CALIFORNIA ARCHITECTS BOARD 2007
OCCUPATIONAL ANALYSIS STUDY

Introduction

The California Architects Board regulates the practice of architecture in California. The Board is mandated to protect the health, safety, and welfare of the public by ensuring that only those individuals who are competent to practice architecture are licensed. In order to obtain a license to practice architecture in California, a candidate must pass not only the national examination but also the California Supplemental Examination (CSE). The CSE assesses a candidate's entry-level competence in California-specific architectural knowledge, skills and abilities (KSA). By administering these examinations, it is possible to provide candidates with an opportunity to demonstrate their competence without actually putting the public at risk.

The CSE is an oral examination. The test plan that is used to construct multiple versions of the examination is based on occupational analysis information that is periodically updated. Prior to this study, the last occupational analysis was conducted in 2001.

Study Objectives

The primary goal of the occupational analysis was to describe performance requirements for architects working in the state of California. The updated occupational analysis results served as the foundation for an updated CSE test plan. Our primary objectives were to conduct this study in a way that would (a) promote broad input from California-licensed architects; (b) flow directly into an easy to use, valid CSE test plan; and (c) recognize current issues and trends in practice.

Supporting Expert Groups

The California occupational analysis of the practice of architecture was conducted with the help of multiple groups of architects who provided subject matter expert (SME) guidance to Human Resources Research Organization (HumRRO), the contracted consultant. The architects were identified by the Board and represented a broad spectrum of practice in the state, geographically as well as with respect to firm or organization size and type of work done. The architects ranged in experience from 14 to 51 years (mean = 31 years), and ranged in years licensed in California from 9 to 46 (mean = 25 years). While the architects came from a variety of work settings (architectural or engineering office, non-architectural corporate setting, construction-related settings, educational institutions, and government agencies), about two thirds worked in architectural firms. More than half of the architects were principals or had managerial positions in their firm, while others were project architects, project managers, or sole practitioners. The architects represented organizations that ranged in size from 1 to over 100 employees, with an almost even distribution across small (1-5), medium (6-25), and large companies (26-100 and over 100).

Each group of SMEs was joined by representatives of the Board's CSE Examination Committee to provide direction in the following activities:

- Focus Group Meeting
- Framework Meeting
- Survey Development, Review, and Results Review Workshops
- Test Plan Meeting

Overall, the Board and HumRRO involved 38 California-licensed architects in the various meetings to develop and pilot test the occupational analysis survey and to evaluate the results of the study. Most of the architects participated in more than one of the occupational analysis meetings to help bring continuity to the CSE Test Plan development process.

Overview of Technical Approach

Using information from available documents and SMEs, a survey to be administered to a broad sampling of architects practicing in California was constructed. The survey was designed primarily to identify important job tasks as well as the knowledge and skills required for successful performance of those tasks. The on-line survey was administered to over 1,000 architects who were identified using the Board's licensee database. After determining that the survey sample was reasonably representative of the target population, the results review group of SMEs reviewed HumRRO's occupational analysis results. Finally, the results review and test plan groups of SMEs were guided through a structured process to use the survey findings and other relevant information as a basis for constructing a new CSE blueprint.

Final Web-Based Survey

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CAB 2007 Occupational Analysis Survey

Biographical Information

SECTION 1: BIOGRAPHICAL INFORMATION

The information you provide in this section is confidential. It will be treated as personal information subject to the Information Practices Act and will be used only for the purpose of analyzing the responses to the survey and for ensuring that the respondents reflect the diversity of California's architect population.

Instructions
To answer each question, either type in your response or use the pull down menu to select your response.

Most questions ask for only one response; however, some will ask you to give a percent response for each answer option. For these questions, the total percent for your answers must be 100.

01. Are you currently employed as an architect or engaged in any capacity in the profession of architecture in California?

- ○ Yes
- ○ No

02. Over the past 2 years, approximately what percentage of your architectural work has been on projects **outside** California (either in other states or outside the U.S.)?

0%

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03. For approximately how many years have you worked in the profession of architecture? (Do not include years in which you worked less than 10 hours a week.)

[ ] yrs.

04. In what year were you initially licensed as an architect in California?

[ ]

05. If you were first licensed in a jurisdiction other than California, indicate the year of licensure.

[ ] ☐ Not applicable.

06. Over the last 2 years, how would you describe your work in the profession of architecture?

- ○ Full Time (at least 20 hrs per week)
- ○ Part Time (less than 20 hrs per week)

07. In what California county is your primary workplace (office) located?

[ ]

08. Which of the following **best** describes your **primary** work setting?

- ○ Architectural or engineering office
- ○ Non-architectural corporate setting
- ○ Construction-related setting (e.g., developer, contractor)
- ○ Educational institution
- ○ Governmental agency

09. What is your **primary** role?

- ○ Principal or managerial
- ○ Project architect or project manager
- ○ Sole practitioner
- ○ Other

10. What is the highest level of formal education that you have completed?

- ○ High school diploma
- ○ Two-year community college degree
- ○ Four-year degree in architecture
- ○ Four-year degree in field other than architecture
- ○ Professional degree in architecture
- ○ Post-professional degree in architecture (e.g., Master's, Doctorate, or Ph.D.)
- ○ Advanced degree other than architecture

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11. Approximately how many employees are in your organization? (Include yourself and all staff members.)

- ○ 1-5
- ○ 6-25
- ○ 26-100
- ○ More than 100

12. At the office location where you perform the majority of your work, approximately how many employees (including yourself) are

- [ ] licensed architects?
- [ ] unlicensed persons involved in architecture-related tasks?
- [ ] in the process of obtaining a California architect license?

13. Indicate the percentage of time you have spent working with each of the following project types over the past 2 years. (Total percent must equal 100.)

0	%	Residential (all types)
0	%	General commercial, retail, hospitality, or industrial
0	%	Institutional, educational, medical, or public buildings
0	%	Specialty industrial or technical
0	%	Total

14. Indicate the percentage of time you have spent with each of the following types of construction over the past 2 years. (Total percent must equal 100.)

- ☐ Not applicable to my work.

0	%	New construction
0	%	Remodel / renovation
0	%	Total

15. Indicate the percentage of your projects over the past 2 years that used each of the following delivery methods. (Total percent must equal 100.)

