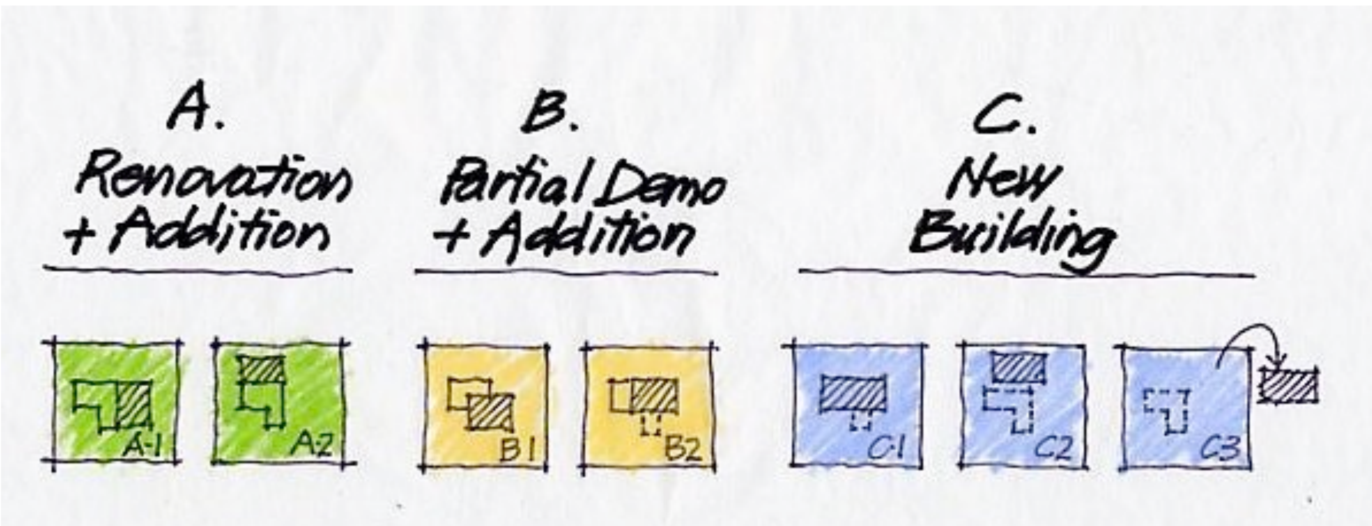
Renovation or a New Library: A Planning Process



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1. INTRODUCTION

California continues to experience a high growth rate in population in almost all areas of the state. As a result, city and county public libraries experience a growth of demand for more reader space, shelving, technology infrastructure and staff areas. At the same time, buildings constructed for library services appropriate to a period twenty or more years ago become inadequate beyond just space or built-in infrastructure. The older buildings are typically less flexible for spatial change, have poor lighting for contemporary uses, consume too much energy, are not universally accessible, have relatively high maintenance costs and often have become physically degraded.

Inevitably, the idea arises of providing a modern facility by building a new library or renovating and expanding the existing library. As public buildings usually supported by tax dollars, the opportunities for such a project are rare or require compelling justification for decision-makers. The large expenditure of funds for any construction project requires careful study to determine the best approach of procuring the facility for the most effective use of public monies. In almost every case, therefore, an in-depth evaluation of the two basic alternatives, new building versus renovation and expansion, is required.

This article provides an outline of a decision-making process based on an evaluation of all the factors that should be considered. To make the process clear and to provide an illustration of the importance of many of the factors involved, the article employs a *Case Study Approach.* The case study is based on an actual process used by a medium-sized central coast city in California which faced the classic issues of high growth of patronage, information technology needs and an aged, inadequate facility to meet the demands of the growing population. In outlining the decision-making process, the case study will be used to illustrate both the technical factors involved and the non-technical issues that drive the ultimate decision. Cost is always a major factor, but not always the only one that determines the public choice of which type of project to select.

2. THE DECISION-MAKING PROCESS

2.1 Background and Preparation

The initial step in the process of establishing the overall characteristics of the new, larger facility is a *Needs Assessment*. The needs assessment identifies and justifies the types of services needed in the specific service area and includes community input. Based on the results of this assessment, a *Library Plan of Service* is developed to satisfy these needs. Both documents usually include an analysis of the service limitations and physical inadequacies of the existing library, which is the first step in the determination of whether to construct a new building or to renovate and expand the existing building.

A *Library Building Program* translates the plan of service into a space allocation plan and quantifies the amount and detailed characteristics of each type of specific space. The program should be general such that it could be applied to either existing building space or new building space. It is an ideal, and usually is more easily realized through the "clean slate" approach of a new building design rather than the adaptation of an existing building.

Characteristics of an existing building can cause the program to be modified to suit existing conditions, not necessarily to the detriment of the program, or can result in the program being inefficiently accommodated. This aspect of efficiently fitting the program to the building design is an important consideration in the renovation versus new discussion and could have cost implications as well as functional impacts.

With the completion of the library building program, the physical planning of the facility to meet the established criteria can begin. This is also the point of departure for the process of deciding whether to construct a new building or to renovate and expand the existing library building.

