

Understanding the Architectural Process

A Guide for Building Owners Planning a Major Museum or Library Project



By Steve Keller
Museum and Library Security Consultant

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Publisher's Note: This work is based on almost a half century of experience and reflects my personal experience and opinions. Your situation may be unique.

Part 1: Understanding the Architectural Process: *A Guide for Building Owners Planning a Major Project*
Part 2: So You Want to Be a Security Consultant

When you build a new museum, you are either building an artistic masterpiece for the ages or a nightmare for the future facility manager—or maybe both.

—STEVE KELLER

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Preface

This year I will be seventy-nine years old, well past my retirement date and quickly approaching my “for best results use by” date. I don’t have to work but I do because my cardiologist still has one kid to put through an ivy league college (and also because he told me that most of his patients die six months after they retire). I don’t plan to ever retire. Well, maybe voluntarily anyway.

My two longest tenure employees, younger than me, who both eventually became my business partners, have retired and I have discontinued working on major new construction projects for museums and their architects. When it takes as many as five years to plan, fund, design, and build a new museum, I don’t want to be working to age eighty-four when it is time to do final acceptance testing on the security systems that have changed three times in those years to keep up with technology. I still do risk assessments and short-duration security management consulting projects. I consider myself to be semi-retired.

When I stopped accepting major long duration projects, I immediately noticed a vacuum forming that I used to help fill along with other colleagues who have also retired or semi-retired. There is no one with adequate museum security experience able or willing to fill the vacuum at the level my firm provided. There are:

- numerous very capable security practitioners who have never worked in a museum,
- several practitioners who have worked in a museum, but who have never designed and specified a high-tech security system,
- dozens of capable engineers who can design a security system but have no clue where to place the detectors because they don’t know how museums function or how museum thefts happen, and
- others who lack just the right knowledge and skill to step in and fill the void.

Nevertheless, I saw about a half dozen or more people with some museum security experience open their doors as “museum security consultants” ready and willing to design their first multi-million-dollar security system without any real understanding as to what that might entail. Not a single one had real, professional and general liability insurance, and not one of them owned an AutoCAD license. A few couldn’t read a blueprint.

Behind them was a line of electrical engineers waiting to design the alarm, access control, CCTV and object protection systems and each called him or herself a museum security expert in spite of never having worked a day in a museum. I asked several how museum thefts happen. While they all offered opinions based on what they saw on TV or in the movies, not one mentioned the most prevalent methods. Not one knew what a Registrar does in a museum and the role they play in securing the collection. Not one could answer basic questions about the current technologies made specifically for museums and libraries. I feel strongly that if you are going to design systems that prevent museum thefts, you need to know how those thefts occur. And a security consultant should know as much about a client’s business as the client does. I decided that if I didn’t mentor at least some of the more promising of the lot, my former museum clients were in for some bad consulting in the near future.

So here I am, writing a monograph about the architectural process and while I am at it, I might as well write it for a wider audience. In fact, this document is written for the following readers:

- Museum and library employees in all departments planning a new construction project or major renovation

- Security professionals with actual museum experience wishing to expand their knowledge so they can become successful security consultants working on construction and renovation projects with an architectural design team.
- Consultants with other specialties who want to work with architects as part of a project design team
- Museum and library security managers facing an upcoming construction project. This includes people with museum experience but lacking architectural support experience or electronic/technical system experience.

I am NOT writing this for:

- Security directors who are between jobs, but to save face, call themselves a security consultant hoping to pick up a few dollars. If you aren't interested in working for the rest of your career as a consultant, you probably will bail out in the middle of a five-year project.
- Electrical engineers, no matter how qualified you may be, without years of hands-on museum security experience in responsible charge of a security program. It isn't enough to know about electronics, architectural processes, or bid documents if you don't know how museums function or the risks they face. That part of the job is often more important and sometimes more difficult than the engineering in many ways.

While I know cultural properties and their unique problems and have written this document from that perspective, the architectural process is pretty much standard and uniform whether you are planning an office building, storage facility, data center, or museum. So regardless of what you are building, this document will help you understand the process and hopefully have better results. And if you are a security professional wanting to work on new museum projects or major museum or library renovations, you can learn more from this document than in some college courses. But for sure, this is about museum security even though the chapters on the architectural process apply to any project or discipline. Why? Because I am a security professional. That's what I know. If you are a curator who is here to learn the architectural process, I will be teaching it using the perspective of the security consultant. You will need to extrapolate that to your own discipline.