0	%	Design-Bid-Build or Negotiated Bid
0	%	Construction Manager at Risk
0	%	Design/Build
0	%	Lease/Lease Back or Multiple Prime Contracts
0	%	Integrated Project Delivery
0	%	Total

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Task Ratings

SECTION 2: TASK RATINGS

Instructions

This section of the survey lists tasks that California architects may perform. You will rate the importance of each task based on your individual experience.

The 68 tasks are organized into the following categories:

- Contract Development
- Project Planning
- Design
  - Design Management
  - Conceptualization
  - Schematic Design
  - Discretionary Approval Process
  - Design Development
- Construction Documents and Permitting Process
- Project Bidding and Construction
  - Bidding and Negotiation
  - Construction and Close-Out

For each task, ask yourself, "**How important is the performance of this task in fulfilling my responsibilities as an architect?**"

Respond to the question by choosing one of the following ratings:

- Task not performed
- Minimally important
- Important
- Very important
- Extremely important

Factors to consider when rating the task:

Relevance to role - How relevant is this task to my role as an architect?
Consequences - How damaging are the consequences if the task is not performed well?
Time - Do I spend a lot of time performing or supervising this task?

Consider all factors when choosing your importance rating. Each factor may vary in weight depending on the task. For example, a task that you perform or supervise often, but has no serious consequences if it is not performed well every time, would be rated lower than a task that is performed less often, but which is very important to get right.

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"**How important is the performance of this task in fulfilling my responsibilities as an architect?**"

Factors:
Relevance to role - How relevant is this task to my role as an architect?
Consequences - How damaging are consequences if task is not performed well?
Time - Do I spend a lot of time performing or supervising this task?

	Task Not Performed	Minimally Important	Important	Very Important	Extremely Important
	0	1	2	3	4

CONTRACT DEVELOPMENT	Importance				
001 Assess preliminary project requirements including budget and schedule relative to firm's or organization's business goals and resources.	○	○	○	○	○
002 Define project goals (e.g., community, sustainability, quality, financial) with clients.	○	○	○	○	○
003 Identify local, state, and federal regulatory jurisdictions.	○	○	○	○	○
004 Identify documents and consultants to be provided by clients (e.g., boundary and topographic survey, geotechnical report, EIR, hazardous materials abatement).	○	○	○	○	○
005 Determine project delivery methods in collaboration with clients.	○	○	○	○	○
006 Determine architectural services to be provided.	○	○	○	○	○
007 Identify team members (e.g., architects, engineers, specialty consultants, cost estimators) and their required scope of services and fees.	○	○	○	○	○
008 Evaluate potential contractual risks and determine strategies to manage them.	○	○	○	○	○
009 Establish basis of compensation and negotiate fees with clients.	○	○	○	○	○
010 Prepare proposals and/or execute owner-architect agreements.	○	○	○	○	○
011 Prepare and execute consultants' agreements.	○	○	○	○	○

PROJECT PLANNING	Importance				
012 Establish protocols for client communications (e.g., point of contact, schedules for reporting).	○	○	○	○	○
013 Analyze clients' specific needs and project opportunities and constraints (e.g., business culture, clientele, context, financing, entitlements).	○	○	○	○	○
014 Determine specific roles and responsibilities of project participants (e.g., owner's representative, architect, contractor, construction manager).	○	○	○	○	○
015 Assess projects relative to their physical, social, and economic context.	○	○	○	○	○
016 Determine specific requirements of regulatory agencies.	○	○	○	○	○
017 Consider environmental conditions (e.g., geotechnical, hydrological, air quality, noise, traffic) for potential project impacts (e.g., cost, scope, further investigation by specialty consultants).	○	○	○	○	○

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	0	1	2	3	4

PROJECT PLANNING	Importance				
018 Assist in establishing the scope of clients' consultant services.	○	○	○	○	○
019 Perform or evaluate site feasibility studies (e.g., size, gradient, infrastructures, locations).	○	○	○	○	○
020 Develop or review programs with clients.	○	○	○	○	○
021 Assess projects relative to any master plans.	○	○	○	○	○
022 Establish documentation standards for project teams to follow.	○	○	○	○	○

DESIGN Design Management	Importance				
023 Prepare and manage the schedules and budgets of design teams (consultant and staff costs).	○	○	○	○	○
024 Implement strategies for managing contractual risk.	○	○	○	○	○
025 Prepare project budgets.	○	○	○	○	○
026 Assist clients in evaluating alternate design solutions relative to project budgets.	○	○	○	○	○
027 Review and update preliminary cost estimate at each design phase.	○	○	○	○	○
028 Manage distribution and review of documents.	○	○	○	○	○

DESIGN Conceptualization	Importance				
029 Develop or review clients' design standards and guidelines.	○	○	○	○	○
030 Develop alternate design concepts that respond to program requirements.	○	○	○	○	○
031 Review alternate design concepts relative to local zoning, codes, ordinances, and covenant requirements.	○	○	○	○	○
032 Review alternate design concepts with clients to determine design direction.	○	○	○	○	○

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	Task Not Performed	Minimally Important	Important	Very Important	Extremely Important
	0	1	2	3	4

DESIGN Schematic Design	Importance				
033 Furnish appropriate technical project information to consultants.	○	○	○	○	○
034 Perform regulatory analysis (e.g., building codes, zoning or local codes and ordinances, covenants).	○	○	○	○	○
035 Review project with regulatory agencies, community groups, and other stakeholders for general conformance, guidance, and/or to identify potential issues.	○	○	○	○	○
036 Analyze and select basic building elements and systems (e.g., structural, mechanical, electrical, fire safety, security, telecommunications/data).	○	○	○	○	○
037 Analyze and select architectural features (e.g., configurations, circulation, materials, finishes).	○	○	○	○	○
038 Prepare models, renderings, or sketches to help communicate project designs.	○	○	○	○	○
039 Prepare schematic design documents that comply with program requirements.	○	○	○	○	○
040 Review schematic documents with clients for compliance with program and to obtain client approval.	○	○	○	○	○

DESIGN Discretionary Approval Process	Importance				
041 Determine requirements for discretionary approvals (e.g., major use permit, conditional use permit, coastal development permit, variance, zone change, General Plan amendment).	○	○	○	○	○
042 Prepare and submit exhibits and application forms for discretionary approvals to governing agencies (e.g., Planning Department, Coastal Commission, Design Review Board).	○	○	○	○	○
043 Work with agency staff to incorporate proposed conditions of discretionary approval into project documents.	○	○	○	○	○
044 Present projects at public hearings or meetings (e.g., community groups, Design Review Board, Planning Commission, City Council).	○	○	○	○	○
045 Incorporate final conditions of discretionary approval into project documents.	○	○	○	○	○

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Time - Do I spend a lot of time performing or supervising this task?