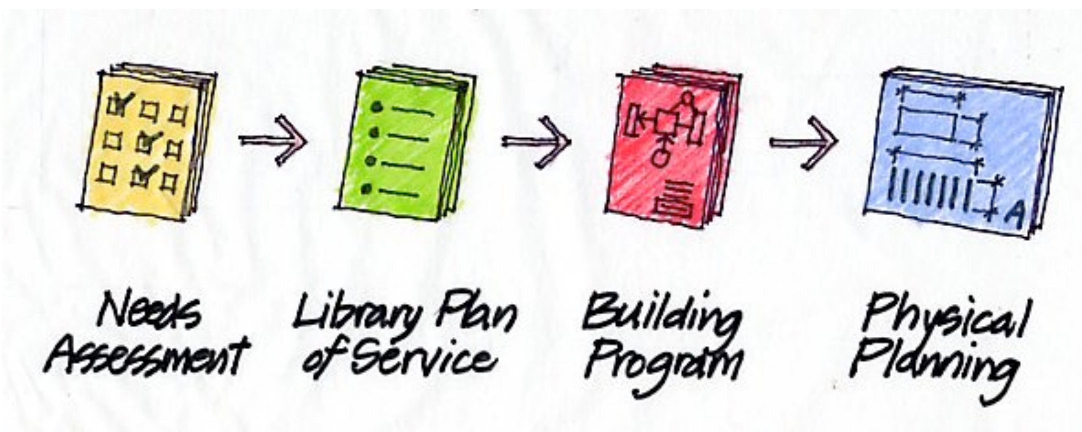


Figure 1. Overview of the general planning process.

2.2 Renovation/Expansion versus New Construction: General Factors

There are a number of factors that should be included in the evaluation process and which should be weighted in some manner as part of the overall decision process. Cost is quantifiable and a major consideration. Other less quantifiable factors that should be addressed are:

2.2.1 Service Impacts

These include the possible disruption of service due to construction activity, discomfort created by exterior noise or noise within the building, or phasing of construction within the existing building. Multiple moves of the collections or reader spaces have costs as well as service implications and could involve some risk to the condition of special collection items due to dust or higher variations in climate control.

2.2.2 Quality of Space

In addition to providing pleasant lighting and acoustics, the new facility should have an ambience that encourages its use and provides the community with an uplifting experience in its public building. The nature of the existing library building may be such that it cannot provide this experience, or on the other hand, that it can provide a unique experience that cannot be duplicated in a new building.

2.2.3 Site Location

There may be a strong desire to create or maintain a sense of a civic center, of which the library building is usually an important component. The decision to renovate or build new then takes on wider agendas and design implications that need to be considered.

Accessibility to the library site can also influence the decision of whether to renovate and expand the existing facility. In non-pedestrian environments, easy access by car and adequate nearby parking may be motivations to choose a new building at a convenient site. On the other hand, a strong desire to create a pedestrian environment in a city center area, or to support a concept of mixed-use commercial and public services in an area, may lead to a decision of renovation and expansion at the existing site, even if some extra cost may result.

2.2.4 Phasing

Renovation and expansion inevitably involve planning for phasing and possible surge space[1] for the period of construction. Depending on site conditions and the capacity of the expansion space, the phasing can be simple, using the new expansion space as surge space while the renovation work is carried out. If the site is severely restricted or the expansion space is small, however, the phasing may have to occur in a series of moves, effectively requiring the library to maintain operations while construction is carried out around it and moving library functions at the end of each sub-phase.

[1] *Surge Space* is temporary space utilized by library functions while existing space is undergoing construction activity. The library functions are said to be *decanted* into surge space during construction.

The latter scenario is almost inevitably more costly than the new building alternative and there usually must be compelling reasons to re-use the existing structure and remain in the same location. In this type of situation, the project study team should consider the option of providing a temporary facility at another location for the duration of construction using portables designed or retrofitted for library floor loading.

Large open floor areas can be created using the portable units for stacks and reading areas, and data cabling can be readily installed. Some units come pre-assembled with restroom facilities, and inexpensive temporary shelving can be purchased and sold later to recover some costs. Total cost, including a 24-month lease of the portables, set-up and break-down, utility hookups, temporary foundations and shelving is typically in the range of $120 to $170 per square foot, depending on specific conditions.

This temporary facility option is almost always less expensive than multiple phases where the building remains in use during construction.

For new buildings, the library simply moves at the completion date, using the existing library structure in the interim, unless the new building is to be built on the site of the existing building. In the latter case, a temporary facility will have to be provided as surge space during demolition of the existing building and construction of the new library facility. The phasing cost would then be identical for either a renovated or new facility.

2.2.5 Program Adaptation

The characteristics of the existing library building may inevitably result in compromised design of spaces or the need to accept sub-standard programmatic conditions, such as floors that do not align, unless a significant cost premium is acceptable. Spaces in an existing building may also have to be larger to accommodate the same program requirements for stacks or reader seats because of unusual or inappropriate shapes of those spaces.

