10. PROJECT COSTS

10.1 Construction Cost of Total Complex

10.2 Consultant Service Fee and Cost

10.3 Cost Breakdown Table

10.1 Construction Cost of Total Complex

10.1.1 Cost Plan

Hospital zone	SR	US$
Cancer Center	163,670,000	47,750,000
Joint-Use	327,190,000	95,430,000
General Hospital	182,306,000	53,173,000
Utilities Center	156,220,000	45,580,000
Parking Buildings	207,980,000	60,660,000
Mosque	14,780,000	4,310,000
Overnight Accommodation	12,310,000	3,590,000
External Works	30,840,000	9,010,000
Emergency Control Center	578,000	169,000
Medical Equipment (CC+J.U)	214,290,000	62,500,000
(GH)	54,430,000	15,875,000
Management Equipment (CC+J.U)	41,540,000	12,120,000
(GH)	7,529,000	2,196,000
Hospital Zone Total	(1,413,663,000)	(412,363,000)
Housing zone		
Housing	219,490,000	64,010,000
Recreation Center	8,630,000	2,520,000
External Works	33,800,000	9,860,000
Housing Zone Total	(261,920,000)	(76,390,000)
Grand Total	1,675,583,000	488,753,000

10.1.2 Cost Analysis

Construction costs for this project consist of the following facilities:

A. Hospital zone

CANCER CENTER	Cancer Center area of the main hospital (21,470 m²)
JOINT-USE FACILITIES	Joint-use area of the main hospital and the General Clinic (45,450 m²)
GENERAL HOSPITAL	General Hospital area of the main hospital (28,220 m²)
UTILITIES CENTER	Buildings and utility services of the utilities center, warehouse, waste water treatment facilities, oil tank, trench and water tower (7,080 m²)
PARKING BUILDING	Parking area of the main hospital and the General Clinic (95,800 m²)
MOSQUE	Building for the mosque in the hospital zone (1,100 m²)
OVERNIGHT ACCOMMODATION	Building for the overnight accommodation in the hospital zone (2,910 m²)
EMERGENCY CONTROL CENTER	(110 m²)
EXTERNAL WORKS	Roads exterior parkings, fences and gates, gardens and guard houses in (130 m²) in the hospital zone

Total Floor Area of Hospital zone: 202,270 m²

B. Housing zone

HOUSING	Housing for doctors, nurses, administration and paramedical staff (52,450 m²)
RECREATION CENTER	Building for restaurant, bank and shops (1,040 m²)
EXTERNAL WORKS	Roads, exterior parkings, fences and gates, gardens and guard houses(30 m²) in the housing zone

Total Floor Area of Housing zone: 53,520 m²

C. Total Floor Area of Hospital Complex: 255,790 m²

10.1.3 Cost Control and Estimating System

The main items for this cost plan are as follows:

ARCHITECTURAL	Site work, earthworks, structure, exterior finishes, interior finishes and specialities
ELECTRICAL	Serivce and distribution, lighting and special electrical systems
SANITARY AND PLUMBING	Plumbing, fire protection and special mechanical & sanitary systems
HVAC	Heat and cooling systems, distribution systems and special Air-Conditioning systems
CONVEYING SYSTEMS	Elevators, dumbwaiters and pneumatic tube systems
MEDICAL EQUIPMENT	Cancer Center + Joint-Use departments and General Hospital
MANAGEMENT EQUIPMENT	Computer system without software and file management system

(NOTE) 1. Escalation is not considered.

2. ZAKAT and TAX are not included.

10.2 Consultant Service Fee and Cost

Total service fee and cost: SR76 million

A. Detail design fee and cost (including Tender Assistance Service)

SR34.5 million

B. Supervising Service and one year maintenance service after completion of project, fee and cost

SR41.5 million

(NOTE) 1. Estimation of Consultant service fee and cost is shown as standard figures.

2. Escalation is not considered.

3. ZAKAT and TAX are not included.

4. General conditions and conditions of contract will be provided in both English and Arabic texts, but other tender documents will be provided only in the English text.

10.3 Cost Breakdown Table

Construction Cost of Total Complex

	BLOCK TOTAL		ARCHITECTURAL		ELECTRICAL		SANITARY & PLUMBING		HVAC		ELEVATOR & LIFT		FURNITURE & EQUIPMENT		MEDICAL & MANAGEMENT EQUIPMENT		EXTERNAL WORKS	
	SR	US$	SR	US$	SR	US$	SR	US$	SR	US$	SR	US$	SR	US$	SR	US$	SR	US$
Hospital zone																		
CANCER CENTER	163,670,000	47,750,000	104,000,000	30,330,000	18,610,000	5,430,000	13,910,000	4,060,000	16,780,000	4,900,000	2,300,000	670,000	8,070,000	2,360,000				
JOINT USE FACILITY	327,190,000	95,430,000	197,590,000	57,630,000	39,580,000	11,540,000	29,920,000	8,730,000	35,590,000	10,380,000	6,930,000	2,020,000	17,580,000	5,130,000				
GENERAL HOSPITAL	182,306,000	53,173,000	110,611,000	32,262,000	20,089,000	5,859,000	14,350,000	4,185,000	23,252,000	6,782,000	4,286,000	1,250,000	9,718,000	2,835,000				
UTILITIES CENTER	156,220,000	45,580,000	54,640,000	15,940,000	47,200,000	13,770,000	24,020,000	7,010,000	29,210,000	8,520,000	470,000	140,000	680,000	200,000				
PARKING BUILDING	207,980,000	60,660,000	154,720,000	45,130,000	27,430,000	8,000,000	18,790,000	5,480,000	6,490,000	1,890,000	550,000	160,000						
MOSQUE	14,780,000	4,310,000	12,850,000	3,750,000	410,000	120,000	520,000	150,000	1,000,000	290,000								
OVERNIGHT ACCOMMODATIONS	12,310,000	3,590,000	5,010,000	1,460,000	1,590,000	460,000	1,380,000	400,000	2,630,000	770,000	480,000	140,000	1,220,000	360,000				
EXTERNAL WORKS	30,840,000	9,010,000			6,670,000	1,950,000	2,420,000	710,000	1,200,000	350,000							20,550,000	6,000,000
EMERGENCY CONTROL CENTER	578,000	169,000	301,000	88,000	132,000	38,000	56,000	16,000	77,000	23,000			12,000	4,000				
MEDICAL EQUIPMENT (CC+J.U)	214,290,000	62,500,000													214,290,000	62,500,000		
(GH)	54,430,000	15,875,000													54,430,000	15,875,000		
MANAGEMENT EQUIPMENT (CC+J.U)	41,540,000	12,120,000													41,540,000	12,120,000		
(GH)	7,529,000	2,196,000													7,529,000	2,196,000		
(SUB TOTAL)	(1,413,663,000)	(412,363,000)	(639,722,000)	(186,590,000)	(161,711,000)	(47,167,000)	(105,366,000)	(30,741,000)	(116,229,000)	(33,905,000)	(15,016,000)	(4,380,000)	(37,280,000)	(10,889,000)	(317,789,000)	(92,691,000)	(20,550,000)	(6,000,000)
Housing zone																		
HOUSING																		
VILLA	21,740,000	6,340,000	15,960,000	4,650,000	2,020,000	590,000	430,000	130,000	1,090,000	320,000			2,240,000	650,000				
	(1,811,667)	(528,333)	(1,330,000)	(387,500)	(168,333)	(49,167)	(35,833)	(10,833)	(90,833)	(26,667)			(186,667)	(54,167)				
MARRIED — DOCTOR*2	59,780,000	17,440,000	39,560,000	11,540,000	6,350,000	1,850,000	1,520,000	440,000	3,800,000	1,110,000	1,660,000	490,000	6,890,000	2,010,000				
	(19,926,667)	(5,813,333)	(13,186,667)	(3,846,667)	(2,116,667)	(616,667)	(506,667)	(146,667)	(1,266,667)	(370,000)	(553,333)	(163,333)	(2,296,667)	(670,000)				
MARRIED — PARAMEDICAL*3	18,900,000	5,520,000	13,480,000	3,930,000	1,490,000	440,000	510,000	150,000	1,270,000	370,000	550,000	160,000	1,600,000	470,000				
	(18,900,000)	(5,520,000)	(13,480,000)	(3,930,000)	(1,490,000)	(440,000)	(510,000)	(150,000)	(1,270,000)	(370,000)	(550,000)	(160,000)	(1,600,000)	(470,000)				
SINGLE MALE*4	27,910,000	8,130,000	14,300,000	4,170,000	2,550,000	740,000	1,920,000	560,000	4,800,000	1,400,000	1,110,000	320,000	3,230,000	940,000				
	(27,910,000)	(8,130,000)	(14,300,000)	(4,170,000)	(2,550,000)	(740,000)	(1,920,000)	(560,000)	(4,800,000)	(1,400,000)	(1,110,000)	(320,000)	(3,230,000)	(940,000)				
FEMALE — SENIOR NURSE*5	25,650,000	7,480,000	16,440,000	4,790,000	1,680,000	490,000	1,010,000	300,000	2,530,000	740,000	1,110,000	320,000	2,880,000	840,000				
	(12,825,000)	(3,740,000)	(8,220,000)	(2,395,000)	(840,000)	(245,000)	(505,000)	(150,000)	(1,265,000)	(370,000)	(555,000)	(160,000)	(1,440,000)	(420,000)				
FEMALE — JUNIOR NURSE*6	47,420,000	13,830,000	20,590,000	6,010,000	3,960,000	1,150,000	5,430,000	1,580,000	13,580,000	3,960,000	520,000	150,000	3,340,000	980,000				
	(47,420,000)	(13,830,000)	(20,590,000)	(6,010,000)	(3,960,000)	(1,150,000)	(5,430,000)	(1,580,000)	(13,580,000)	(3,960,000)	(520,000)	(150,000)	(3,340,000)	(980,000)				
FEMALE — PARAMEDICAL*7	18,090,000	5,270,000	8,600,000	2,510,000	1,320,000	380,000	1,810,000	530,000	4,530,000	1,320,000	520,000	150,000	1,310,000	380,000				
	(18,090,000)	(5,270,000)	(8,600,000)	(2,510,000)	(1,320,000)	(380,000)	(1,810,000)	(530,000)	(4,530,000)	(1,320,000)	(520,000)	(150,000)	(1,310,000)	(380,000)				
HOUSING	219,490,000	64,010,000	128,930,000	37,600,000	19,370,000	5,640,000	12,630,000	3,690,000	31,600,000	9,220,000	5,470,000	1,590,000	21,490,000	6,270,000				
RECREATION CENTER	8,630,000	2,520,000	5,560,000	1,620,000	760,000	220,000	640,000	190,000	940,000	270,000	10,000	10,000	720,000	210,000				
EXTERNAL WORKS	33,800,000	9,860,000			9,780,000	2,850,000	2,080,000	610,000	30,000	10,000							21,910,000	6,390,000
(SUB TOTAL)	(261,920,000)	(76,390,000)	(134,490,000)	(39,220,000)	(29,910,000)	(8,710,000)	(15,350,000)	(4,490,000)	(32,570,000)	(9,500,000)	(5,480,000)	(1,600,000)	(22,210,000)	(6,480,000)			(21,910,000)	(6,390,000)
TOTAL	1,675,583,000	488,753,000	774,212,000	225,810,000	191,621,000	55,877,000	120,716,000	35,231,000	148,799,000	43,405,000	20,496,000	5,980,000	59,490,000	17,369,000	317,789,000	92,691,000	42,460,000	12,390,000

*1: 2 UNITS x 12 BLOGS *2: 28 UNITS x 3 BLOGS *3: 28 UNITS x 1 BLDG *4: 112 UNITS x 1 BLOG

*5: 56 UNITS x 2 BLOGS *6: 300 RM x 1 BLDG *7: 100 RM x 1 BLDG

REMARKS: Exchange rate ¥240 = US$1, ¥70 = SR.1. NOTE: ( ): /BLDG

APPENDICES

Appendix O-1 Meteorological Data in Jeddah

PROVISIONAL NORMALS
(1966-80)

STATION: JEDDAH LAT. 21°31'N LONG. 39°12'E ELEVATION: 17 Meters

MONTH	TEMPERATURE (DEGREES CELSIUS)									MEAN VAPOUR PRESSURE (MB)	% RELATIVE HUMIDITY			WIND				PRESSURE (MBS)				PRECIPITATION (MM)					NUMBER OF DAYS WITH						
	MEAN																														
	DAILY			MONTHLY		EXTREME												STATION LEVEL			MEAN SEA LEVEL										
	MAX	MIN	MEAN	MAX	MIN	HIGH EST MAX TEMP	HIGH EST MAX DT	LOW EST MIN TEMP	LOW EST MIN DT		MAX	MIN	MEAN	PREVAILING DIRECTION	MEAN SPD (KT)	EXTREME WIND SPD (KT.)	EXTREME WIND DIRN (DEG.)	MAX	MIN	MEAN		MEAN MONTHLY TOTAL	MAXIMUM IN A MONTH AMT	MAXIMUM IN A MONTH DT	MAXIMUM IN 24 HOURS AMT	MAXIMUM IN 24 HOURS DT	THUNDER STORM	DUST/SAND STORM	PRECIPITATION*	MIST	FOG	BLOWING DUST	HAZE
JAN	28.5	18.9	23.3	32.2	14.2	34.0	1977 30	11.4	1977 20	17.0	100	12	66	N	09	38	070° 280°	1021.2	1002.2	1012.2	1013.8	23.6	124.7	1969	80.0	1979 16	1.4	0.6	2.8	2.3	0	5.2	7.7
FEB	29.3	18.9	23.9	33.6	14.7	35.4	1977 27	11.6	1972 07	17.5	96	10	60	N	10	48	250° 170°	1018.7	1003.1	1011.2	1012.9	11.1	98.9	1971	85.9	1971 04	0.3	0.5	2.5	2.1	0.1	6.7	7.6
MAR	31.0	20.5	25.4	36.5	16.1	40.2	1980 26	14.0	1974 02	19.3	98	05	58	N-NNW	08	46	190°	1019.8	997.4	1009.3	1010.9	0.4	3.0	1974	3.0	1974 18	0.2	1.3	0.3	2.2	0.3	9.8	14.2
APR	33.3	22.2	27.4	39.0	17.1	44.5	1979 03	14.4	1977 01	20.4	98	07	57	N-NNW	08	46	170°	1016.0	1000.4	1007.1	1008.8	7.3	93.0	1968	88.0	1968 17	0.3	1.0	0.7	2.0	0.3	8.0	11.1
MAY	35.4	24.5	29.7	40.3	19.9	48.2	1970 22	16.4	1971 25	23.5	100	10	57	N-NNW	08	36	120°	1012.4	998.5	1005.4	1007.1	1.5	20.0	1976	20.0	1976 17	0.3	0.4	0.4	4.0	0.7	6.9	11.2
JUN	36.4	25.3	30.7	43.5	22.3	49.0	1979 24	20.0	1971 04	25.5	100	05	59	N-NNW	08	33	310°	1009.8	996.7	1002.8	1004.4	T	T	1972	T	1972 08	0	0.3	0	6.2	1.3	9.1	14.0
JUL	37.6	26.8	32.0	41.2	23.5	1966/12 43.6 1977/20		21.1	1979 02	26.5	100	11	56	NNW	07	35	140°	1008.4	996.1	1002.1	1003.8	0.1	2.0	1978	2.0	1978 19	0	0.4	0.1	5.3	0.5	4.9	14.5
AUG	37.1	27.2	32.0	40.5	23.9	42.4	1979 13	22.3	1975 15	28.2	100	15	59	N-NW	08	40	040°	1008.4	990.0	1002.4	1004.1	T	T	1975	T	1975 06	0.2	0.3	0	5.2	0.3	5.6	14.0
SEP	35.8	26.1	30.8	40.2	22.7	46.6	1977 30	20.3	1971 29	29.9	100	03	68	N	10	30	340°	1012.7	998.1	1004.4	1006.0	0.1	1.0	1979	1.0	1979 10	0.2	0.3	0.1	7.2	2.2	5.8	15.1
OCT	34.9	24.2	29.1	39.7	20.1	44.5	1977 01	15.6	1975 26	26.9	100	03	67	N	05	36	240°	1013.8	1003.1	1008.2	1009.9	0.5	4.0	1976 1979	1976/04 3.0 1979/18		0.3	0.2	0.3	8.2	2.2	4.6	15.2
NOV	32.5	22.3	27.1	35.5	18.5	37.5	1970 11	15.5	1978 15	22.5	100	09	62	N-NW	06	35	010°	1016.3	1004.2	1010.7	1012.4	15.6	83.0	1972	23.5	1980 06	0.7	0.3	1.9	3.8	0	5.8	8.5
DEC	29.7	20.0	24.7	33.3	15.4	35.0	1978 20	11.4	1971 29	18.8	97	09	60	N	07	40	200°	1020.1	1002.9	1012.5	1014.2	10.2	55.5	1977	55.5	1977 13	0.7	0.3	1.4	9.2	0	3.1	9.2
YEAR	33.5	23.1	28.0	46.4	14.0	49.0	1979 JUN 24	20-1-77 11.4 29-12-71		23.0	100	03	61	N-NNW	08	46	190° 170°	1021.2	990.0	1007.4	1009.0	70.4@	124.7	1969 JAN	88.0	1968 APR 17	4.6	5.9	10.5	59.2	8.1	75.5	142.3

@: Annual Total Precipitation

*: A day with Precipitation Amount ≥ 0.05 mm

Max. portion in a year was 173.0 mm in the year 1968.

Source: Meteorology and Environmental Protection Administration in Jeddah

Appendix O-2 References

Summary of Saudi Arabian Third Five Year Development Plan (Second edition)	Dr. Abdulla Mohammed Sindi and Dr. Ibrahim Fahad Alghofaily
Saudi Arabia Yearbook 1981	The Research & Publishing House Sin el Fil-Lebanon
The Kingdom of Saudi Arabia (6th revised edition embracing 1980-85 plan)	Transworld Arabian Library
The Health of the Family in a Changing Arabia (1st edition)	Zohair A. Sebai

MINUTES OF MEETING ON THE BASIC DESIGN
FOR THE CANCER CENTRE OF THE KINGDOM
OF SAUDI ARABIA

In pursuance to the request made by the Ministry of Health of Saudi Arabia on 24 November 1982, the Japanese study team, headed by Dr. T.Saburi visited Jeddah and had a series of discussions on the Conceptional Design I-2, of the Cancer Centre, in which joint-use of facilities with the proposed General Hospital is taken into account, with the Saudi team, headed by Dr. H.N. Nassief.

1. (1) With regard to the Conceptional Design of the Cancer Centre, both sides agreed to proceed basically with the Alternative III of the 1st Site Plan submitted by the Japanese study team.

(2) The Japanese study team stated that the following comments as well as other minor technical modifications suggested by the Saudi side will be incorporated in the subsequent basic design,

(a) Parking facilities should be extended to accommodate 1500 to 2000 vehicles in total,

(b) Additional recreational facilities should be considered with due attention to the segregation of sexes,

(c) The floor space for the OPD should be doubled,

(d) Due consideration should be given to the utilization of a part of such facilities as radio diagnosis, clinical laboratory, blood bank and pharmacy for the casualty department in designing the OPD,

(e) 1 to 3 doctors' offices should be provided for each floor.

2. (1) The Saudi side expressed their wish that the basic design of the General Hospital and the detailed design of the combined complex of the Cancer Centre and the General Hospital be undertaken by the Japanese side.

(2) The Saudi side added that they are prepared to cover the expenses of the aforesaid detailed design.

(3) The Japanese study team indicated that they would convey the Saudi proposal to the Government of Japan for serious consideration and the response of the Japanese side would be made as soon as possible.

