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DEPARTMENT OF EXTERNAL AFFAIRS
SURVEY OF PROPERTY MANAGEMENT

A REPORT FROM

Woods, Gordon & Co.

MANAGEMENT CONSULTANTS

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DEPARTMENT OF EXTERNAL AFFAIRS

SURVEY OF PROPERTY MANAGEMENT

MAY 1968

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Woods, Gordon & Co.

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May 15, 1968

Mr. T.H. Bennett
Director-General, Finance and
Administration
Department of External Affairs
Ottawa, Ontario

Dear Mr. Bennett:

As requested by you, we have carried out a brief study of the Property Management Division of the Department of External Affairs. Our original terms of reference consisted of -

- (a) Assisting the personnel of the Division in the preparation of the five-year program review submission to the Treasury Board, particularly in relation to the forecasting of the Department's capital requirements, and
- (b) preparing recommendations for improvement in the planning and control of capital activities, particularly in connection with the Department's long-term plans for property acquisition abroad.

However, as the study developed it became obvious that item (a) above was well advanced and it was not necessary for us to spend as much time on this subject as originally anticipated. When this was brought to your attention, you requested that we study the possibility of using a working capital advance to finance the acquisition of properties abroad, along the lines of the arrangement outlined in your memorandum to Mr. M. Grant dated March 25, 1968.

Generally speaking, we found that existing procedures are reasonably satisfactory. At the same time we believe scope exists for improvement at the planning stage of projects through the transfer of some of the work presently done by the Property Acquisition group to the Program Planning group and through the use of network diagrams, at least for the planning and design stages and, where possible, for the actual construction of buildings.

These and other suggestions are discussed in the pages that follow, under the following headings:

- Determining project priority
- Planning a project
- The role of the architectural sub-committee
- Appointing and briefing a Canadian architect
- Post briefing
- The role of the Department of Public Works
- Comments on suggested financing arrangement
- Network planning

We would be pleased to discuss our recommendations with you or your staff at your convenience, and to assist in their implementation if you so desire.

Yours very truly,

Woods Gordon & Co

DETERMINING PROJECT PRIORITY

A long-term program of acquiring property abroad through the construction or purchase of chancery buildings, official residences for heads of mission, and staff quarters was approved in principle by the Treasury Board in August, 1966. An acquisition program estimated at \$98 million has been prepared by the Property Management Division.

In preparing this program, the advantages of owning versus renting were assessed for each post and a schedule was prepared showing the priority that should be given to the acquisition of property at various posts as determined by this assessment. On the basis of our interviews with senior personnel it would appear that the following factors were used in this analysis:

	<u>Chanceries</u>	<u>Official Residences</u>	<u>Staff Quarters</u>
Cost	x	x	x
Availability of suitable space	x	x	x
Security	x	minor	-
Public relations	x	x	-
Expiration of present lease	x	x	x

Each of these factors is discussed briefly below.

The cost of owning versus the cost of renting property is based on a 20 year projection of such costs for each post. In both cases the projection takes into account pre-occupancy costs, occupancy costs, post-occupancy costs, and residual values. Capital investment costs are taken at their face value at the time the analysis is made, whereas the 20 year rent is determined from a projected trend based on past rent increases. The residual value of rented accommodation consists of sale of lease, key money or other applicable credits. In the case of owned buildings, the residual value is taken as half of the building acquisition cost plus the full land cost.

While the rental figures used in the analysis reflect the anticipated increase in rent over the next 20 years, the residual value used in determining the cost of acquiring property does not take fully into account the appreciation of property values that would normally accompany any increase in rent. Since property values have been appreciating at a very rapid rate in almost all parts of the world, without any apparent end in sight, any analysis that tends to under-rate the importance of this factor can produce misleading results.

The second factor affecting the desirability of owning rather than renting is the availability of suitable space which could be rented for a reasonable rate in a desirable area of the city in which the post is located. Here the phrase "suitable space" applies to the size of rooms and their layout, the operating efficiency, the alterations required and the overall physical appearance of the property.

Security also plays an important role in assessing the desirability of owning rather than renting property. Ideally a chancery should not abut other buildings, and the sensitive zone should be located in an area of the chancery where it will not interfere with other functions. Inasmuch as it is impossible to attach a dollar value to something as intangible as security, there may be a temptation to use this factor as the sole means of justifying the acquisition of certain properties. Thus, considerable care needs to be exercised to avoid giving this factor any greater weight than its importance really merits.

The weight to be given to the public relations factor is based on the importance to the post of the sense of identity that goes with a separate chancery, the practice followed by other countries represented at the post, and the type of representation that the host country has in Canada.

The expiration date of an existing lease coupled with a lack of availability of alternative suitable space might, in some cases, have the effect of increasing the priority that a project would otherwise receive if the existing lease was not about to expire.

Conditions having an important bearing on the relative importance of the above factors can change substantially from year to year. We suggest, therefore that the priority list continue to be reviewed regularly and that each project continue to be analyzed separately and thoroughly on the basis of the factors relevant to that project before an acquisition is made.

PLANNING A PROJECT

Organization

The Property Management Division is presently divided into three sections, namely the Property Leasing and Maintenance, the Programme Planning and the Property Acquisition, all responsible to the Head of the Division. We believe this represents a logical organizational arrangement. At the same time, we believe that a more effective division of work could be made between the Programme Planning and the Property Acquisition Sections.