	Task Not Performed	Minimally Important	Important	Very Important	Extremely Important
	0	1	2	3	4

DESIGN Design Development	Importance				
046 Coordinate the design of building systems (e.g., structural, mechanical, electrical, fire safety, security, telecommunications/data).	○	○	○	○	○
047 Prepare design development documents.	○	○	○	○	○
048 Perform value engineering and life cycle cost analyses.	○	○	○	○	○
049 Review design development documents with clients for compliance with requirements (program, budget, and schedule) and for client approval.	○	○	○	○	○

CONSTRUCTION DOCUMENTS AND PERMITTING PROCESS	Importance				
050 Prepare construction documents.	○	○	○	○	○
051 Coordinate construction documents (e.g., architectural, structural, mechanical, civil, electrical) and identify potential conflicts or errors.	○	○	○	○	○
052 Prepare or review statements of probable construction costs.	○	○	○	○	○
053 Manage distribution and review of documents during the construction document and permit phases.	○	○	○	○	○
054 Review construction documents for conformance with special program requirements and project goals.	○	○	○	○	○
055 Review construction documents for conformance with codes and regulations.	○	○	○	○	○
056 Review construction documents for conformance with conditions of prior approvals (e.g., client, regulatory, community).	○	○	○	○	○
057 Review construction documents for constructability.	○	○	○	○	○
058 Present construction documents to clients for approval.	○	○	○	○	○
059 Submit construction documents to agencies, coordinate responses, and obtain approvals.	○	○	○	○	○

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Factors:
Relevance to role - How relevant is this task to my role as an architect?
Consequences - How damaging are consequences if task is not performed well?
Time - Do I spend a lot of time performing or supervising this task?

	Task Not Performed	Minimally Important	Important	Very Important	Extremely Important
	0	1	2	3	4
PROJECT BIDDING AND CONSTRUCTION — **Bidding and Negotiation**	Importance				
060 Prepare bid documents appropriate to selected delivery method.	○	○	○	○	○
061 Assist in the bidding process (e.g., distribute documents, conduct pre-bid meetings, prepare addenda, review bids).	○	○	○	○	○
062 Assist clients in negotiating construction contracts.	○	○	○	○	○
PROJECT BIDDING AND CONSTRUCTION — **Construction and Close-Out**	Importance				
063 Monitor that construction is in general conformance with contract documents (e.g., respond to requests for information, conduct site observations/field reports, review submittals).	○	○	○	○	○
064 Initiate or process documents to record construction changes (e.g., directives, supplemental instructions, change orders).	○	○	○	○	○
065 Monitor project construction costs and schedule (e.g., review and certify contractor applications for payment, verify lien releases).	○	○	○	○	○
066 Perform project close-out services (e.g., certification of substantial completion, notice of completion, verify final lien releases, verify public agency approvals).	○	○	○	○	○
067 Review test, inspection, and observation programs for conformance with construction documents.	○	○	○	○	○
068 Conduct post-construction services (e.g., post-occupancy evaluations, extended commissioning, record drawings).	○	○	○	○	○

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Knowledge and Ability Ratings

SECTION 3: KNOWLEDGE AND ABILITY RATINGS

Instructions

This section of the survey lists knowledges and abilities that may be required of California architects. You will rate the importance of each knowledge and ability based on your individual experience.

The 112 knowledge and ability statements are organized into the following categories:

- Context
  - Physical Environment
  - Human and Social Environment
- Regulatory
  - California State Laws, Codes, and Regulations
  - Other Laws, Codes, Regulations, and Standards
  - Agencies and Entitlements
  - California Architects Practice Act
- Management
  - Project Planning and Management
  - Risk Management and Quality Assurance
  - Communication
- Predesign
- Design
- Construction

For each statement, simply ask yourself, "**How important is this knowledge or ability for enabling me to fulfill my responsibilities as an architect?**"

Respond to the question by choosing one of the following ratings:

- Not utilized
- Minimally important
- Important
- Very important
- Extremely important

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"**How important is this knowledge or ability for enabling me to fulfill my responsibilities as an architect?**"

		Not Utilized 0	Minimally Important 1	Important 2	Very Important 3	Extremely Important 4
	CONTEXT **Physical Environment**	**Importance**				
001	Knowledge of conditions of the natural environment (e.g., climate, geology, topography, hydrology, flora and fauna) as they relate to design and construction.	◉	○	○	○	○
002	Knowledge of conditions of the natural environment regulated in California (e.g., wetlands, coastal regions, habitats of endangered species) as they relate to design and construction.	◉	○	○	○	○
003	Knowledge of how to obtain information regarding natural site conditions (e.g., geotechnical investigation, boundary or topographical survey, biological surveys, hazardous materials surveys).	◉	○	○	○	○
004	Knowledge of natural and human-caused hazardous conditions (e.g., seismic activity, fire, winds, flood zone, hazardous materials) and potential mitigations.	◉	○	○	○	○
005	Knowledge of the existing built environment (e.g., existing buildings, building types, infrastructure, utilities, adjacent land use).	◉	○	○	○	○
006	Knowledge of how to obtain information regarding existing built conditions (e.g., research building records, field measure, review as-built drawings, digital scanning).	◉	○	○	○	○
007	Knowledge of traffic and transportation considerations (e.g., existing traffic patterns, availability of public transportation) as they relate to development.	◉	○	○	○	○
	CONTEXT **Human and Social Environment**	**Importance**				
008	Knowledge of human behavior and comfort factors (e.g., personal space requirements, ergonomics, light and noise levels, temperature, humidity).	◉	○	○	○	○
009	Knowledge of health issues related to buildings (e.g., offgassing, mold, adequate ventilation).	◉	○	○	○	○
010	Knowledge of types of clients (e.g., institutional, corporate, residential, public entity) and implications for project management and design.	◉	○	○	○	○
011	Knowledge of user characteristics (e.g., varying ages, cultures, abilities, activity requirements).	◉	○	○	○	○
012	Knowledge of socio-economic conditions (e.g., of a neighborhood, community, or region) as they relate to project design.	◉	○	○	○	○
013	Knowledge of types of stakeholders (e.g., environmental groups, citizens' advisory committees, neighborhood and community organizations) concerned about design and construction.	◉	○	○	○	○