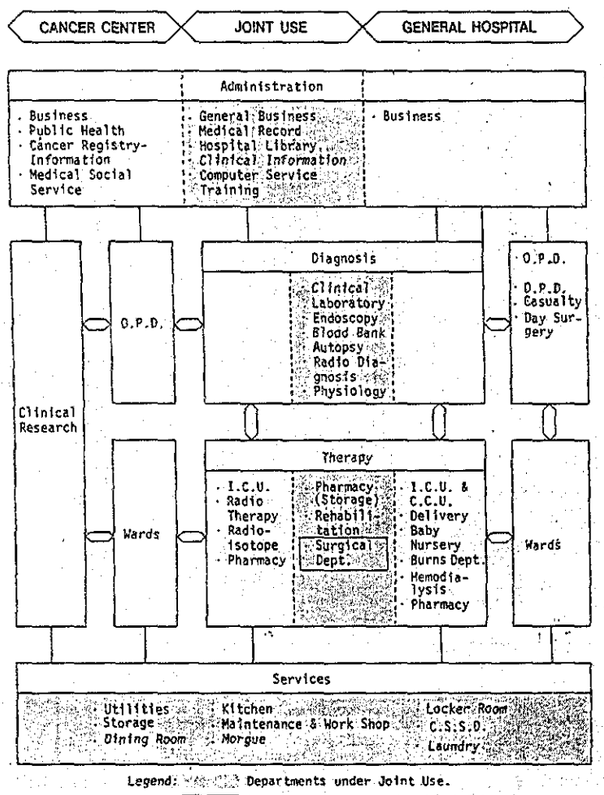
In Jeddah 15 February, 1983

Dr. Teruhiko Saburi
Head of the Japanese
Study Team

Dr. Hassan Nazih Nassief
Superintendant of Health Affair
Western Province,
The Kingdom of Saudi Arabia.

B-4-3. JOINT USE ALTERNATIVES : ALTERNATIVE III
FUNCTIONAL DIAGRAM AND DISTRIBUTION OF FLOOR SPACE FOR EACH DEPARTMENT

1. FUNCTIONAL DIAGRAM



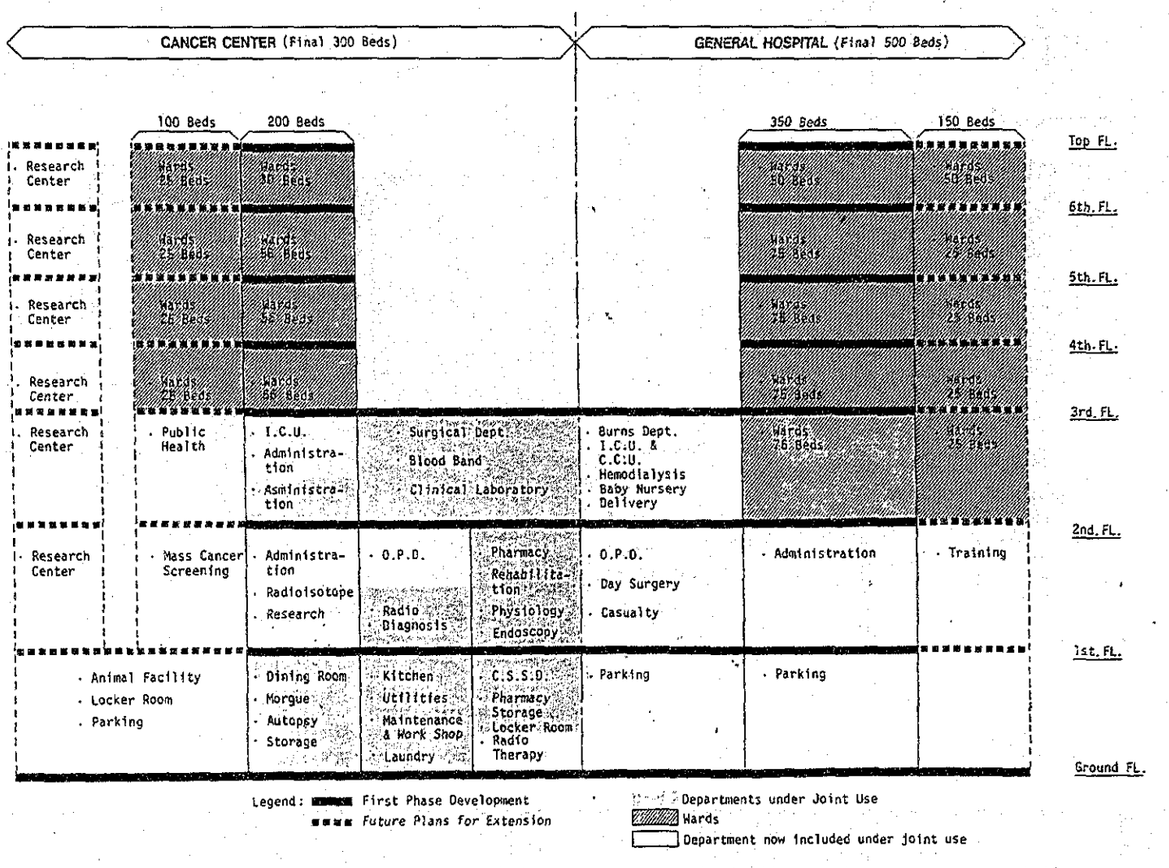
Legend: Departments under Joint Use.
Departments now moved under Joint Use.

2. DISTRIBUTION OF FLOOR SPACE FOR EACH DEPARTMENT

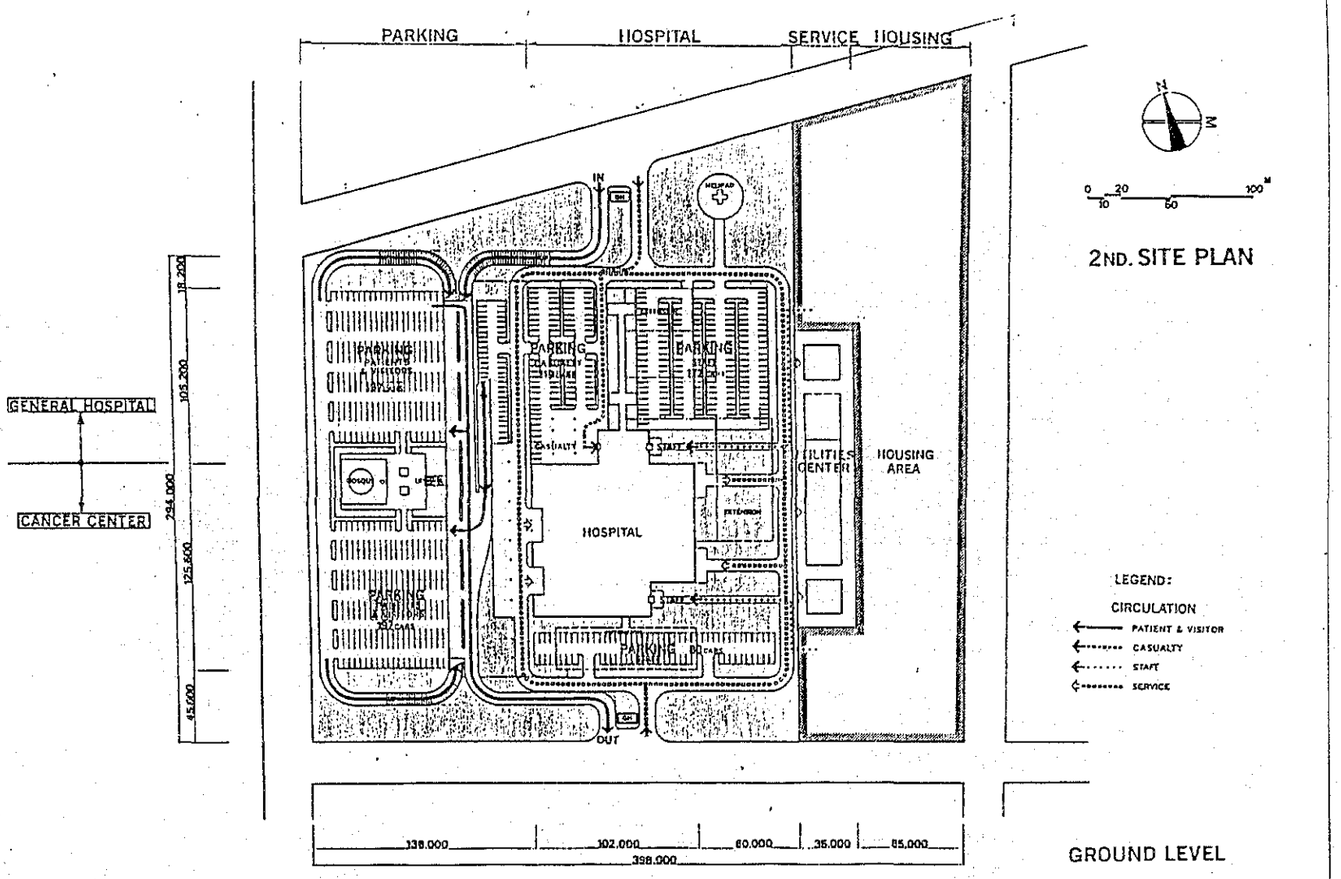
Department		Cancer Center 200Beds	Joint Use Dept.	General Hospital 350 Beds	Total	Difference*
		m^2	m^2	m^2	m^2	m^2
Wards		9,000	-	14,000	23,000	-
O.P.D.	C.P.D.	1,700	-	1,600	3,300	-
	Casualty	-	-	800	800	-
	Day Surgery	-	-	500	500	-
	Sub Total	1,700	-	2,900	4,600	-
Diagnosis & Therapy	Radio Therapy	1,400	-	-	1,400	-
	Radio Diagnosis	-	1,900	-	1,900	-300
	Radioisotope	600	-	-	600	-
	Clinical Laboratory	-	2,300	-	2,300	-500
	Physiology	-	500	-	500	-100
	Endoscopy	-	600	-	600	-200
	Blood Bank	-	300	-	300	-100
	Pharmacy	200	300	200	700	-300
	Rehabilitation	-	800	-	800	-400
	Surgical Dept.	-	2,100	-	2,100	-300
	I.C.U. & C.C.U.	800	-	700	1,500	-
	Burns Dept.	-	-	500	500	-
	Hemodialysis	-	-	200	200	-
	Delivery	-	-	600	600	-
	Baby Nursery	-	-	700	700	-
	Autopsy	-	300	-	300	-100
	Sub Total	3,000	9,100	2,900	15,000	-2,300
Clinical Research		1,200	-	-	1,200	-
Administration		1,700	1,500	1,900	5,100	-500
Services	C.S.S.D. & Laundry	-	1,200	-	1,200	-300
	Kitchen	-	1,600	-	1,600	-50
	Dining	-	650	-	650	
	Locker Room	-	800	-	800	-100
	Utilities	600	2,000	700	3,300	
	Maintenance & Work Shop	-	800	-	800	-1,100
	Storage	-	800	-	800	-200
	Morgue	-	400	-	400	-100
	Sub Total	600	8,250	700	9,550	-1,850
Total		17,200	18,850	22,400	58,450	
Separated Plan		26,600		36,500	63,100	-4,650

* See note on page 11.

C-5-2. DEPARTMENTS LOCATION ON VARIOUS FLOORS : ALTERNATIVE III



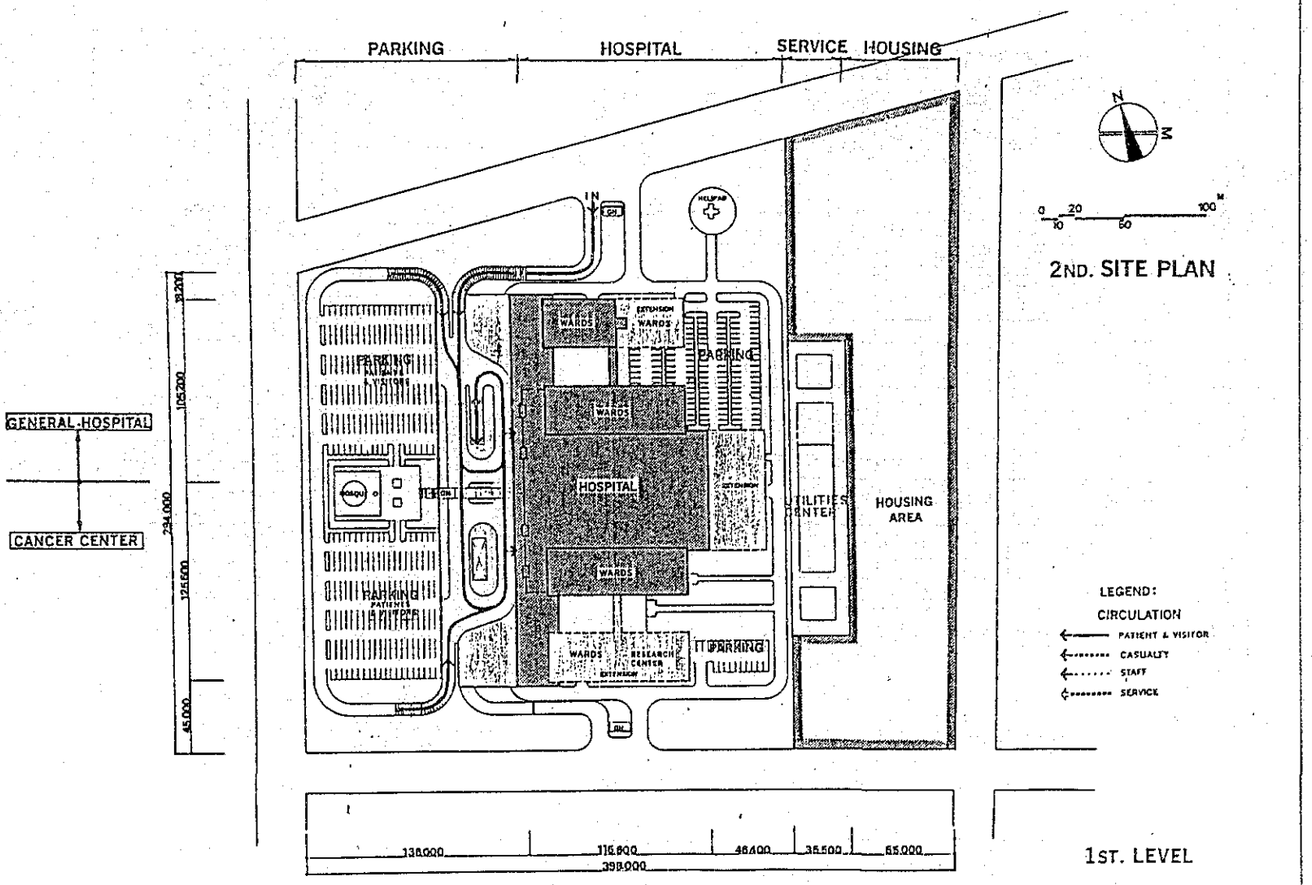
Legend: First Phase Development
Future Plans for Extension
Departments under Joint Use
Wards
Department now included under joint use



2ND. SITE PLAN

GROUND LEVEL

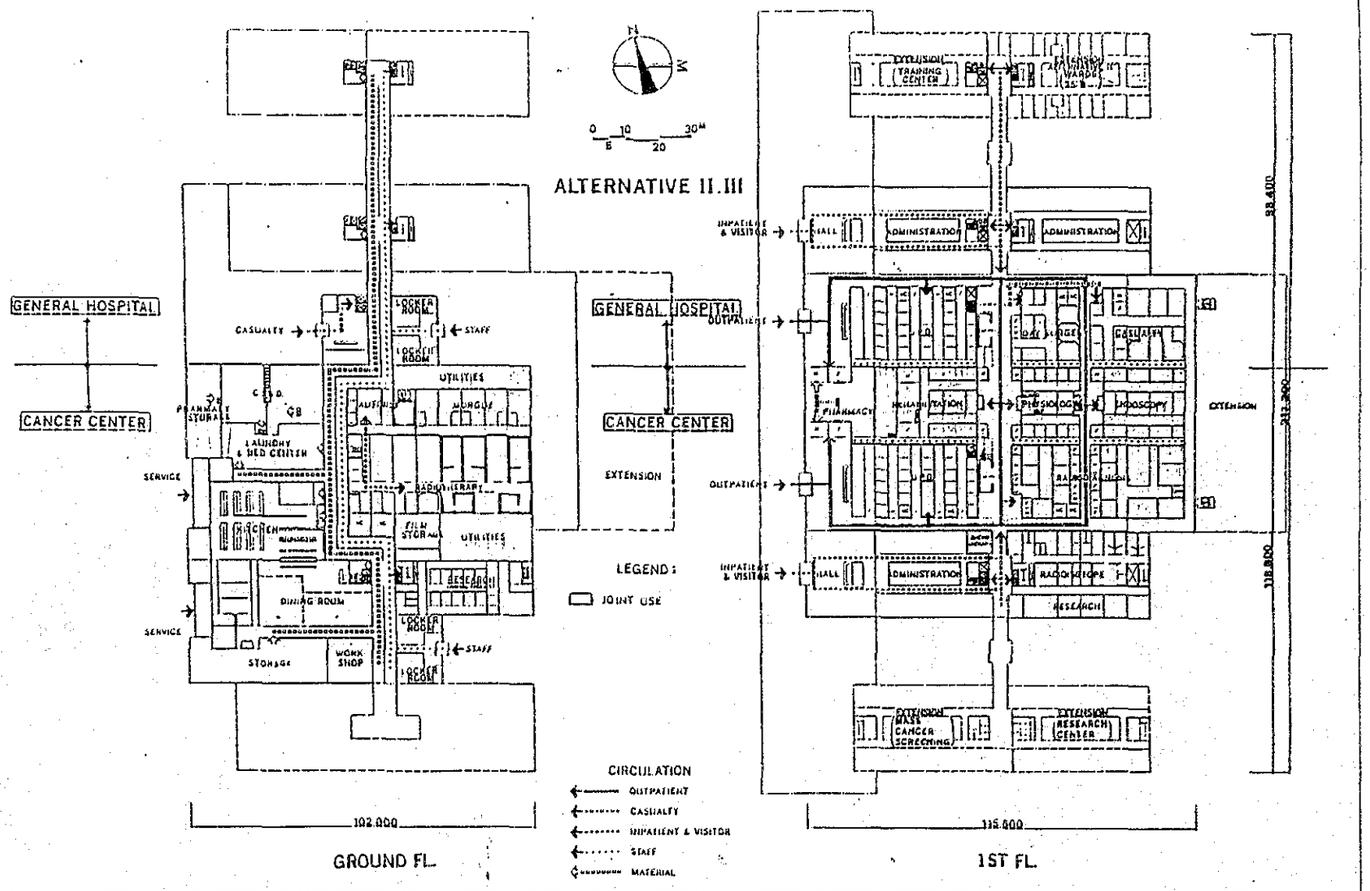
THE NATIONAL CANCER CENTER ESTABLISHMENT PROJECT IN THE KINGDOM OF SAUDI ARABIA	CONCEPTUAL DESIGN I-2	JAPAN INTERNATIONAL COOPERATION AGENCY	2ND. SITE PLAN & EXTERIOR CIRCULATION	06