At the present moment, program planning is carried out by one officer in the Division. In the course of his work, he obtains establishment forecasts from all government departments and agencies wishing accommodation in the proposed chancery. These forecasts are used to determine the approximate space required and the cost of the space based on an average construction cost of \$40.00 per square foot for the building and the estimated cost of the land. The project priority is then determined on the basis of an analysis of the factors described previously, and the project is included in the five-year program review under the appropriate year.

After the five-year program has been approved in principle by the Treasury Board, the project becomes the responsibility of the Property Acquisition Section. Staff of this Section again contact the departments and agencies sharing chancery space with the Department of External Affairs, and confirm their establishment forecasts or obtains new ones where their needs have changed. Property Acquisition staff then proceed to work out a detailed space schedule. We believe greater continuity and more effective coordination of this work would be provided if it were all carried out by the staff of the same section.

Another organizational problem centres around the fact that it is sometimes necessary for an officer in the Property Acquisition Section to drop a project which is in the planning stage and go abroad to deal with problems associated with the construction or acquisition of another property. The project that has been dropped is either postponed or passed on to another officer who has to determine its status and familiarize himself with it before being able to proceed with the work. To remedy this situation, we recommend that all planning, up to and including the preparation of the detailed space schedule, be done by a group of people who would not have to travel. This could be achieved by transferring officers from the Property Acquisition Section to the Program Planning Section.

Space Requirements

At this point we would like to comment on the determination of chancery space requirements as indicated on the detailed space schedule. The actual establishment at each post is plotted on a graph for each year from 1960 to 1968, as well as the planned establishment for the next five years (up to the fiscal year 1972/73). Projections are then made for the following ten years (up to 1982/83), at a growth rate of 2% to 7% depending on the location of the post, its past growth rate and other factors known to the Property Management Division. Space requirements for the new chancery are then derived from these projections and provide for the post's needs 15 years from the planning stage or 10 to 12 years from the anticipated date of occupancy.

EXHIBIT I

DEPARTMENT OF EXTERNAL AFFAIRSEstablishment Trends at Typical Chanceries

<u>Post</u>	<u>1960</u>	<u>1965</u>	<u>1968</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>
Accra, Ghana	19	26	32	32	37	42
Ankara, Turkey	19	20	23	23	25	28
Athens, Greece	34	42	47	47	49	52
Beirut, Lebanon	24	30	42	46	55	62
Berne, Switzerland	24	26	35	40	43	48
Bordeau, France	-	12	19	20	23	27
Brussels, Belgium	47	59	71	74	80	86
Canberra, Australia	18	26	31	35	38	43
Caracas, Venezuela	24	23	27	28	29	31
Colombo, Ceylon	23	24	28	34	37	41
Copenhagen, Denmark	35	38	39	39	42	46
Dar-es-Salaam, Tanzania	-	17	24	27	29	32
Geneva, Switzerland	19	42	59	59	63	67
Helsinki, Finland	16	20	19	19	22	26
Kingston, Jamaica	9	21	39	43	47	51
Madrid, Spain	22	32	40	44	49	52
Mexico City, Mexico	28	33	38	41	47	53
Montevideo, Uruguay	8	9	15	23	25	29
Moscow, U.S.S.R.	31	44	50	55	59	62
Nairobi, Kenya	-	-	27	28	32	36
Oslo, Norway	28	27	30	32	34	37
Port of Spain, Trinidad	8	21	30	40	48	54
Prague, Czechoslovakia	17	20	32	33	40	47
Rome, Italy	71	78	87	94	112	124
Santiago, Chile	18	23	24	29	33	37
Stockholm, Sweden	23	33	35	38	44	50
Tehran, Iran	25	18	26	28	32	36
Tel Aviv, Israel	24	35	39	42	49	56
Vienna, Austria	33	42	47	52	56	60
Wellington, New Zealand	18	19	23	28	31	36
Total 30 posts	<u>665</u>	<u>870</u>	<u>1,078</u>	<u>1,173</u>	<u>1,310</u>	<u>1,451</u>
Increase over 1960		205	413	508	645	786
% increase over 1960		31%	62%	76%	97%	118%

Exhibit I facing this page shows past and projected increases in establishments at 30 posts. The total for these posts indicates an actual increase of 413 people from 1960 to 1968 and a projected increase of 373 from 1968 to 1980. Even after taking into account the fact that 3 of the 30 posts shown in Exhibit I were opened during the 1960-68 period, the rate of growth projected for the next 12 years would appear to be only half that experienced in the last 8 years. The use of such a conservative (or controlled) rate of growth tends to minimize the effect, when building a new chancery, of providing for the anticipated space requirements of the post for the next 10 to 12 years.

What can happen when a more rapid increase in post establishment is anticipated is dramatically illustrated by the planning data developed for the new Washington and Tokyo chanceries. These are presently in the design stage, and their projected establishment and space requirements are shown below.