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"**How important is this knowledge or ability for enabling me to fulfill my responsibilities as an architect?**"

		Not Utilized 0	Minimally Important 1	Important 2	Very Important 3	Extremely Important 4
	REGULATORY California state laws, codes, regulations, and standards	Importance				
014	Knowledge of California Environmental Quality Act (CEQA) as it relates to design and construction.					
015	Knowledge of California Coastal Act as it relates to design and construction.					
016	Knowledge of California Clean Air Act as it relates to design and construction (e.g., air quality requirements for dust mitigation, limitations on generator exhaust).					
017	Knowledge of Essential Services Buildings Seismic Safety Act as it relates to design and construction.					
018	Knowledge of the Field Act as it relates to design and construction of public schools.					
019	Knowledge of the Hospital Facilities Seismic Safety Act as it relates to design and construction of health facilities.					
020	Knowledge of what is encompassed by the California Building Standards Code (e.g., Building, Electrical, Mechanical, Plumbing, Energy) and how the CBSC is distinct from the model codes.					
021	Knowledge of structural provisions of the California Building Code.					
022	Knowledge of provisions of the California Building Code for anchoring and bracing nonstructural elements.					
023	Knowledge of accessibility provisions of the California Building Code.					
024	Knowledge of fire and life safety provisions of the California Building Code.					
025	Knowledge of provisions of the California Energy Code.					
026	Knowledge of provisions of the California Historical Building Code.					
027	Knowledge of California Health and Safety Code as it relates to design and construction.					
028	Knowledge of California water quality regulations as they relate to design and construction.					
029	Knowledge of the Design Professionals' Lien Law.					
030	Knowledge of the Mechanic's Lien Law.					

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REGULATORY — **Other laws, codes, regulations, and standards**	Importance				
031 Knowledge of local or regional laws, codes, regulations, and standards (e.g., General Plan; planning and zoning ordinances; local building ordinances; design guidelines; Codes, Covenants, and Restrictions [CC&Rs]) relevant to design and construction.	○	○	○	○	○
032 Knowledge of the Americans with Disabilities Act (ADA) with regard to how it impacts architectural practice (e.g., client and architect responsibilities, design and construction).	○	○	○	○	○
033 Knowledge of federal laws, codes, and regulations other than ADA (e.g., Environmental Protection Act, Federal Aviation Administration regulations, US Army Corps of Engineers regulations) relevant to design and construction.	○	○	○	○	○
034 Knowledge of national standards (e.g., UL, ANSI, ASTM, Factory Mutual) relevant to design and construction.	○	○	○	○	○
REGULATORY — **Agencies and Entitlements**	Importance				
035 Knowledge of local community development agencies and other authorities that normally have jurisdiction over design and construction (e.g., building, planning, public works, police and fire departments).	○	○	○	○	○
036 Knowledge of local or regional agencies and other authorities that may have jurisdiction over design and construction (e.g., Design Review Boards, Air Quality Management District, County Flood Control District, airport authorities, Environmental Health Department).	○	○	○	○	○
037 Knowledge of requirements for obtaining commitment ('will serve') from utility providers to deliver services (e.g., sewer, water, electricity, gas).	○	○	○	○	○
038 Knowledge of California state agencies that have jurisdiction over design and construction (e.g., Coastal Commission, Water Resources Control Board, Dept. of Fish and Game, Air Resources Board, California Department of Transportation).	○	○	○	○	○
039 Knowledge of federal agencies that have jurisdiction over design and construction (e.g., US Fish and Wildlife Service, US Army Corps of Engineers, Federal Aviation Administration, Federal Emergency Management Agency).	○	○	○	○	○
040 Knowledge of procedures for obtaining approvals from regulatory agencies.	○	○	○	○	○
041 Knowledge of interrelationships among various regulatory agencies (e.g., sequence of approvals, hierarchy of jurisdictions).	○	○	○	○	○
042 Knowledge of process for resolving conflicts between agencies or between codes, regulations, and standards.	○	○	○	○	○

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"**How important is this knowledge or ability for enabling me to fulfill my responsibilities as an architect?**"

		Not Utilized 0	Minimally Important 1	Important 2	Very Important 3	Extremely Important 4
	REGULATORY — **California Architects Practice Act**	Importance				
043	Knowledge of the architect's responsibilities and requirements for practicing in California in accordance with the Practice Act (e.g., responsible control, standard of care, licensing requirements, signing and sealing of documents).	○	○	○	○	○
044	Knowledge of the elements of a legal contract as required by the Practice Act.	○	○	○	○	○
045	Knowledge of administration of the Practice Act (e.g., examination, licensing, and enforcement).	○	○	○	○	○
046	Knowledge of business and professional requirements of the Practice Act (e.g., architectural corporations, firm naming, associations, professional conduct).	○	○	○	○	○
	MANAGEMENT — **Project Planning and Management**	Importance				
047	Knowledge of project delivery methods (e.g., design-bid-build, construction management at risk, design-build) and how they affect architectural services.	○	○	○	○	○
048	Knowledge of consultants' (e.g., civil, structural, mechanical, electrical, landscaping, acoustical, traffic) services.	○	○	○	○	○
049	Knowledge of contractual responsibilities to clients.	○	○	○	○	○
050	Knowledge of contractual responsibilities to architect's consultants.	○	○	○	○	○
051	Knowledge of project scheduling considerations (e.g., workload, regulatory agency processing time).	○	○	○	○	○
052	Knowledge of staffing methods (e.g., in-house, association, joint venture, outsourcing) and their implications for project management.	○	○	○	○	○
053	Knowledge of project team selection considerations (e.g., areas of expertise, compatibility, availability, design fees).	○	○	○	○	○
054	Knowledge of architect's role and responsibilities in coordinating an entire project team.	○	○	○	○	○
055	Knowledge of architect's role and responsibilities in managing project teams to obtain necessary agency approvals at the appropriate time.	○	○	○	○	○
056	Knowledge of the preparation and monitoring of project budgets (hard and soft costs).	○	○	○	○	○
057	Knowledge of how to allocate resources and manage in-house and consultant costs throughout all phases of architectural services.	○	○	○	○	○
058	Knowledge of project cost control methods (e.g., value engineering, life-cycle costing, advance purchasing, cost estimating).	○	○	○	○	○