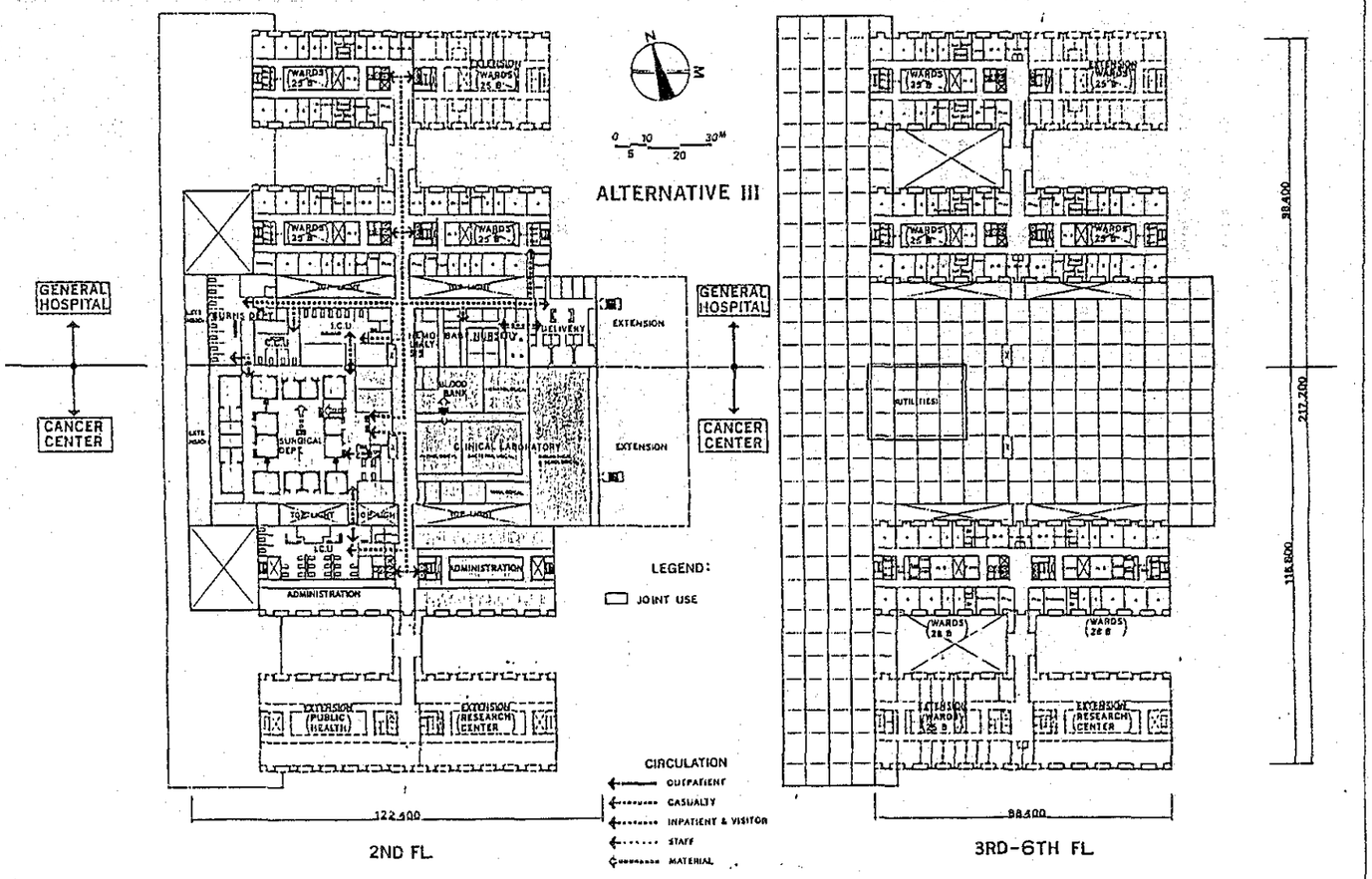
2ND. SITE PLAN

1ST. LEVEL

THE NATIONAL CANCER CENTER ESTABLISHMENT PROJECT IN THE KINGDOM OF SAUDI ARABIA	CONCEPTUAL DESIGN I-2	JAPAN INTERNATIONAL COOPERATION AGENCY	2ND. SITE PLAN & EXTERIOR CIRCULATION	07



THE NATIONAL CANCER CENTER ESTABLISHMENT PROJECT IN THE KINGDOM OF SAUDI ARABIA	CONCEPTUAL DESIGN I-2	JAPAN INTERNATIONAL COOPERATION AGENCY	FLOOR PLAN INTERIOR CIRCULATION	ALTERNATIVE II.III 03



THE NATIONAL CANCER CENTER ESTABLISHMENT PROJECT IN THE KINGDOM OF SAUDI ARABIA	CONCEPTUAL DESIGN I-2	JAPAN INTERNATIONAL COOPERATION AGENCY	FLOOR PLAN INTERIOR CIRCULATION	ALTERNATIVE III 05

THE NATIONAL CANCER CENTER

ESTABLISHENT PROJECT

IN

THE KINGDOM OF SAUDI ARABIA

S U M M A R Y OF THE TECHNICAL REQUESTS

PROPOSED BY THE SAUDI SIDE

AT

THE MEETING OF FEBRUARY 14th, 1983.

FEBRUARY 16th, 1983.

BASIC DESIGN STUDY TEAM

JAPAN INTERNATIONAL COOPERATION AGENCY

16.7.83 A. Tanjour

16.2.83 Ekram

Feb.16.1983 M. Katsuhara

16.2.83 Nasser Ghazwani

I. SELECTION OF PLANS

1. Site plan : 1st site plan ✓
2. Joint use : Alternative III ✓
3. Floor plan : Alternative III ✓

2. Floor plan of the General Hospital ✓

Such economization of the spaces shall not be required as it will be made by introducing the Joint use Dept.

The original spaces before introducing the Joint use Dept. shall accordingly be remained as they were.

3. PARKING

1) Total parking capacity : 1500 - 2000 cars ✓

2) Parking tower

location : Female zone of the housing area. ✓
Height : Around the same as hospital building's. ✓

4. ADDITION OF RECSEATION FACILITIES

Location : on the roof between the wards of the G.H. & C.C. ✓

5. FLOOR PLAN

1) Space of O.P.D. in the C.C. and G.H. to be increased 100%. ✓

2) Casualty Dept.

Such facilities as X-ray, laboratory, pharmacy and Blood transfusion shall be provided. ✓

3) Morgue & animal facilities.
locations shall be detached from other facilities such as kitchen, and the own exits shall be provided.

4) Surgical Department
a. number of operating rooms, 14 rooms are not enough.
b. septic operation rooms.
locations shall be detached from other facilities, and a corridor for their own use shall be arranged.

29th. MAY. 1983

Dr. Adnan Jamjoom
Superintendant of
Health Affairs
Western Province
The Kingdom of Saudi Arabia.

Dear Sir;

We wish to express our sincerest gratitude for reviewing the presented Draft Basic Design Report I of the National Cancer Center with us and for providing approvals, clarifications and your revisions which are outlined in the attached minutes of meeting and drawings. In cases where difference exists in the contents of minutes of meeting or drawings, the contents of the later minutes of meeting or drawings shall supersede the previous contents.

We thank you for your permission to proceed with our work which shall be continued without delay based on the approvals, clarifications and your revisions.

Sincerely yours,

Mr.Masamichi Kataoka
Leader of the Japanese
Study Team.

Enclusures :
Minutes : 1st meeting to 8th meeting &
minutes of meeting with Dr.Arefin

Drawings : As listed in attached
list of Drawings

List of Drawings

1. May 18, 1983
   1) Revised Site Plan: Alternative 1
   2) " " " : Alternative 2
   3) 1st Floor Plan
   4) Basement Floor Plan
   5) Cross Section
   6) Operation Room Plan & Words Plan

2. May 21, 1983
   1) Parking- Number of Stalls
   2) First Floor Plan
   3) General Clinic Floor Plan
   4) Auditorium Plan
   5) Doctor's & Nurses Room Plan in I.C.U.
   6) Additional Waiting Room Plan

3. May 25, 1983
   1) Revised Site Plan
   2) Housing Plans: Ground Floor Plan
   3) " " : 1st - 5th Floor Plan
   4) Housing: Number Units
   5) Operating Room Plans: Revised Plans A & B.

4. May 29, 1983
   1) O.P.D. of Cancer Center
   2) Arrangement of Clinical Department for O.P.D.
   3) Revised 2nd Floor Plan

Minutes of First Meeting

Date & Time : 16th May 11:30 AM. - 1:30 PM
Place : Ministry of Health, Western Region
Conference room in 6th floor.
Attendants : Saudi Arabia
* Dr. Adnan Jamjoom
Superintendent Health Affairs,
Western Province, M.O.H.
* Mr. Abdullah Ekram.
Resident Architect,
M.O.H. , Jeddah.
Japanese Study Team
* Mr. Masamichi Kataoka ,
* Mr. Susumu Takahashi .
* Mr. Tsuneo Safu .
* Mr. Akira Tada.
Embassy of Japan
* Mr. Masafumi Yamamoto .
* Mr. Shigeru Sudo.

Articles Submitted:

1) The National Cancer Center
Draft Basic Report I.(Part 1) .
1) " " (Part 2).
3) Drawings.
4) Model.
5) Prespective 1&2 .
6) Schedule of Meeting of the Basic
Design Study Team.
7) General Schedule for the Basic
Design Study and Plan of Operation.
8) Our Opinion Regarding Saudi Arabian
Responses to the Confirmation Items
for Conceptual Design II .

/

1. The schedule of meeting of the Basic Design Study team was approved as follows :
lst week : General Meeting
2nd week : Technical meeting
3rd week : General meeting

2. The general schedule for the Basic Design Study and the plan of operation was approved as follows :

- Draft basic design report II shall be submitted to the Saudi Arabian authorities by the end of July.

- Final report shall be submitted to the Saudi Arabian authorities by the end of September.

3. The Japanese team's opinion regarding Saudi Arabian responses to the confirmation items for conceptual design II

1) A.2 Clinical department in the General clinic.

E,N.T. orthopedics , dentistry and eye surgery can be added in the floor plan of the draft basic design report I, and this was approved,

2) A.5 overnight accomodation

a. Location : Alternative 1 (west side of the Mosque)

b. Number of units : 44 units (six stories) as proposed by the Japanese Study Team was decided upon instead of 20 units.

c. Floor plans : The floor plan as presented was approved.

3) B-1. Baby Nursery in the Geberal Hospital Rooming-in System and Non-Rooming-in System can be operated on a 50-50 basis in the floor plan of the Draft Basic Design Report I and this was approved.

4) B-2 Clinical Departments in the General Hospital:
Eye Surgery can be added in the floor plan of the Draft Basic Design ReportI, and this was approved.

5) C-1. Floor space of O.P.D.

$\frac{\text{C/D-II } 7,250\text{m2}}{\text{C/D-I-2 } 3,300\text{m2}}$ = 220% was approved

6) Number of Operating Rooms
It was approved that the number of operating rooms be increased to 20 rooms from 18 rooms.

2

4. The Saudi Arabian side requested the following items with regards to Draft Basic Design report I (Part 1) & (Part 2) and the Japanese study team agreed to study them.

1) General Clinic

a. Access

Access to the General Clinic shall be separated from that to the main entrance of the hospital.

b. Communication to the Hospital building.

Change the communication system to an underground pathway with a ramp instead of an overhead corridor using an elevator.

2) Parking Building.

a. Parking building B (for staff) shall be cancelled and that area shall be used for recreational purposes such as football ground.

b. Parking building a shall be increased by 3 stories underground to secure the parking space allotted for Parking Building B.

3) Wards

Provide rooms for Chief Doctor, doctor and secretary at each ward.

4) Surgical department provide induction room and recovery room together with the operating room.

5) Burns Department

8 bedrooms are sufficient, but each room shall be for one patient to protect from infection and should be treated like I.C.U. The treatment room shall be provided with facilities for surgery and with a large bath.

6) Delivery Department

3 delivery rooms are good. The delivery rooms shall be provided to perform caesarean operation. Consider an access for the husband to enter the delivery room.

7) O.P.D.

Each department in the O.P.D. Should have special facilities, and details will be discussed later.

5. Others

1) The Japanese study team shall prepare a schedule for discussion and shall present it at the next meeting.

2) It was explained by the representative from the Japanese Embassy that this study team has not yet been authorized to conduct discussion on the General Hospital.

Masamichi Kataoka
Mr. Masamichi Kataoka
Leader of the Japanese
Study Team

6.8.03
18.5.83
Dr. Adnan Jamjoom
Superintendent of
Health Affairs
Western Province
The Kingdom of Saudi Arabia.

Minutes of Second Meeting

Date & Time : 16th, May 7:15pm - 9:15pm.
Place : Ministry of Health, Western Region
Conference room in 6th floor
Attendant : Saudi Arabia
* Dr. Adnan Jamjoom.
* Dr. Mohammad Al-Sayegh.
* Mr. Abdullah Ekram.
Japanese Study Team
* Mr. Masamichi Kataoka.
* Mr. Susumu Takahashi.
* Mr. Tsuneo Safu.
* Mr. Akira Tada.
Embassy of Japan
* Mr. Masafumi Yamamoto
* Mr. Shigeru Sudo.

1. The Saudi Arabian side insisted that the Cancer Center and General Hospital are one project and should be implemented together. It was requested that the Japanese Embassy report this by telex to the Japanese Government.
The Japanese side stated that the mission arriving during end May will discuss with the Saudi Arabian side on the General Hospital.

2. Draft Basic Design Report i
1-4. Condition for the design:
1) 1-4-1-D. Accommodation Capacity
Number of visitors shall be increased to 2,000 persons/day from 1,000 persons/day.
2) 1-4-3. Applicable Codes and Standards it was requested to add the Saudi Standard to the list.

3. Specifications of Geological Survey
Saudi Arabia side stated that Additional data will be provided if necessary and a letter for the additional data stating the required dead line was requested.

/

Masamichi Kataoka
Mr. Masamichi Kataoka
Leader of the Japanese
Study Team

18.5.83
6.5.03
Dr. Adnan Jamjoom
Superintendent of
Health Affairs
Western Province
The Kingdom of Saudi Arabia.

2

Minutes of Third Meeting

Date and Time : 18th May, 1983
7:10 PM - 9:00 PM

Place : Ministry of Health, Western Region.
Conference room in 6th floor.

Attendants : Saudi Arabia

Dr. Adnan Jamjoom
Dr. Sameer J. Simbawa
Dr. Abdullah Raddah
Dr. Abdul Karim Tilmisany

Japanese Study Team

Mr. Masamichi Kataoka
Mr. Susumu Takahashi
Mr. Tsuneo Safu
Mr. Akira Tada

Embassy of Japan

Mr. Masafumi Yamamoto
Mr. Shigeru Sudo

Drawings submitted:

1) Revised site plan
   (1) Alternative 1
   (2) Alternative 2
2) Floor plan of General Clinic and Parking facilities.
   (1) 1st Floor
   (2) Basement
3) Cross Section of general clinic and parking facilities.
4) Operating Room Plans
5) Wards plans

1. Review of the Japanese Study Team's solution on Items Requested at 1st.meeting.

1) Site Plan

A. Design of access road for the General Clinic as shown in the presented design (revised site plan) was approved. ✓

B. Plan for replacement of parking facilities and location of additional recreation facilities as shown in Alternative 2 in the presented design (Revised Site Plan) was approved. ✓

2) Floor Plan of General Clinic and Parking facilities.

A. Subway pathway was approved as shown in the presented design (1st. Floor plan and Cross section), but 2 subways were requested and the Japanese study team agreed to study the placement of another subway. ✓

B. Parking facilities.

The presented design (Basement Floor Plan and Cross Section) which shows 2 underground stories increased in the Parking building A and parking space in the entire underground of the hospital building instead of increasing 3 underground stories in the Parking Building A was approved. ✓

3) Operation Room

Revised operation room design (Operation Room Plans) was requested to be further studied to provede separate scrubbing room. ✓

4) Doctors and Secretaries Room in each wards. Revised plan as shown in the presented design (Wards Plans) was approved. ✓

2. Comments on Ground Floor

1) *Kitchen*

Corridor between Casualty Department and Kitchen shall be separated completely by partition wall. ✓

2) *Radio Therapy.*

Separate waiting rooms shall be provided for inpatients (big room) and outpatients (small room). ✓

3) *Pharmacy*

Size of the pharmacy is sufficient, but provide small satelite pharmacy for each ward. ✓

4) *Medical Records*

This name is confusing, so change it to Filing Storage. ✓

5) Storage, Locker, Recreation and Research.
Approved as shown in the drawing. ✓

3. Comments on First Floor

1) O.P.D.

A. Provide a fountain or waterfall in the lobby to give a nice atmosphere. The waiting rooms in the lobby are not necessary and can be eliminated. ✓

B. Examination room should be enlarged even though number of rooms must be decreased. ✓

2) Radio diagnosis, Physiology, Endoscopy, Rehabilitation and Administration.
Approved as shown in the drawing. ✓

4. Coments on General Clinic

Approved as shown in the drawing, except for the acess which shall be changed to the opposite side. ✓

Mr. Masamichi Kataoka
Leader of the Japanese
Study Team.

Dr. Adnan Jamjoom
Superintendant of
Health Affairs
Western province
The Kingdom of
Saudi Arabia.

Minutes of Fourth Meeting

Date and time : 19th May, 1983
10:00 AM - 11:30 AM

Place : Ministry of Health, Western region.
Conference room in 6th floor.

Attendants : Saudi Arabia

Dr. Adnan Jamjoom

Japanese Study Team

Mr. Masamichi Kataoka
Mr. Susumu Takahashi
Mr. Tsuneo Safu
Mr. Akira Tada

Embassy of Japan

Mr. Masafumi Yamamoto

1. Comments on each Departments.

1) 2nd Floor

(1) Auditorium
Number of seats should be enlarged to accommodate 200-250 from 154.

(2) Clinical Laboratory.
Provide a bio-medical instrument work-shop near to the Laboratory.

(3) Wards, Administration and Blood Bank.
Approved as shown in the drawing.

2) 3rd Floor

(1) Surgical Department

A. Size of operating rooms are acceptable as shown in the drawing.

B. *Provide a storage room.*

(2) I.C.U., C.C.U & C.C.R.U.

Rooms are necessary for doctors (30 Persons) *nurses (60 persons) and para-medical staff (10 Persons),* and the recovery room (8 beds) which will become unnecessary can be used.

3) 5th Floor

(1) Recreation Facilities
Approved as shown in the drawing.

4) 6th Floor

1) Wards
Relocate the *Infectious Desease ward to the 2nd floor.*

5) Others

1) Provide an audio visual center to supply music and video for patients recreation.

2) Provide a Media Center to prepare slides and films.

2. Items confirmed and clarified by Saudi side

1) *Out-patients clinic*

(1) Opening hours for out-patient's clinic

A. Reception hours
* General Clinic : From 8 AM TO 2 PM
* O.P.D. : From 9 AM to12 AM
From 2 PM to 5 PM

B. Examination hours
* General Clinic : From 8 AM to 5 PM
* O.P.D. : From 9 AM to12 PM
From 2 AM to 5 PM

(2) Examination hour for out-patient

* General Clinic : average 5 - 10 minutes
* O.P.D. : average 15 - 20 minutes

(3) Flow of Out-patients and Papers.

A. General Clinic

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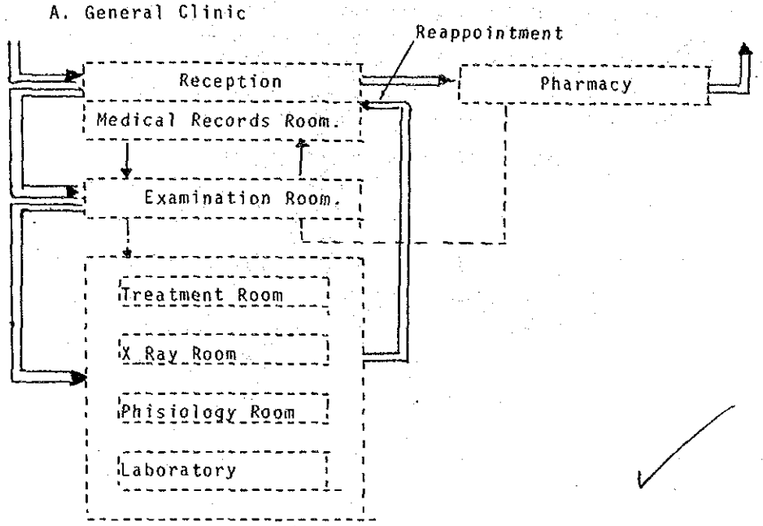
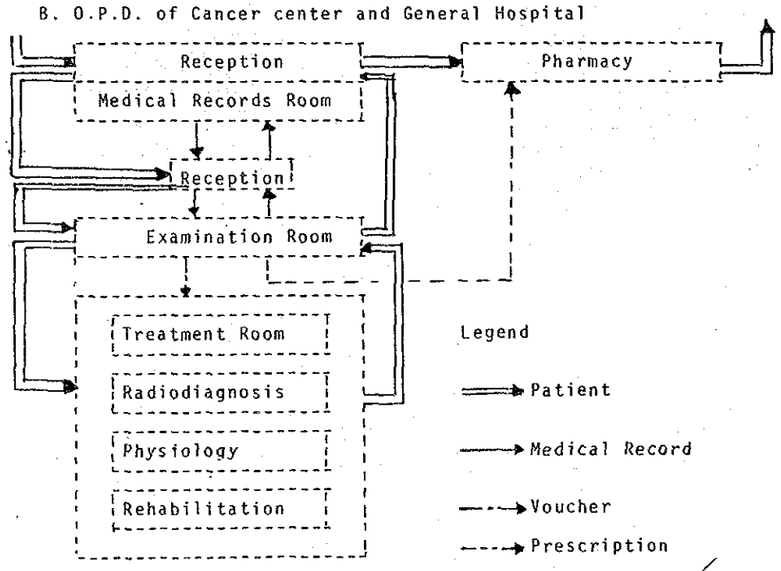


B. O.P.D. of Cancer center and General Hospital



2) Ward Separation between Male and Female also Clinical Departments.

