

Understanding the Hospital Planning, Design, and Construction Process

Introduction

California's acute care hospitals are an essential health care resource that serve a wide range of patients during times of illness or injury. To do so properly, they must be well designed, safe, and efficient. Recent hospital construction planning in response to the seismic safety mandates of SB 1953 will require many hospital boards of directors to oversee major building projects. Because such projects are relatively infrequent, board members and leaders may have only limited experience with the many complexities and challenges involved in the planning, design, and construction of a hospital facility. This issue brief is intended to acquaint non-experts with the way in which hospital construction projects are developed and delivered.

Background

The hospital planning, design, and construction process takes the form of three distinct phases.

The first is the definition and planning for the hospital project itself, including the project request, strategic plan, facilities needs assessment, specific program, and concept design.

Second is the preparation of schematic design, design development, construction documentation, and securing a building permit. This phase involves two public agencies: the city or county for land use approval, and the Office of Statewide Health Planning and

Development Facilities Development Division (OSHDPD FDD) for the building permit and subsequent construction observation. See page 5 for descriptions of these agencies.

The third phase covers bidding, construction, licensing, and evaluation. Licensing is provided by the U.S. Department of Health Services and the California Health and Human Services Agency. Only with their approval can the hospital operate and be eligible for Medicare and Medical reimbursement.

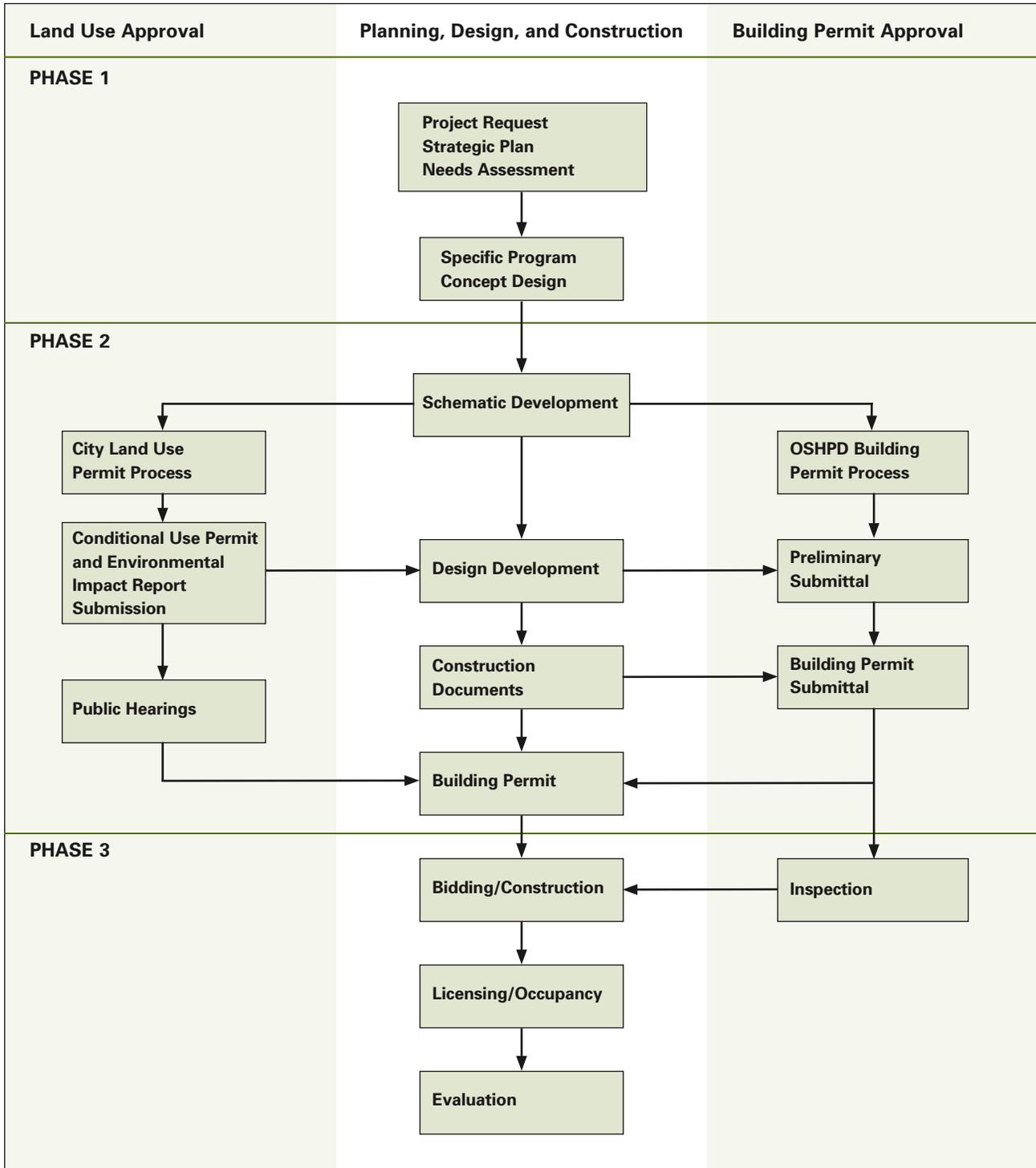
Implementation of the hospital planning, design, and construction process is depicted on the flow chart on page 2. The chart is based upon major projects or extensive re-builds which typically take seven or eight years to complete. Smaller projects, such as interior remodeling, use the same process but may not require the land use approval activities.

