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Incorporating Reserve Fund Analysis into Graduate Construction Education

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A central theme of this paper is that construction management graduates posses the necessary knowledge and skills to participate more fully in the development process, and specifically in the post development property management function of reserve fund analyses. Four areas are briefly examined: 1) the real estate development process with specific interest in the post-development stage; 2) the unique characteristics of real estate and particularly as they relate to professional service opportunities; 3) the construction/project management objective's of a quality product, produced on time and within budget, and specifically the techniques of scheduling, estimating and contract administration which support these objectives; and 4) reserve fund analysis fundamentals. This information is synthesized to establish a logical link between the inherent characteristics of real estate during post-development property management, on-going management of the asset, and project management tools and techniques typified by graduate programs in construction science. Based on establishment of this link, the question of supply and demand for reserve fund analysis services is addressed. Trends related to construction value and laws related to association boards' fiduciary responsibility are presented as operationalization of the demand construct. The supply construct is operationalized as availability of specific reserve fund analysis courses and/or concentrations in facilities management in graduate construction programs.

Key Words: Reserve Fund, Replacement Fund, Construction Management, and Construction Graduate Education

Introduction

As educators of future professionals of the built environment, at least one of our primary objectives should be to develop knowledge and skills that are needed by society. In construction related programs, and especially at the graduate level, this often includes advanced training in the management aspects. Unfortunately, we tend to look rather narrowly at the potential "management" market the construction graduate student will enter. Construction is but one phase, and actually a rather short one in the life of real property. The majority of time is spent in managing the property once it has been built. Management of property, specifically the operational aspects, are perhaps best filled by individuals with training more directly focused in this area. However, continued management of the physical aspects of the property require knowledge and experience in construction related areas such as contract bidding and administration; estimating and scheduling; and materials and methods. This knowledge alone, however, does not qualify a property or construction manager to compute and evaluate reserve fund analyses. Producing quality reserve fund analysis requires additional knowledge and training in this area.

The purpose of this paper is to establish a logical link between the inherent characteristics of real estate during post-development property management, on-going management of the asset, and project management tools and techniques typified by graduate programs in construction science. In order to more fully understand this logical link, a brief explanation will be provided for the real estate development process, including some of the unique characteristics that complicate as well as provide opportunity for professional services. Included also are the objectives and tools typified by professional construction/project management, especially as typified by graduate programs in this area, and the basic steps of a reserve fund analysis. Following these examinations, the paper will focus on the questions of supply and demand for services in this area.

The Real Estate Development Process

This section will provide an overview of the development process to establish the context, including sequencing and duration, as well as typical participants, in which property reserve fund analysis is conducted. According to Blew (I 989) real estate development is "... the steps by which a property may be altered over time to increase it's value or usefulness". The steps that Blew refers to vary in number and exact sequence depending on the scope and nature of the project, but in general follow four stages (Sharkawy, 1994) as shown in Appendix A, diagrammed by Sharkawy and Nobe (I 995):

Pre-Development.

This stage begins with conception of the project. As project inception activities progress, the developer will begin to solicit financial interest both from equity investors and lending institutions. At the conclusion of this stage, the market has been preliminarily analyzed; highest and best use identified; conceptual design completed; and conceptual estimates, schedules and proformas completed.

Document Development.

During this stage preliminary studies are completed, estimates and schedules refined, and letters of commitment are sought both from construction and permanent lenders. Given a financial commitment, final working drawings, specifications, budgets, contracts, and financial statements are prepared. Final approvals from various regulatory agencies are sought and received and during this time bidding and/or negotiation of the various portions of the work can be completed.

Product Development.

Upon completion of the final working drawings (except in the case of fast track projects), the project enters the project production or construction phase. Beginning with the closing of the construction loan and signing of construction related contracts, mobilization and construction proceed. Marketing, leasing, and/or pre-sales activities will commence at some point during this phase, if not earlier. Upon completion of construction and fulfillment of the terms of the permanent loan covenants, the construction lender is *taken out* (refinanced) by the permanent lender.

Post Development.

This stage will vary by type of development (i.e. residential, commercial, mixed use, etc.) but may include continuation of sales, leasing, or a combination of both. In general, this stage is known as *Property Management* but will also include Asset Management. In both cases, the prime objective is management of the physical and financial assets with the intent of minimizing the risks and optimizing the long-term cash flow and associated value of the property.