6th Floor :	24 Beds Female Internal	20 Beds Germ Free
5th Floor :	24 Beds Male Internal	24 Beds Male Mixed
4th Floor :	24 Beds Male Surgical	24 Beds Male Surgical
3rd Floor	24 Beds Female Surgical	24 Beds Female GY& Mixed
		12 Beds Infectious Desease.
	(Western Nursing Unit)	(Eastern Nursing Unit)

3) Items relating to the Morgue and Autopsy.

(1) Estimated number of deaths occuring in one day.

average : 3-5/day

(2) The average length of time the dead body is kept in the morgue.

Max : 3 days
Average : 1 day

(3) The number of bodies to be kept in the refrigerator at one time in the morgue.

Max :15 bodies (for big accident)

(4) Estimated number of autopsies performed in one day.

Average : 1-2 bodies

(5) The custom in Saudi Arabia for handling dead body.

A. Dead body is immediately removed to the morgue.

B. Dissection of dead body is greatly disliked.

C. Dead body is transported to the home by ambulance or pick-up, and it is washed at the home.

(6) Number of relations accompanying a dead body.

Average : 3-4 persons

(7) Floor plan of Morgue and Autopsy.
Approved as shown in the drawing.

4) Number of Visitors

(1) Visitors visiting hospitalized patients in one day.

* Cancer Center (200 Beds):
  150 Persons/hour x 4 hours = 600 Persons ✓

* General Hospital (350 Beds)
  300 Persons/hour x 4 hours =1200 Persons ✓

(2) Visitors accompanying out-patients in one day.

* Male adult : 25% ✓
* Female adult:75% ✓
* Children :100% ✓

5) Number of Out-patients for General Clinic and O.P.D.

* Gene ral Clinic	: 1,550 Persons/day
* O.P.D. (Cancer Center)	: 450 Persons/day
* O.P.D. (General Hospital)	: 1,000 Persons/day
Total	: 3,000 Persons/day

Masamichi Kataoka

Mr. Masamichi Kataoka
Leader of the Japanese
Study Team.

Dr. Adnan Jamjoom
Superintendant of
Health Affairs
Western province
The Kingdom of
Saudi Arabia.

MINUTES OF THE FIFTH MEETING

Date and Time : 21st. May 1983
7:00 PM - 9:30 PM

Place : Ministry of Health, Western Region
Conference Room in 6th floor.

Attendants : Saudi Arabia
Dr. Adnan Jamjoonm
Japanese study team
Mr. Masamichi Kataoka
Mr. Susumu Takahashi
Mr. Tsuneo Safu
Mr. Akira Tada
Embassy of Japan
Mr. Shigeru Sudo

Drawings submitted :

1) 1st. Floor Plan around General Clinic Building.
2) General Clinic Plan
3) Auditorium Plan
4) Doctor's & Nurse's Room Plan in I.C.U.
5) Additional Waiting Room Plan in Radiotherapy Dept.
6) Table of Number of Stalls in Parking Facilities.

1. Reviewed the revised design of the following items:

a) Two way subway corridor between General Clinic and hospital. ✓
The presented design was approved.

b) General clinic floor plan
The presented design was approved. ✓

c) Auditorium enlarged to seat 250 persons. ✓
The presented design was approved.

d) Revised design for 3rd floor providing doctors and nurses room in the recovery room which was replaced to each operating theater.
The presented design was approved. ✓

2. Minutes of the third and fourth meeting
The minutes were reviewed and signed by both parties.

3. Housing for Staff

a) Housing for doctors 130 units and senior nurses 112 units are sufficient. ✓

b) Housing for 600 junior nurses is necessary, so provide 300 dormitory type rooms with two beds and washing basin for each room. ✓

c) Housing for 200 female para-medical personnels is necessary. ✓

d) Provide 4 housing buildings at the former parking building area which was being considered for recreation. 3 buildings are to be dormitory type rooms for nurses and para-medical personnels. Provide toilet, kitchen and living room in the center of each floor, also a recreation room in the basement. Provide about 20 laundry machine with dryer and service facility in the top floor or in the basement.
1 building shall be for small flats consisting of

1 master bedroom and 1 children room. This request will be studied. ✓

e) Housing for administrative and service staff was approved.

4. Mosque and Recreation Center
The presented design was approved. ✓

5. Project Cost.
The estimated project cost was explained and a revision incorporating the changes will be presented by the Japanese Study Team.
The Saudi Arabia representative will report and describe the revised project cost and the contents of the meetings with the Japanese Study Team to His Excellency, The Minister and transmit the results to the Japanese Study Team.

Mr. Masamichi Kataoka
Leader of the Japanese
Study Team

Dr. Adnan Jamjoom
Superintendant of
Health Affairs
Western Province
Kingdom of Saudi Arabia.

MINUTES OF SIXTH MEETING

Date and Time : 23rd May 1983
10:30 AM - 12:30 AM

Place : Ministry of Health, Western Region
Conference room in 6th Floor.

Attendants : Saudi Arabia

Mr. Abdulla Ekram

Japanese Study Team

Mr. Masamichi Kataoka

Mr. Tsuneo Safu

Mr. Akira Tada

Mr. Tokio Kusuyama

Embassy of Japan

Mr. Shigeru Sudo

1. Structural system was discussed.

a) Page 38 of draft basic design report 1 (Part 1) was corrected as follows:

1) "One-floor" in second line of 3.1.1.C parking building (A) and General Clinic was corrected to "three floor".

2) 3.1.1.D. parking building (B) was deleted.

3) "five floors" in third and fourth lines of 3.1.1.F. Residential housing was corrected to "seven floors".

b) Structure of water tower was agreed to have steel column with concrete water tank.

c) New report for additional information on soil was confirmed to be ready by end June.

d) Foundation work was explained to have no piling, but to have continuous girder as shown in foundation drawing.

e) Question of using sulfuric acid proof cement for entire work because of the higher cost was agreed to be discussed at a later stage.

f) Live load standard shown in Table 3-1 was confirmed to be according to international standards.

g) Wind velocity was agreed to be checked with the meteorological office which will be arranged for next week.

h) Seismec load calculation was explained to be calculated based on severe condition imposed in Japan. However it was also agreed that data should be discussed with meteorological department.

2. Architectural Design

The advantages of modular design was explained and a request was made to think of ways to make the columns pleasing from an architectural viewpoint. in detailed design.

3. Site Utility

It was agreed that drainage and garbage disposal as presented in the plan was better since municipal facilities were still uncertain.

Mr. Masamichi Kataoka
Leader of the Japanese
Study Team

Mr. Abdulla Ekram
Chief Architect
Ministry of Health
Jeddah.

MINUTES OF SEVENTH MEETING

Date and time : 23rd May 1983
7:00 PM - 7:50 PM

Place : Ministry of Health, Western Region
Conference room in 6th floor

Attendants : Saudi Arabia
Dr. Adnan Jamjoom
Japanese Study Team
Mr. Masamichi Kataoka
Mr. Susumu Takahashi
Mr. Setsuo Shibata
Mr. Kozo Nakatani
Mr. Akira Tada

1. Minutes of fifth meeting was confirmed and signed by both parties.

2. Medical Equipment

The medical equipment which is listed in the Draft Basic Design Report 1 (Part - 1) was explained as being based mainly on Japanese equipment.

The list of equipment was approved with the following changes.

(1) Orthopedic

✓ 1)	Intermittence Traction Apparatus	1 → 2
✓ 2)	Plaster Bandage Table	1 → 2
✓ 4)	Plaster Cutter	1 → 2
✓ 5)	Mobile C-Arm X-Ray TV	1 → 2

.../1

(2) Ophthalmological

✓ 4)	Fundus Camera	1 → 2
✓ 16)	Surgical Laser System (addition)	0 → 1

(3) Urology

✓ 7)	Cold Light Supply	2 → 4
✓ 9)	Biopsy and Grasping Forceps	2 → 4

(4) Gynecology

✓ 1)	Gynecological Examining Table	3
✓ 2)	Gynecological Examining Unit	3
✓ 3)	Stereo Camera Colposcope	1
✓ 4)	Fiber Light	4
✓ 5)	Kymographic Insufflation Apparatus	4
✓ 6)	Cryosurgery Unit	2
✓ 7)	Ultrasonic Diagnostic Apparatus	1

(9) Endoscopy

✓ 10)	Sigmoidscope	2 → 4
✓ 18)	Water Sterilizer	1 → 2
✓ 22)	Ventilator	1 → 2
✓ 23)	Anesthesia Machine	1 → 2
✓ 27)	Universal Forceps	2 → 4
✓ 31)	E.N.T. Treatment Chair	1 → 2

(10) Physiology

✓ 1)	6-Channel Recording Electrocardiograph	1 → 2
✓ 2)	Non-Invasive Evaluation of Arterial function.	1 → 2

.../2

(14) I.C.U.

1) I.C.U. Patient Monitor
(each monitor with 10 satelites) 2 → 2

(15) SURGICAL DEPT.

3) Electric Surgical Unit 20 → 22
8) Operating Microscope 3 → 6
11) Blood-loss Digital Scale 5 → 15
21) Instrumentation for Vitrectomy 1 → 2

3) The following Medical Equipment were requested to be provided

1) Urology
Ultrasonic therapeutic Apparatus 1

2) Radiotherapy
Neutron Apparatus 1

Masamichi Kataoko
Mr. Masamichi Kataoko
Leader of the Japanese
Study Team

Dr. Adnan Jamjoom
Superintendant of
Health Affairs
Western Province
The Kingdom of
Saudi Arabia

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THE MINUTES OF EIGHTH MEETINGS

Date and Time : 25th May 1983
07:00 PM - 08:00 PM

Place : Minister of Health, Western Region,
Conference room on 6th floor.

Attendants : Saudi Arabia
Dr. Adnan Jamjoom
Prof. Awad Owar
M.D. Prof. Hermatology and Clinical Path ology

Japanese Study Team
Mr. Masamichi Kataoka
Mr. Susumu Takahashi
Mr. Setsuo Shibata
Mr. Kozo Nakatani
Mr. Tokio Kusuyama
Mr. Akira Tada

1. Minutes of the Seventh Meeting was reviewed and signed by both parties.

2. Medical equipment list for C.C.R.U. and Hyperbaric also for General Clinic was approved with the following revisions.

   a. (32) C.C.R.U.
      Add the words "6 satelite" in the description of:
      1) C.C.R.U. patient Monitor

.../

      3) 3-channel electrocardiograph
      12) Automatic pulse output Recorder

   b. Add the following equipment
      General Clinic 7) Physiology
      Electromyography 2

3. Drawings of revised site plan, housing plans for junior nurses and female para-medicals, housing number of units, operating room plans and arranged of clinical departments for O.P.D. were approved as follows :

   a. Approved as shown in drawings.
      Revised site plan, Housing plans for junior nurses and female para-medicals, housing number of units and operating room plans (revised plan B).

   b. Revisions requested in arrangement of Clinical Departments for O.P.D.

      1) Examination rooms need not be separated into male and female only waiting rooms need be separated.

      2) Move the conference room to a more convenient location.

4. The revised cost estimate was presented by the Japanese study team and the factors for revision was approved.

   The estimate figure were to be further studies by the Saudi Arabian side. However permission was granted to proceed with the Basic Design.

Mr. Masamichi Kataoka
Leader of the Japanese
Study Team.

Dr. Adnan Jamjoom
Superintendant of
Health Affairs
Western Province The Kingdom
Of Saudi Arabia.

Equipment	Quantity
(32) C . C . R . U .	
1) C.C.R.U. Patient Monitor (6 Satellites)	1
2) Ventilator	6
3) 3-Channel Electrocardiograph (6 Satellites)	1
4) Closed Chest Heart Massager	1
5) Residual Volumemeter	1
6) Osmometer	1
7) Blood Gas Analyzer	1
8) Autoanalyzer	1
9) Respiratory Function Recorrding Apparatus	1
10) Electroencephalograph	1
11) Na,K, Analyzer	1
12) Automatic Pulse Output Recorder (6 satellites)	1
13) Oxymeter	1
14) Ultrasonic Diagnostic Apparatus	1
15) Intra-Aortic Balloon Pump	1
16) Hypo-Hyper Thermia Unit	1
(33) Hyperbaric	
1) Hyperbaric Oxygen Apparatus	1
2) Hyperbaric Oxygen Chamber	1

PROJECT COSTS

May 25, 1983

According to the change of the planning, the Cost Plan in "DRAFT BASIC DESIGN REPORT I" is reviewed and changed.

Cost Plan (Revised May 25, 1983)

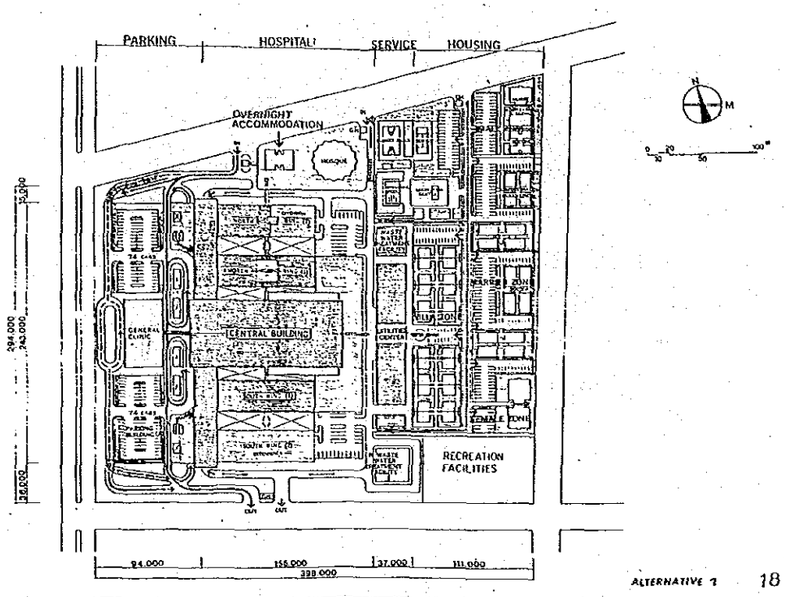
Hospital zone	SR.
Cancer Center	151,830,000
Joint-Use	285,663,000
Utilities Center	146,790,000
Parking Buildings	214,050,000
Mosque	23,510,000
Overnight Accomodation	14,746,000
External Works	30,110,000
Medical Equipment	176,094,000
Management Equipment	43,623,000
Hospital zone Total	1.086,416,000

Housing zone	SR.
Housing	306,052,000
Recreation Center	20,140,000
External Works	19,840,000
Housing zone Total	346,012,000
Grand Total	1.432,428,000

.../...

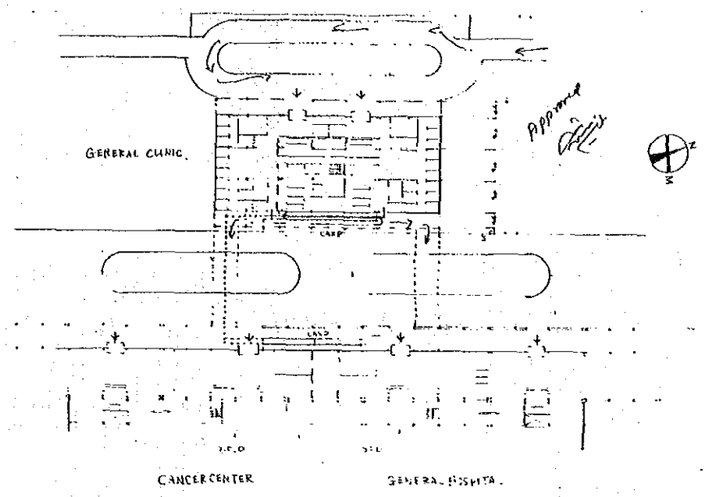
This revised cost plan is prepared as the preliminary cost estimation according to the following items.

a) Overnight Accomodation (2,600 m^2) is added. ✓
b) Parking Building B (40,750 m^2) is canceled, Parking Building A (37,200 m^2) is expanded to 75,100 m^2 and the parking area for staff (18,6000 m^2) is proposed at the basement of the Hospital. ✓
c) Housing for junior nurses and female par medical staff are added to the Housing Zone. (15,550 m^2) ✓
d) General Clinic is expanded from 2,450 m^2 to 4,450 m^2 ✓
e) Medical Equipment and Management Equipment are partially changed. ✓



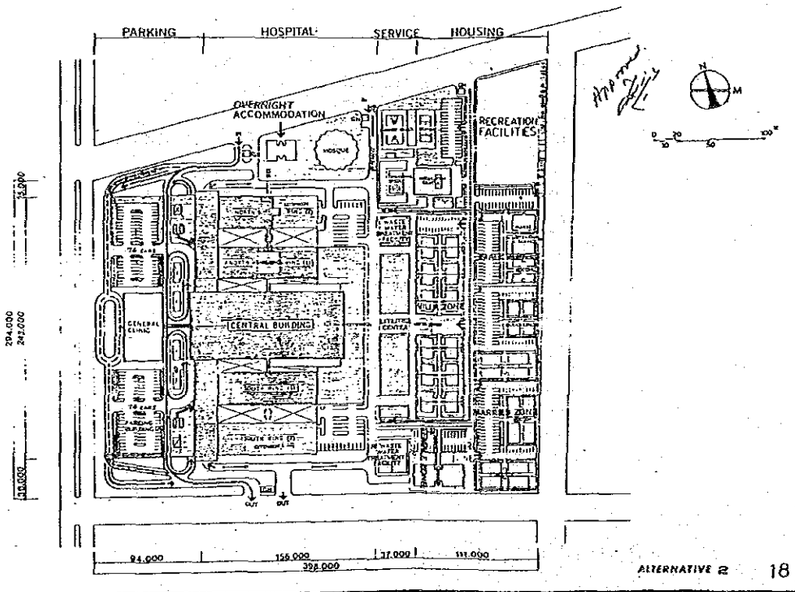
ALTERNATIVE 1 18 MAY '83

THE NATIONAL CANCER CENTER ESTABLISHMENT PROJECT IN THE KINGDOM OF SAUDI ARABIA	BASIC DESIGN DRAFT	JAPAN INTERNATIONAL COOPERATION AGENCY	REVISED SITE PLAN



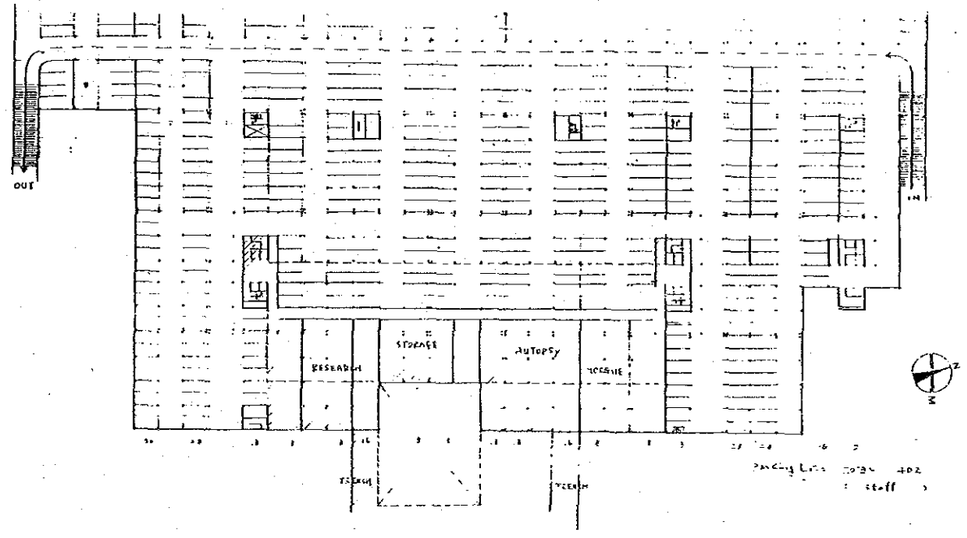
1ST. FLOOR PLAN

18. MAY. '83



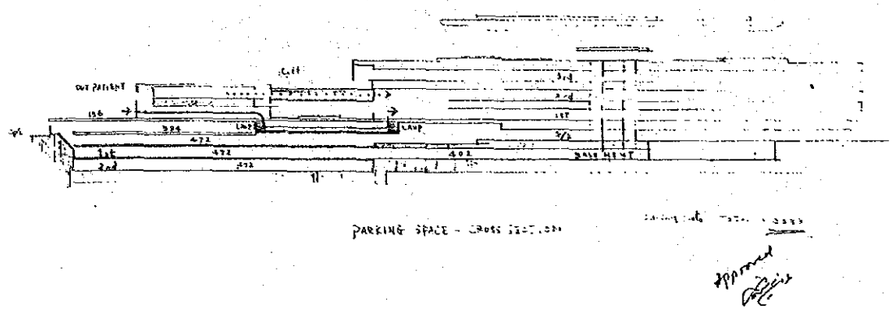
ALTERNATIVE 2 18 MAY '83

THE NATIONAL CANCER CENTER ESTABLISHMENT PROJECT IN THE KINGDOM OF SAUDI ARABIA	BASIC DESIGN DRAFT	JAPAN INTERNATIONAL COOPERATION AGENCY	REVISED SITE PLAN