Phase 1: Project Definition and Planning

Project Request: All hospitals should have a process to identify construction projects and requests. Smaller projects are often a part of the routine planning and budgeting process; larger projects typically require focused attention and consideration within the context of the hospital's longer range strategic and capital planning processes.

Strategic Plan: Most hospital construction projects are the result of either changes in

Figure 1: Elements of a Hospital Building Project



the numbers of patients served, new treatments, or technologies, or strategic initiatives that further the hospital’s mission. All hospitals should have a strategic plan that has been developed with the participation of hospital’s administration, professional staff,

patients, physicians, and the board of directors. The plan should address the patient care and community service goals for a period of at least five years. The proposed building projects encompassed within the strategic plan should both allow the hospital to grow

and improve the treatment of patients through the introduction of new equipment or services, development of key departments, and compliance with Senate Bill 1953 for seismic upgrades, which may require major additions or even hospital replacement. Any new project should be reviewed internally to determine whether it is consistent with the strategic plan.

Facility Needs Assessment: Intrinsic to the strategic plan is the facility needs assessment. This evaluates each of the departments in the hospital to determine how they are meeting their current and potential future workloads. These workload forecasts generate space requirements that form the basis for future remodeling or additions that accommodate changing needs. Service lines may need clarification or re-definition. A technology plan should be reviewed and updated. These needs can then be prioritized to become a road map for fiscal and building development. The needs assessment should also include a master facilities plan. This plan can assist in predicting when a proposed project may trigger upgrades of mechanical, electrical, plumbing, and structural systems as well as assist in determining where additional sources of power are required. Facility needs assessments should be updated regularly.

Specific Program: Once a proposed project has been identified, a specific program should be developed to define the space needs and major equipment for each of the departments affected. The space requirements are driven by the number of medical procedures or services in each area, plus the area necessary for circulation, waiting, handicapped access requirements, and toilets. A staffing model, material flow diagrams, staff and patient flow diagrams, and related services and adjacencies are also considered. Percentage factors are applied for mechanical equipment space, net-to-gross square footage ratios, and exit ways such as stairs and elevators. Often, the Department of Health Services (which will subsequently license the project) reviews the staffing model and program. The specific

program is then tested against the strategic plan and the facilities needs assessment.

Depending on the complexity of the project, this is the time to select an architect with appropriate engineering consultants. Some firms provide the programming services above, but most hospitals should select their design team no later than the completion of programming. It is essential that the architect be experienced in the design of California hospitals and has extensive experience working with OSHPD FDD.