The development sub-stages, particularly construction/rehabilitation and property management are not drawn to time-scale in Appendix A, and therefore under represents the magnitude of post development and the associated property management function. It does nevertheless depict the overall context in which construction mangers participate. Specifically, construction is shown as one of many phases, and in the overall life of the asset, a relatively short one. Also shown is the large number of typical participants in the development process. Similarly to duration of construction, the construction managers' role is typically limited in scope as well.

Unique Characteristics of Real Estate

Etter (1989) provides a useful summarization of three unique characteristics of real estate which complicate investment decisions:

Physical immobility.

Real estate cannot be easily relocated at some future date, and therefore, its value is directly related to the market area in which it is constructed.

Long economic life.

It takes many years, often decades, to recover the cost of the asset through it's ability to generate income.

Large economic outlay.

Cost of acquisition and/or construction is large, often requiring the use of long-term financing in addition to investor equity.

In addition to complication of initial investment decisions during the pre-development stage, it is these very characteristics, the essence of real estate, which require the continued management of the asset for the duration of the holding period. Further, it is these characteristics and their associated need to be managed which provide the basis of demand for property management, including the analysis of reserve funds. Therefore, within the unique characteristics that complicate real estate investment initially lays the opportunity for continued management.

Construction and Project Management

Consistent with research by Berryman, Jensen and Craig (1995) and definitions developed by the Project Management Institute, as well as other respected experts in the field of

construction/project management (Clough and Sears, 1979, Barrie and Paulson, Jr. 1978), the following primary objectives are suggested:

Quality.
Conformance to project requirements and/or specifications, which may include elements in alignment with the economic, social, political, legal and environmental, desires of all interested and influential parties to the project.

Time.
This objective encompasses the four areas of planning, estimating, scheduling and control. Planning includes defining the project/owner's goals and objectives; preparation of strategies to accomplish the stated goals and objectives; and identification of specific methods which may be employed.

Cost.
This includes all processes that are employed to maintain financial control over the project, generally classified as estimating and cost control (which include forecasting, estimating, budgeting, monitoring and reporting). Also included in these areas is the estimation of life cycle costs.

Further building on the central theme of Berryman, et. al. project management is recognized as the core discipline of construction management. Therefore, for purposes of this paper, the underlying management principles and techniques that are utilized in construction and project management are considered synonymous. The project manager utilizes many tools to meet the objectives stated earlier. Several, which are among the core curriculum of most construction management programs, are:

- Contract Administration
- Scheduling
- Estimating
- Materials and Methods

As Wyndhamsmith (1986) suggests "... selection of a Reserve Study Specialists should center on the consultant's past experience and knowledge of construction (structural, mechanical, electrical and landscape infrastructures) or the ability to put these skills into an understandable document." (Author highlight). The authors suggest that graduate students, properly equipped with construction knowledge, project management tools, and given a basic understanding of reserve fund analysis, are well suited for this service.

Reserve Fund Analysis

"Reserves for Replacement, are estimates of that amount of money which must be put aside to replace major items (or building components) that will wear out before the entire facility or project wears out... " (Wyndhamsmith 1986). Common industry terminology also includes Reserve Fund, Maintenance Reserve, Replacement Fund, Replacement Plan, Capital Replacement and/or any combination of the above. Two recent observations help establish the importance of reserve funds. "Establishing a reserve fund for your condominium association is a

little like flossing: You don't have to do it for all your associations, just the ones you want to keep" (Anderson, 1994). "One area that seldom has a well developed plan of action is the replacement of the physical assets of a property" (Moseman, 1995).

Replacement funds can range from the polar extremes of "pay as you go" to "special assess as you need". Without going into the philosophical underpinnings of these extremes and the impact this has on the overall format of the fund, the generic step process of establishing and administering a replacement fund can be summarized as follows:

- Prepare list of capital items
- Determine quantity of items
- Determine quality of items
- Determine useful life
- Determine current cost
- Establish Board of Directors risk level
- Determine inflation and interest rates trends
- Determine existing fund
- Determine needed fund
- Determine contribution/special assessment requirements
- Prepare short term bid packages
- Administer contract

Based on historical association documents; a physical property survey; and interviews of property managers, tenants and board members, information is compiled, analyzed and used to generate a replacement fund. A sample fund is shown below in Table 1.