2.2.6 Sustainable Design/Energy Conservation[2]

Generally, it is considerably easier to achieve high levels of energy efficiency with a new building design at lower initial cost, since modern systems and materials can be used to optimal effect. It is also difficult to quantify the operation cost savings due to energy management features introduced into the design of a new building since the comparable “standard” is not normally designed as part of the process. That is, there is no way to define “savings.” It is safe to state, however, that a new building is almost assuredly a far superior energy performer than a

[2] See *Sustainable Library Design* on the Libris Design website. See also *Energy Management Strategies in Public Libraries*, available from the California State Library through the Libris Design website.

renovated building, even one with extensive retrofit strategies.

Other sustainable design features can more readily be introduced into a new building than applied to a retrofitted building, particularly with regard to a reduction in electric power demand (thereby reducing greenhouse gases from power plants). Re-use of the existing building, however, is a form of recycling, and a careful study should be done of the trade-offs among high energy efficiency, reduction of power demand, and re-use of existing materials and components.

2.2.7 Historic Structures

In the case of a registered historic structure, the State Historic Building Code applies, which generally allows more flexibility (and requires less cost) in upgrade requirements since full compliance with current codes could result in a serious compromise of the historic features. On the other hand, restoration and mitigation measures desired by the community could involve additional cost.

2.3 Renovation/Expansion versus New Construction: The Evaluation Process

The general evaluation process involves a sequence of steps that, if thoroughly and rigorously followed, can lead to the best approach for the new library facility. Figure 2 illustrates this sequence as generally applied to any project.

The first set of steps involves the collection and assimilation of all the relevant detailed information concerning the project, including the completed needs assessment, library plan of service and building program. Additional detailed information about the site and the existing building, including site utilities, soil conditions and key building issues, will be gathered and analyzed as well.

There follows then a series of steps concerned with the development of an organized set of plausible alternatives that includes complete renovation and expansion, partial demolition of the existing library with extensive new construction, and entirely new construction.

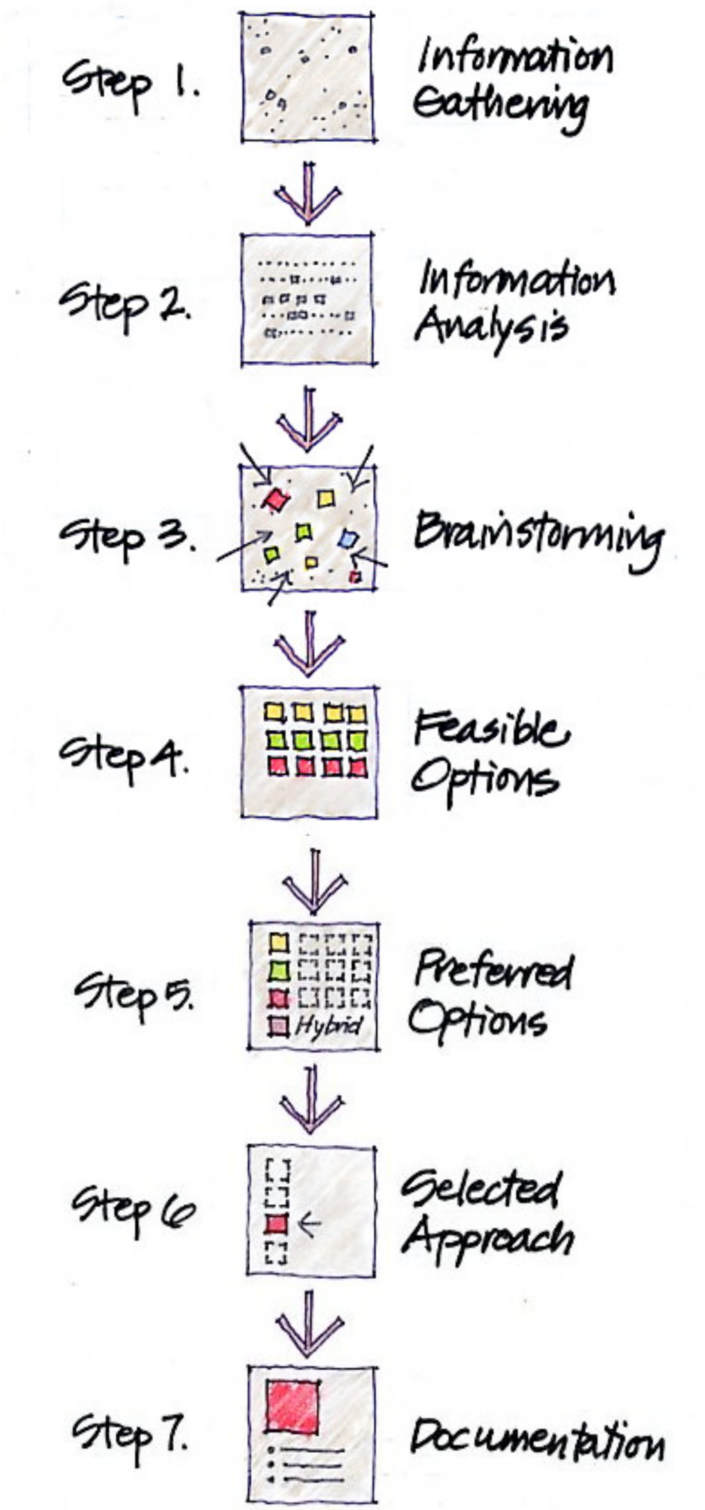


Figure 2. Diagram of the evaluation process

These alternatives, which result from a series of brainstorming sessions with the entire project team, are narrowed down to a limited number of optimal or preferred approaches by fitting the building program carefully to each one.