<u>Post</u>	<u>Year</u>	<u>Net Space Requirements (in square feet)</u>	<u>Inside Parking to be Provided (in square feet)</u>	<u>Projected Establishment</u>
Washington	1966/67	16,000		102
	1971/72	33,000		138
	1981/82	54,000	60,000	272
Tokyo	1966/67	12,800		62
	1970/71	17,000		110
	1980/81	38,000	22,000	192

It can be seen from the above table that the establishment at these two posts is expected to almost double between 1971 and 1981. This means that a large amount of space will be provided at the time that the new chancery is built that will not be needed for up to 10 years.

We cannot help but wonder whether some less expensive method of providing for the expansion needs of those posts that are both large and faced with a major increase in their establishments could not be found. We realize that the normal solution of providing for an expansion program of this magnitude by adding wings or extra floors has some definite drawbacks when dealing with a special purpose building like a chancery - and considering the predicted rate of growth, which would engulf the staff of the chancery in the noise, dust, and general inconvenience of a building program every few years.

It might be possible, however, to provide for the expansion needs of all government departments represented at a post for, say, a five year period, and then provide for a further period of expansion by finding alternative accommodation for representatives of other government departments as the space occupied by them was needed for External Affairs staff. At the end of that period a major addition could be made to the chancery and the cycle repeated.

We realize that such a proposal carries with it the unfortunate implication that representatives of other departments are second class tenants to be bounced in and out of the chancery like a rubber ball. A preferable alternative, if it were feasible, might be to construct a separate self-contained wing, to avoid security problems, and then lease this wing to suitable tenants for a limited period. At the end of this period, the wing would be connected to the main building and would form part of the chancery proper.

These alternatives obviously haven't been thought through, and our only reason for suggesting them is our concern that the Department should base its planning for a chancery in a city like Tokyo on providing over a million dollars worth of space that will not be needed at the time the building is occupied.

Space Requirements of Other Departments

During the course of our study many people drew our attention to the difficulties encountered in trying to determine the total space requirements for a chancery. As previously mentioned, it has been the custom for the Property Management Division to obtain establishment forecasts from those departments that normally share chancery space with External Affairs. On several occasions they have found that the building being planned or designed was not capable of accommodating personnel from a department or agency which does not usually share chancery space, and therefore was not contacted when the space schedule was prepared, but which was contemplating the opening of an office at that post. This has resulted in the need to redesign the building and go back to Treasury Board for additional funds, as well as a delay in the building program.

We recommend that a circular letter be drafted and sent to all potential chancery space users telling them that the Department is contemplating the construction of a new chancery at the post in question, and requesting that they notify the Department of their requirements if they wish to share in such accommodation. Another circular letter could be sent out prior to the advanced planning stage and a third one, if necessary, at the start of the design stage. Since the purpose of acquiring chanceries is to provide office space for government employees abroad, every effort should be made to keep departmental data on the requirements of other government departments as up-to-date as possible, even if it means sending out letters more frequently or to more departments than might normally be considered necessary. Until some machinery can be devised that will require other departments to notify External Affairs when their plans and their needs change, the Department will have to take the initiative in seeking out such information at reasonably frequent intervals.

RELATIONSHIP CHART

PROXIMITY

- 1 ESSENTIAL
- 2 DESIRABLE
- 3 IF POSSIBLE
- 4 AVOID

REASON

1. RECEIVING THE PUBLIC
2. DEALING WITH THE PUBLIC
3. SHARING RESPONSIBILITIES
4. SECURITY REQUIREMENTS
5. SERVICING AND UTILIZATION
6. DISTURBANCE

Use of a Relationship Chart

It would appear that, on occasion, misunderstandings arise between the personnel at the post, the Property Management Division and the architect commissioned to prepare the preliminary plans, and extra work is involved in redrawing the plans simply because the architect did not understand the working relationships between the various functions at the post. We suggest that this problem could be resolved by having the Programme Planning Section prepare a "Relationship Chart" along the lines of the chart illustrated in Exhibit 2 facing this page.

This chart would indicate those functions that needed to be in close proximity to each other, the priority of such need and the reason for it. It would not be necessary to prepare a chart for every chancery, since one basic chart might be suitable for several chanceries operating under similar conditions. The use of such a chart has been discussed in detail with the Head of the Property Management Division.

Network Planning

While on the subject of project planning, we would like to discuss briefly the possibility of using a technique known as "network planning" in this connection. A more detailed description of this technique is set out in Appendix A at the end of this report.

In the early part of 1967, the staff of the Property Management Division drew up a network plan (critical path schedule) for the planning and design of a typical chancery building. Unfortunately, pressure of other work and lack of familiarity with the technique led to its abandonment. Our experience in using this technique has demonstrated to us that the benefits to be derived from its use far outweigh the time and effort involved in preparing the network plan and keeping it up-to-date.

We suggest that the most effective way of re-introducing this technique to the work of the Division, and of obtaining the benefits from its use as quickly as possible, would be to adopt a program incorporating the following steps.

- (1) Retain the services of a consultant, experienced in using this technique, who would draw a network for a typical chancery building.
- (2) Have the consultant put on a course for all the technical officers of the Division, using the typical network as a means of explaining the technique. We believe that a three day course would provide sufficient training for the officers to understand the concepts and be able to apply them.

