintenance
- c Chemists need a specific course in process control
- d Meter readers need an orientation program in Public Relations, and a course in meter reading
- e All supervisors need a course in basic supervision
- f Regional and central office management staff need management training

- g. All clerical staff require basic skills training in office procedures and filing systems.
- h All staff need a basic orientation course on the goals and goals and purpose of their respective organizations.

3.7 Criteria for selecting the trainers

Heads of sections are to nominate the names of trainees according to their needs in training
Trainers could be from the experienced technicians in WAJ, JVA, MWI or from abroad the more specialized courses

3 8 Number of trainers

According to references in the field of training, effective training requires a ratio of roughly one trainer for every 15-20 participants in a training session

4. OPTIONS FOR THE TYPE OF TRAINING CENTER

In light of all the above, following are three recommended options for the proposed Training Center:

4.1 Option one: A Centralized Comprehensive Training Center

This type of center will cover all needed training including management, computer, accounting and technical training

This type of center will serve provincial cities and small towns across Jordan, and have its own administrative system that will be responsible for all the Center's activities and services. It shall have all the required space for the Center's different activities and services:

- a Space for administration (offices, meeting rooms etc)
- b Space for theoretical training (lecture halls, small classrooms)
- c Spaces for technical training (workshops, storage, lockers, etc)
- d Spaces for services (cafeteria, library, sleeping annex, toilets, storage, boiler room etc)
- e Parking
- f Allowance for future extension as this structure envisages the Center to be a regional one that will serve not only Jordan but the Arab World as well

The following diagram shows a detailed structure for this center

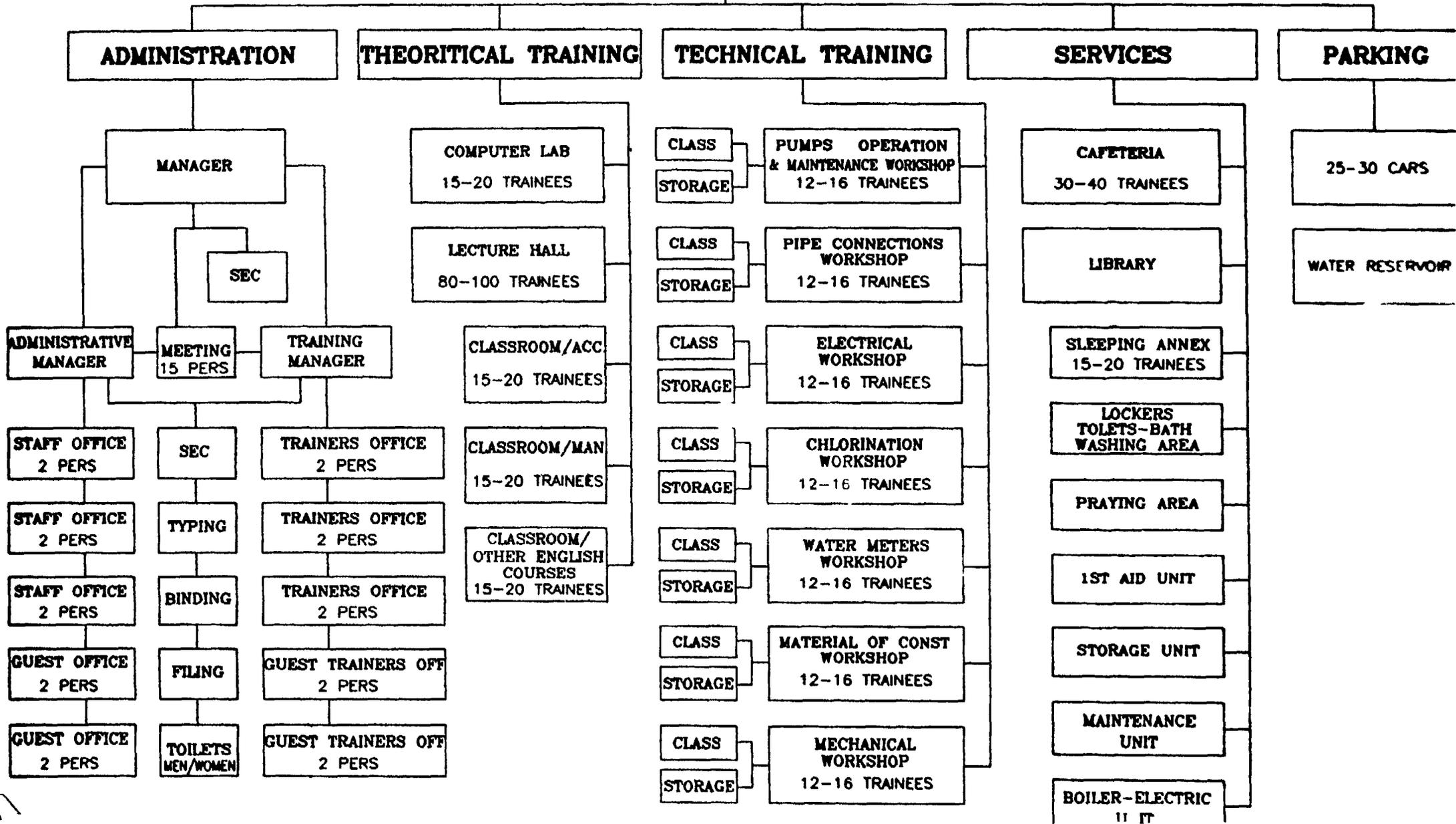
It is to be noted here that there are possible constraints to setting up this type of center. These include