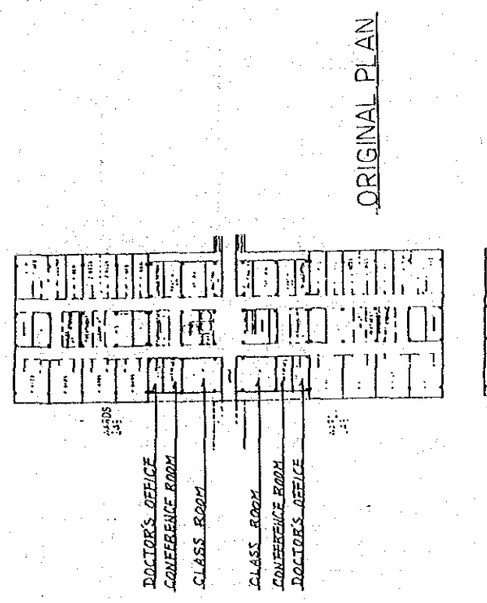
BASEMENT FLOOR PLAN

18. MAY. '83



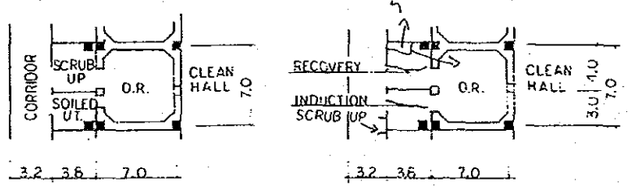
CROSS SECTION

18. MAY. '83



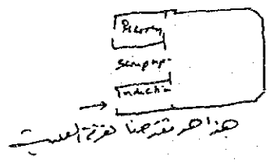
WARDS PLANS

16 MAY'8



ORIGINAL PLAN

REVISED PLAN



OPERATING ROOM PLANS

18. MAY. '83

2.1.2 Parking

A Number of stalls

Facilities	Level	Number of stalls				
		Patients & Visitors	Staff	Emergency Patients	Services	Total
Parking Build. A.	1st Floor	156	—	—	—	156
	Ground floor	352	—	—	—	352
	Basement	472	94	—	—	466
Parking in Hospital Build.	Basement	—	402	—	—	402
Outdoor parking	Ground Level		89	119	73	29
Total		9[illegible]	435	[illegible]	[illegible]	2327

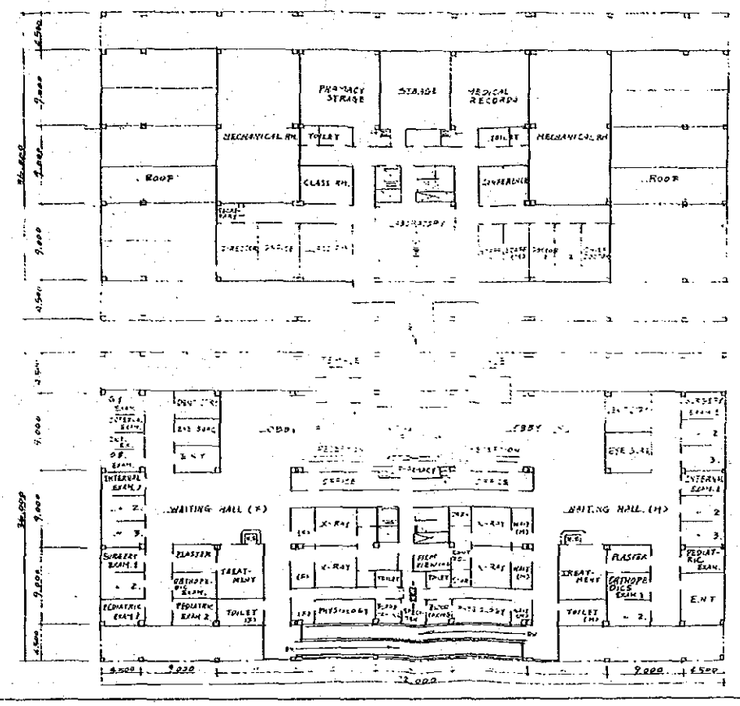
Approved

2.1.3 Housing

a Number of [illegible]

[illegible]

Approved



Approved

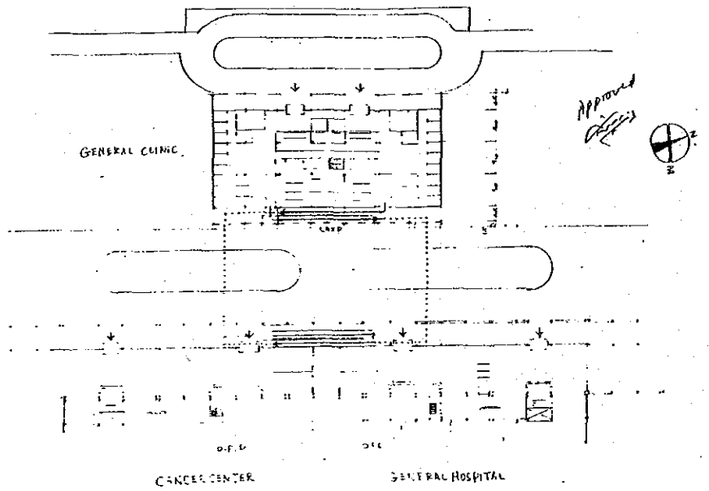
REVISED
2ND. FLOOR PLAN

Approved

REVISED
1ST. FLOOR PLAN

GENERAL CLINIC PLAN

S.1:300 21 MAY '83

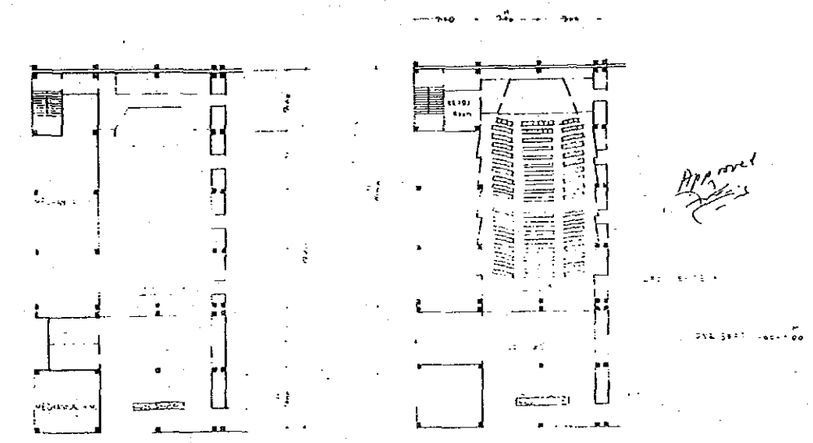


Approved

REVISED PLAN 2 WAY BETWEEN GENERAL CLINIC & HOSPITALS

1ST. FLOOR PLAN

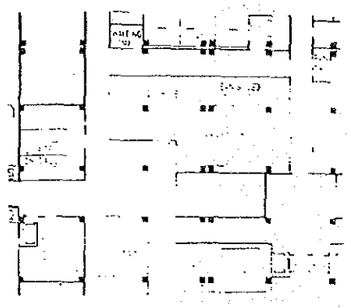
21 . MAY. '83



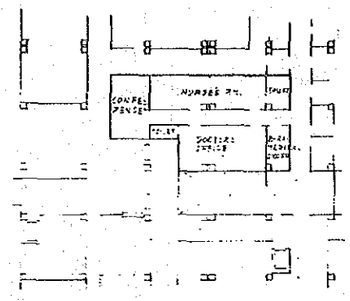
Approved

AUDITORIUM PLAN

S. 1:300 21. MAY. '83



ORIGINAL PLAN

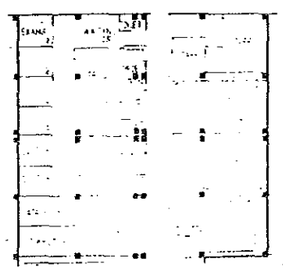


RIVISED PLAN

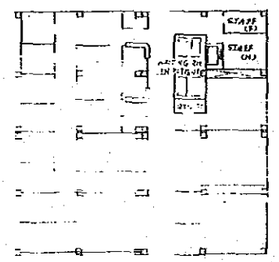
Approved

DOCTOR'S & NURSE'S ROOM PLAN IN I.C.U.

S. 1:300 21. MAY. '83.



ORIGINAL PLAN

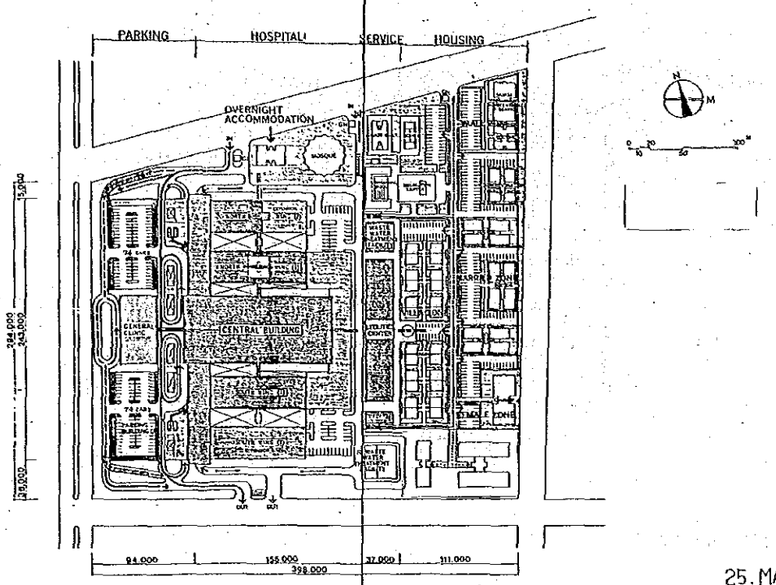


REVISED PLAN

Approved

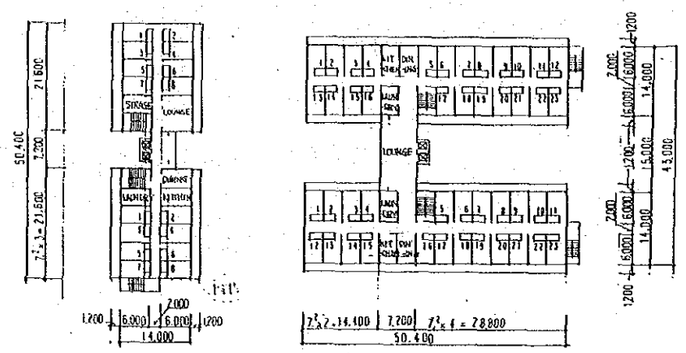
ADDITIONAL WAITING RM. PLAN
IN RADIOTHERAPY DEPT. AN

S. 1:300 21. MAY. '83 33



25. MAY. '83

THE NATIONAL CANCER CENTER ESTABLISHMENT PROJECT IN THE KINGDOM OF SAUDI ARABIA	BASIC DESIGN DRAFT	JAPAN INTERNATIONAL COOPERATION AGENCY	REVISED	SITE PLAN



〈 FEMALE PARA-MEDICAL 〉

TOTAL UNIT 100 UNITS

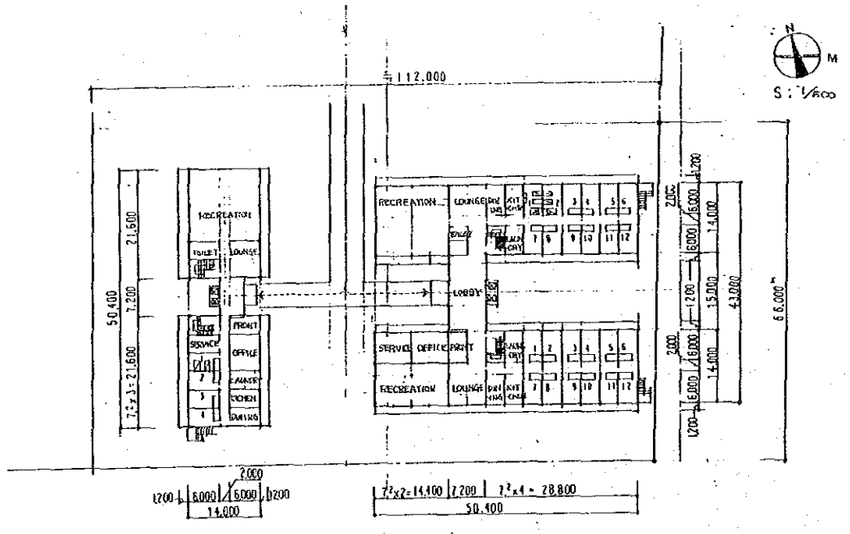
〈 JUNIOR NURSES 〉

TOTAL UNIT 300 UNITS

1ST - 6TH FLOOR PLAN

HOUSING PLANS

25. MAY. '83



〈 FEMALE PARA-MEDICAL 〉

200 PERSONNELS

〈 JUNIOR NURSES 〉

600 NURSES

GROUND FLOOR PLAN

HOUSING PLANS

25. MAY. '83

HOUSING

NUMBER OF UNITS

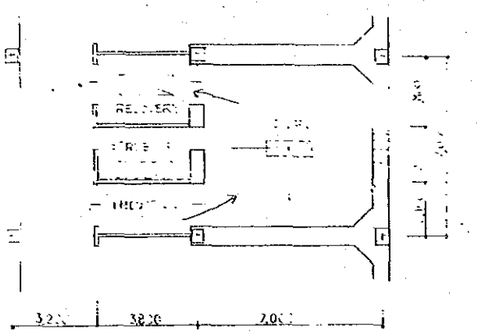
	ESTIMATED NUMBER OF SENIOR STAFF	DISTRIBUTION OF HOUSING UNITS FOR EACH ZONE				
		VILLA	MARRIED	MALE	FEMALE	TOTAL
DOCTORS	130	24	84	28		136
NURSES	712	-		16	412	428
PARAMEDICAL	250	-	1[illegible]	[illegible]	100	150
MAINT.& SERVICE	32		[illegible]	[illegible]		46
TOTAL	1124	24	112	112	512	760

Approved

25. MAY. '83

<REVISED PLAN - >

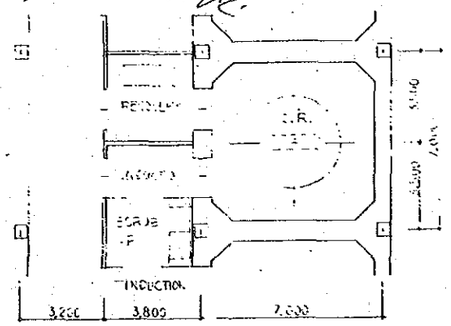
16 OPERATING ROOMS



<REVISED PLAN B >

agreed - approved

20 OPERATING ROOMS



OPERATING ROOM PLANS

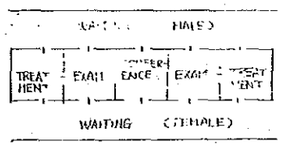
25. MAY. 87

O.P.D. OF CANCER CENTER

GIVEN CONDITIONS

1. Waiting rooms are separated into male and female rooms, but the examination rooms are not separated.
2. Conference rooms are located at the center for easy access.

O.P.D. PLAN

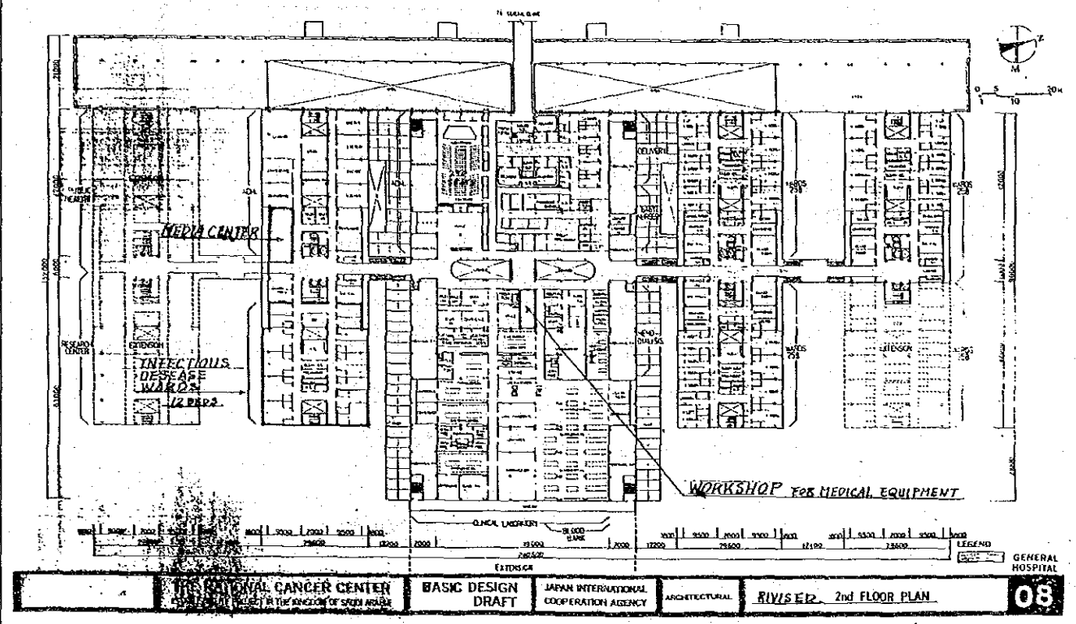


NUMBER OF ROOMS

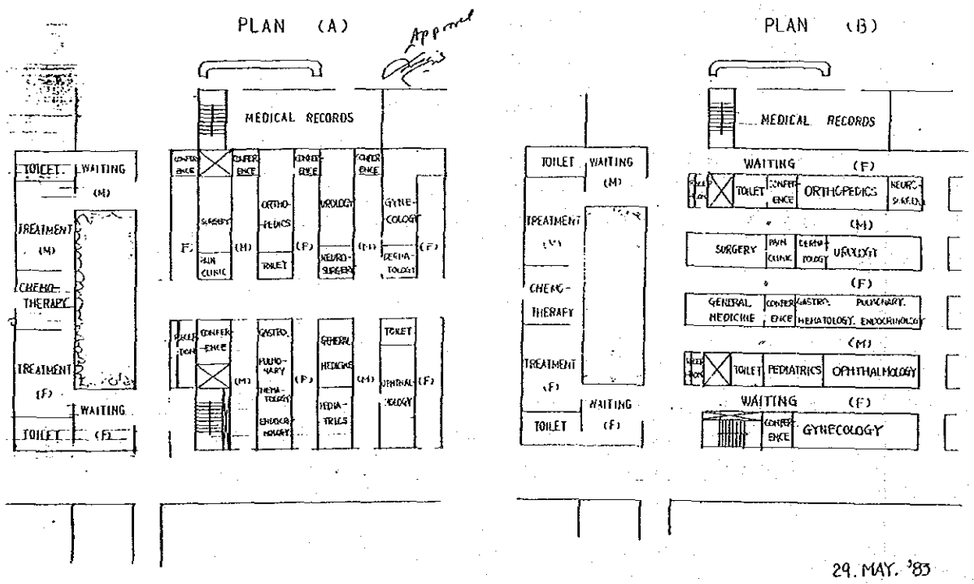
	NUMBER OF EXAM. ROOMS	NUMBER OF SPEC. TREATMENTS	NUMBER OF CONF.
GENERAL MEDICINE	2		
GASTROENTEROLOGY	2		
HEPATOLOGY			
PULMONARY MEDICINE	2	—	1
HEMATOLOGY			
ENDOCRINOLOGY			
SUB TOTAL	6	—	1
HEAD AND NECK SURGERY			
THORAX SURGERY	2	—	
ABDOMINAL SURGERY			1
UROLOGY	1	2	
ORTHOPEDICS	1	2	
NEURO-SURGERY	1	—	
SUB TOTAL	5	4	1
DERMATOLOGY	1	—	
OPHTHALMOLOGY	1	2	
PEDIATRICS	1	—	1
GYNECOLOGY	1	3	
PAIN CLINIC	1	—	
SUB TOTAL	5	5	1
TOTAL	16	9	3

Approved

29. MAY. '83



ARRANGEMENT OF CLINICAL DEPARTMENTS FOR O.P.D.