- (3) Have the consultant provide a certain amount of follow up to ensure that the technique is used to best advantage.
- (4) Assign the responsibility of producing and up-dating each network to a Programme Planning Officer.

residences

It is quite probable that a network for the planning and design of a typical chancery would be adaptable to most chanceries and similarly a typical network would suffice for the planning and design of all official chanceries. Since the construction phase of the projects takes place in other countries, we do not know the degree of acceptance that this planning technique would receive from the builders. However, we believe that a "construction milestone network", which measures progress at key points in a construction project, would be of assistance to the Property Management Division in measuring the performance of contractors. The feasibility of using one "typical" network to plan and control a number of similar projects has been amply demonstrated in actual practice. For example, our firm was asked by the owners of a chain of department stores to prepare a sample network for a typical store. That sample is still being used to monitor all stages of their construction program for new stores.

THE ROLE OF THE ARCHITECTURAL SUB-COMMITTEE

The architectural policy of the Department, with respect to buildings erected at a post, is that such buildings shall be dignified and yet economical to build, operate and maintain. The architectural style shall be such that it will reflect credit on the Canadian Government and increase goodwill by the intelligent appreciation and use of architecture appropriate to the site and the country. The group most concerned with ensuring that this policy is followed is the Architectural Sub-committee, composed of representatives from the Royal Architectural Institute of Canada, the Department of Public Works, Central Mortgage and Housing Corporation and the Department of External Affairs. It is a sub-committee of the Treasury Board Advisory Committee on Accommodation Abroad, and is chaired by the Assistant Under-Secretary (Administration).

The Sub-committee's duties, as originally stated, were to be as follows:

1. Study all pertinent material referred to it and provide the Department with the names of two or more Canadian architects considered best qualified to design the required buildings in a particular country.
2. Consider the plans, specifications and costs subsequently prepared by the architect selected, and confer as required with the architect and the Department with respect to any amendments thought necessary.

3. To recommend to the Advisory Committee the acceptance or otherwise of the plans, specifications and estimated costs submitted to the Department.

From the information made available to us, it would appear that the Sub-committee has in the past limited its functions to item (1) above and to comments on the overall appearance of the building being planned. Relatively little emphasis has been put on the effect of the design on operating efficiency and construction costs.

We were informed that the senior personnel of the Property Management Division are aware of the need to analyze at an early stage the effect that the design presented by an architect will have on the functioning of a chancery. Henceforth they are proposing to present their views more strongly in meetings with the architects.

In this same connection, we believe the staff of the Division should refer those matters on which they are not in agreement with the architect - particularly as they relate to operating efficiency and construction costs - to the Architectural Sub-committee for their consideration and recommendations.

APPOINTING AND BRIEFING A CANADIAN ARCHITECT

The selection of a Canadian architect is made by the Minister of Public Works, normally from a list provided to him by the Architectural Sub-committee, and concurrence is obtained from the Secretary of State for External Affairs.

Following the selection of the architect, and his acceptance, a briefing meeting takes place between the architect and representatives of the Department of Public Works and the Property Management Division. To assist the architect in arriving at the optimum compromise between the conflicting desires of distinctiveness of design and minimal operating and construction costs, we suggest that definite cost and other guidelines be established prior to the briefing of the architect and that he be requested to remain within these guidelines. The architect should also be supplied with a copy of the Relationship Chart mentioned earlier to assist him in arriving at floor layouts that will provide the necessary working relationship between the functions represented at the post.

If network diagrams are used, the architect should be supplied with a copy of the diagram and requested to estimate the duration of the activities under his control. He should be informed that progress reports will be required at regular intervals for the purpose of up-dating the schedule.

POST BRIEFING

A document has been prepared by the Property Management Division for the purpose of briefing personnel at posts where the acquisition of property is being considered. This document is in two basic parts. The first part outlines in a general way the acquisition program and the information developed by headquarters on the specific project. The second part consists of questionnaires to be filled in by the post and returned to headquarters. These questionnaires are for the purpose of gathering information on real estate conditions, building practices, local regulations and other information pertinent to the project.

It has been customary to brief the post by correspondence. However, this method has proven most unsatisfactory, both from the point of view of the time taken by most posts to supply the information, and the technical ability of the post personnel to present it in a way which leaves no chance of misinterpretation on the part of the Technical Officer having to use the information.

We suggest that it would be better to send a Technical Officer to the post in question to brief the post and obtain the information necessary to complete the planning function. While at the post, this Officer would familiarize himself with the availability of real estate in the area, and any other factors influencing the acquisition of property at the post. In discussing this suggestion with the Head of the Property Management Division, it was suggested that the Technical Officer would be better qualified to brief a local architect and, in some cases, he might even be able to do the work himself, thereby eliminating the necessity of retaining a local architect.

Another area in which the posts could contribute information that would be useful to the staff of the Property Management Division concerns the functional efficiency of a given design and any operating or maintenance problems arising out of the design.

During the course of our study we were told that the Property Lease and Maintenance Section is in the process of developing preventive maintenance schedules for government-owned buildings abroad. This Section has also accumulated a considerable amount of knowledge and statistics on the maintenance of buildings in various countries. We believe that their experience, along with the standards and specifications that will result from the development of the preventive maintenance system, should be used to the fullest possible extent in the design of new buildings.

To ensure that the experience of the post in operating and maintaining a chancery or other buildings, built in accordance with a given design, is made available, to those who are responsible for designing future buildings of this type, we suggest that, after a new building has been occupied for a suitable interval, a report be prepared by the Head of Post, or his Administrative Officer, highlighting the desirable and undesirable features of the building.