I have included a final chapter "So you want to be a museum security consultant" specifically for the handful of nearly qualified practitioners who need guidance on how to become qualified to step into my shoes. Having spent several years living 180 nights a year in luxurious hotels like the Hampton Inn, I don't know why they would want to do so, but apparently many do, and I'm here to offer my advice. If this doesn't apply to you, just ignore it and move on. (There is an upside. I traveled so much on Delta one year I got a Christmas gift from their President). While I wouldn't plan my career any differently if I had a do over, there is something sad when the only bartender in the world who knows your name is in the Atlanta airport.

This monograph isn't perfect. While it is intended to be brief and best of all free, if you are expecting a textbook, that will cost more. Consider this the Cliff Notes version of a textbook. But by all means if I got something terribly wrong, let me know, and I can make revisions.

I hope everyone finds this material useful.

Author's note: I am writing this in March 2026. For the past month Microsoft 365 for Macintosh is experiencing a world wide "file save" problem, and on three occasions I have lost many of the revisions I made during proofing of the final copy. I'm at my wits end. I've spent days trying to fix this. I apologize for any typos, but this is going to be my last pass over this document and any typos that remain will be fixed later. None of the solutions posted online have worked and I have other things to do and must move on.

Introduction

I have been involved with more than 1000 museum and library security consulting projects, over 100 involving the construction of a new building, a new wing, a major renovation of an existing building, or a security system upgrade. In each and every project mistakes were made that could have been avoided with better planning. I made a few, but most were made by others on the design team or by the building owner, and I learned from all of them. While my perspective here is from that of the security consultant, and occasionally of the museum's security director, my observations apply to everyone involved in a museum design and construction project. My purpose here is to help you save money, avoid the waste of staff time, and make the process go more smoothly. Most importantly, in my career I have seen dozens of serious security problems built into museums by bad designs, poorly planned additions, and carelessly made architectural changes done on the cheap. I have seen emergency exits from auditoriums exit through the Conservation Lab, coat and parcel check rooms located well inside the security perimeter, and security command centers located on the other side of a drywall divider from the wet garbage dumpster in a non-air-conditioned space. My hope is that these problems that can be resolved only through a renovation get corrected and not have to wait another one hundred years because they got left out in the programming phase.



For purposes of these examples, throughout this document, let's assume that we are building a new wing for an existing museum building because, in many ways, that type of project is more complicated than building a new building from scratch because it often involves surveying existing conditions to determine if existing systems can be expanded. If not, then work may extend beyond the actual new wing into the existing building. And let's approach this project from my perspective and let each reader interpret for him or herself, how the points made here apply to their career specialty.

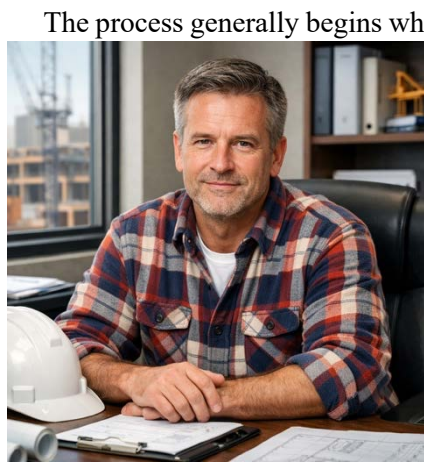
For security professionals wanting to move into the consulting field, you can make a modest living simply doing risk assessments, but you cannot prosper. Trust me on this. If you are going to make a living equal to a job working in a major museum as a security director, you will need to master security technology and work for architects who are working on museum and library projects. I attribute my success to my mastery of changing security technology, my ability to write detailed reports and bid documents, and my thorough understanding of how museums function. I made a decision early in my career to specialize in cultural properties and to reject any other project offers, no matter how lucrative, that did not involve cultural property protection or major private art collections worth more than \$35 million. I won't explain the psychology of this in this document but trust me, it is one reason why museums chose me and not someone who insisted they were experts in many security disciplines. Museum professionals know that museums are unique. You might also choose to work exclusively

in this field. And one more thing. You must be independent and non-product affiliated with nothing to sell but your expertise. If you have a product to sell or guards to rent, you are a salesman not a consultant and you have a conflict of interest.