29. MAY. '83

MINUTES OF MEETINGS BETWEEN DR.K.M. MORAD

AREFIN AND JAPANESE STUDY TEAM

Date and time : 24th May 1983 10:30 AM - 01:30 PM

25th May 1983 09:~~30~~ 00 AM - ~~12:30~~ 2:00 PM

27th May 1983 09:30 AM - 12:15 PM

28th May 1983 09:30 AM - 12:00

Place : Ministry of Health, Western Region

Conference room on 6th floor.

Attendants : A. Saudi Arabia

Dr. K.M. Morad Arefin

Mr. Abdulla Ekram — part time

B. Japanese Study Team

Mr. Masafumi Kataoka

Mr. Susumi Takahashi

Mr. Yoshiro Mimaki

Mr. Tsumeo Safu

Mr. Setsuo Shibata — part time

Mr. Tokio Kusuyama

Mr. Akira Tada

The Draft Basic Design Report 1 was reviewed by Dr. Arefin and the following items were requested for study. by the Japanese team before the next submission

A. Architectural

1. Site Plan

a. Discrepancy between site area quoted and actual area was pointed out. The study team explained that they were fully aware of this fact and although

.../

the site area was the given condition, the lay-out was based on the smaller actual area to avoid any future problems. Correction to the text of this report is to be implemented to avoid future confusion.

b. Relation between site area and floor area, also the percentage of various department ~~floor~~ surface area on the ~~ground area~~ surface to total area was requested to be provided.

c. Provide pedestrian entrance gate in front of the General Clinic.

d. Change location of Entrance to Housing Zone to midpart of eastside road.

e. Provide emergency access and parking for ambulance outside of the Casualty Department.

f. Specify height of minaret and outline description of mosque.

g. Provide adequate numbers of garbage pool in the housing zone.

2. Floor Plan

a. Provide adequate storage for furnitures and fixtures such as beds, stretchers, trolleys, plumbing, medicine and medical and nonmedical equipment as follows:

i.	Furnitures and fixtures	1 year supply
ii.	Medicine (near main pharmacy)	2 wks-1 mo. supply
iii.	Medical and non-medical equipment.	1 year supply.

b. Provide workshop for engineering repair facilities for minor repairs which should include carpentery, plumbing, electrical, mechanical and routine maintenance. Also for vehicles owing to lack of space only minor repairs will be conducted.

.../

c. Revise kitchen layout to improve food preparation and distribution, head chef office, storage of cooking pans and kitchen staff dining and lounge.

d. Provide headquarters for housekeeping and porter service with adequate storage of materials.

e. Consider laundry layout and press room to provide good working condition and handling of linen and laundry.

f. Relocate incinerator to location away from inflamable matters, also provide prevention of smoke, dust and smell pollution.

g. Provide two sets of ~~standy~~ bed lift elevator in the central building. These elevators shall be restricted for use ~~beds of patients~~. operating theatre patients + supplies only.

h. Provide data storage in the Pathological Department.

i. Provide stores for flower, books, cigarettes, etc.

j. Provide two additional fire escape stairs with sufficient width. in the central building and these should be centrally located. fire escape stairs and landing should be adequately large enough to carry people from all floors

k. Mail room facilities should have mail handling and delivery functions.

l. Consider recreational facilities for single personnels, living in the dormitories

m. Adequate facilities with loading and unloading bay for heavy trucks & fuel tankers are to be provided ... roads are to be widened for this purpose.

B. Utilities Service:

1. General

a. Standby capacity required is the capacity which will be able to cover at least 80% of normal

operation and services at times of breakdown. Also it is desirable that the number of equipment be increased instead of the capacity of equipment to allow for this extra spare capacity.

b. Provide standby system which controls hospital functions such as emergency generators pumps and special equipment such as filters and spare parts for medical and non-medical equipment.

c. Provide spare parts (one year stock), for essential equipment and supply a list of spare parts,

d. Provide adequate noise insulation in the utility building with regard to generators, boilers AHU, etc.

e. Provide covering for open space parking.

2. Air Conditioning and Ventillation.

a. Chilling system (4.2.1) will require two sets of standby chillers.

b. Provide sufficient ventillation for kitchen, laundry and parking area.

c. Heating system is also to be provided in general wards in winter season.

3. Plumbing

a. Storage tank capacity of domestic water will be changed from two day's reserve to three day's reserve.

.../

b. Water treatment plant for potable water will be designed in the Utilities Center taking into account storage capacity for supply and delivery.

c. Storage capacity of walkin freezer and cooler room and their sizes will be increased for two weeks' reserve.

d. Incinerators should be increased to include stand-by capacity.

Solid: 9,200 Kg x 1.5 (to be divided into 2 sets)
Liquid: 400 - 500 Kg (- " -)

e. Provide both CO2 and foam type hand or portable extinguisher in addition to other extinguishing equipment such as sprinklers.

4. Electrical

a. Provide extension of hospital telephone at each room of the housing complex, also provide adequate number of public telephones on each floor in the dormitory building.

b. Provide TV and radio outlets at the wards and headsets for patients on each bed.

c. Emergency power is also required for exterior lighting also for corridor, staircase and hall lightings in the housing building.

d. Housing power should be 220V/110V, *and these should be identified.*

e. Provide warning lights showing location of helipads.

.../

f. Identify the computor control for management purpose and for operation purpose.

5. Others

a. Suggested changes in wording to prevent confusion.

i. Tree planting "on rootop" change to"fourth floor"x *of the central building*.

ii. "Receiving bay" in kitchen change to "loading and unloading bay"

iii. Computor "subystem" change to "records".

iv. "Plumbing system" change to "Mechanical and ~~plumbing~~ *sanitary* system"x *and this to include air conditioning and ventilation system.*

b. Consider to provide additional outline specification.

c. *Adequate safety must be taken into consideration for all inhabitants and suitable protection against radiation must be provided.*

The Saudi Arabia representative expressed that the Basic Design was well thought out and represented, but the space accommodation provided for administrative and other medical and non-medical personnels was inadequate. The study team explained that the limited site area constraint was pointed out to Saudi Arabia representatives, but was requested to make the Basic Design within this site area under the presented conditions

The present review on the Draft Basic Design was conducted primarily for the purpose of improving the hospital function of the Cancer Center and Joint-use facilities.

Protection Against Spread of Disease through Animals

Dr. Arefin requested the Japanese team to include extra safety procedures to protect the environment against spread of disease through specially bread animals in the Cancer Research Center by coming in contact with other house animals such as rats and cats.

Protection against Radiation

Adequate safety must be taken into consideration for all inhabitants of the hospital buildings and residential buildings. Suitable protection against radiation by using lead lined doors in radiology rooms of both general and cancer hospitals must be used.

The Japanese team were requested by Dr. Arefin to give meticulus attention on this safety aspect under all circumstances, mainly because of the use of very high voltage radiation techniques used in treating some cancer patients.

Dr. Arefin informed Dr. Jam Joom and others that it is essential to find additional residential area to accommodate staff and families of staff.

Ideally this additonal space should be found adjacent or near to the hospital site for convenience and to eliminate the need for transportation of staff. This additional land must provide adequate space for 100 three bed room villas, 300 two bed room villas, and 600 two/one bed room appartments with adequate recreation facilities for families children and bachelor staff.

The facilities should include swimming pool, childrens' playgrounds, gardens, tennis courts, squash courts etc,.

28/5/83
K.M.M. AREF.

Masanichi Katoka

MASANICHI KATAOKA

Appendix 1-4 Minutes of Meeting (August, 1983)

Minutes for the National Cancer Center Discussion

Date & Time : 13th, Aug, 1983, 10;00 AM - 01:00 PM

Place : Ministry of Health, Western Region
conference room in 6th floor

Attendants : Saudi Arabia

* Dr. Adnan Jamjoom
Superintendant Health Affairs,
Western Province, M.O.H.

Japan

Japanese Advisory Committee

* Dr. Teruhiko Saburi

* Dr. Tatsuo Wada

* Mr. Akitoshi Matsumoto
Japan International Cooperation Agency

* Mr. Yukihisa Sakurada
Japanese Study Team

* Mr.Masamichi Kataoka

* Mr. Susumu Takahashi

* Mr. Tsuneo Safu

* Mr. Kozo Nakatani

* Mr. Akira Tada
Embassy of Japan

* Mr. Masafumi Yamamoto
Japan International Cooperation Agency

* Mr. Hideo Yasuki

1. General plan and floor plan

The Japanese study team presented the Final Draft Basic Design Report and described the improvements made in the general plan and floor plan wihich were based on the discussion of the meetings held in May. The improvements are outlined in red in the drawings.

The study team also recommended two alternative plans. One was a floor plan, which has an increased number of examination rooms, for the General Clinic. The other was a plan changing the 5th floor east wards to pediatric wards.

The general plan and floor plan together with the two alternative plans were approved.

2. Project cost

The study team explained the project cost but the cost was regarde to be very high with the exception of the medical equipment and management equipment which was regarded to be reasonable.

The study team agreed to further study the cost, and the Saudi authority arranged a meeting with the Director of Project, M.O.H, in Riyadh on the 20th of Aug. to provide recent data on hospital construction cost and also to discuss mechanical and electrical items for the National Cancer Center.

3. Project schedule

The study team explained the project schedule stating that six months of the construction periode could be overlapped in the detailed design period.

Discussion regarding the shortening of the schedule was conducted, and although difficulties such as extra time for translation into arabic was expected, it was agreed to shorten each period as follows :

Detailed disign period : 10 months
Construction period : 36 months

This schedule does not include time necessary for tendering and contracting.

4. Medical equipment

The study team presented the revised and completed medical equipment list which was approved with the provision that if changes were required, notification of the changes would be given within six weeks.

5. Others

It was arranged to have the Japanese study team give a slide presentation of the National Cancer Center at the King Fahad Hospital on the 17th of Aug. at 09:00 AM

Mr. Masamichi Kataoka
Leader of the Japanese
Study Team

Dr. Adnan Jamjoom
Superintendant of
Health Affairs
Western Province
The Kingdom of Saudi Arabia

Minutes of Meeting between Dr. K.M. Morad Arefin
and Japanese Study Team for the National Cancer Center.

Date and time : 21st August, 1983 09:00 AM - 11.00 AM
22nd August, 1983 09:00 AM - 12.00 Noon.

Place : Ministry of Health, Riyadh
Conference Room.

Attendants : Saudi Arabia

Dr. K.M. Morad Arefin

Japanese Study Team

Mr. Masamichi Kataoka
Mr. Susumu Takahashi
Mr. Tsuneo Safu
Mr. Akira Tada

The Japanese Study Team submitted the final Draft Basic Design Report with drawings, and explained the purpose of the meeting that is:

1. Collect data for revising the Project Cost to a more realistic figure based on data and information provided by Ministry of Health.

2. Review the incorporation of the items requested for study at the meetings conducted during 24th May,1983 - 28th May,1983.

1. The Japanese Study Team explained that they were requested by Dr. Jamjoom to contact the Ministry of Health, General Directorate for Projects & Maintenance to obtain figures and data to revise the Project Cost for which he had arranged ~~for~~ a meeting with Eng. Mohammed A. Al-Gwahas, Director General Directorate for Projects & Maintenance Dept. The Japanese Study Team requested for copies of recent B/Q and tender documents by 23rd August since they would leave Riyadh on that day and they must submit the final ~~draft~~ report within one month.

   Dr. Arefin briefly discussed the cost aspects of the project and produced some unpriced B/Q to the Japanese Study Team for a brief look and to get some idea as to the format and the content of such a B/Q.

2. The Japanese Study Team described the revisions made in compliance with the request made in the previous meeting of May 1983 in Jeddah.

Dr. Arefin requested the following items to be studied by the Japanese Team;

1) Since there seems to be space available, study whether two more elevators for personnel in the Central Building could be provided. The study team agreed to study whether it would be possible.

2) The Mechanical and Electrical workshop in the Utilities Center seems small and requested to study its enlargement. The Study Team agreed to study the enlargement.

3) The Sorting area for clothes in the laundry should be doubled. The study team agreed to study the arrangement to increase the sorting area.

4) Two more swimming pools are desirable in the hospital staff accommodation area for the Villa Zone and the Male Zone area of drawing 04 but it is realized that space limit poses difficulty and cannot possibly be accommodated within the compound.

5) British, German and French Standards were requested to be added to the list of standards.

6) Dinning facilities should be carefully studied preferably increased in view of the fact with its the joint use for a hospital of 800 beds.
Special attention should be given on providing Doctor's Dinning room and Lounge area, Senior Consultants and Administration Dining area, Coffee Lounge/Snack bar etc and Wash room.

7) Electrical outlets of 2 pin & 3 pin type in the Hospital Building for both the Cancer Center and the General Hospital should be adequate to cater for various types of electrical plugs as medical equipment may be comming from various sources/Countries.

8) On accommodation it was pointed out, the solution provided is perhaps not the best one for following reasons:

   a) Seven Story buildings for all staff except the Villa occupants are not desirable. It can be acceptable for bachelor staff only.

   b) Number of male staff assumed in the design appear to be an under estimation of the requirements. It should be carefully considered.

contd...3...

   c) Two more passenger elevators should be added to the 600 units building of the female nurses staff.

   d) Two more fire - escape staircases are to be provided for the populated residential buildings, one on each side of the building.

The Japanese Study Team clarified their position that they are consultants and their brief is only to supply designs and drawings both basic and/or detail as the case may be. They will not participate in the execution of the construction and they are only interested in providing the design of a modern Cancer Center and most realistic project cost estimate for the benefit of the Saudi Arabian Government.

Overall design is quite good and JICA have modified and improved the drawings of the Hospital taking into account Dr. Arefin's observations and comments made in May,1983.

SAUDI ARABIA

DR. K.M. MORAD AREFIN
23/8/83

JAPANESE STUDY TEAM

MR. MASAMICHI KATAOKA
LEADER.

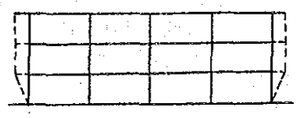
Appendix 3-1 Expansion Joints

A. Expansion and contraction

Cracks in the concrete structure of a building are most often caused by expansion due to temperature changes and contraction in the drying process.

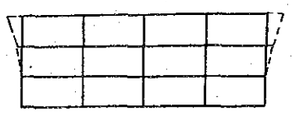
1) Deformation of buildings by temperature changes

Changes in outdoor temperature affect the internal temperature of concrete structures above ground. Because underground concrete structures remain unaffected throughout the year, a considerable floor displacement occur above the ground floor by expansion under high temperature, as shown by the broken line in the figure below.



2) Deformation of a building by solar radiation

The effect of solar radiation is overwhelmingly larger on the rooftop than on the exterior walls. Accordingly, expansion is mostly concentrated on the top floor, with lower floors remaining virtually unaffected, as shown below.



The temperature expansion coefficient under a normal range of temperature is $\alpha = 1.2 \times 10^{-5}$ for concrete structures virtually regardless of different mixing, consistency and age, and $\alpha = 1.1 \times 10^{-5}$ for steel structures.

3) Contraction by drying

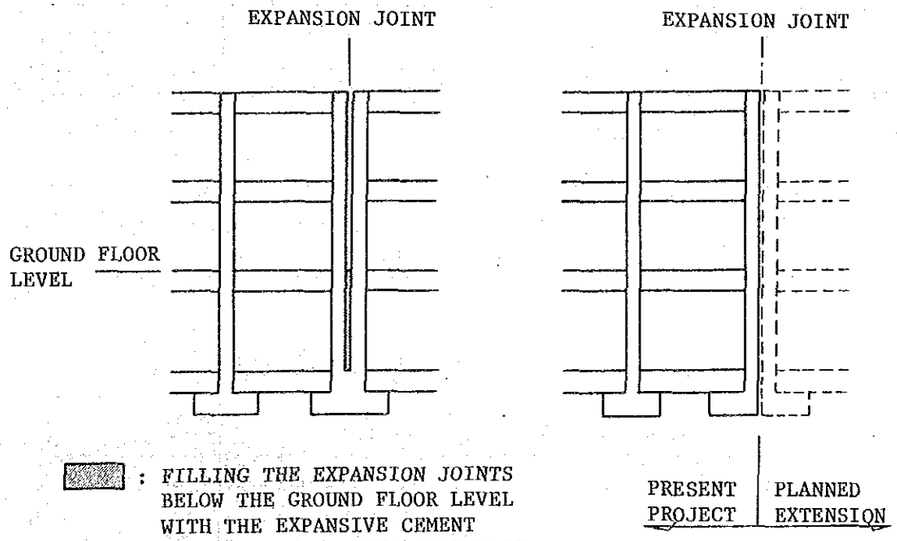
The free contraction coefficient for reinforced concrete structures varies considerably with the density of reinforcing steel. Assuming the time elapse of one year after placement and the material age of two weeks, the coefficient is calculated as follows:

Reinforcement ratio of 0.6% ..... 5×10^{-4}
Reinforcement ratio of 1.2% ..... 4×10^{-4}

The speed of contraction is very rapid during the first six months or so, and then gradually tapers off. The contraction largely ends after one year.

B. Appropriate construction method and planning

One of the methods to overcome the hazards from expansion and contraction is the expansion joint construction method. Expansion joints provided in appropriate places will reduce the stress on materials from temperature changes and drying contraction as shown below.

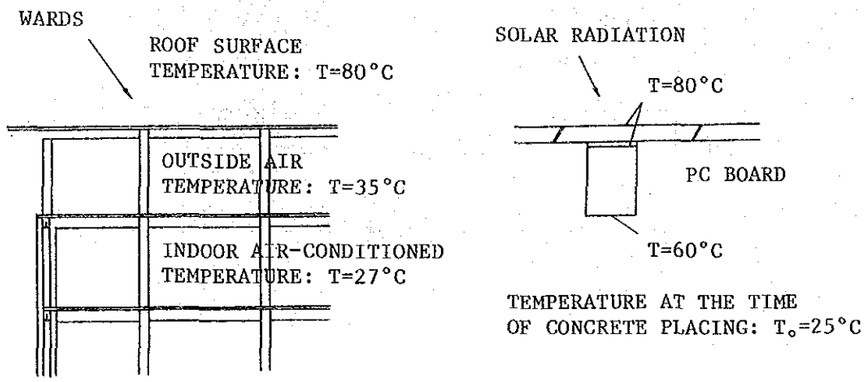


C. Calculations of temperature and solar radiation stress

1) Assumptions

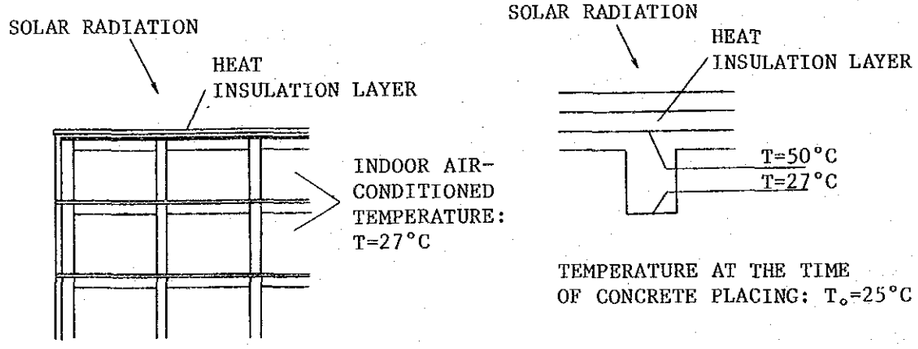
Stress effects from outdoor-indoor temperature differences and solar radiation are estimated for two cases on the assumptions as shown below.