THE ROLE OF THE DEPARTMENT OF PUBLIC WORKS

The procedure adopted by the Property Management Division calls for the Department of Public Works to provide assistance in the following manner:

- (1) Enter into a contract with the Canadian architect selected by the Minister, and act as a liaison between the architect and the Property Management Division.
- (2) In conjunction with the Property Management Division review the architect's report and preliminary drawings from the point of view of the functional characteristics of the proposed design, building cost, land utilization and the possibility of future expansion on the site.
- (3) Review and approve the architect's working drawings.
- (4) Determine the most acceptable tender and enter into contract with the building contractor selected, upon approval from the Treasury Board.

We have analyzed the role played by the Department of Public Works in the acquisition of properties abroad and we do not believe any change in this role or any shifting of responsibilities would benefit either department at this time. Because the new property acquisition program is barely under way, only a few construction projects have been initiated by the Property Management Division and the Department of Public Works has been able to provide advice and support services to the Division on the architectural and engineering aspects of the projects as required. However, the expediency with which these services can continue to be provided is dependent on the volume of work involved and the workload facing Public Works personnel at the time their services are requested. When the acquisition program approaches its peak, it might be advantageous to temporarily transfer personnel with architectural, civil and mechanical engineering from the Department of Public Works to the Property Management Division. Based on the proposed program we do not believe that this would be required for at least another two years.

COMMENTS ON SUGGESTED FINANCING ARRANGEMENTS

In your memorandum of March 25, 1968 to the Head of the former Supplies and Properties Division you outlined a possible solution to the problem of financing the Department's property acquisition program. You suggested the establishment of a working capital fund to finance the acquisition program, with the fund being replenished by charging rent to those departments, including your own, that occupied the space.

At your request we made a limited analysis of your proposal, using the information available in the records of the Property Management Division. As a basis for making the analysis we assumed that the rental rate charged by the Department of External Affairs should be competitive with the market rate for similar accommodation. In order to establish the current market rate for each type of accommodation in which the Department is involved, we obtained from the records the annual rental charges and the number of "space units" rented (square feet for chanceries, and homes for official residences and staff quarters). Our findings are summarized below.

(a) Chanceries

The Department presently rents 63 chanceries at a total cost of \$1,400,000 per year, not including maintenance, operating and alteration costs. The Department of External Affairs' share of the rent is approximately \$1,000,000 per year. The gross rented area is 420,000 square feet for an average of 6,700 gross square feet per rented chancery and an average cost of \$3.43 per gross square foot.

(b) Official Residences

Thirty-nine official residences are rented at a cost of \$440,000 per year, not including maintenance, operating and alteration costs, except in those cases where some of these costs are included in the rental charges. Thus, the average annual rental cost per residence is \$11,280.

(c) Leased Staff Accommodation

A total of 1,100 units are presently rented at a cost of \$3,193,400 per year for an average annual rental cost of \$2,900 per unit. Only 315 of the 1,100 units are leased by the Government, the balance being private leases. The Government leased accommodations have an average annual rental cost of \$3,000.

We then compared these figures with the cost of acquiring equivalent space. Methods of calculating the cost of owning property can become very complicated if one tries to take into account factors such as the depreciation of the dollar, the appreciation of property, and the physical depreciation of the buildings. In order to keep the number of variables down to a minimum, we made the arbitrary assumption that the appreciation of the property due to the increased cost of real estate would be at least equal to the physical depreciation of the building. We also made our analysis on the basis of constant

EXHIBIT 3

DEPARTMENT OF EXTERNAL AFFAIRSGovernment-owned Official Residences Abroad

<u>Country</u>	<u>Year of Purchase</u>	<u>Purchase Cost and Alterations</u>	<u>Appreciation Factor</u>	<u>Current Estimated Value</u>
Argentina	1964	\$ 191,000	18%	\$ 225,000
Australia	1950	47,000	70	80,000
Austria	1964	171,000	10	188,000
Belgium	1963	366,000	10	403,000
Brazil	1955	372,000	60	595,000
Ceylon	1966	127,000	8	137,000
Chile	1966	142,000	8	154,000
Cuba	1949	106,000	100	212,000
Denmark	1949	147,000	100	294,000
Finland	1966	233,000	8	252,000
France, Marseilles	1966	184,000	8	200,000
Paris	1950	448,000	100	896,000
Ghana	1962	96,000	15	110,000
India*	-	-	-	-
Indonesia	1954	92,000	60	148,000
Ireland	1957	78,000	50	117,000
Jamaica	1965	132,000	12	148,000
Japan*	-	-	-	-
Kenya	1967	87,000	2	89,000
Mexico	1959	78,000	40	109,000
Netherlands	1949	217,000	100	434,000
New Zealand	1954	70,000	55	108,000
Nigeria	1960	89,000	30	116,000
Norway	1956	218,000	70	370,000
Portugal	1967	245,000	2	250,000
Tanzania	1962	62,000	30	81,000
Trinidad	1958	66,000	50	99,000
Union of South Africa	1948	82,000	100	164,000
United Arab Republic	1961	163,000	30	212,000
U.K. London	1948	358,000	150	537,000
U.S.A. New York U.N.	1961	165,000	50	247,000
New York C.G.	1961	29,000	50	43,000
Seattle	1967	102,000	3	105,000
Washington	1947	303,000	100	606,000
Venezuela	1964	172,000	25	215,000
Yugoslavia	1964	66,000	25	82,000
Total for 34 units		<u>\$5,514,000</u>	<u>45%</u>	<u>\$8,026,000</u>
Average estimated current value per unit.....				\$ 236,000
Average annual carrying charges (10% of estimated current value)				\$ 23,600