- size
- cost
- acceptance
- staffing *

* staff who are technically strong and who are also able to learn to become trainers are limited in number and are usually needed for supervision

TRAINING CENTER STRUCTURE - OPTION 1

THE TRAINING CENTER



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4.2 Option two: A Centralized Training Center With Linkages To Other Resources

This type of center will focus on offering technical training leaving theoretical training courses to take place in other specialized existing centers, mentioned earlier in this report

This type of center will have:

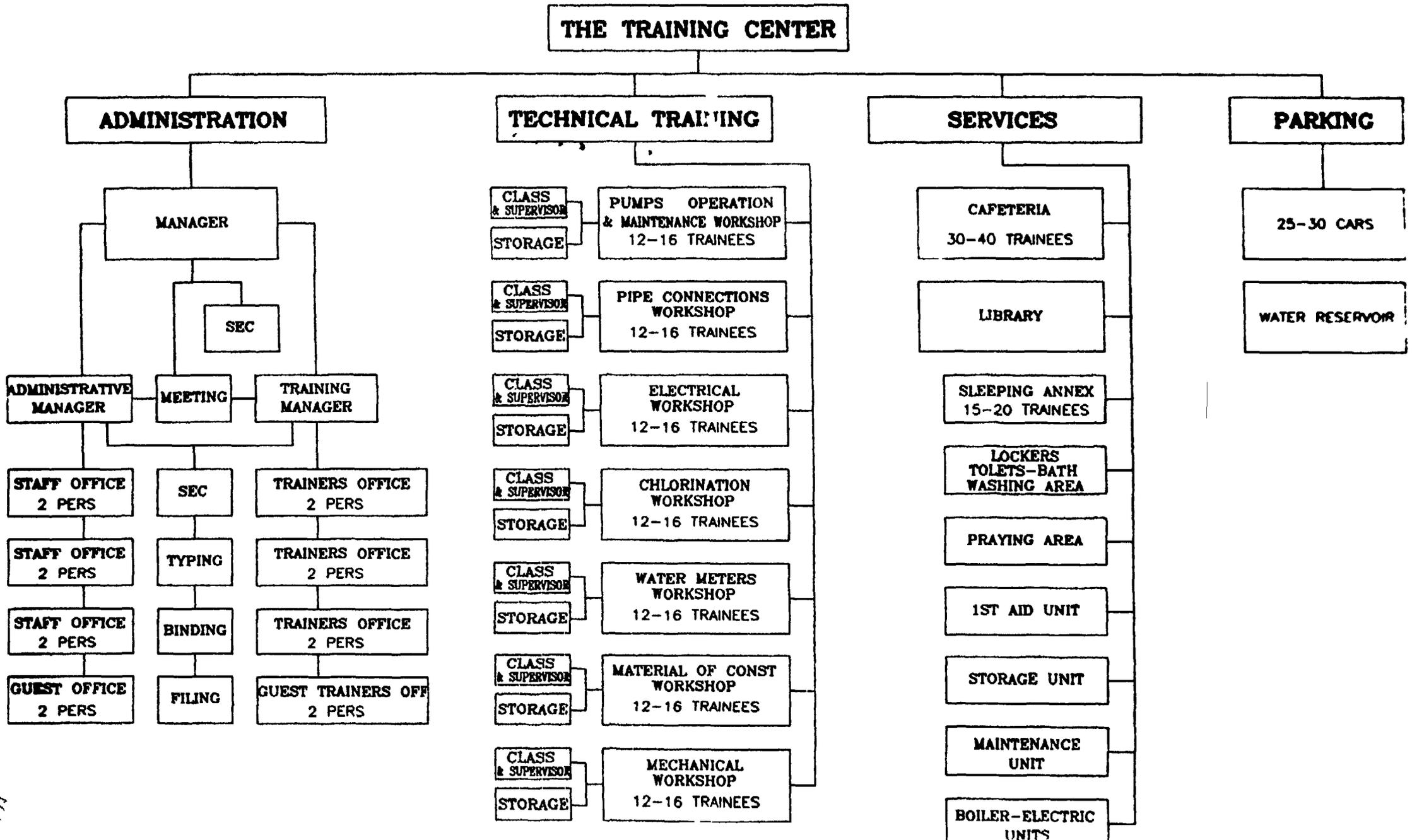
- its own administrative department with all needed office space for managers, staff, trainers, clerks and personnel
- fully equipped workshop facilities for technical training
- small classrooms adjacent to workshops
- needed services (cafeteria, toilets, sleeping annex, parking etc)