If you are an architect or architectural student, I want you to know that I have the greatest respect for your talent and skill. And I am extremely grateful for the opportunity I have had to work with some of the greatest architects of our time on museum projects. Keep this in mind if I speak harshly of some of your colleagues. There are things that architects do on nearly every project that make the process more difficult than it should be because they often don't think security was important. They certainly understood the risk museums face, often lacking insurance for a museum theft themselves and fearing litigation for errors and omissions, and some hire me because I had a insurance that shielded them should they incur liability for favoring aesthetics over good security. They also know that I would do my very best to accommodate their often-unreasonable aesthetic demands. Hopefully you will not become the *prima donna* architect who, like one told me, "nothing on my ceilings and nothing on my walls" and another who demanded that the "Exit" signs be taped over because the light was distracting from his building, or the architect who referred to his contract and threatened to sue a museum when they could not accommodate visitors fast enough in restrooms with the air hand dryers he provided when they wanted to replace them with paper towel dispensers he thought to be unattractive. One architect said there was an inadequate budget for the 64 recommended cameras and cut the number down to 16, then used the savings to special order 16 cameras in custom cases specially plated in a shiny bronze colored finish. You can be a difficult lot. As long as you continue to build museums on sea walls in hurricane prone areas and design galleries with minimal sight lines, include skylights in roofs, and refuse to provide for security equipment closets to hold equipment racks, museums will need people like me to represent and advocate for security. For more information on this, see my article "The Architect's Prized Building May be Security's Nightmare".

Engaging an Owner's Representative

Engaging the services of an Owner's Representative (OR) is a common practice for new construction and major renovation projects, particularly when the project is large, complex, or when the owner does not have in-house expertise to manage the development process. The owner's representative acts as the owner's trusted advisor and project manager, helping guide the project from early planning through design, construction, and completion. The process for selecting an owner's representative typically follows a structured procurement approach similar to that used for selecting architects and other professional consultants.



The process generally begins when the project owner identifies the need for professional project management assistance. This often occurs during the early planning stages of a project, when the owner is determining feasibility, budget expectations, and development strategies. Owners may recognize that they require specialized expertise to oversee the many technical, financial, and administrative aspects of the project. At this stage, the owner may prepare a project description and scope of services outlining the responsibilities they expect the owner's representative to perform. These responsibilities can include assisting with project planning, coordinating consultants, monitoring the budget and schedule, managing procurement processes, and representing the owner's interests throughout the project.

After defining the scope of services, the owner typically begins the selection process by issuing a Request for Qualifications (RFQ) or Request for Proposals (RFP) to qualified firms that specialize in construction management or owner's representation services. The RFQ asks firms to submit information about their experience, qualifications, project team, and past projects of similar scale and complexity. Firms may also provide references, resumes of key personnel, and examples of successful projects they have managed on behalf of owners. The goal of this stage is to identify firms with strong experience in project management, construction processes, budgeting, and coordination of design and construction teams.

Once submissions are received, the owner or a selection committee evaluates the responses based on several factors. These typically include the firm's relevant experience, the qualifications of proposed team members, familiarity with the project type, understanding of the owner's goals, and the firm's ability to manage cost, schedule, and risk. From this evaluation, the owner typically develops a shortlist of the most qualified firms.

Shortlisted firms are often invited to participate in interviews or presentations, where they can explain their approach to project management, discuss how they would support the owner during different phases of the project, and demonstrate their communication and problem-solving skills. During these interviews, the owner evaluates how well the firm understands the project goals and whether the team would be an effective partner throughout the project lifecycle. Having worked successfully with the favored architect can also be a plus in selecting an owner's rep.

After the interviews, the owner selects the preferred owner's representative firm and enters into contract negotiations. The contract defines the scope of services, responsibilities, compensation structure, and reporting

requirements. Compensation may be structured as a lump sum fee, hourly rates, or a percentage of the project cost, depending on the complexity of the project and the services required. Once the terms are agreed upon, the parties execute a formal agreement, and the owner's representative begins work.