The process outlined above and the core curriculum discussed earlier suggests a logical link between current educational skills development and required functional responsibility of reserve fund management. If the premise that construction mangers are fundamentally equipped to produce reserve fund analyses is accepted, two additional questions must be answered. First, is there a sustainable demand for these types of services, and second, do graduates in construction have access to courses geared specifically toward reserve fund analysis. These two questions are addressed in the following sections.

The Demand for Reserve Fund Analysis

Socially, it comes as no surprise that people of this nation are individually concerned and collectively committed to demanding greater fiscal responsibility from their elected officials. The national debt and budget deficit debates stand as evidence as to the status to which this issue has been elevated. Similarly, individual homeowners have recently begun to demand the same type of fiscal responsibility from their elected board of directors. A recent article in the

Table 1

Sample Reserve Fund Analysis

XYZ ASSOCIATION, INC.
REPLACEMENT FUND EXPENDITURE & ASSESSMENT ANALYSIS: 1995-2010

1995 ASSESSMENT:	**300,000**
YEARLY ASSETS INCR:	**3.0%**
RATE OF INFLATION	**5.0%**
RATE OF INTEREST:	**8.0%**

Bldg.	Item NO.	Description	Avg. Life	1995 Age	1995 Cost	Req'd Bal.	1999 Expense	1999 Contrib.	2001 Expense	2001 Contrib.	2003 Expense	2003 Contrib.	2005 Expense	2005 Contrib.	2007 Expense	2007 Contrib.	2009 Expense	2009 Contrib.	2010 Expense	2010 Contrib.
I	1	Roofing	18	14	92,000	77,905		7,870		8,264		8,677		9,111	(111,827)	9,566		10,045		
	2	Exterior Painting	5	1	15,654	3,444		3,616		3,796		3,986		4,186	(19,028)	4,395		4,615		
	3	Signage	12	9	3,000	2,406		338		355		373	(3,473)	392		411		432		
	4	Interior Painting	7	5	4,600	3,442		795		835	(5,072)	876		920		966		1,015		
	5	Carpet	10	8	3,800	3,181		492		517	(4,190)	543		570		598		628		
I	6	Roofing	18	10	98,000	64,735		8,384		8,803		9,243		9,705		10,190		10,700		
	7	Exterior Painting	6	2	20,200	7,400		3,980		4,179		4,388		4,607	(24,553)	4,837		5,079		
	8	Signage	10	3	4,700	1,658		609		639		671		705		740		777		
	9	Interior Painting	7	5	3,600	2,694		622		653	(3,969)	686		720		756		794		
	10	Carpet	3	5	5,000	3,349		774		812		853	(5,788)	896		940		987		
Pool Bldg.	11	Roofing	16	10	43,000	30,637		3,968		4,166		4,374		4,593		4,823		5,064		
	12	Exterior Painting	6	2	13,900	5,892		2,739		2,875		3,019		3,170	(16,896)	3,329		3,495		
	13	Signage	5	1	5,000	1,100		1,155		1,213		1,273		1,337	(6,078)	1,404		1,474		
	14	Plaster	15	11	87,000	69,623		8,382		8,801		9,241		9,703	(105,749)	10,188		10,698		
	15	Furniture	4	2	4,000	2,098		1,128		1,184	(4,410)	1,244		1,306		1,371		1,440		
	16	Mechanical	12	11	68,000	63,728		7,672	(74,970)	8,056		8,459		8,881		9,326		9,792		
	17	Air Handling System	15	10	15,000	1,159		1,445		1,517		1,593		1,673		1,575	(19,144)	1,844		
	18	Concrete Covering	10	1	5,400	666		699		734		771		810		850		893		
Other	19	Pathways	4	2	1,000	524		282			(1,103)	311		326		343		360		
	20	Parking Lot Patching	3	2	2,000	1,366		734	(2,205)	771		810		850	(2,431)	893		937		
	21	Landscaping	1	1	1,000	1,000		1,050	(1,103)	1,103	(1,103)	1,158	(1,158)	1,216	(1,276)	1,276	(1,276)	1,340		
	22	Resurface	10	9	31,000	28,535		4,015	(34,178)	4,215		4,426		4,647		4,880		5,124		
	23	Elevator	15	14	35,000	33,378		3,372	(38,588)											
	24	Window	15	12	59,000	50,380		5,684	(1,380)											
	25	Common Doors	10	6	9,800	6,442		1,269		1,333		1,399		1,469	(11,912)	1,543		1,620		
	26	Miscellaneous	1	1	2,000	2,000	8,110	2,100	(2,205)	2,205	(2,205)	2,315	(2,315)	2,431	(2,431)	2,533	(2,553)	1,680		
		Previous Year End Balance						477,940		540,903		452,773		499,097		489,855		263,118		
		Current Year Assessments						71,073		65,118		68,374		71,792		75,382		79,151		
		Current Year Expense					(8,110)		(153,248)		(22,050)		(81,034)		(302,119)		(22,973)			
		Current year-end Balance				477,948		540.903		452,773		499,097		489,855		263,118		319,296		
		Previous Year End Balance						188,475		484,230		678,821		499,097		1,376,953		1,511,980		
		Current Year Assessments						300,000		309,000		318,270		71,792		337,653		347,782		
		Interest						8,865		38,839		65,272		89,855		99,493		133,032		
		Current Year Expense					(8,110)		(153,248)		(22,050)		(81,034)		(302,119)		(22,973)			
		Current year-end Balance				182,475		484,230		678,821		1,040,314		1,376,953		1,511,980		1,969,821		
		Excess (Shortfall)				289,465		(56,673)		226,048		541,217		887,098		1,248,862		1,650,525		