CALIFORNIA ARCHITECTS BOARD

PUBLIC PROTECTION THROUGH EXAMINATION, LICENSURE, AND REGULATION

"**How important is this knowledge or ability for enabling me to fulfill my responsibilities as an architect?**"

		Not Utilized 0	Minimally Important 1	Important 2	Very Important 3	Extremely Important 4
	MANAGEMENT — **Risk Management and Quality Assurance**	Importance				
059	Knowledge of methods of limiting professional liability (e.g., contractual allocation of risk, working in your area of expertise, hiring experienced consultants, client and project selection).	○	○	○	○	○
060	Knowledge of document checking and review procedures for quality assurance (in-house and external).	○	○	○	○	○
061	Knowledge of how practicing within the standard of care limits professional liability exposure.	○	○	○	○	○
062	Knowledge of how to manage the use of technological resources (e.g., Building Information Modeling or CAD file management; drawing, publishing, and distribution procedures; electronic signatures).	○	○	○	○	○
063	Knowledge of documentation procedures and policies (for decisions, changes, and approvals) to limit liability exposure.	○	○	○	○	○
	MANAGEMENT — **Communication**	Importance				
064	Knowledge of appropriate methods for communicating with clients, project teams, contractors, agencies, and stakeholders (e.g., meetings, emails, letters, minutes, transmittals, phone logs, visual aids).	○	○	○	○	○
065	Knowledge of technological resources for supporting communication (e.g., CAD, imaging software, web-based applications).	○	○	○	○	○
066	Ability to communicate graphically.	○	○	○	○	○
067	Ability to communicate orally.	○	○	○	○	○
068	Ability to communicate in writing.	○	○	○	○	○
	PREDESIGN	Importance				
069	Knowledge of types of predesign services (e.g., programming, feasibility studies, site analysis).	○	○	○	○	○
070	Knowledge of project performance objectives (e.g., comfort control, safety and security, sustainability).	○	○	○	○	○
071	Knowledge of the components of a program.	○	○	○	○	○
072	Knowledge of methods for gathering program information from users (e.g. interviews, surveys, research).	○	○	○	○	○
073	Ability to evaluate user activities to determine spatial requirements and adjacencies.	○	○	○	○	○

CALIFORNIA ARCHITECTS BOARD

PUBLIC PROTECTION THROUGH EXAMINATION, LICENSURE, AND REGULATION

"**How important is this knowledge or ability for enabling me to fulfill my responsibilities as an architect?**"

		Not Utilized 0	Minimally Important 1	Important 2	Very Important 3	Extremely Important 4
	PREDESIGN	**Importance**				
074	Ability to organize and evaluate relevant program information.					
075	Ability to prepare a final program document.					
076	Ability to interpret site data and reports (e.g., seismic, geotechnical, topography) to determine impacts on projects.					
077	Ability to interpret data about the built environment (e.g., existing buildings, infrastructure, roads) to determine impacts on projects.					
	DESIGN	**Importance**				
078	Knowledge of the scope of the various types of design services (conceptual, schematics, design development, construction documents).					
079	Knowledge of design principles (e.g., human factors, texture, scale, balance, proportion, rhythm, emphasis, unity).					
080	Knowledge of sustainable design principles (e.g., energy conservation, resource management, indoor air quality).					
081	Knowledge of methods for developing design solutions with involvement of client, users, consultants, and stakeholders.					
082	Ability to analyze and integrate information to create design solutions.					
083	Knowledge of contents of design drawings and related documents required for agency approvals.					
084	Knowledge of contents of construction drawings, specifications, and related documents required for construction.					
085	Knowledge of building systems (e.g., structural, mechanical, electrical, plumbing, life safety, conveying, building systems controls) and their integration with each other.					
086	Knowledge of structural components that resist vertical and lateral forces (e.g., foundations, columns, beams, diaphragms, shear walls).					
087	Knowledge of nonstructural elements as defined by the California Building Code (e.g., fixtures and equipment items, nonbearing partitions, suspended ceilings).					
088	Ability to identify implications of special structural loading conditions (e.g., heavy equipment, snow, library shelving).					
089	Knowledge of environmental control systems (e.g., energy management, occupant comfort and control).					

CALIFORNIA ARCHITECTS BOARD

PUBLIC PROTECTION THROUGH EXAMINATION, LICENSURE, AND REGULATION

"**How important is this knowledge or ability for enabling me to fulfill my responsibilities as an architect?**"

	Not Utilized 0	Minimally Important 1	Important 2	Very Important 3	Extremely Important 4
DESIGN	**Importance**				
090 Ability to integrate building systems into a project.	○	○	○	○	○
091 Knowledge of how to analyze initial and life-cycle costs to select materials and systems.	○	○	○	○	○
092 Knowledge of how to prepare statements of probable cost.	○	○	○	○	○
093 Ability to refine design solutions to respond to statements of probable cost.	○	○	○	○	○
094 Knowledge of material characteristics, performance, and testing standards.	○	○	○	○	○
095 Ability to integrate appropriate building materials into the project design.	○	○	○	○	○
096 Knowledge of construction methods appropriate to project design.	○	○	○	○	○
097 Ability to prepare construction documents appropriate to project type.	○	○	○	○	○
098 Knowledge of construction bidding and negotiation processes.	○	○	○	○	○
099 Knowledge of public work bidding requirements of the California Public Contract Code.	○	○	○	○	○
CONSTRUCTION	**Importance**				
100 Knowledge of interrelationships among owner, architect, and contractor during construction.	○	○	○	○	○
101 Knowledge of the limits of the architect's role and responsibilities during construction (e.g., directing subcontractors, means and methods).	○	○	○	○	○
102 Knowledge of the architect's role and responsibilities relative to construction managers.	○	○	○	○	○
103 Knowledge of construction conflict resolution strategies (e.g., mediation, arbitration, litigation).	○	○	○	○	○
104 Knowledge of procedures for determining general conformance of construction with contract documents (e.g., observation, submittal reviews, requests for information).	○	○	○	○	○
105 Knowledge of procedures for implementing changes during construction (e.g., directives, supplemental instructions, change orders).	○	○	○	○	○
106 Knowledge of procedures for monitoring construction costs and schedules (e.g., reviewing and certifying payments to contractor, reviewing lien releases).	○	○	○	○	○

CALIFORNIA ARCHITECTS BOARD

PUBLIC PROTECTION THROUGH EXAMINATION, LICENSURE, AND REGULATION

"**How important is this knowledge or ability for enabling me to fulfill my responsibilities as an architect?**"