The role of the owner's representative is to act as the owner's advocate and manage the project in the owner's best interest. Unlike architects or contractors, who focus on design and construction respectively, the owner's representative oversees the entire project and ensures that all participants are working toward the owner's goals. One of the primary responsibilities of the owner's representative is to provide strategic guidance during the early planning phase. This may include helping the owner define project objectives, develop the project program, establish a realistic budget, and create a preliminary project schedule.

During the design phase, the owner's representative helps manage the design process by coordinating communication between the owner, architects, engineers, and consultants. They review design progress, track milestones, monitor design decisions that affect cost or schedule, and ensure that the project remains aligned with the owner's requirements. They may also assist with selecting members of the design team, negotiating contracts, and reviewing design deliverables.

Another critical function of the owner's representative is cost management and budget oversight. Throughout the project, the OR monitors project costs, reviews cost estimates prepared by the design team or cost consultants, and help identify opportunities to control costs or avoid budget overruns. If the project begins to exceed budget targets, the owner's representative works with the design and construction teams to identify value engineering options or design adjustments that maintain the project's objectives while controlling costs.

The owner's representative also plays a major role in procurement and contractor selection. They help prepare bid documents, manage the bidding or proposal process, evaluate contractor qualifications, and advise the owner during contractor selection and contract negotiations. Their expertise helps ensure that the owner selects contractors who are capable of delivering the project successfully.

During the construction phase, the owner's representative continues to monitor the project on behalf of the owner. They track construction progress, review schedules, monitor contractor performance, and help resolve issues that arise during construction. The OR often attends progress meetings, reviews change orders, monitors payment applications, and ensures that the contractor's work aligns with the project requirements and design intent.

In addition to managing cost and schedule, the owner's representative also helps manage project risk and communication. They ensure that the owner receives regular updates on project status and that decisions are made in a timely manner. By coordinating communication among architects, engineers, contractors, and consultants, the OR helps prevent misunderstandings and facilitates collaboration among project stakeholders.

As the project approaches completion, the owner's representative assists with project closeout and transition to operations. This may include coordinating inspections, ensuring that commissioning and testing are completed, verifying that all required documentation is provided, and helping the owner prepare for occupancy and long-term building operations.

In summary, the process of engaging an owner's representative involves defining the required project management services, soliciting qualifications or proposals from experienced firms, evaluating and interviewing candidates, selecting the preferred firm, and negotiating a professional services agreement. Once engaged, the owner's representative serves as the owner's trusted advisor and project manager, overseeing planning, design, procurement, and construction activities. Their primary role is to protect the owner's interests, manage cost and schedule, coordinate the project team, and help ensure that the completed project meets the owner's goals and

expectations. On most projects, the security consultant is free to work directly with the designated project architect, but it is generally required that the owner's rep be copied in on most emails.

Engaging an Architect

Engaging the services of an architect for a new building or major renovation project typically follows a structured procurement and selection process designed to ensure that the owner selects a qualified design professional who can meet the project's technical, functional, and financial requirements. While the exact steps may vary depending on whether the owner is a private developer, corporation, or public agency, most projects follow a similar sequence of planning, solicitation, evaluation, and contract negotiation.

The process generally begins with the project owner defining the project needs and objectives. At this stage, the owner establishes the overall vision for the project, including the intended use of the building, approximate size, desired performance standards, schedule, and preliminary budget. The owner may also develop a written project program describing the required spaces and functions of the building. For large or complex projects, owners sometimes hire a project manager, owner's representative, or feasibility consultant to help refine these requirements before selecting an architect.