*Official residence is part of a compound, and separate figures on the cost of the residence are not available.

dollars. With the assistance of Property Management personnel, we estimated the maintenance and operating cost of chanceries at 4% of the original cost, per annum. In the case of official residences and staff quarters we used 3% per annum. To these percentages we added an interest factor of 7% per annum making a total of 11% carrying cost for chanceries and 10% for other accommodation.

The average cost of constructing a chancery is estimated at \$40 per square foot of gross floor space plus a cost of \$6.40 per square foot of floor space for the cost of the land (16%, on average, of the cost of the building) making a total of \$46.40 per square foot. At 11% carrying charge per annum this works out to \$5.10 per gross square foot, compared to the current average rental rate of \$3.43. On the assumption that government built chanceries offer better than average accommodation we felt that we could justifiably use the \$5.10 figure in assessing your proposal.

The cost of providing interior parking space was estimated at \$23.00 per square foot including land cost, and the carrying cost at 2½% for maintenance and operation plus 7% for the cost of money. An annual rental rate of \$2.20 per square foot was used for assessment purposes.

The anticipated cost of building official residences is estimated at \$230,000 on average. This works out to an annual rental of \$23,000 at 10% per annum. Since this is about twice the average cost of the official residences the government is presently renting, we checked the validity of using this figure by making a rough estimate of what the official residences presently owned by the Government would cost on the basis of current market values and using the same carrying charge. The results of this analysis are shown in Exhibit 3 facing this page, and indicates that the average annual carrying charge for these residences would be \$23,600. It was therefore decided to use \$23,000 per year per residence in assessing your proposal.

The cost of acquiring one staff residence is estimated at \$30,000. At 10% this results in an annual carrying charge of \$3,000 which is very much in line with the current rental rate. This figure was used in assessing the proposal. It is interesting to note that the average estimated current market value of government-owned staff accommodation abroad is \$35,000 and approximately 50% of these are single dwelling units, which would lead us to believe that an average of \$30,000 per planned unit is reasonable.

In Exhibit 4, facing the next page, we have projected the rental income of the Department over each of the next ten years if all the accommodation it presently owns and plans to build during this period were rented at the rates discussed previously. The 1968/69 space and housing unit figures shown in the table represent the properties presently owned by the Government. The space available for rental purposes in subsequent years was obtained by adding to the existing space the facilities that will be created through acquisition or purchase as scheduled in the five year program review. Figures for the remainder of the ten years were estimated with the assistance of the Head of the Property Management Division. Capital budget figures were also obtained from the same sources.

DEPARTMENT OF EXTERNAL AFFAIRS

Comparison of Projected Rental Income with the Cost of the Property Acquisition Program

(for the period 1968/69 to 1977/78)

Fiscal Year	<u>Chanceries</u>		<u>Residences</u>		<u>Staff Quarters</u>		Total Rental Income	Planned Capital Budget	Balance
	Number of square feet available	Rental Income (1)	No.	Rental Income (2)	No.	Rental Income (3)			
1968/69	169,000	\$ 860,000	35	\$ 805,000	17	\$ 51,000	\$ 1,716,000	\$ 4,190,000	\$ 2,474,000
1969/70	202,400	1,030,000	38	874,000	27	81,000	1,985,000	7,085,000	5,100,000
1970/71	258,400	1,315,000	40	920,000	27	81,000	2,316,000	8,280,000	5,964,000
1971/72	281,780	1,440,000	45	1,035,000	54	162,000	2,637,000	9,400,000	6,763,000
1972/73	385,400	1,960,000	49	1,125,000	137	411,000	3,496,000	10,065,000	6,569,000
1973/74	471,000 22,000(P)	2,400,000 48,000	56	1,290,000	180	540,000	4,278,000	8,385,000	4,107,000
1974/75	626,300 82,000(P)	3,180,000 180,000	61	1,400,000	248	744,000	5,504,000	8,500,000	2,996,000
1975/76)							6,500,000	8,500,000	2,000,000
1976/77)	Estimated						7,500,000	8,500,000	1,000,000
1977/78)							<u>8,500,000</u>	<u>8,500,000</u>	<u>-</u>
Total for ten year period							<u>\$44,432,000</u>	<u>\$81,405,000</u>	<u>\$36,973,000</u>

(P) Indicates interior parking area.

(1) Based on \$5.10 / gross square foot of chancery space and \$2.20 / gross square foot of interior parking space.

(2) Based on \$23,000 per official residence per year.

(3) Based on \$3,000 per unit per year.

The exhibit indicates that it would take 10 years before sufficient accommodation is owned by the Department to generate enough rental revenue to support anticipated annual capital expenditures. In the meantime, some \$37,000,000 would be required to finance the projects.