The following diagram illustrates a detailed structure for this center

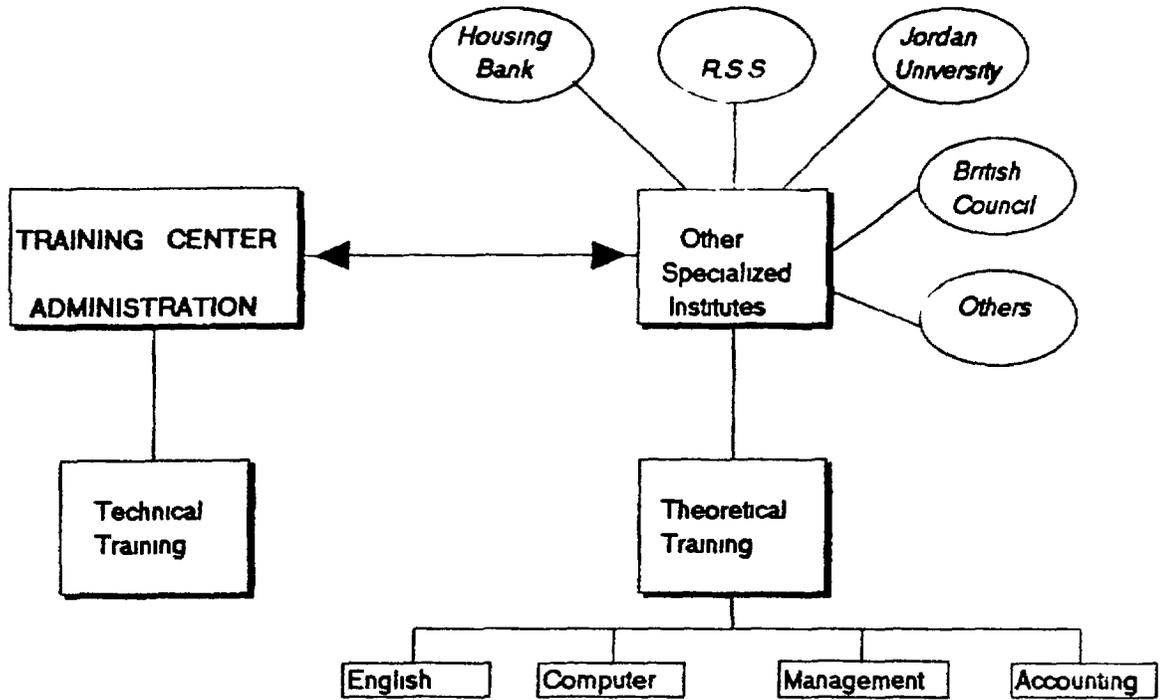
It is to be noted here that there are possible constraints to setting up this type of structure These include

- Cost fully equipped workshops will have a high cost
- Feasibility the number of trainees in such a small country like Jordan will not justify the high cost involved in establishing and running such a training center

TRAINING CENTER STRUCTURE - OPTION 2



STRATEGY OF TRAINING OPTION (2)



Strategy for option (2)

~Notice how all theoretical training is not under the activities of the main center~

Water quality laboratory testing chemical & biological analyses will be excluded from the center to be On Job Training at the existing water laboratory of WAJ at Wadi Al Seer

4.3 Option three: A Training Center Linked To Satellite Stations.

This type of structure will focus on both technical and theoretical training. It will have its own administrative structure and services but will follow a different strategy from Options One and Two above.