Case I: Wards



TEMPERATURE AT THE TIME OF CONCRETE PLACING: T_o=25°C

Case II: Hospital



TEMPERATURE AT THE TIME OF CONCRETE PLACING: T_o=25°C

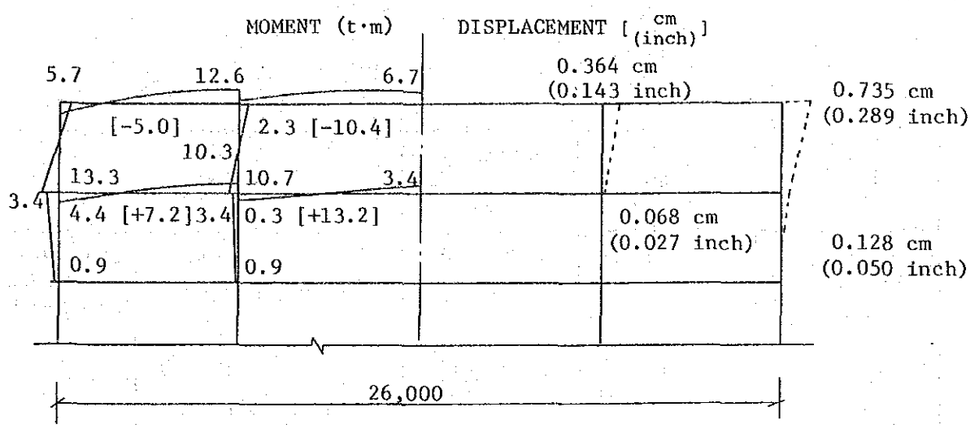
Stress effects for each case are examined for three alternatives in the length of a building as follows:

(a) 7.0 m/span x 4 spans = 28.0 m
(b) 7.0 m/span x 8 spans = 56.0 m
(c) 7.0 m/span x 14 spans = 98.0 m

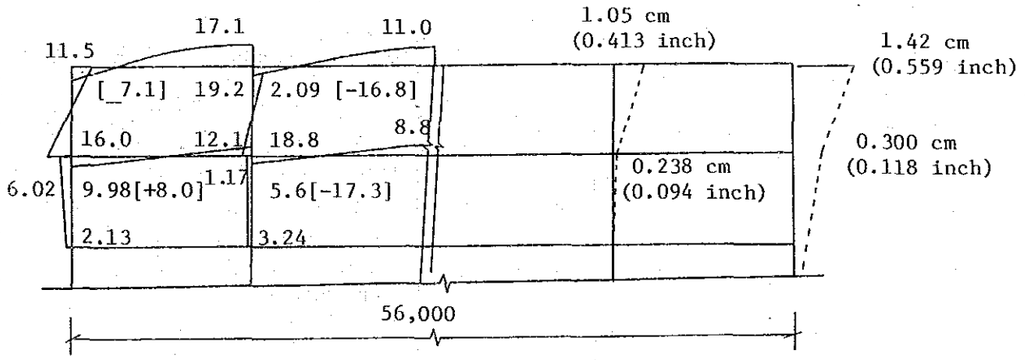
2) Results

a) Case I: Wards

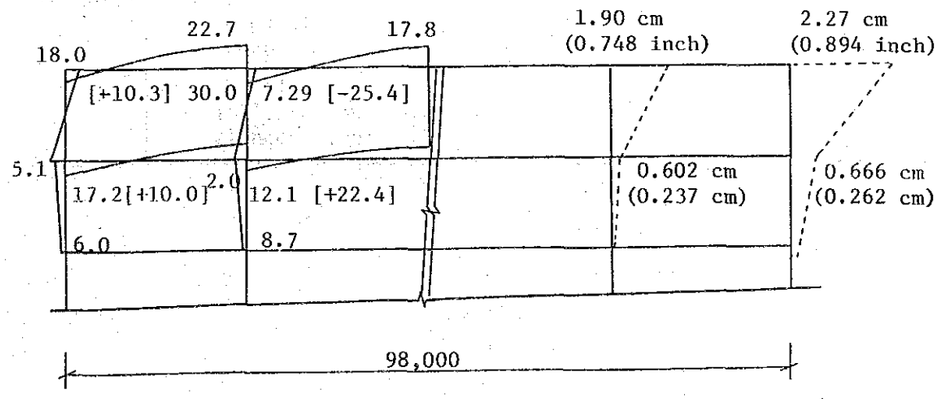
(a) Length 28.0 m



(b) Length 56.0 m

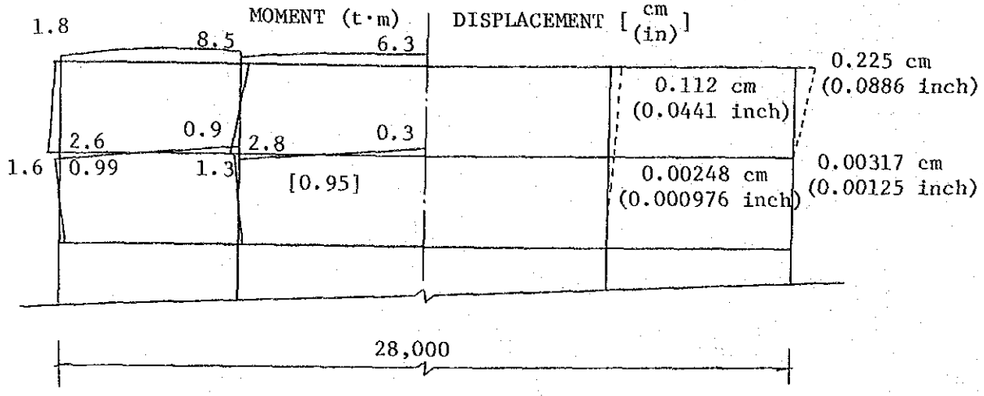


(c) Length 98.0 m

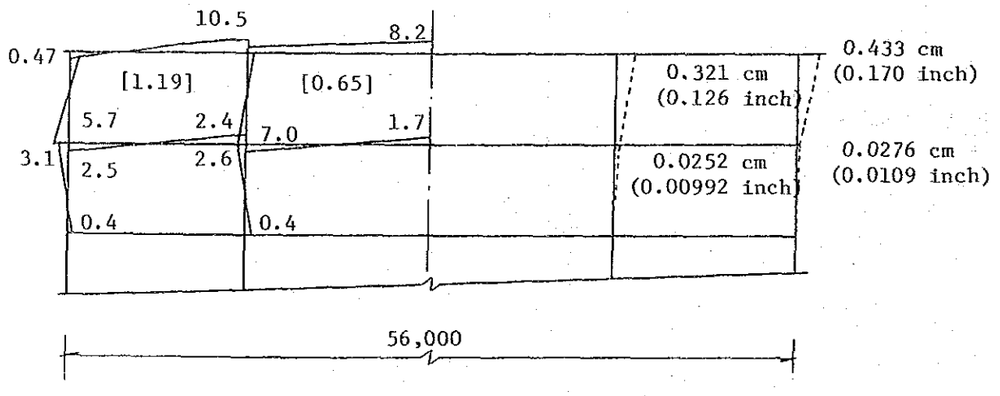


b) Case II: Hospital

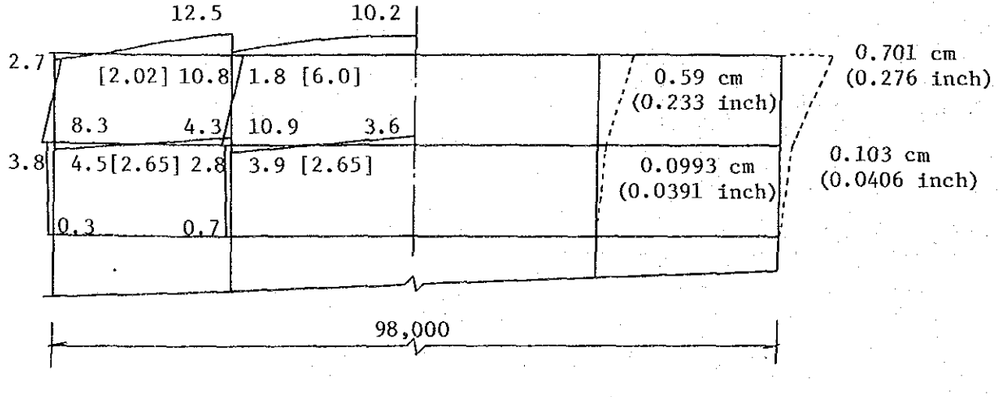
(a) Length 28.0 m



(b) Length 56.0 m



(c) Length 98.0 m

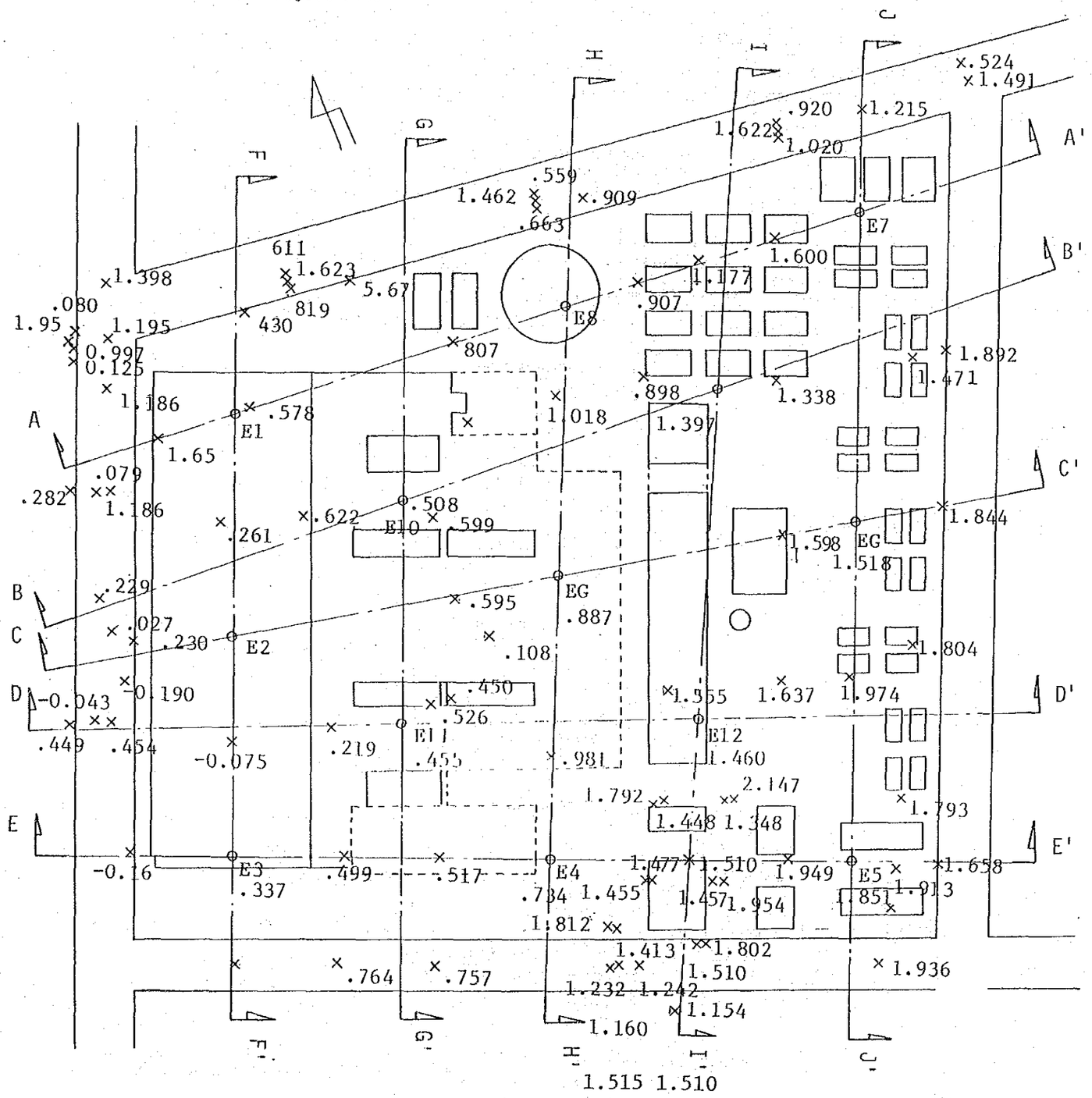


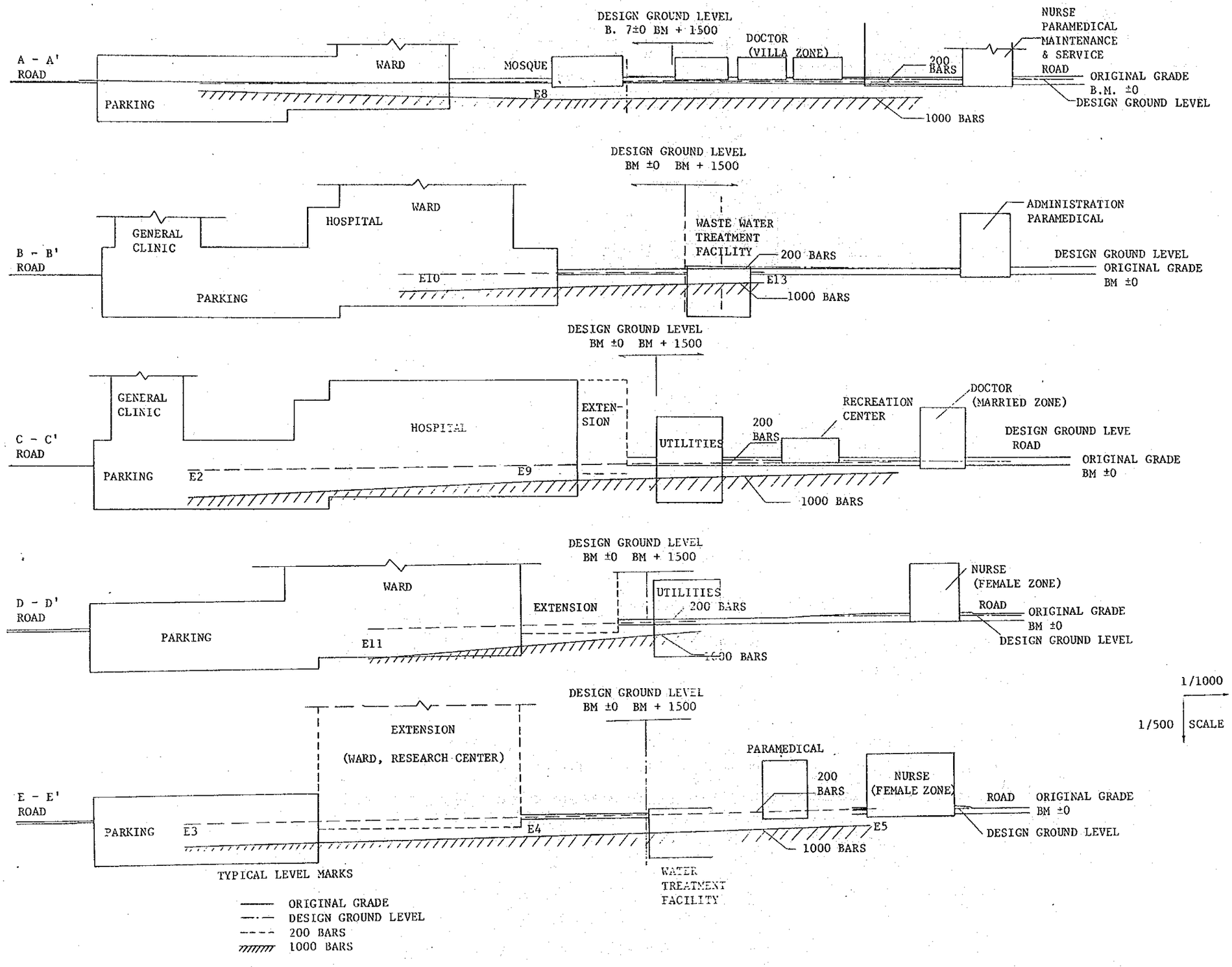
D. Position of expansion joints by length of buildings

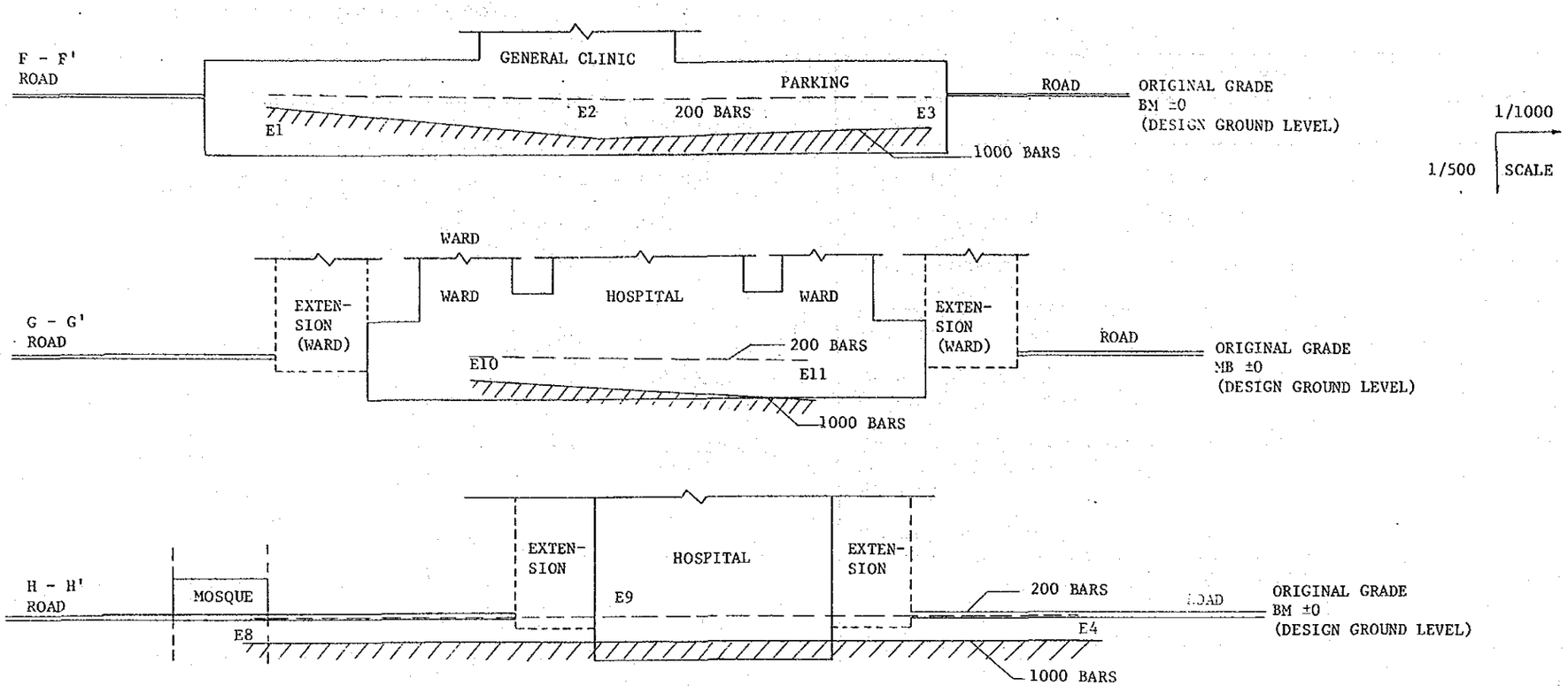
Building codes in selected countries have the following specifications for the positions of expansion joints.