NETWORK PLANNING

In this appendix we set out a brief description of "network planning" which is basically a technique for planning and controlling projects that consist of a number of interrelated activities, and which is ideally suited to construction projects.

Each project of this type must pass through three distinct phases, namely, planning, design and construction. There is the mistaken impression throughout the construction industry that management is a matter of experience alone and that the nature of the operations in each of these three phases is such that it does not lend itself to formal planning and control.

The planner justifies his lack of detailed planning on the complexities of dealing with a variety of boards and regulatory bodies, over which he has no control. The architect, during the design phase, claims his creative work does not lend itself to management planning and control and that the process of producing working drawings is too involved and variable to use a formal control system. The contractor, during the construction phase, has a host of reasons for lack of formal management, such as undependable sub-contractors, the vagaries of the weather, strikes, etc. The significant point to be made here is that the reasons given for not using a formal management control system are, in fact, the very reasons why a formal system should be used.

All planning is based on assumptions, for if it were possible to know precisely how a project were going to proceed, no planning would be necessary. Planning establishes how a project should proceed, based on the best information available at the time. If conditions change as the project progresses, it is then possible to determine the effect of the new conditions on the original project goal. On the basis of this information those in authority are in a better position to make effective decisions on a new course of action and can take steps to correct any deviation from the original plan.

Therefore, the fact that the program is difficult to plan and control and is continually subject to changing conditions makes it all the more necessary that a formal system of management control be used to ensure that continual attention is provided to direct the program towards its goals.

A good management control system for any project must have the following characteristics:

- (1) It must facilitate detailed planning.
- (2) It must be able to measure performance in relation to the plan and quickly report any deviations from the plan.

ILLUSTRATION OF NETWORK ANALYSIS TECHNIQUES

NETWORK ANALYSIS TECHNIQUES

ACTIVITY ORIENTED SYSTEMS

EVENT ORIENTED SYSTEMS

ACTIVITY AS ARROW

ACTIVITY AS NODE

PERT

CRITICAL PATH METHOD

PRECEDENCE DIAGRAMMING



- (3) It must be able to communicate planning and performance information to all parties involved.
- (4) It must identify objectives and highlight important operations leading to these objectives.

The best management system available to fulfill the above requirements is network planning, which uses the "network analysis techniques" of "critical path scheduling" and "precedence diagramming" as described later in this appendix. In this system, the activities making up the project are shown on a network diagram, which displays in a graphical manner the interrelationship of the activities.

The organized manner of assembling information on the network diagram forces the planner to think through the project in detail. When the network is completed, the project is effectively portrayed on paper. Problems which might otherwise be overlooked are identified at an early date, allowing time for alternative plans to be developed to avoid the difficulties. The effect of altering the time or sequence of any activity can be related to other activities and the project as a whole, thus allowing alternative programs to be evaluated.

The diagram indicates which activities are critical to completion of the project and the amount of tolerance in the case of non-critical activities. This permits the project to operate on a "management by exception" principle whereby attention is focused on only those activities requiring close control. Critical items on a project will usually not exceed 20% of the total activities. Thus, although all details are taken into consideration in developing the schedule, the system identifies the priority items and permits management to achieve maximum benefits for effort expended by concentrating on these.

By constantly monitoring progress in relation to the critical path schedule, deviations from the schedule can be reported early, allowing immediate action to be taken to adjust for the lost time and return to the original schedule.

The varied and detailed reports provided by critical path computer reports makes it possible to communicate the schedule and performance information to all personnel involved in the management of the project.

The various network analysis techniques used under network planning are shown in Exhibit A1 facing this page. These techniques can be divided into "activity oriented" systems and "event oriented" systems. In the case of activity oriented systems, activities are identified on the network diagram and are related to the performance of some task over a period of time. In the event oriented systems, the network is developed with emphasis on events, an event being a point in time when certain conditions have been fulfilled, usually the start or completion of one or more activities.

There are two activity oriented systems in use, - Critical Path Method (CPM), and Precedence Diagrammings - whereas, PERT (Programme Evaluation

and Review Technique) is an event oriented system. The method by which the planning logic of a project is displayed on the network diagram in each of these systems is shown in the exhibit.

In CPM, the activity is shown as an arrow. The length or direction of the arrow has no significance other than that the activity starts at the tail of the arrow and is completed at the head of the arrow. The order in which the arrows are joined (head to tail) indicates the order in which the activities represented by the arrows must be performed. The arrows depict the performance of an activity and the junction points, or "nodes", are events which indicate a point in time when all the activities leading to the node have been completed and all the activities leaving the node may start.

The PERT network uses an arrow diagram similar to the CPM network, with the main exception being that the events are identified in the nodes on the PERT diagram. The arrows joining the nodes show the time that must elapse before a subsequent activity can start.

CPM and PERT evolved with different emphasis, one on activities and the other on events, as the result of development in two different management environments. CPM developed in the construction industry, where the activities and activity times could be well defined, the project was located in one location, and was usually controlled by one dominant organization.

PERT, on the other hand, evolved in the research and development field, where activities between specific milestones could not be accurately defined nor accurate time estimates provided, but completion by milestone target dates was important for success of the project. Also, PERT projects usually involved massive programs with many large organizations involved, and with extensive operations taking place in many different locations.