Journal of Property Management which is based on several interviews with experts in this area (Anderson, 1994) supports this view:

- *Buyers are putting clauses into their purchase agreements that make the sale of the unit dependent on the existence of healthy reserves* (Maureen Reardon, CPM, President, Progressive Management, Inc., Florida)

- *Buyers are becoming much more sophisticated. If they see an association is under funded, they are likely to go somewhere else* (R. Donald Larrance, CPM, President, Perry & Co., Colorado)

- *I think we are dealing with much more knowledgeable, and more sophisticated people than we were before... Condo associations now want more in-depth analysis of reserves* (Roger Kramer, CPK President and owner, Kramer and Associates, Ltd., Michigan)

This public demand has resulted in higher standards in both the legal and accounting professions, and in some states even in the enactment of laws requiring the use of reserve fund analysis. In California for example, since 1992 associations have been required to complete studies of their reserves every three years. Regardless of whether laws have been enacted or not, the lawyers and accountants have responded by raising their professional standards when it comes to assessment of reserves. As Anderson (I 994) notes "... the accounting industry's disclosure requirements have become more stringent, and CAI predicts this trend will continue ... Since 1991 the American Institute of Certified Public Accountants has required auditors review ... the basis for establishing reserves." It stands to reason that as one profession responds to the new standard, so to will others, especially financial institutions that provide capital to purchase such property.