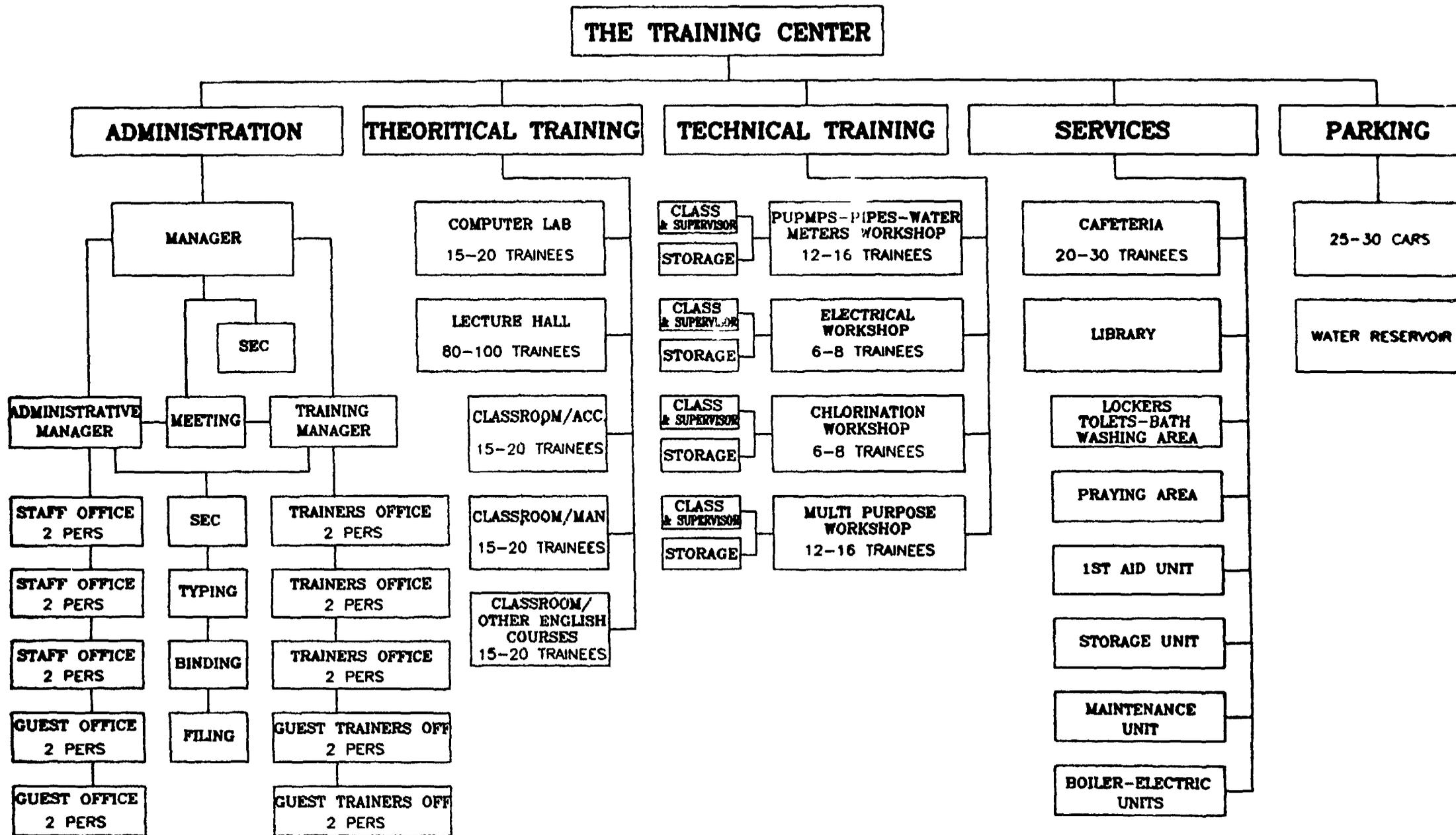
This Center will focus on Training of Trainers either by bringing them to the Center or by training them in the satellite stations through the support of training specialists from the Center.

This strategy of decentralization means that a mechanism to support the training needs of the satellites must be put in place and a focus on the improvement of the satellite stations in terms of space and facilities for training must be adhered to. This will involve creating a training network to support training, and using a mobile training units

This options enjoys the advantage of being the most economical to set up and implement. Its provides the opportunity to develop regional capability in training