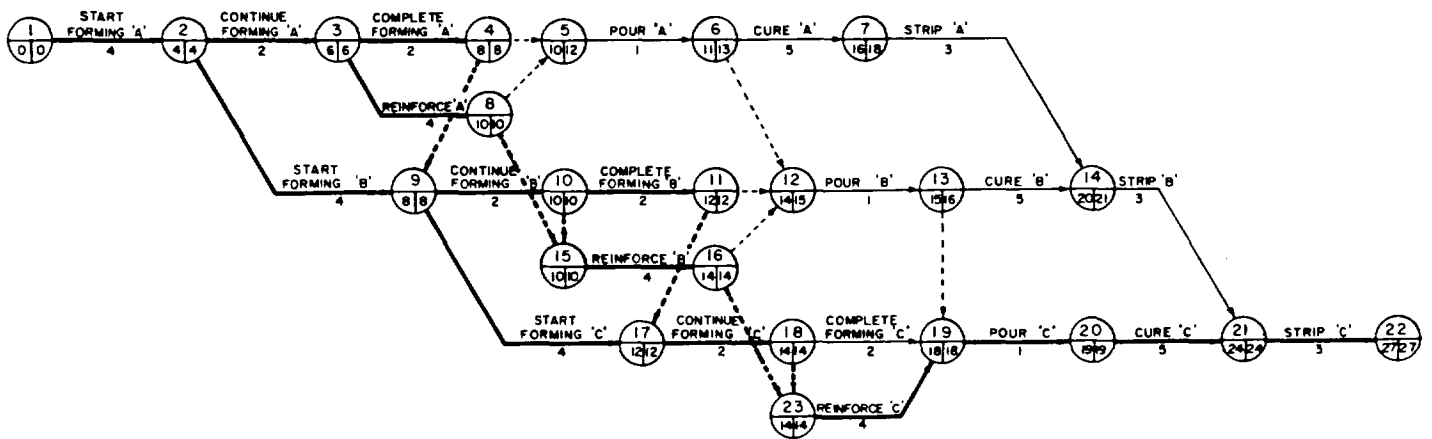
Precedence diagramming is a combination of CPM and PERT in which the activities are shown in the node and the restrictions they might impose on subsequent activities are shown by joining the nodes, either with arrows or connecting lines without arrows.

Precedence diagramming is the most effective technique for showing the planning logic of a project on a diagram. The arrow diagramming used in CPM and PERT often requires complicated networks to show the proper relationship amongst activities. For example, the only relationship which can be shown on an arrow diagram is the "finish-start" relationship, where one activity must finish before the next one may start. In practice, however, many activities overlap, with one activity starting before the previous one is completed. To show this type of relationship on an arrow diagram requires the activity to be sub-divided to show the point at which the subsequent activity may start. In precedence diagramming, a variety of relationships can be shown without destroying the identity of each activity.

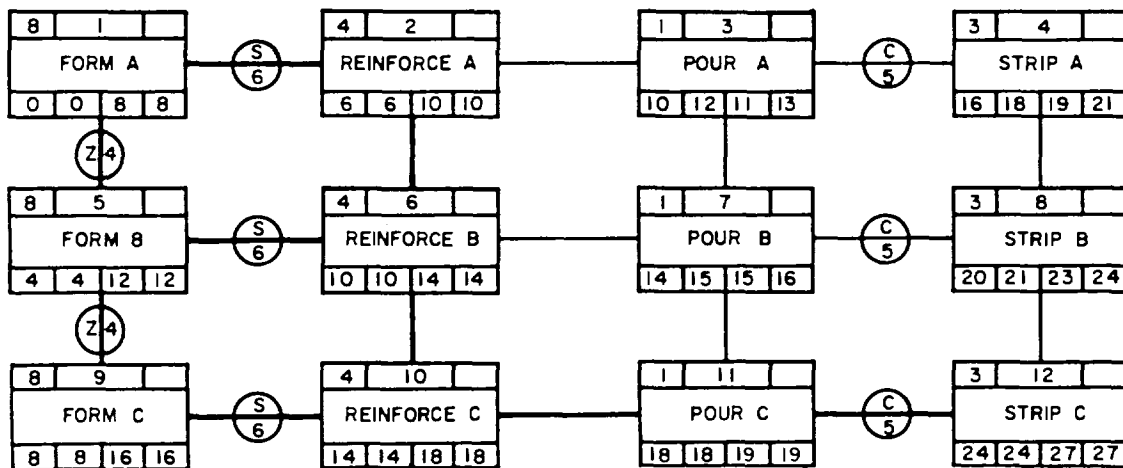
EXHIBIT A2

ILLUSTRATION OF THE USE OF A CRITICAL PATH DIAGRAM
AND A PRECEDENCE DIAGRAM TO SOLVE THE SAME PROBLEM

CRITICAL PATH DIAGRAM



PRECEDENCE DIAGRAM



— — HEAVY LINE INDICATES CRITICAL PATH

The precedence diagramming networks are also much easier to understand by a person who has not had much training in network analysis techniques. Each activity is clearly identified and the relationship between any two activities is shown distinctly. Exhibit A2 facing this page shows a critical path diagram and a precedence diagram for the same hypothetical problem. The difference in the complexity of these diagrams can be readily evaluated.

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