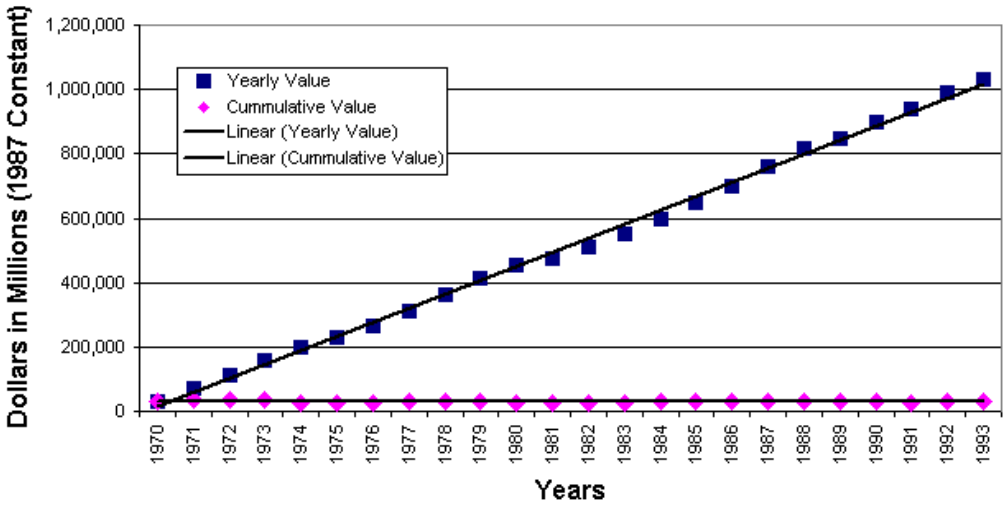

Figure 1: Dollar Value of Multi-Family Residential Construction

From a physical perspective, demand is logically tied to the amount of real estate that exists. This would include not only new construction, and especially new residential multi-family construction, but also all construction which has been put in place over the last several decades and which has not yet reached its useful life. Review of the data indicates a substantial and growing market. Between 1970 and 1990, the value of residential capital stock in this country has increased by 75% (in constant dollars), due in part by the nearly 50% increase in multi-family housing units over this same period. Perhaps more telling, since capital stock numbers are distilled components of gross national product, is the cumulative value of new multi-family residential construction put in place. Figure 1 shows both yearly and cumulative estimated values of private multifamily residential construction put in place. Although the trend in constant dollars has remained rather flat, it is the cumulative value, and associated market, which should be noted as a growing and substantial potential market. This follows the earlier discussion of unique characteristics of real estate (which are typically thought to complicate real estate investment decisions), and especially the concepts of physical immobility and long economic life. The point is that real estate lasts a long time and during that time frame, the physical aspects of the project must be managed. The need for this service is an opportunity for anyone possessing the proper knowledge and technical training.

Supply Assessment

Although it is recognized that there are a multitude of potential participants in the analysis and management of reserve funds, (i.e. lawyers, accountants, engineers), in most cases work by these individuals will be limited to select input into a comprehensive model. Generally management of the overall process is left to someone else. The current champion of the process is the property manger, who in many instances would rather manage a professional consultant that the process itself As it has been contended, graduate students from construction related programs are well suited for management of this process, given the proper technical skills associated with reserve analysis. Do graduate construction students have access to this type of technical training? To address this question, a survey of graduate construction programs across the United States was conducted. The target population was all graduate programs in construction. The sample population was all institutional members of the Associated Schools of Construction (ASC). Although underrepresented, the strong membership of the ASC can be considered a provider of good external validity for the survey results.

There are 84 institutions within the ASC membership. Of the 54 ASC members that were polled, 26 sent back responses. With a 95% confidence level, the sampling error was ± 7.7%. The respondents of the sample were evenly dispersed geographically across the United States which allowed the following sample inferences to be made of the ASC population (84 colleges) as a whole: 46% percent of the ASC colleges teach some or all aspects of facilities management and 27% of these same colleges teach reserve fund analysis (see Exhibit 1.3 for summary data). Further statistical evaluation, using binomial probability distribution, imply that there is a very low (12.6%) probability that a random sample of 23 colleges (27% of all ASC members) from the 84 ASC members list would teach reserve fund analysis. These indicators infer that there is a small group of colleges training graduate students in reserve fund analysis. Given these results and the relatively small number of graduate students completing college (in comparison to undergraduates), it can be concluded that there are few construction graduates being trained in reserve fund analysis.