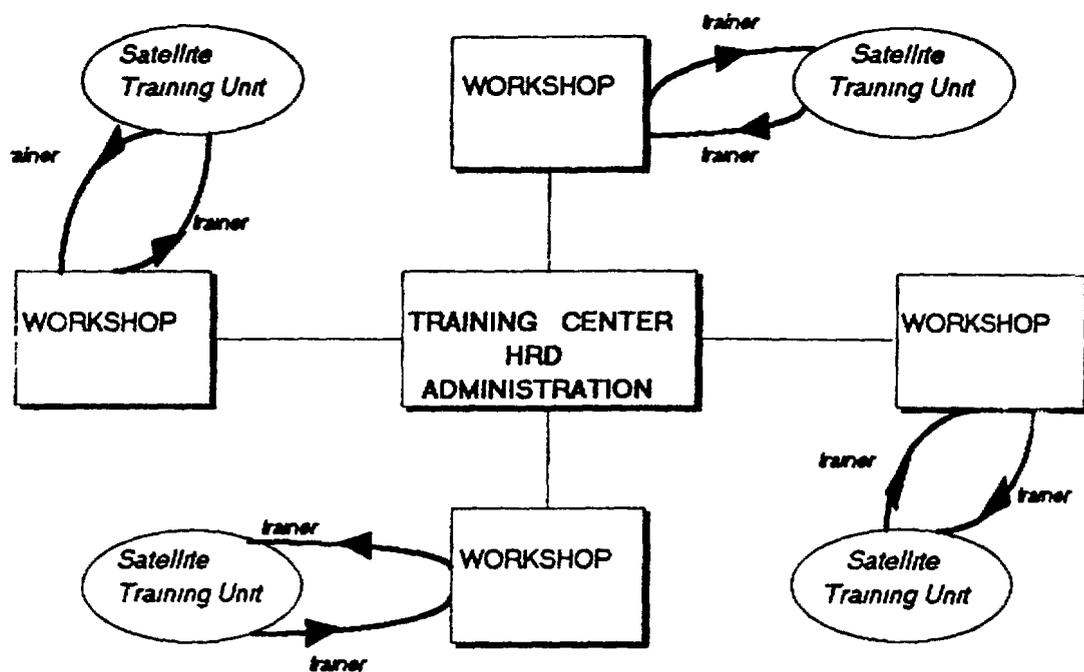
The following diagram shows a detailed structure for this option

TRAINING CENTER STRUCTURE - OPTION 3



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STRATEGY OF TRAINING OPTION (3)



Strategy for option (3)

- To be run under the H.R.D. Unit
- To train trainers
- To focus on satellite training units supported by the main (training center)
- To minimize the number of workshops to meet the current needs of the of the Water Authority in Jordan
- Workshops to be as flexible as possible to changes in function

Mechanical workshop /maintenance and repair for vehicles machines/ will be excluded from the center to be On Job Training at the existing mechanical workshops of WAJ at Ras al Ein

Water quality laboratory testing chemical & biological analyses will be excluded from the center to be On Job Training at the existing water laboratory of WAJ at Wadi Al Seer

5. ARCHITECTURAL PROGRAM

5.1 Factors Affecting The Program

Once the desired option is chosen, the following needs to be defined:

- a What the courses need in terms of buildings and spaces
- b Types of spaces needed
- c Floor areas needed
- d. Equipment needed
- e Services needed
- f Total area needed for the Center
- g The cost

5.2 Areas Required for The Training Center

In order to determine the total area required for the proposed training center, the space needed for each activity were concluded according to references dealing with space data requirements

The proposed training center comprise the following activities,

- 1- Administration
- 2- Theoretical training
- 3- Technical training/ Workshops
- 4- Services
- 5- Parking
- 6- Balance area

5 3 General points considered in Area determination

* When determining the area for administration it should be borne in mind ,that many of the staff are part-time and therefore provisions needs to be worked out pro-rata with the number of hours worked and that some sharing may be involved A part time member of staff may need as much secure storage space as a full time staff member

* Theoretical training could take place in big lecture halls, in small classrooms or in the provided spaces adjacent to the workshops This will depend on the number of trainees and on the course type

*The Workshop is a major activity in the training center Planning for these workshops will be discussed in more detail in a separate section

* Services, parking and balance area follow typical standards and regulations

5.4 Planning of Workshops

The planning and management of workshops in training centers are concerned with the function and purpose of these workshops. For the benefit of training the administration staff of the training centers, chief instructors and teachers should be involved in the design along with the architects. It is important to have coordination between trainers and the architects right from the early stages of planning.

1- Workshop purpose

The shape and size of a workshop, the kind of equipment and its location in the workshop, depends primarily on the purpose which the workshop is established for

The brief to the architect should include the maximum number of pupils expected to use the workshop, the facilities to be provided and the equipment and processes involved

2- The cost

This is an inevitable factor in workshop planning. Many of the plans were not implemented due to the lack of funds.

Therefore a suitable plan should be a reasonable one that can be implemented.

3- Flexibility

The change and innovation according to the new demands affect the layout of machines and workshops organization.

There is advantage in spaces not being too closely geared to or committed to specific uses.

High ceiling - clear spans - and ease of removing, adding or changing furniture, equipment and services, should be aimed at.

The modern tendency is to make as much equipment as possible portable; even quite heavy equipment can nowadays be fitted with casters and supplied from flexible electrical sources so that they can be removed from the teaching spaces when not in use.