	CONSTRUCTION	Not Utilized 0	Minimally Important 1	Important 2	Very Important 3	Extremely Important 4
		Importance				
107	Knowledge of procedures for performing project close-out (e.g., Certificate of Substantial Completion, Notice of Completion, final lien releases).	○	○	○	○	○
108	Knowledge of elements of California construction laws (e.g., lien requirements, minimum warranty periods).	○	○	○	○	○
109	Knowledge of code-required special inspections and testing (e.g., field welding, high strength concrete).	○	○	○	○	○
110	Knowledge of inspection, testing, reporting, and documentation requirements for construction of California hospitals, public schools, and Essential Services Buildings.	○	○	○	○	○
111	Ability to provide construction contract administration services appropriate to project type.	○	○	○	○	○
112	Knowledge of post-construction services (e.g., extended building commissioning, record document preparation, operational and maintenance programming, facilities management, post-occupancy evaluation).	○	○	○	○	○

CALIFORNIA ARCHITECTS BOARD

PUBLIC PROTECTION THROUGH EXAMINATION, LICENSURE, AND REGULATION

Comments

SECTION 4: COMMENTS

If you would like to claim two AIA Learning Units for completing this survey, enter your AIA member number.

Please let us know if you have any feedback about this survey or comments about the process.

8000 characters left

HumRRO

Human Resources Research Organization

Data Processing and Response Rates

Table 3 shows how we went from a total of 4,466 architects invited to respond to an analysis sample size of 1,155. Respondents who indicated that they were not actively working as architects or that they did not do at least 20% of their work on projects in California were "exited" from the survey, meaning the survey did not allow them to answer any further questions but instead displayed a thank you message that explained why they would not be able to participate in the survey. This reduced the sample by 130 cases. Another 147 cases were deleted from the analysis because they did not complete at least 90% of the task or KSA ratings. In most cases, the vast majority of survey data were missing because the individual had accessed the survey but stopped filling it out quite soon after starting. This left an analysis sample size of 1,109, which is 25.2% of those invited architects who were potential survey respondents. (This figure is a bit of an underestimate because it excludes the 130 architects who accessed the survey but were not eligible to complete it.) The overall final analysis sample size was increased to 1,155 with the addition of the pilot test responses.

The approximately 25% response rate we achieved here compares quite favorably to surveys of this type. Moreover, the absolute sample size of 1,155 is quite sufficient to achieve statistical reliability of the survey results. So the remaining question is whether the sample is representative of the population of California architects. Unfortunately, the Board database does not provide information on many characteristics that might be used to make this assessment (e.g., work setting, demographic background). We can, however, look at representativeness in terms of years since licensure and location. Table 4 shows a reasonably close match between the characteristics of the drawn sample of 4,466 and the analysis sample of 1,155 in years since licensure and an exact match in term of percentage of architects in southern versus northern California.

Table 3 Survey Response Rate

	n
Number of architects invited to complete survey	4,466
Number of architects deceased/retired/bad mailing address/no computer access	69
Number of potential respondents	4,397
Number of architects accessing survey	1,386
% of potential respondents accessing survey	31.5%
Number of architects exited from survey due to ineligibility[1]	130
Number of architects eliminated due to missing data[2]	147
Number of architects eligible for final analysis	1,109
Response rate (% of potential respondents eligible and completing survey)	25.2%
Number of architects in final analysis[3]	1,155

[1] Based on response to Q1 (not currently employed or engaged in the profession of architecture) *or* Q2 (at least 20% of work done on projects in California).
[2] Respondents were eliminated from analyses if they did not complete more than 90% of either section of the survey.
[3] Includes 46 pilot test respondents.

Table 4 Representativeness of Survey Sample

Yrs. Since Licensure	Population	Drawn Sample	Analysis Sample
1-10	21%	35%	36%
11-20	43%	35%	31%
21 or more	36%	30%	33%
Location	Population	Drawn Sample	Analysis Sample
Southern CA	52%	52%	52%
Northern CA	48%	48%	48%

Data Analysis

Sample Characteristics

Table 5 describes the survey sample in terms of characteristics of the respondents, such as how long they have been in the profession (which could be longer than how long they have been licensed architects), their education level, and work setting. The majority of respondents (85%) work in an architectural or engineering office and most (over 91%) have been working in the profession for over 10 years. Almost 65% of the respondents have either a professional or post-professional degree in architecture.

Table 5 Survey Sample Biographical Information

	Frequency	%
Percentage of architectural work on projects outside CA		
5% or less	908	78.6
6% to 30%	185	16.0
Over 30%	62	5.4
Total	*1,155*	*100.0*
Number of years working in the profession		
5 years or less	7	0.6
6-10 years	93	8.1
11-20 years	348	30.1
21-30 years	509	44.1
More than 30 years	198	17.1
Total	*1,155*	*100.0*
Year of initial licensure as an architect in CA		
1980 or prior	120	10.4
1981-1990	412	35.7
1991-2000	331	28.7
2001-2007	292	25.3
Total	*1,155*	*100.0*
Architecture employment status over past 2 years		
Full Time (at least 20 hrs per week)	1071	92.7
Part Time (less than 20 hrs per week)	84	7.3
Total	*1,155*	*100.0*
Primary work setting		
Architectural or engineering office	983	85.1
Non-architectural corporate setting	29	2.5
Construction-related setting	48	4.2
Educational institution	20	1.7
Government agency	75	6.5
Total	*1,155*	*100.0*
Primary role		
Principal or managerial	502	43.5
Project architect or project manager	423	36.6
Sole practitioner	193	16.7
Other	37	3.2
Total	*1,155*	*100.0*

Highest level of formal education		
High school diploma	41	3.6
Two-year community college degree	49	4.2
Four-year degree in architecture	218	18.9
Four-year degree in field other than architecture	50	4.3
Professional degree in architecture	436	37.8
Post-professional degree in architecture	313	27.1
Advanced degree other than architecture	47	4.1
Total	*1,154*	*100.0*

Table 6 focuses more on the characteristics of the organizations in which the architect respondents work. Over 40% of the respondents work in organizations employing five or fewer people and another 24.4% work in offices employing six to 25 people. Respondents were asked to indicate what percentage of time over the previous two years they had spent on various types of projects (e.g., residential, commercial), construction (e.g., new, remodel), and using various delivery methods (e.g., design/build). Table 6 shows the mean response for each option across all respondents. So, for example, almost 40% of time across all the architects was spent on residential projects, 31.2% of time on institutional projects, 24.4% of time on commercial projects, and 4.5% time on specialty projects. Across this sample of architects, 57.6% of time is spent on new construction and 42.1% is spent on remodeling or renovation projects. With regard to delivery methods, most (73.7%) projects use design-bid-build or negotiated bid methods.