The preferred design schemes are then subjected to a careful examination of the principal issues, including the general factors noted above, program fit and cost. After evaluating the implications of these issues, as well as the design opportunities and constraints offered by each scheme, the proper choice of solution is usually apparent.

A case study is used in the following section to illustrate this evaluation process. It is also a convenient method for further discussion of important factors in the decision of renovation/expansion versus new construction.

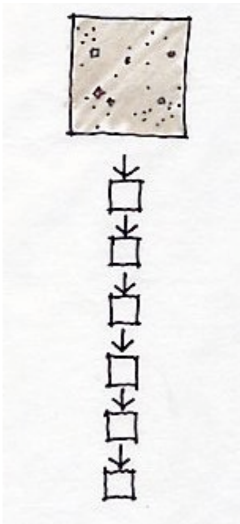
3. CASE STUDY: PUBLIC LIBRARY FOR A MEDIUM-SIZED CALIFORNIA CITY

In this case study, the existing library building of 28,000 square feet is located on a compact city center property that includes an historic city hall building and surface parking. A needs assessment and a library plan of service identified severe inadequacies in the existing building and a likely minimum need of doubling the size of the existing facility to provide an appropriate level of services for the change in population in the past 30 years. A building program was developed that identifies a facility of 60,000 gross square feet of space.

The existing building consists of an original structure built in 1935 and three separate additions constructed over the following 40 years. Two of the additions are two-story structures, one of which is used as public space and incorporates an elevator. The second levels of these two structures do not align. Because of the location of the surface parking areas, the library has two separate entries on opposite sides of the building.

Initially, the library staff and city officials believed that a phased renovation and expansion of this existing structure would provide the most economic solution to the addition of 32,000 square feet. Wisely, a study of all possible alternatives was carried out to evaluate potential renovation and expansion concepts, as well as a possible new building.

3.1 Step 1. Information Gathering



To make sure that no hidden costs in the project would be overlooked, all necessary documentation of the existing conditions was assembled and reviewed by the project team.

3.1.1 Facility Documents

The facility documents required are:

- "As-Built" drawings and documentation of existing library facilities.
- Site utilities location and connection to the building.
- Building infrastructure, including any data cabling changes.
- Historical information on the existing facility, including any designations of the building as locally or regionally "historic."

In this case, it was found that the main electrical and data feed to the city hall was located immediately to the east of the existing library building, which would require a major additional cost for relocation of the feed if a 32,000 sq. ft. addition was located on this side.

3.1.2 Site Constraints

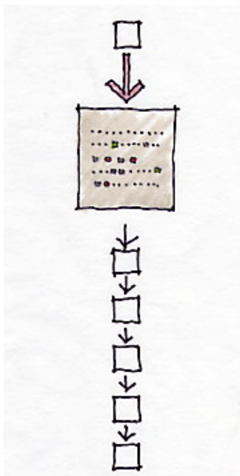
In addition to detailed documents on the existing building, other site constraints need to be evaluated to determine the impact on the options for expansion. Such site information includes:

- Nearby existing buildings and structures.
- Property boundary.
- Existing trees and landscape.
- Topography and slope.
- Zoning regulations.
- Building code site regulations (seismic zone).
- Soils conditions (soils report by geotechnical engineer).

In this case study, the city hall lies immediately to the north of the existing library and a civic garden with substantial specimen trees is located directly to the west. Thus, expansion of the existing building can reasonably occur only to the east and south, with the eastern expansion option incurring the extra cost of the electrical utility relocation.

City property included an historic house used by another city department, which could be moved to another location if the site area was needed. There is no historic significance to the existing library building, thus any required code upgrades would strictly follow code requirements for seismic and ADA upgrades. Zoning regulations limited the height of the building to 35 feet, and required one parking space for each 250 square feet of building area. The site area is designated as "seismic zone 3," normal for California, and the soils report indicated that normal structural foundations would be adequate.

3.2 Step 2. Information Analysis



Before conceptualizing all plausible development options for the facility, a fairly extensive analysis should be done of all information gathered, including site analysis and building analysis. Often, a thorough analysis will point the way to preferred design concept options.

3.2.1 Site Analysis

The site analysis issues can be summarized in general as follows:

- Existing parking and site access/transportation services.
- Expansion limits/available buildable site.
- Climate analysis.
- Sun analysis.
- View corridors.
- Height limits, lot coverage.
- Accessibility issues.
- Site "context" characteristics (*urban design*).
- Soils conditions and required foundation system.

For this case study, the most significant result of the site analysis was the limitation on the available buildable site, particularly for the option of a new building. A library of this size should generally be two stories to maintain internal visual access while minimizing the number of required service points. A testing of the available site area immediately showed that there was adequate space for an addition of 32,000 sq. ft. on two levels to the east and south. However, an entirely new 60,000 sq. ft. two-story building could only be located to the east of the existing building in the area occupied by half the library's surface parking. This would position a new library building on a secondary street, rather than the main collector street fronted by the city hall. This location was not deemed to be a serious flaw, however, since access to the city hall occurred from this same side due to the location of its parking area.