4- Space and movement

The overall area of the workshop is calculated on the basis of the following elements,

- Number of trainees
- Work area
- Machines and equipment
- Material store
- Instructor office
- Classroom area

Space should be allowed for effective movement, and adequate supervision and appropriate lighting should be provided.

5- Resemblance grade to real work in the future

A prototype situation should take place during the training period

6- Safety

Safety considerations should be taken into account from the very first stages of building planning

So, planners are requested to foresee accidents and the sources of the danger, to take them into account and minimize accidents

5.6 Area And Shape Of The Workshops

The total area of the workshop can be calculated during the design stage by taking the following three points into consideration

1- Work area as the required area for machines plus the necessary area which allows the students to move around it without hindrance

The machinery and furniture should be so arranged as to enable the different processes to be undertaken in definite zones within the workshop. An adequate free area around each piece of equipment and furniture is required to give the operator safe working space

The total area equals the sum of

- Area required for the machines
- Area for the student to move around

2- Area of passages

The size of passage is determined according to the kind of training, eg electronic workshops need narrow passages whilst auto-mechanic

3- Classrooms, stores, offices and bathrooms

The total area of these places, added to the total working area and the passages, gives the total area of the workshop.

The location of the store, instructor office, and the classroom is also an important factor. The location and area should be in a position to contribute positively and effectively to the interest of the training operation

5.7 Area Standards For Activities

A table showing area standards for typical activities and a typical workshop layout can be found in Appendix -B- .

5.8 Space Requirements and Cost

The estimated space requirements and estimated cost for each of the three options are given in Appendix -A- . Also shown in the Appendix -A- is a table which compares between the area and cost of the three proposed options

APPENDIX - A -

SPACE REQUIREMENTS
ESTIMATED COST
COMPARISON

OPTION (1)

Centralized Comprehensive Center

SPACE REQUIREMENTS

Type of Unit	No Of Units	Area / Unit m2		Total area m2
A- Administration				
General manager	1	32		32
Secretary & Waiting area	1	25		25
Meeting room	1	45		45
Training Manager	1	24		24
Trainer office	3	16		48
Guest trainer office	2	16		32
Administration manager	1	24		24
Staff office	3	16		48
Guest Office	2	16		32
Secretary	1	12		12
Typing	1	6		6
Filing	1	6		6
Binding	1	6		6
Private toilet for manager	1	4		4
Toilet for staff / men	1	10		10
Toilet for staff / women	1	8		8
Entrance lobby	1	30		30
Teaching aid room	1	20		20
				412
Circulation area + walls	(15 % of Total area)			62
			TOTAL AREA	474
B- Theoretical Training				
Computer lab	2	45		90
Lecture hall	1	100		100
Classroom	3	24		72
				262
Circulation area + walls	(15% of Total area)			39
			TOTAL AREA	301
C- Technical Training				
Pumps workshop	1	240		240
Pipes workshop	1	240		240
Electrical workshop	1	240		240
Chlorination workshop	1	184		184
Water meters workshop	1	184		184
Material of Construction	1	184		184
Mechanical workshop	1	300		300
** Classrooms supervisor office storage passages area included				1572
Circulation area + walls	(15% of Total area)			236
			TOTAL AREA	1808

Type of Unit	No Of Units	Area / Unit m2		Total area m2
D- Services				
Cafeteria service/kitchen	1	100	Total area	100
Library	1	48		48
Sleeping annex				210
-Bedroom(4 occupants)	4	16		64
-Managers flat	1	50		50
-Living room reception	1	30		30
-Sick room	1	10		10
-Locker spaces	16	1		16
-Shower	4	2		8
-Wash basins	4	1		4
-WC	4	2		8
-Urinals	4	1		4
-Laundry	1	10		10
-Kitchen	1	6		6
WC for trainees (2 women 7 men)	9	2		18
Wash basins (2 women 7 men)	9	1		9
Urinals	6	1		6
Praying area & washing	1	30		30
First aid unit	1	15		15
Storage unit	1	100		100
Maintenance unit	1	12	12	
Boiler	1	40	40	
Electrical room	1	10	10	
Guard room & toilet	1	20	20	
			618	
Circulation area + walls (15% of Total area)			93	
TOTAL AREA				711
E- Parking	30	30		900 ⁰
F- Water reservoir ((50 cubic meter))				

SUMMARY OF AREA REQUIREMENTS FOR OPTION (1)					
Administration m2	Theoretical m2	Technical m2	Services m2	Parking m2	Total m2
474	301	1808	7107	900	4194
474	301	1808	7107	*****	3294

ESTIMATED COST

Following local material prices and local building cost (1994)