Table 6 Survey Sample Employment Setting Information

Approximate no. of employees in organization	Frequency	%
1-5	467	40.4
6-25	282	24.4
26-100	184	15.9
More than 100	222	19.2
Total	*1,155*	*100.0*

	Frequency	%	Mean
Number of employees at your office location who are:			
licensed architects?			7.6
0 to 1	470	40.7	
2 to 5	342	29.6	
More than 5	343	29.7	
unlicensed doing architectural work?			11.8
0 to 1	497	43.0	
2 to 5	252	21.8	
More than 5	406	35.2	
in the process of obtaining a CA license?			4.69
0 to 1	693	60.0	
2 to 5	248	21.5	
More than 5	214	18.5	
Total	*1,155*	*100.0*	

Percentage of time working with each project type	Frequency	Mean %
Residential	1,153	39.9
General commercial, retail, hospitality, or industrial	1,153	24.4
Institutional, educational, medical, or public buildings	1,153	31.2
Specialty industrial or technical projects	1,153	4.5
Total	*1,153*	*100.0*

Percentage of time working with each type of construction	Frequency	Mean %
New construction	1,127	57.6
Remodel and renovation	1,127	42.1
Not applicable	23	2.0
Total	*1,150*	*100.0*
Percentage of projects that used delivery methods	**Frequency**	**Mean %**
Design-bid-build or negotiated bid	1,111	73.7
Construction manager at risk	1,111	5.8
Design/build	1,111	13.4
Lease/lease back or multiple prime contracts	1,111	2.3
Integrated project delivery	1,111	4.7
Total	*1,111*	*100.0*

Final Test Plan

The Board is mandated to protect the public health, safety, and welfare. The California Supplemental Examination (CSE) assesses whether applicants for licensure demonstrate minimum standards of competency necessary to meet the requirements of current architectural practice in California.

The CSE Test Plan was developed using the results of the statewide survey of architectural practice in California conducted in 2007. The intent of the CSE Test Plan is not to duplicate coverage of general areas of practice already addressed by the national test, the Architectural Registration Examination (ARE). The intent of the CSE Test Plan is to focus on California-specific aspects of practice; it is therefore neither comprehensive nor representative of the full scope of architectural practice.

This test plan covers important knowledge and ability areas that are tested using oral questions and predefined grading criteria; some important areas are excluded because they cannot be adequately assessed in an oral format.

The Test Plan is organized into four primary knowledge categories as shown below. The "Weights" indicate the percentage of examination points that will be allocated to each category.

Table 10 Final CSE Test Plan

Categories and Subcategories	Weights
I. Context & Predesign	16%
II. Regulatory	42%
A. California State Laws, Code, Regulations, and Standards (24%)	
B. Other Laws, Codes, Regulations, Standards, Agencies and Entitlements (18%)	
III. Management & Design	27%
IV. Construction	15%
	100%

I. CONTEXT AND PREDESIGN (16%)

This category encompasses the knowledge required to evaluate and respond to the physical and social context in California. This requires an understanding of natural and built conditions and their impact on design, including potential mitigations. Additional knowledge and abilities are those required to develop and utilize program information that addresses user characteristics and activities and performance objectives.

Knowledge and Ability Statements

1. Knowledge of conditions of the natural environment regulated in California (e.g., wetlands, coastal regions, habitats of endangered species) as they relate to design and construction.

2. Knowledge of natural and human-caused hazardous conditions (e.g., seismic activity, fire, winds, flood zone, hazardous materials) and potential mitigations.

3. Knowledge of health issues related to buildings (e.g., offgassing, mold, adequate ventilation).

4. Knowledge of user characteristics (e.g., varying ages, cultures, abilities, activity requirements).

5. Knowledge of types of stakeholders (e.g., environmental groups, citizens' advisory committees, neighborhood and community organizations) concerned about design and construction.

6. Knowledge of project performance objectives (e.g., comfort control, safety and security, sustainability).

7. Ability to evaluate user activities to determine spatial requirements and adjacencies.

8. Ability to organize and evaluate relevant program information to prepare a final program document.

II. REGULATORY (42%) - This category includes knowledge of the state, local, regional, and federal regulatory environments specific to the practice of architecture in California, and includes knowledge of agencies and entitlement processes.

A. California State Laws, Codes, Regulations, and Standards (24%)

This subcategory encompasses the knowledge required to practice within the regulatory environment specific to California. This requires an understanding of the California-specific legal constraints upon design and construction, including a working knowledge of California building codes, environmental regulations, and lien laws. This also requires understanding of the requirements of the California Architects Practice Act, including but not limited to those regarding contracts, responsible control, standard of care, licensing, and instruments of service.

Knowledge Statements

9. Knowledge of California Environmental Quality Act (CEQA) as it relates to design and construction.

10. Knowledge of Essential Services Buildings Seismic Safety Act as it relates to design and construction.

11. Knowledge of what is encompassed by the California Building Standards Code (e.g., Building, Electrical, Mechanical, Plumbing, Energy, Historical) and how the CBSC is distinct from the model codes.

12. Knowledge of structural provisions of the California Building Code.

13. Knowledge of provisions of the California Building Code for anchoring and bracing nonstructural elements.

14. Knowledge of accessibility provisions of the California Building Code.

15. Knowledge of fire and life safety provisions of the California Building Code.

16. Knowledge of provisions of the California Energy Code.

17. Knowledge of California Health and Safety Code as it relates to design and construction.

18. Knowledge of the Design Professionals and Mechanic's Lien Laws.

19. Knowledge of other California special regulations relevant to design and construction (e.g., water regulations, California Coastal Act, California Clean Air Act, California Public Contract Code, Field Act, Hospital Facilities Seismic Safety Act).

20. Knowledge of the architect's responsibilities and requirements for practicing in California in accordance with the Practice Act (e.g., responsible control, standard of care, licensing requirements, signing and sealing of documents).