Concept Design: Upon approval of the specific program, a concept design is prepared that develops the available space into floor plans, interior elevations, stacking and blocking diagrams, building sections, exterior elevations, and a site plan. A major addition or replacement uses the same process but in a broader frame of reference. The concept design should be detailed enough to obtain a general cost-per-square-foot estimate based upon historical cost factors in the hospital's location. This information, while limited, is often the basis for the development of a total project cost budget. This will be the construction budget that the executive administration and the board may approve for the entire project. Therefore, it's very important that percentage contingencies for inflation, unknown existing conditions, cost increases during the permitting phase, and potential owner changes during construction are included in the construction cost budget. While the concept construction budget is crucial, the project approval will be based upon the total project cost.

Total Project Cost: The total project cost budget includes architects and engineers' fees, medical equipment, furnishings and fixtures, OSHPD building permit fees and project contingencies. A general rule for total project cost is to multiply the construction cost by 1.5. Loss of business revenue, financing, conditional use permit fees, non-construction related

consultant fees, attorney's fees, and other related costs are separate line items additional to the total project cost. Upon approval of the total project cost, implementation of the schematic design phase can be authorized to start the project delivery process.

Phase 2: Design, Documentation, and Permitting

Schematic design is the stage when the building is designed in terms of character, materials, the shape and organization of interior spaces, and exterior appearance. Major mechanical and electrical equipment locations as well as the definition of the structural system, grading, and building location occur during this phase. Hospitals can expect requests for frequent department and staff interviews to assist in this process. This is also the time to start the remaining two parallel processes; initiate the land use approval process and initiate the OSHPD approval process. Soil Borings should be taken at the project site and a geotechnical report submitted through OSHPD to the Bureau of Mines and Geology. This review will determine the seismic zone for the site and confirm the criteria for the structural design of the building. Upon completion of the schematic design a more detailed cost estimate can be prepared. This estimate should confirm that the project is on track per the previously approved total project cost.

Design Development: This is the process whereby the schematic design information is developed into specific room by room data that includes all the medical equipment, HVAC loads, plumbing and electrical requirements, detailed floor plans, wall elevations, materials, and finishes for each treatment room. Also included are the typical types of patient rooms, public spaces, and food service. The receipt of the approved geotechnical report from OSHPD FDD will provide the criteria necessary for the structural design of the project.

The goal of this phase is to obtain all the decisions necessary to move on to preparing the construction documents when this phase is approved. Design development is the most labor intensive for hospital personnel as the rooms require many detail decisions. At the conclusion of this phase, the design development package is submitted to OSHPD FDD as a preliminary submittal. Completion of their review of this submittal is necessary prior to proceeding with construction documents. Additionally, if a public hearing was held, comments that may affect the design should be received from the local municipality. Also at the end of this phase, the cost estimate is updated to confirm if the project is within the budget.

Construction Documents: Following the hospital's approval of the design development phase, construction documents are prepared. These are the working drawings and specifications necessary to provide the general contractor with sufficient information to construct the building. Ideally, all decisions on the scope and detailed definition of the project have been made in design development. This allows the architect/engineer team to complete their work with a minimum of client interface during this phase.

Building Permit: Upon completion of these drawings and specifications, they are submitted to OSHPD FDD for approval and the building permit. A typical hospital project will have a minimum of two OSHPD FDD reviews with comments. The first review comments are usually issued within 90 to 120 days. Then the architect/engineer team must respond to those comments and correct the drawings as necessary. A second review may also take place with the corresponding response period. This process of review comments and resubmitted corrections continue until OSHPD FDD is satisfied that all the building code issues have addressed. Once the final building corrections and the land use approval in the form of

Key Regulatory Approvals

As the planning, design, and construction of a hospital move into the schematic development stage, two regulatory processes must be coordinated with the project's schedule: local land use approval, and OSHPD permitting and inspection.

Land Use Approval by City or County:

In California, no property is zoned for hospitals. As a result, all hospitals require discretionary approvals from municipalities or counties when they choose to build new buildings or additions to existing buildings. These approvals take the form of conditional use permits that include environmental review. A conditional use permit (CUP) grants the hospital land use approval for a specific project. In most cases these projects are additions or replacements that alter only the exteriors of the buildings. A CUP requires the submission of the appearance and size of the project along with an extensive application that includes traffic demands, parking, handicapped access points, access to public transportation, noise, exterior lighting and other effects upon the surrounding neighborhood. This is an inclusive process. Public hearings will be required as will design review by an appointed board, the city planning commission, or the city council.