Space type	Area (m2)	Cost JD/m2	Total Cost
			JD
Main Building	3294	250	823425
Parking	900	100	90000
Water reservoir			4000
Total cost			917425

OPTION (2)

Centralized Center with linkages to other resources

SPACE REQUIREMENTS

Type of Unit	No Of Units	Area / Unit m2		Total area m2
A- Administration				
General manager	1	32		32
Secretary & Waiting area	1	25		25
Meeting room	1	45		45
Training Manager	1	24		24
Trainer office	3	16		48
Guest trainer office	1	16		16
Administration manager	1	24		24
Staff office	3	16		48
Guest Office	1	16		16
Secretary	1	12		12
Typing	1	6		6
Filing	1	6		6
Binding	1	6		6
Private toilet for manager	1	4		4
Toilet for staff / men	1	10		10
Toilet for staff / women	1	8		8
Entrance lobby	1	30		30
Teaching aid room	1	20		20
				380
Circulation area + walls	(15 % of Total area)			57
TOTAL AREA				437
B- Technical Training				
Pumps workshop	1	240		240
Pipes workshop	1	240		240
Electrical workshop	1	240		240
Chlorination workshop	1	184		184
Water meters workshop	1	184		184
Material of Construction	1	184		184
Mechanical workshop	1	300		300
** Classrooms supervisor office storage passages area included				1572
Circulation area + walls	(15% of Total area)			236
TOTAL AREA				1808

Type of Unit	No Of Units	Area / Unit m2		Total area m2
C- Services				
Cafetera service/kitchen	1	100	Total area	100
Library	1	48		48
Sleeping annex				210
-Bedroom(4 occupants)	4	16		64
-Managers flat	1	50		50
-Living room reception	1	30		30
-Sick room	1	10		10
-Locker spaces	16	1		16
-Shower	4	2		8
-Wash basins	4	1		4
-WC	4	2		8
-Urinals	4	1		4
-Laundry	1	10		10
-Kitchen	1	6		6
WC for trainees (1 women 4 men)	5	2		10
Wash basins (1 women 4 men)	5	1		5
Urinals	5	1		5
Praying area & washing	1	30		30
First aid unit	1	15		15
Storage unit	1	100		100
Maintenance unit	1	12		12
Boiler	1	40	40	
Electrical room	1	10	10	
Guard room & toilet	1	20	20	
			605	
Circulation area + walls (15% of Total area)			91	
TOTAL AREA				696
D- Parking	25	30		750
E- Water reservoir ((50 cubic meter))				

SUMMARY OF AREA REQUIREMENTS FOR OPTION (2)					
Administration m2	Theoretical m2	Technical m2	Services m2	Parking m2	Total m2
437		1808	696	750	3691
437		1808	696	*****	2941

ESTIMATED COST

Following local material prices and local building cost (1994)

Space type	Area (m2)	Cost JD/m2	Total Cost JD
Main Building	2941	250	735188
Parking	750	100	75000
Water reservoir			4000
		Total cost	814188

OPTION (3)

Centralized Center with linkages to Satellite Stations

SPACE REQUIREMENTS

Type of Unit	No Of Units	Area / Unit m2		Total area m2
A- Administration				
General manager	1	32		32
Secretary & Waiting area	1	25		25
Meeting room	1	45		45
Training Manager	1	24		24
Trainer office	3	16		48
Guest trainer office	2	16		32
Administration manager	1	24		24
Staff office	3	16		48
Guest Office	2	16		32
Secretary	1	12		12
Typing	1	6		6
Filing	1	6		6
Binding	1	6		6
Private toilet for manager	1	4		4
Toilet for staff / men	1	10		10
Toilet for staff / women	1	8		8
Entrance lobby	1	30		30
Teaching aid room	1	20		20
				412
Circulation area + walls	(15% of Total area)			62
			TOTAL AREA	474
B- Theoretical Training				
Computer lab	2	45		90
Lecture hall	1	100		100
Classroom	3	24		72
				262
Circulation area + walls	(15% of Total area)			39
			TOTAL AREA	301
C- Technical Training				
Pumps pipes water meter	1	300		300
Electrical workshop	1	240		240
Chlorination workshop	1	184		184
Multipurpose workshop	1	240		240
				964
** Classrooms supervisor office storage passages area included				
Circulation area + walls	(15% of Total area)			145
			TOTAL AREA	1109

Type of Unit	No Of Units	Area / Unit m2		Total area m2
D- Services				
Cafeteria service/kitchen	1	100		100
Library	1	48		48
W C for trainees (1 women 6 men)	7	2		14
Wash basins (1 women 6 men)	7	1		7
Urinals	7	1		7
Praying area & washing	1	30		30
First aid unit	1	15		15
Storage unit	1	100		100
Maintenance unit	1	12		12
Boiler	1	30		30
Electrical room	1	10		10
Guard room & toilet	1	20		20
				393
Circulation area + walls (15% of Total area)				59
TOTAL AREA				452
E- Parking	21	30		630
F- Water reservoir ((50 cubic meter))				