The limitation on buildable area therefore reduced the on-site options to renovation and expansion schemes to the south or east, or a new building located on the open site area to the east. In any of these options a large portion of the existing parking would be removed, and the zoning regulations would require an additional 240 parking spaces to be provided. A substantial amount of parking would have to be a significant feature of any option for the new facility.

The climate and sun analyses indicated that many good energy efficiency strategies would be possible in any design approach, including passive cooling. View corridors, or lines of sight to significant buildings or landscape features, were limited to views of the historic city hall building. The desired two-story structure would also be within the height limits imposed by the city's zoning regulations.

3.2.2 Building Analysis

The building analysis conducted for the existing building to determine the actual cost implications of saving some or all of the existing facility should incorporate a thorough examination of the issues that are listed in the checklist in Table 2, provided at the end of this article.

The results of this comprehensive analysis are normally assembled in a narrative of existing conditions of the building, which then becomes part of the scope of renovation and is included in the cost models of the renovation options. Not only will this analysis provide a good basis for real cost determination, but it also serves as a comparison of the final product of a renovated and expanded facility versus an entirely new facility. In some cases, the cost of a new building, considering all factors, may be comparable or only marginally higher when giving weight to factors such as functionality, maintainability, staffing requirements, energy efficiency, etc.

For this case study, the extent of any renovation of the existing facility and the size of the addition automatically triggered the requirement of complete code upgrades, including seismic and accessibility codes. Code upgrades of this extent usually have high cost premiums, and often suggest major changes to structure and building features.

While almost all of the building systems and building infrastructure in the case study example needed serious upgrading or replacement, some features of the existing building could not be changed. The building is a mixture of one- and two-story areas, and since the second floor structures of two of these areas do not align, it would be impossible to create contiguous floor areas for flexibility and basic visual connection. While retention of these spaces might provide some nominal cost savings, the resulting building would retain its basic dysfunctional characteristics, even with a well-planned addition. Existing poor wayfinding would not be significantly improved.

However, a scheme that involved partial demolition of the existing structure, retention of the newest portion containing the elevator, and construction of a larger addition was a more attractive approach than renovation of the entire structure. This surgical approach would eliminate the most seriously dysfunctional features of the existing building while possibly utilizing the remaining portions to good advantage.

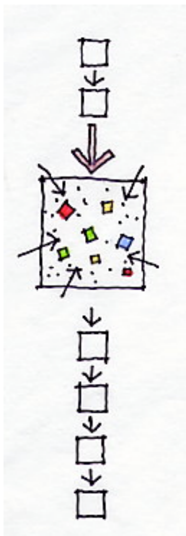
At this point of the case study analysis it was clear that any renovation option would involve significant cost. It was also apparent that the most promising options would be either a selective demolition/renovation with a larger expansion to the south or east, or a new building to the east. The renovation scheme with an eastern expansion would incur the additional cost of extensive electrical utility relocation, as noted above in section 3.1.1.

3.2.3 Program Verification

The final analytical step before embarking on design studies is *program verification*. Building codes, site availability, service access and other physical constraints are combined with the previously-developed building program requirements to determine a three-dimensional diagram of the building areas and their spatial relationships, as constrained by legal and physical conditions. This step also serves to coordinate the details of the program with the librarian group and the professional design team.

The conclusion of the analysis phase of the study sets the stage for the *Brainstorming Phase* and the development of the feasible design options.

3.3 Step 3. Brainstorming

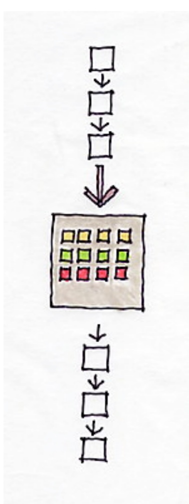


The analytical phase points the way toward the most feasible approaches to the best architectural solution. In the brainstorming phase the project team maps out the entire "landscape of solutions" based on the results of the analysis of information, including approaches that seem borderline or perhaps unrealistic.

Finding the best solution is often a complex process, involving many interrelated factors, and the process of working through solutions can sometimes yield surprising results. Furthermore, this process of examination of partially flawed schemes occasionally produces a kernel of a good idea for a portion of the design, which can be adapted later to the final selected scheme.

This can also be the most exciting phase of the work, usually involving all parties to the process, and generating creative ideas to fill out the "solution space." *Thinking-out-of-the-box* is desired at this point as even apparent objections can be questioned and evaluated for their validity.

3.4 Step 4. Feasible Options



In this phase of the process, the results of the brainstorming phase are organized by categorizing the various scheme ideas into separate groups or families that have similar characteristics. Typically, these families of solutions fall into the three categories of renovation and addition, partial demolition and addition, and new building schemes. Occasionally, other families of solution options may be possible, such as re-use of another existing building at a different location.

Distinctions among each scheme in a family of solutions are noted, including compatibility with the library program and likely special costs. If possible, the schemes of each family should be ranked in order of potential for successfully resolving the key facility issues.