21. Knowledge of the elements of a legal contract as required by the Practice Act.

22. Knowledge of administration of the Practice Act (e.g., examination, licensing, and enforcement).

23. Knowledge of business and professional requirements of the Practice Act (e.g., architectural corporations, firm naming, associations, professional conduct).

II. REGULATORY (42%) - Continued

B. Other Laws, Codes, Regulations, Standards, Agencies and Entitlements (18%)

This subcategory encompasses the knowledge required to practice within the local, regional, and federal regulatory environments in California. This requires an understanding of the legal constraints upon design and construction, including a

working knowledge of how General Plans inform planning and zoning issues and how the Americans with Disabilities Act may impact architectural practice. This subcategory also encompasses the knowledge required to interact with local, regional, and state governing agencies that may have jurisdiction. This requires an understanding of the jurisdictions, procedures, and approval processes of the agencies, as well as an awareness of the architect's responsibilities in obtaining approvals.

Knowledge Statements

24. Knowledge of local or regional laws, codes, regulations, and standards (e.g., General Plan; planning and zoning ordinances; local building ordinances; design guidelines; Codes, Covenants, and Restrictions [CC&Rs]) relevant to design and construction.

25. Knowledge of the Americans with Disabilities Act (ADA) with regard to how it impacts architectural practice (e.g., client and architect responsibilities, design and construction).

26. Knowledge of federal laws, codes, and regulations other than ADA (e.g., Environmental Protection Agency Regulations, Federal Aviation Administration regulations, US Army Corps of Engineers regulations) relevant to design and construction.

27. Knowledge of national standards (e.g., UL, ANSI, ASTM, Factory Mutual) relevant to design and construction.

28. Knowledge of local community development agencies and other authorities that normally have jurisdiction over design and construction (e.g., building, planning, public works, police and fire departments).

29. Knowledge of local or regional agencies and other authorities that may have jurisdiction over design and construction (e.g., Design Review Boards, Air Quality Management District, County Flood Control District, airport authorities, Environmental Health Department).

30. Knowledge of California state agencies that have jurisdiction over design and construction (e.g., Coastal Commission, Water Resources Control Board, Department of Fish and Game, Air Resources Board, California Department of Transportation).

31. Knowledge of procedures for obtaining approvals from regulatory agencies.

32. Knowledge of interrelationships among various regulatory agencies (e.g., sequence of approvals, hierarchy of jurisdictions).

33. Knowledge of process for resolving conflicts between agencies or between codes, regulations, and standards.

III. MANAGEMENT & DESIGN (27%)

This category encompasses the knowledge required to plan and manage project teams, including consultants, and to implement procedures for risk management and quality assurance. This requires an understanding of the architect's role and responsibilities for coordinating project teams, an understanding of consultants' services as they relate to systems and building design, obtaining agency approvals, and an understanding of how to limit professional liability exposure. This category also encompasses the knowledge and abilities required to develop design solutions and prepare design and construction drawings and documents. This requires an understanding of methods for developing design solutions collaboratively with clients, users, and stakeholders; an understanding of the drawings and documents needed for agency approvals; and an awareness of specific design concerns in California (e.g., nonstructural elements, special structural loading conditions, environmental control systems, material performance and testing standards). This category also encompasses knowledge of the bidding process.

Knowledge and Ability Statements

34. Knowledge of consultants' (e.g., civil, structural, mechanical, electrical, landscaping, acoustical, traffic) services.

35. Knowledge of architect's role and responsibilities in coordinating an entire project team.

36. Knowledge of architect's role and responsibilities in managing project teams to obtain necessary agency approvals at the appropriate time.

37. Knowledge of document checking and review procedures for quality assurance (in-house and external).

38. Knowledge of how practicing within the standard of care limits professional liability exposure.

39. Knowledge of methods for developing design solutions with involvement of client, users, consultants, and stakeholders.

40. Knowledge of contents of design drawings and related documents required for agency approvals.

41. Knowledge of nonstructural elements as defined by the California Building Code (e.g., fixtures and equipment items, nonbearing partitions, suspended ceilings).

42. Ability to identify implications of special structural loading conditions (e.g., heavy equipment, snow, library shelving).

43. Knowledge of environmental control systems (e.g., energy management, occupant comfort and control).

44. Knowledge of material characteristics, performance, and testing standards.

45. Ability to prepare construction documents appropriate to project type.

46. Knowledge of construction bidding and negotiation processes.

IV. CONSTRUCTION (15%)

This category encompasses the knowledge and abilities required to perform construction contract administration services. This requires an understanding of the architect's role and responsibilities during construction, including knowledge of procedures for resolving conflicts, implementing changes, managing construction costs and schedules, and including California-specific special inspections and testing. Also requires knowledge of performing project close-out procedures, including understanding of lien laws.

Knowledge and Ability Statements

47. Knowledge of interrelationships among owner, architect, and contractor during construction.

48. Knowledge of the limits of the architect's role and responsibilities during construction (e.g., directing subcontractors, means and methods).

49. Knowledge of construction conflict resolution strategies (e.g., mediation, arbitration, litigation).

50. Knowledge of procedures for implementing changes during construction (e.g., directives, supplemental instructions, change orders).

51. Knowledge of procedures for monitoring construction costs and schedules (e.g., reviewing and certifying payments to contractor, reviewing lien releases).

52. Knowledge of procedures for performing project close-out (e.g., Certificate of Substantial Completion, Notice of Completion, final lien releases).

53. Knowledge of elements of California construction laws (e.g., lien requirements, minimum warranty periods).

54. Knowledge of code-required special inspections and testing (e.g., field welding, high strength concrete).

55. Ability to provide construction contract administration services appropriate to project type.

Conclusion

The Board is mandated to protect the public health, safety, and welfare. The CSE assesses whether applicants for licensure demonstrate minimum standards of competency necessary to meet the requirements of current architectural practice in California. The intent of the CSE test plan is not to duplicate coverage of general areas of practice already addressed by the ARE, but rather to focus on California-specific aspects of practice. It is therefore neither comprehensive nor representative of the full scope of architectural practice.

This new test plan covers important knowledge and ability areas that are tested using oral questions and predefined grading criteria; some important areas are excluded because they cannot be adequately assessed in an oral format. It is important to recognize that some important areas, such as communication skills, are not addressed by the CSE and therefore should be considered for explicit inclusion in other licensure requirements (e.g., the Comprehensive Intern Development Program). Also, although the test plan was constructed for an oral examination, the development exercise could use a different examination format.