SUMMARY OF AREA REQUIREMENTS FOR OPTION (3)					
Administration m2	Theoretical m2	Technical m2	Services m2	Parking m2	Total m2
474	301	1109	452	630	2966
474	301	1109	452	*****	2336

ESTIMATED COST

Following local material prices and local building cost (1994)

Space type	Area (m2)	Cost JD/m2	Total Cost JD
Main Building	2336	250	583988
Parking	630	100	63000
Water reservoir			4000
Total cost			650988

This table illustrates a comparison for total area and cost between the three options.

	<i>Total area m2</i>		<i>Total cost JD</i>
<i>Option (1)</i>	<i>4194</i>		<i>917 425</i>
<i>Option (2)</i>	<i>3691</i>		<i>814 188</i>
<i>Option (3)</i>	<i>2966</i>		<i>650 988</i>

APPENDIX - B -

STANDARDS FOR TYPICAL ACTIVITIES
TYPICAL LAYOUT FOR A WORKSHOP

The following table shows Area standards for typical activities

Space Type	Area standard (m ²)
Administration	
-Manager's office	25 - 30
-Secretary & waiting room	25 - 30
-Secretary without waiting room	10 - 12
-Staff office - independent	12 - 16
-Staff office - shared room	20 - 25
-Head of department office	20 - 25
- Files, binding, typing	3 6 - 5 92 for each activity
-Meeting room	2 5 m ² per person
-Toilet, private	4 0 m ² per person
-Toilet for staff/ women	4 0 m ² per 3 persons
-Toilet for staff/ men	4 0 m ² per 3 persons
-Entrance lobby & information	25 - 30 m ²
Theoretical teaching	
- Lecture theaters and close seating arrangements	1 0
- Students seated at tables or in informal groups	1 8- 2 1
- Demonstration facilities and students seated at large tables	2 5-3 0
- Teaching aids room	20 m ²
Technical training	
- Workshops	
Light occupations	6 0-8 5
Electronic / Electrical	7 5-12 0
Heavy	10 0-15 0
Multi craft	4 0 - 6 0
Services	
-Dining hall for 30 seats	1 02 m ² /person
-Snack bar area	1 48-2 15 m ² /seat
-Service area for snack bar	25-25 % of total area
-Net kitchen area	15-25 % of total area
-Library	1 5- 2 classroom size
-First aid unit	15-20 m ²
-W C per 3 persons	1
-Wash basin per 2 persons	1
-Praying room	1 5-2 0 m ² /person
-wash area	10 m ²
-Maintenance area	10-12 m ²

Hostel Unit

For shared bedrooms for 2-4 persons

-Space per bed	3 7-4 0 m ²
-Manager's flat	50 - 75 m ²
-Sick room for 30-40 bed	9-10 m ²
-Locker space/bed	1 m ²
-Wash basin/ 2-3 beds	1 m ²
-Shower per 10-15 beds	1 m ²
-Bath per 20-25 beds	1 m ²
-W C per 8-10 beds	1 m ²
-Urinals per 8-10 beds	1 m ²
-Laundry	10 m ²

Parking

- One car for every 100 m ²	
- Car parking space	15 m ² /car
- Car circulation space	15 m ² /car

Layout Numbering Key

Item No	Item Title	Item No	Item Title
1	Instructor Desk	10	Central Heating Installation booth
2	Swivel Chair	11	Power Drive Threader
3	Filing cabinet	12	Plumbing Training booth
4	First Aid Cabinet	13	Domestic Bathroom
5	Storage Shelf	14	Boiler Room
6	Storage Cabinet	15	Drill Press
7	Blackboard	16	Work Bench
8	Demonstration Bench	17	Grinder
9	Tablet Chair		

R E F E R E N C E S

List of members of MWI, WAJ, JVA, met with during the course of preparing this study.

Mr Qusai Quteishat

Dr Muwaffaq Al Saqqar.

Mr Bassam Al Tal

Mr Fawzi Abu Niaaj.

Mr Mazen Al Saket

Mr Al Juneidy

Mr Muhammad Al Hanbaly

Reports and References

- 1- WASH Report & 68
- 2- Training Needs Assessment for the Ministry of Water and Irrigation
- 3- Two annual reports by the Water Authority 1991 - 1992.
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- 11- Neufert Data Standards.
- 12- Time Saver Data Standards
- 13- British Standards