In the case study, a total of seven schemes were identified as potential approaches to the new facility. These schemes were categorized as shown in Figure 3 and as described in Table 1 below. The solution approaches of the same family of solutions are identified by a common alphabetical letter.

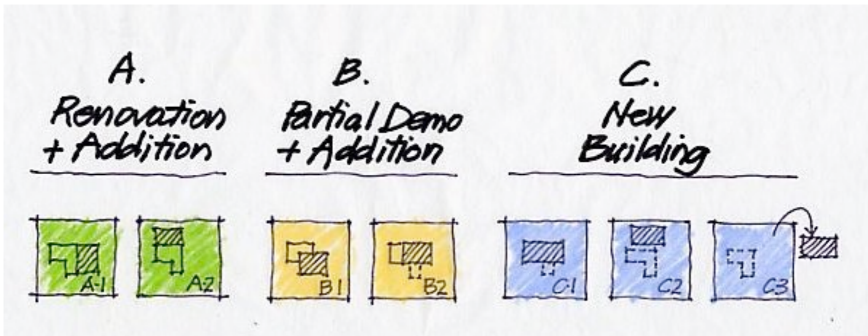


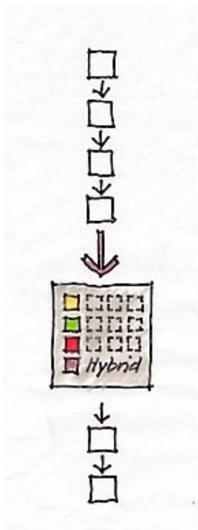
Figure 3. Categorization of the seven feasible options for the case study

Table 1. Characteristics of Feasible Options for the Case Study

Scheme A1	New 32,000 sq. ft., two-story addition to the south of the existing 28,000 sq. ft. library structure (approach initially proposed prior to any study).
Scheme A2	New 32,000 sq. ft., two-story addition to the east of the existing 28,000 sq. ft. library structure.
Scheme B1	Demolition of all but the most recent two-story portion of the existing library (which includes the elevator), renovation of the remaining 16,000 sq. ft., and a new 44,000 sq. ft., two-story addition on the site of the demolished portions.
Scheme B2	Demolition of all one-story (and the oldest) portions of the existing library, renovation of the remaining 22,000 sq. ft., and a new 38,000 sq. ft., two-story addition in place of the demolished portions.
Scheme C1	New 60,000 sq. ft. library on the site of the existing library.
Scheme C2	New 60,000 sq. ft. library on the site of the surface parking area to the east.
Scheme C3	New 60,000 sq. ft. library at a new site, away from city center site.

Schemes not considered for technical reasons: adding a level to the one-story portion (inadequate foundations and structure), or building a new 60,000 sq. ft., two-story building in the surface parking area to the south (inadequate site area). It is important to note solution approaches that are not really feasible, and the reasons for their rejection, when documenting the process in the final step.

3.5 Step 5. Preferred Options



It is often useful to select one scheme from each family to study further in the second round of design studies of *Preferred Options*. The study of the preferred schemes in the next step involves more detailed development of spatial relationships and cost modeling, and usually reveals additional information about the desirability of certain "family characteristics."

For decision-making reasons, the selection of three or four preferred schemes for further development seems to work best in this process. Quite often, a hybrid scheme emerges at this point, which incorporates the better ideas of two or more fatally flawed schemes, while abandoning their fatal flaws.

In the case study, no hybrid scheme emerged, but one scheme from each of the three families of solutions was selected for further study. This selection process for the preferred schemes is shown in Figure 4.

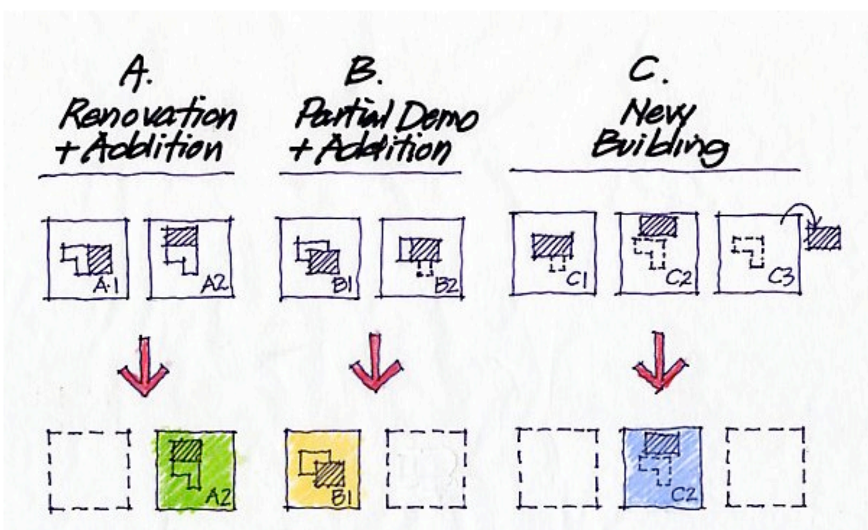


Figure 4. Selection of the preferred schemes for the case study

Scheme A1 (the scheme initially proposed before the evaluation process was undertaken) and Scheme C3 were eliminated from consideration quickly by the project team. Scheme A1 called for a simple addition to the south, connecting the new two-story addition through the one-story portion of the existing building. Since the one-story portion of the existing building would remain in the middle of the final design, disconnecting the two second-floor areas of the final building, it was clear that this scheme would not yield the best use of space compared to other schemes under consideration.