The city planning staff has two options for environmental review: a negative declaration or an environmental impact report. If the project is a minor addition or a small free standing building, staff may determine the project needs only a negative declaration. New hospitals will always require a full

environmental impact report. By initiating the CUP approval process at the completion of schematic design, most of the required documentation has been completed and is ready to submit to the local municipality. However, design review may involve changes to the project during the design development phase.

Office of Statewide Health Planning and Development (OSHPD)

The Office of Statewide Health Planning and Development Facilities Development Division (OSHPD FDD), the building permitting agency for all California hospitals, cannot issue a building permit until the conditional use permit has been granted. The goal is to have the time frames for discretionary approvals and OSHPD permitting track together. No municipality or county can issue a building permit for a hospital since the Hospital Seismic Safety Act in 1983. In this capacity, OSHPD is responsible for the development and implementation of all applicable building codes and state mandates. This includes the development of regulations and the implementation of Senate Bill 1953. Hospitals are very complex buildings and California has its own building code for hospitals. This code includes codes for structural integrity following an earthquake as well as quality and performance requirements in other areas that are superior to the national codes. Therefore it is very important to select architects and engineers who have experience in the design of hospitals in California.

a conditional use permit are obtained, the building permit will be issued. A final detailed cost estimate will also be prepared during this period.

Phase 3: Bidding, Licensing, and Evaluation

The bidding and construction of a hospital project can take several forms. The first is to have pre-qualified general contractors bid competitively based on the permitted construction documents. This is the traditional way to select a contractor, and most publicly funded projects use it. However, some hospi-

tals select a construction manager at the same time they select the architect/engineer. The construction manager becomes part of the project delivery team and advises the hospital on construction systems and techniques that may be incorporated in the design. They may also provide each of the cost estimates prior to the start of construction as well as manage the project delivery schedule.

In some instances the construction manager is directly involved in the construction process by managing all the major sub-contractors and guaranteeing a maximum price. This more sophisticated

process is often used for hospital replacement or complex remodeling or renovation projects. Upon receiving successful bids, the hospital can proceed with construction and the ordering of medical equipment, furniture, fixtures and major/minor equipment. OSHPD FDD also contributes to the construction phase by requiring state certified inspector(s) of record who must document the progress of the construction. This information is reviewed periodically by OSHPD FDD field staff to confirm that the project is constructed according to the approved construction documents.

Invariably, there are modifications to the project during construction. Often hospital personnel or policies have changed during the time elapsed from construction document decisions to the construction phase. These “change orders” may require modifications to the construction that can add significant cost to the project. These changes need careful evaluation by hospital administration.

Beneficial Occupancy: Upon completion of construction, the architect and the contractor will contact OSHPD FDD to request approval of beneficial occupancy so the hospital can staff and stock the facility. Upon receipt of the approval, the hospital can install equipment and furnishings as well as provide and train staff in preparation for licensing and certification.

Licensing: The licensing section of the Department of Health Services will request final fire safety approval from OSHPD FDD in preparation for the hospital to be eligible for Medicare certification. Upon approval, the hospital will be granted a certificate of occupancy recognizing that it is now complete and ready to receive patients.

Evaluation: Engaging the hospital in an evaluation process following the first six months of occupancy can be very beneficial to the new users as well as design team. This evaluation should include input

from staff and patients who use the facility on a daily basis. Criteria should include whether the original intent of the project has been met; impact on operations; ease of operations; heating and air conditioning performance; items needing completion or correction; and general satisfaction with the program and process.

FOR MORE INFORMATION:

More information regarding hospital planning, design and construction can be found in the report *Best Practices for Project Management, Design and Construction of Buildings under OSHPD Jurisdiction*, available on the CHCF Web site at www.chcf.org/topics/hospitals/index.cfm?itemID=119899.

AUTHOR:

John E. Millsap, AIA, is a former vice president for facilities development at the California Pacific Medical Center. He also served as a member of the California Hospital Building Safety Board.