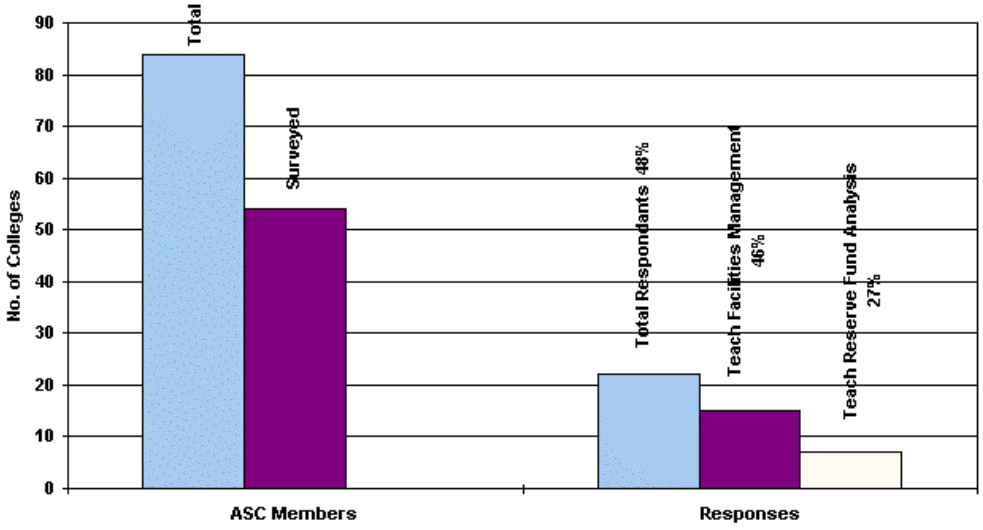

Figure 2: ASC Survey Results Facilities Management and Reserve Fund Analysis

Conclusion

This intent of this study was to establish a broad understanding of the real estate development process and the unique characteristics commonly associated with investment in this area. In addition, the fundamentals of construction/project management and reserve fund analysis/management were developed. From this broad-brush perspective, several primary points were established. First, real estate development is a long process with the majority of time being consumed by on-going management of the property. Owing to it's unique characteristics, primarily physical immobility and long economic life, which typically are considered risk factors to the investor, there is a virtually continuous opportunity for service. Cumulative trends of real estate in place support this supposition. The requirements of reserve fund analysis and the core curriculum of graduate construction education are closely aligned. This evidence suggests that there is demand for professionals trained in construction to produce reserve fund analyses. Unfortunately, very few schools appear to currently be offering either a course or concentration in either facilities management and/or reserve fund analysis.

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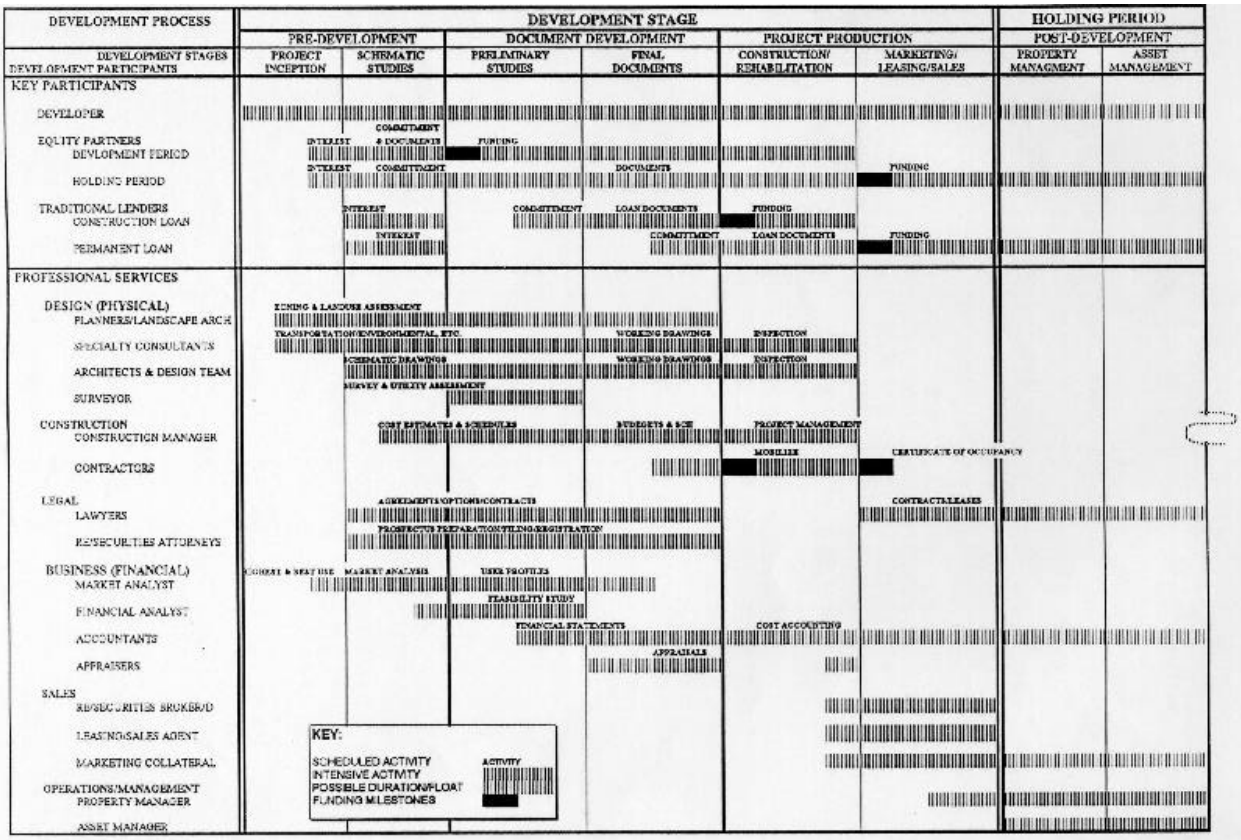
Appendix A

The Property Development Process



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