Scheme C3, the off-site location alternative, was considered to be poor since it diminished the city center complex to no real advantage in public access or services.[3]

Upon analysis, the schemes involving selective demolition and major addition proved to be difficult and costly. Scheme B1 retained only the most recently constructed two-story portion and demolished the balance of the space, while Scheme B2 retained both two-story portions of the existing building and demolished only the one-story portion. Both schemes would clearly require decanting of the library to a temporary facility for the period of construction, incurring significant additional cost to the project.

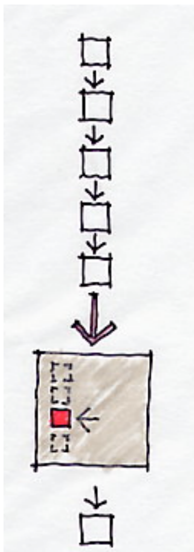
At this stage in the evaluation process, prior to any detailed cost analysis, it appeared prudent to carry one of these two schemes to the next step so that its likely impracticality could be quantified. Since the two-story portions of the existing building do not align, making Scheme B2 functionally limited, the project team decided to carry Scheme B1 forward to the next step of the process.

Scheme C1 was abandoned as the most expensive scheme, involving a temporary facility plus an entirely new facility. This scheme, however, was the one new-building scheme that would place the library in equal prominence to the city hall, facing a major boulevard. Though appealing, the cost of this scheme was deemed to be excessive. It was abandoned in favor of Scheme C2, which avoids the cost of phasing by locating the new structure to the east where it faces a quieter secondary street. Scheme C2 also allows the existing library building to be recycled to other uses and city space needs and ultimately forms a complex of three city buildings at the city center site.

[3] See *Site Selection for Libraries* on the Libris Design website (www.librisdesign.org) for site evaluation techniques.

Through this process of evaluation, three preferred schemes were selected for further development: Schemes A2, B1 and C2. It should be noted that in all three schemes, the required parking is accommodated on the south lot using more efficient surface parking and a two-level parking structure.

3.6 Step 6. Selected Approach



In Step 6, the preferred schemes undergo further development and study of all the architectural and engineering systems of the building. Without necessarily designing the building, much can be determined about the building systems and materials based on the building program and other information.

A design team of architect and engineers can establish a *design narrative* and even a *sketch plan* to assist a professional cost estimator in cost modeling each of the preferred schemes. Especially in the case where renovation appears to be the least expensive approach, it is important that the project cost be as comprehensive and realistic as possible. An experienced professional cost estimator is essential to achieve this objective.

In addition to regular construction cost, other project costs should be included as they affect the total cost of any particular scheme. Moving costs, temporary facility costs, site acquisition cost and even architectural and engineering fees can vary depending on the scheme's approach. At the same time it is important to normalize other costs that should effectively not vary from scheme to scheme, to ensure that the comparative cost models are of the "apple-to-apple" variety.

In the case study example, the three preferred schemes were carefully examined. Scheme A2, the renovation/addition scheme, was determined to have the lowest cost[4] at $14.8 million. Scheme B1, the partial demolition/addition scheme, actually incurred the highest cost at $16.7 million, primarily due to the need for the temporary facility during construction. In the other two schemes, A2 and C2, the library could remain in the existing building until the new space was completed. The new building scheme, C2, modeled at $15.5 million for construction only.

Scheme B1 was eliminated when considering the disruption caused by the moving process and

[4] The project cost rightly includes all costs that will be incurred through project delivery. These include, in addition to the building construction cost, site development, fees, furniture, equipment, moving expenses, temporary facilities, land acquisition costs and inflation to the midpoint of construction. The cost numbers listed above represent only site development and construction costs and are based on 1997 dollars. They are utilized here only for comparative illustration purposes.

temporary relocation for two years, in addition to the higher cost. Furthermore, the portion of the existing building to be saved as part of Scheme B1 was not considered optimum space compared to the qualities that could be brought to an entirely new space.

The final choice of the best approach in this case study hinged primarily on second-level considerations, since a $700,000 cost difference could be offset by other unknown costs associated with renovation projects or more subjective issues of value obtained for the investment of public funds. In this case, the city realized that with Scheme C2 the existing library building could be recycled into expansion office space for the adjacent city hall. Additional value would be obtained by eliminating currently leased space used by city departments and centralizing activities on the city center site.

When considered in the context of the future city office project, the total cost to the city would be less for Scheme C2 with the additional renovation of the existing library for simple office space. The new library could, in a sense, be regarded as Phase 1 of a total city center project.

The disposition and practical use of the existing library building was the deciding factor in the choice of Scheme C2, a new building, over Scheme A2, the renovation and expansion approach. Figure 5 illustrates this final step in the decision process.