Structures		W.Germany: DIN & Other Codes	Japan	U.S.A. Joint Committee
Reinforced Concrete Structures	Frame: pin frame, rigid frame	30 - 35 m	No spec.,	Increase reinforcing steel
	Floor:	30 - 50 m	Usually 40 - 60 m	Less than 60 m in areas with large temperature variations
	(a) Site concreting & factory - precast concrete slabs		Less than 30 m for retaining walls	
	(b) Site-precast concrete slabs	40 - 60 m		
	Roof:			
	(a) With heat insulation layer	10 - 15 m		
	(b) Without heat insulation	5 - 6 m		
	(c) When neither expansion nor contraction is expected to occur	> 15 m		
Steel Structures	(a) Strongly affected by temperature changes	50 m		
	(b) Normal influence on slender steel	100 m		

Appendix 3-2 Topographic Mesh and Cross Sections of Project Site




A - A'
ROAD
PARKING
WARD
MOSQUE
E8
DESIGN GROUND LEVEL
B. 7±0 BM + 1500
DOCTOR
(VILLA ZONE)
200
BARS
1000 BARS
NURSE
PARAMEDICAL
MAINTENANCE
& SERVICE
ROAD
ORIGINAL GRADE
B.M. ±0
DESIGN GROUND LEVEL
B - B'
ROAD
GENERAL
CLINIC
HOSPITAL
WARD
PARKING
E10
DESIGN GROUND LEVEL
BM ±0 BM + 1500
WASTE WATER
TREATMENT
FACILITY
200 BARS
E13
1000 BARS
ADMINISTRATION
PARAMEDICAL
DESIGN GROUND LEVEL
ORIGINAL GRADE
BM ±0
C - C'
ROAD
GENERAL
CLINIC
PARKING
E2
HOSPITAL
E9
EXTEN-
SION
DESIGN GROUND LEVEL
BM ±0 BM + 1500
UTILITIES
200
BARS
1000 BARS
RECREATION
CENTER
DOCTOR
(MARRIED ZONE)
DESIGN GROUND LEVE
ROAD
ORIGINAL GRADE
BM ±0
D - D'
ROAD
PARKING
WARD
E11
EXTENSION
DESIGN GROUND LEVEL
BM ±0 BM + 1500
UTILITIES
200 BARS
1000 BARS
NURSE
(FEMALE ZONE)
ROAD
ORIGINAL GRADE
BM ±0
DESIGN GROUND LEVEL
E - E'
ROAD
PARKING
E3
EXTENSION
(WARD, RESEARCH CENTER)
E4
DESIGN GROUND LEVEL
BM ±0 BM + 1500
PARAMEDICAL
200
BARS
NURSE
(FEMALE ZONE)
E5
1000 BARS
ROAD
ORIGINAL GRADE
BM ±0
DESIGN GROUND LEVEL
WATER
TREATMENT
FACILITY
TYPICAL LEVEL MARKS
ORIGINAL GRADE
DESIGN GROUND LEVEL
200 BARS
1000 BARS
1/1000
1/500 SCALE


F - F'
ROAD
GENERAL CLINIC
PARKING
E1
E2
200 BARS
E3
1000 BARS
ROAD
ORIGINAL GRADE
BM ±0
(DESIGN GROUND LEVEL)
1/1000
1/500
SCALE
G - G'
ROAD
EXTEN-
SION
(WARD)
WARD
WARD
HOSPITAL
WARD
EXTEN-
SION
(WARD)
E10
200 BARS
E11
1000 BARS
ROAD
ORIGINAL GRADE
MB ±0
(DESIGN GROUND LEVEL)
H - H'
ROAD
MOSQUE
E8
EXTEN-
SION
HOSPITAL
EXTEN-
SION
E9
200 BARS
E4
1000 BARS
ROAD
ORIGINAL GRADE
BM ±0
(DESIGN GROUND LEVEL)
I - I'
ROAD
EXTENSION
EXTENSION
UTILITIES CENTER
E13
200 BARS
E12
1000 BARS
BM + 1500
DESIGN GROUND LEVEL
ROAD
ORIGINAL GRADE
BM ±0
RI WASTE
TREATMENT
FACILITY
J - J'
ROAD
DOCTOR
(MALE ZONE)
DOCTOR
(MARRIED ZONE)
DOCTOR
(MARRIED ZONE)
200
BARS
NURSE
(FEMALE ZONE)
ROAD
E5
ORIGINAL GRADE
BM ±0
DESIGN GROUND LEVEL
BM + 1500
1000 BARS

Appendix 3-3 Comparison of US and UK Structural Codes

Concrete			Structural Steel		
	ACI 318-77	BSCP 110		AISC	BS 449
Section Design	Ultimate strength design	Ultimate strength design	Section Design	Working stress design	Working stress design
Stress Distribution	Rectangular	Paraboloidal Rectangular Variable	Standard Material	Grade 36	Grade 43
			Yield Strength	fy = 36 kips	fy = 430 N/mm^2
Ultimate Strain	0.3%	0.35%	Allowable Unit Stress for Tension	ft = 22 kips	ft = 155 N/mm^2
Material Strength	1/0.85 = 1.18 Concrete compression	γm = 1.5 Concrete compression	Maximum Allowable Unit Stress for Compression	fc = 22 kips	fc = 155 N/mm^2
Safety Factor	1.0 Reinforcing steel	γm = 1.15 Reinforcing steel	Maximum and Minimum Allowable Unit Stress for Bending	fc = ft = 24.0 kips	fc = ft = 165 N/mm^2
Material Strength	0.70 Column: bending, axial force		Changes in Allowable Unit Stress by Buckling Length	Similar equation to AIJ vis-a-vis compression/bending moment	Equation completely different from AIJ vis-a-vis compression/bending moment
Reduction Factor	0.75 Column: spiral hoop 0.90 Beam: bending 0.85 Material: tortion, shear		Allowable Shearing Stress	fs = 14.5 kips	fs = 115 N/mm^2
			Welding Strength	Butt welding: Base metal strength Fillet welding: 14.5 kips	Butt welding: Less than base metal strength Fillet welding: 115 N/mm^2
Load Factor	1.4D + 1.7L	1.4D + 1.6L	H.T.B.	As specified by Codes	As specified by Codes
For Stress	0.9D + 1.3W 0.75 (1.4D + 1.7L + 1.7W)	0.9D + 1.4W 1.2D + 1.2L + 1.2W			
For Deflection		1.0D + 1.0L 1.0D + 1.0W 1.0D + 0.8L + 0.8W			
Length/Depth Ratio of Beam	As specified by Codes	As specified by Codes			
Length/Depth Ratio of Column	As specified by Codes	As specified by Codes			
Usual Material	Concrete fc'=4,000 psi	Concrete fcy= 30 N/mm^2			
Specification	Reinforcing steel fy = 60 ksi	Reinforcing steel fy = 410 N/mm^2			

Appendix 4-1 Selection of Air-conditioning Refrigerators

A. Capacity calculation

1) Design assumptions

(a) Air-conditioning area:

Total floor space (109,000 m^2) x 0.65

(b) Top-off factors:

Loss factor of devices, ducts and piping ... 10%
Safety factor of heat-source equipmpnt 10%

(c) Occupants

In-patients	800 persons
Out-patients (including emergency patients)	3,000 (air-conditioning load is calculated for 1,000 persons)
Hospital personnel	2,000
Visitors	2,000
Total	7,800 (air-conditioning load is calculated for 3,800 persons)

2) Load calculation

Load	Base Requirements	Air-conditioning Load (Mcal/h)
Skin Load	45 Kcal/h·m^2	3,189.00[3]
Fresh Air Load	15.36 Kcal/m^3[1]	5,292.00[2]
Lighting Load	20 Kcal/h·m^2	1,417.00[3]
Occupancy Load	100 Kcal/h·person	380.00
Others	10 Kcal/h·m^2	708.50[3]
	Total	10,986.00

Notes: 1) Marginal enthalpy Δi = 12.8 kcal/kg, and specific weight = 1.2 kg/m^3.

2) Volume of fresh air intake = 689,000 m^3/h, and total heat exchanger efficiency = 0.5.

3) Total air-conditioning area = 70,850 m^2.

3) Calculation of refrigerator capacity

Capacity (USRT) = 10,986 (Mcal/h) x 1.2 ÷ 3.024 (USRT/Mcal/h)
= 4,359.52
= 4,360

B. Model Selection

The results of the comparative evaluation of three alternatives are shown in the table below:

The most important requirements of the refrigerators used in the hospital are reliability, easy maintenance and easy replacement. Accordingly, the package-type air-cooled turbo refrigerator (Alternative I) is selected for the present project.

Criteria \ Alternative	I	II	III
	Air-cooled Turbo Refrigerator (Package Model)	Air-cooled Turbo Refrigerator (Separate Model)	Air-cooled Screw Refrigerator (Separate Model)
Maintenance	Easier maintenance due to hermetic sealing which allows no leakage of the refrigerant	Refilling of the refrigerant necessary due to mechanical sealing	Refilling of the refrigerant necessary due to mechanical sealing
Input Power	Easy to start with 3,000 kVA generator	Difficult to start with 3,000 kVA generator	Difficult to start with 3,000 kVA generator
Reliability	High when a number of units installed	High when a standby unit installed	High when a standby unit installed
Durability	Good	Good	Good
Controllability	Can accommodate reduced load when a number of units installed	Difficult to accommodate reduced load	Can accommodate reduced load
Construction Requirement	Easier, requiring no piping for the refrigerant	Piping for the refrigerant necessary	Piping for the refrigerant necessary
Space Requirement	Can be installed on roof-top, thus saving indoor space	Must be installed indoor	Must be installed indoor
Repair	Units easily replaceable	Less easy	Less easy
Chilling Capacity per Unit	Maximum 500 USRT (approx.)	Maximum 2,000 USRT (approx.)	Maximum 2,000 USRT (approx.)

C. Number of required refrigerators

Ten 500 USRT refrigerators, two as standbys, will be provided. The indicated capacity is under the outdoor temperature of 46°C. Under the design outdoor temperature of 41°C for the present project, the capacity of the unit would be 545 USRT.

Appendix 5-1 Boiler Selection

A. Boiler capacity calculations

1) Steam Requirement for domestic hot water supply

Hot water load: 33,000ℓ/hour x (60-15) = 1,485,000 Kcal/h

Steam requirement: $\frac{1,485,000}{0.8 \times 579}$ x 1.2 = 3,847 kg/h

2) Steam requirement for kitchen, laundry and disinfection

Steam requirement: 100 kg/unit/h x 45 units = 4,500 kg/h

3) Steam requirement for room heating

	Heating Area (m^2) [1] / Outside Air (m^3/h)	Skin Load = 25 Kcal/h (Mcal/h)	Outside Air Load [2] = 5 Kcal/h (Mcal/h)	Total Heating Load (Mcal/h)	Steam Requirement (kg/h)
Hospital	59,800 / 590,000	1,495	1,475	2,970	7,695
Extension	9,930 / 14,500	249	363	612	1,585
				Total	9,280

1) Heating area is 60% of the total floor space; namely, 99,610 m^2 x 0.6 = 59,800 m^2 and 16,550 m^2 x 0.6 = 9,930 m^2

2) Outside air load assumes the heat exchanger efficiency of 50%.

The total steam requirement will thus come to 17,627 kg/h, or 17 tons/h.

B. The number of boilers

The boiler load is estimated to be 8.4 tons/h (domestic hot water and hot water for kitchen, laundry and disinfection) during the summer, and 18 tons/h (domestic hot water, kitchen, laundry and disinfection and room heating) during the winter. Taking into consideration such factors as load balance, reliability and compatibility, it is decided to operate two boilers during the summer and four during the winter. The unit capacity of the boilers will be 5 tons/h, and a total of five boilers will be installed, including one standby.

C. Model

Flue tube-smoke tube boilers will be employed.

D. Capacity calculations of oil storage tanks

Reserve requirement is assumed to be one week.

Requirement for boilers	21,000ℓ/day x 7 =	147,000ℓ
Requirement for generators	100,000ℓ/day x 7 =	700,000ℓ
Requirement for incinerators	360ℓ/day x 7 =	2,520ℓ
Total		849,520ℓ

Five 170,000ℓ tanks will be installed underground.

Appendix 5-2 Physical and Chemical Attributes of Local Water

		Results	WHO Standards
Temperature (°C) at Sampling Point		38	
Odour		Unobj	—
Taste		Unobj	—
Colour "pt-Co. Scale" Unit		NIL	—
Turbidity "F.T.U. Scale" Unit		0.34	—
Sediments	mℓ/ℓ	NIL	—
PH		8.40	7.0 to 8.5
Conductivity	VS/cm	154	
Total Hardness	mg/ℓ $CaCo_3$	45	100 to 500 ppm
Total Alkalinity	" "	39	
P. Alkalinity	" "	2	
Cations			
Al+++	mg/ℓ	0.0085	—
Ca++	"	15.20	72 ppm
Cr_6+	"	NIL	0.05 "
Cu++	"	NIL	1.0 "
Fe++ & Fe+++	"	0.040	0.3 "
K+	"	0.815	—
Mg++	"	1.56	50 ppm
Mn++	"	NIL	0.1 "
Na+	"	14.80	—
NH_4+	"	0.166	0.5 ppm
Zn++	"	0.0225	5.0 "
Anions			
Cl-	mg/ℓ	23.02	200 ppm
CO_3--	"	2.40	—
F-	"	0.16	1.0 ppm
HCO_3-	"	42.70	125 "
OH-	"	NIL	
NO_2-	"	NIL	—
NO_3-	"	0.902	40 ppm
PO_4---	"	0.10	—
SO_4--	"	5.64	200 ppm
Silicate as Sio_2	mg/ℓ	2.20	—
Dissolved Oxygen	"	7	
Free CO_2	"	NIL	
Residual CL	"	0.70	—
Hydrogen Sulfide H_2S	"	NIL	
Total Dissolved Solids	"	108	
Marble Test pH		8.45	
Marble Test T. Alkl. $CaCo_3$	mg/ℓ	40	80 ppm
Marble Test T. Hard $CaCo_3$	"	45	100 to 500
Langelier Index			

Source: " Water 'Physical & Chemical' Analysis Report "(SAFAR 1403 H), Kingdom of Saudi Arabia, Ministry of Agriculture and Water Operation and Maintenace, Jeddha Water Works.

Appendix 5-3 Calculations of Daily Domestic Water Requirements

A. Hospital

800 beds x 1,200ℓ/bed·day = 960,000ℓ/day ..... (1)

Or,

In-patients	800 persons x 400ℓ/person·day	= 320,000ℓ/day
Out-patients	3,000 persons x 120ℓ/person·day	= 360,000ℓ/day
Hospital personnel	2,000 persons x 140ℓ/person·day	= 280,000ℓ/day
Visitors	2,000 persons x 60ℓ/person·day	= 120,000ℓ/day
	Total	1,080,000ℓ..(2)

On the basis of (1) and (2), the daily domestic water requirement is assumed to be 1,000,000ℓ.

B. Residential houses

Household (VILLA + MARRIED + A part of FEMALE)

(96 persons + 504 persons + 280 persons) x 280ℓ/person·day
= 246,400ℓ/day

A single hospital worker (MALE + A part of FEMALE)

(112 persons + 800 persons) x 150ℓ/person·day
= 136,800ℓ/day

Total ≒ 383,000ℓ/day

C. Total requirement

A + B = 1,000,000ℓ/day + 380,000ℓ/day = 1,380 m^3/day

Assuming that flush toilets and irrigation use recycled water, the daily requirements for domestic and recycled water will be 970 m^3 and 410 m^3, respectively.

Appendix 5-4 Capacity Calculations of Water Storage Tanks and Elevated Tanks

A. Storage tank capacity

The reserve requirement is assumed to be two days.

1) Domestic water

970 m^3 x 3 = 2,910 m^3

2) Recycled water

410 m^3 x 3 = 1,230 m^3

B. Elevated tanks

1) Estimated peak water consumption

Domestic 970,000ℓ x $1/10^h$ x 3 ≒ 291,000ℓ/h ≒ 4,900ℓ/minute
Recycled 410,000ℓ x $1/10^h$ x 3 ≒ 123,000ℓ/h ≒ 2,100ℓ/minute

2) Maximum water requirement

Domestic 970,000ℓ x $1/10^h$ x 2 ≒ 194,000ℓ/h ≒ 3,200ℓ/minute
Recycled 410,000ℓ x $1/10^h$ x 2 ≒ 82,000ℓ/h ≒ 1,400ℓ/minute

3) Pumping requirement

2) The above is assumed to be the pumping requirement.

4) Capacity of elevated tanks

Assuming the continuous peaking of 30 minutes and the pump operation of 15 minutes:

Domestic (4,900 - 3,200) x 30 min. + 3,200 x 15 min.
= 99,000ℓ = 100 m^3

Recycled (2,100 - 1,400) x 30 min. + 1,400 x 15 min.
= 42,000ℓ = 42 m^3

Or, assuming that the capacity be equivalent to 1.0 times the average hourly requirement:

Domestic 970,000 x 1/10 x 1.0^h = 97 m^3
Recycled 410,000 x 1/10 x 1.0^h = 35 m^3

Results:

Domestic 100 m^3
Recycled 42 m^3

Appendix 5-5 Capacity Calculations of Hot Water Supply

A. Calculations of hot water requirements (hospital zone)

1) Daily requirement

800 beds x 200ℓ/bed·day = 160,000ℓ/day

2) Mean hourly requirement

160,000ℓ x 1/10 = 16,000ℓ/h

3) Maximum hourly requirement

160,000ℓ x 1/10 x 2 = 32,000ℓ/h

or,

97,000 m^2 x 0.4ℓ/m^2·h = 38,800ℓ/h

From the above, the maximum hourly requirements of 32,000ℓ/h is assumed.

B. Hot water tank capacity

V = Qs x T/η = 32,000 x 1/0.8 ≒ 40,000

T = duration of continuous peaking: 1 hour

η = heat exchanger efficiency: 0.8

C. Number and model of tanks

Four 10,000ℓ steam-coil tanks

Appendix 5-6 Water Supply Requirements for Fire Protection System

1) Indoor fire hydrants

Volume of discharge 150ℓ/min. simultaneous operation of five units

Capacity requirement 150ℓ/min. x 5 units x 20 min. = 15 m^3

2) Outdoor fire hydrants

Volume of discharge 350ℓ/min. simultaneous operation of two hydrants

Capacity requirement 350ℓ/min. x 2 units x 20 min. = 14 m^3

3) Sprinkler extinguishing system

Volume of discharge 80ℓ/min. x 20 units = 1,600ℓ/min.

Capacity requirement 1,600ℓ/min. x 20 min. = 32 m^3

4) Foam extinguishing system

100 m^2 ÷ 9 = 11.1 = 12 zones

Capacity requirement 8ℓ/min. x 12 zones x 2 x 10 ≒ 2 m^3

5) Water tank capacity

Total water requirement 15 m^3 + 14 m^3 + 32 m^3 + 2 m^3 = 63 m^3

Effective capacity is assumed to be 65 m^3, and the tank size will be 6.0 m x 5.0 m x 3.0 m.

6) Fire water reservoirs

V = 109,000 m^2 x 1/7,500 x 20 m^3 ≒ 300 m^3 (fire resistant structure)

Six 50 m^3 tanks will be installed, and the tank size will be 5 m x 5 m x 3 m.

Appendix 6-1 Electrical Equipment by Room

Room Designations \ Equipment	Lighting Level (lx)	Percentage of Generators' Circuits (%)		Telephones	Intercom	Broadcasting	CCTV	Public Radio Sets	Public TV Sets	Electric Clocks	Nurse Calls	Grounding	Crime Prevention	
		Lighting	Outlets											
Examination Rooms	400	30	30	o	o					o		o		
Laboratories	400	30	30	o	o					o		o		
X-ray Rooms	200	30	30		o							o		
Operating Rooms	1,000	100	100		o		o			o		o[1]		
ICU, CCU	1,000	50	100				o				o	o[1]		
Delivery Rooms	400	100	100		o					o		o		
Nurseries	400	30	50		o		o					o		
Research Rooms	500	50	50	o	o					o				
Treatment Rooms	400	30	30		o							o		
Doctors' Offices	300	30	30	o	o					o				
Nurse Stations	400	100	100	o	o	o				o	o[2]			
Wards	200	30	30					o	o		o	o		
Pharmacy	400	30	30	o	o					o				
Pantry	200	10	10		o									
Corridors Out-patient Wards	200 100	30	0			o							o	
Lavatories	100	10	0								o			
Entrance Hall and Waiting Lobby	200	30	0	o		o				o			o	
Administration	400	30	30	o	o	o			o	o			o	
Dining Hall	300	30	10	o	o	o			o	o				
Kitchen	400	30	30	o	o	o				o				
Conference Rooms	400	10	0	o	o				o	o				

1. Non-grounding system
2. Master

Appendix 6-2 Skeleton Diagram of Electrical System