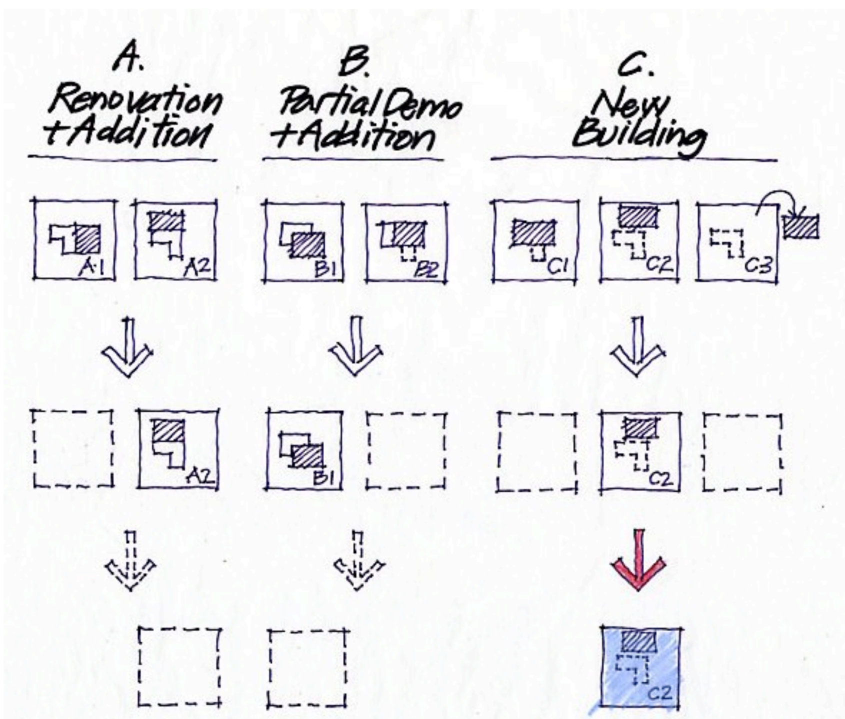
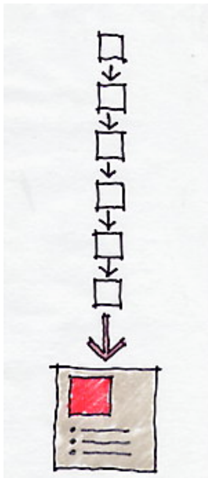


Figure 5. Choice of the selected approach

3.7 Step 7. Documentation of Process and Selected Approach



Clear documentation of both the evaluation process itself and the results of the process is the important concluding step in the overall decision-making process, both to record the issues and evaluations and to provide persuasive evidence of the due diligence and sound background of the ultimate recommendation. This documentation will also provide important information for the project team that takes the selected approach through the following design and construction phases.

Since funding of public library construction involves a close scrutiny of the expenditure of public monies, a carefully recorded document provides a comfortable basis for decision-makers in their review.

Table 2. Checklist of Topics and Issues for an Existing Building Analysis

Building Analysis Component	Issue
1. Seismic resistance capacity	Determine what measures are likely to be required to meet current codes.
2. Structural load capacity	Evaluate if the floor loading capacity is adequate for shelving throughout the existing structure to provide maximum flexibility.
3. Energy efficiency	Determine what features are particularly inefficient and need to be corrected. Retrofit features should be considered as well.
4. HVAC systems	Study the heating/cooling systems and determine if they have reached the end of their useful lives.
5. Electrical systems	Determine how extensive an upgrade will be required.
6. Lighting	Evaluate what needs to be done to provide energy-efficiency and improved quality of light. Determine if this entails replacement of entire light fixtures and their control systems. Evaluate how daylighting can be introduced in an existing structure.
7. Telecommunications and information systems	Determine how easy it is to install new cabling in the existing building and how many new data closets must be added.
8. Fire alarm	Determine if this system needs to be upgraded to meet current standards.
9. Security systems	Evaluate security needs and if security cameras or other new systems will be required.
10. Plumbing systems	Determine requirements for additional toilet facilities required under current code, including the extent of the accessibility (ADA) code upgrade work.
11. Fire protection	Determine if a sprinkler system will be required if not already installed.
12. Acoustics	Determine the extent of existing noise problems that need to be addressed.

13. Accessibility	Determine what ADA upgrades will be required to meet current codes.
14. Shelving systems	Determine if the existing shelving system meets current seismic standards and other code requirements and evaluate the feasibility of keeping the existing shelving in place.
15. Architectural systems	Conduct an overall review of the general condition of the existing building, including features such as roofing, windows, exterior sheathing, and ceilings.
16.Architectural design features	Evaluate changes that will be required to improve wayfinding, overall space organization and code exiting.
17. Miscellaneous	Determine if there are any special aspects of the existing building that may have cost implications in a renovation option, such as its qualification as a registered historic structure.

The Author

Edward Dean, AIA is located in San Francisco. He has led project design teams on many academic and public library projects, including the U.C. Berkeley Main Library, the City of Mountain View, the City of Santa Maria, the University of San Francisco and the joint academic-public library, San Francisco State University / Sutro Library. He has led workshops and written extensively about library design, concerning in particular energy and "green" design. He also taught design in the Department of Architecture at U.C. Berkeley for ten years, before devoting himself full-time to professional practice.