Once the project goals are established, the owner begins the architect selection process. In many cases--especially for public projects--this begins with issuing a Request for Qualifications (RFQ). The RFQ invites architectural firms to submit information about their qualifications, experience, technical capabilities, and past projects. The purpose of the RFQ is to identify firms that have the appropriate expertise and capacity to perform the work. Submissions typically include firm profiles, resumes of key personnel, portfolios of relevant projects, and references from previous clients. Oddly, several projects I was involved with made it this far without the museums including a requirement for a security consultant. If this happens, the museum generally realizes along the way that they need one and solicit consultants outside the contract with the architect. This should be avoided as it results in added costs. In most cases, as soon as an architectural firm decides to pursue a museum project, they will invite security consultants to submit their credentials as possible participants as part of the design team. They will then select a security consultant to pursue the job. Once you have established yourself as a leading security consulting firm with multiple museum projects under your belt, you may find that you are invited to pursue the job as part of multiple teams. Since I only work on cultural property projects, I was almost always included on at least one team and many times I made it clear that if I were to be invited by another architect to be on their team, I would pursue the job as part of both teams. While they may not like this, there aren't that many major projects in any one year so I couldn't risk losing the job because the architect I teamed with wasn't selected.

After reviewing the qualifications submissions, the owner or a selection committee evaluates the firms and develops a shortlist of the most qualified candidates. The shortlisted firms may then be invited to participate in a second stage of the process, often involving a Request for Proposals (RFP). The RFP typically requests more detailed information about how the firm would approach the project, including their proposed design

methodology, team structure, preliminary schedule, and sometimes a conceptual design response. In some cases, the RFP may also request a proposed fee structure or cost estimate for design services. Normally at this point in the process of soliciting architects, the short-listed architects solicit key consultants to commit to working on their team. They ask for a preliminary estimate of fees and a biography of the consultant or engineer listing their qualifications. This enables the building owner to evaluate the team as a whole and a good team can give the advantage to one specific architect.

During the evaluation phase, the owner assesses the proposals based on criteria such as the firm's experience with similar projects, the qualifications of key personnel, technical expertise, understanding of the project goals, design approach, and ability to meet the schedule and budget. For many projects, especially in the public sector, cost is considered but is not the only determining factor. The process often emphasizes qualifications-based selection, where the most qualified firm is chosen first and the fee is negotiated afterward.

The next step often involves interviews with the shortlisted firms. These interviews allow the owner to meet the proposed project team, evaluate communication skills, and better understand how each firm approaches design challenges. Firms may present their past work, explain their design philosophy, and respond to questions about project management, coordination with consultants, and quality control procedures. Interviews help the owner determine which team will be the best fit for the project. On several occasions, I was asked to travel at my own expenses and for no fee to participate in the presentation to the owner. I always agreed to do so only if I would be one of the consultants making a presentation. A small company can't afford to spend several thousand dollars flying across the country only to sit in the corner and watch the electrical engineer and lighting designer make a presentation. When asked to speak about my experience and security philosophy, I realized that making such a presentation carried great responsibility and I prepared for days for a five-minute presentation. Generally, I stressed the importance of security, the opportunity this project offered to reduce operating costs if properly designed, the importance of having a security consultant who actually worked in museum and I offered five or six questions the owner should ask security consultants on the other teams to see if they were qualified to do the job. Some of these questions were:

1. What does SITES refer to?
2. What are the "Recommended Guidelines for Museum Security"?
3. What security is required in collection storage?
4. Explain the term "historic fabric" as it relates to a museum.
5. What role does the Registrar play in collection security?
6. What is an collection indemnification?

I handed each representative of the owner a sheet of paper with the questions and a brief answer and thanked them for allowing me to speak, asked if they had any questions for me. I told them I was looking forward to working with them on the project and sat down. This communicated to them that I was not only a security specialist but also understood museum management. Very often, I had more experience on museum projects than the architect did and this never hurt.

Following the evaluation and interviews, the owner selects the preferred architectural firm. At this point, the owner and architect enter into contract negotiations. The scope of services, project schedule, deliverables, and professional fees are discussed and finalized. Architectural services are commonly structured around standard phases of work, such as schematic design, design development, construction documents, bidding or negotiation, and construction administration. Many projects use standard agreements published by professional organizations

such as the American Institute of Architects (AIA), which provide widely accepted frameworks for defining responsibilities and compensation.

Once both parties agree on the scope of work and compensation, they execute a formal architectural services agreement. This contract establishes the legal relationship between the owner and architect and defines the obligations of each party. After the agreement is signed, the architect can begin work on the project, starting with programming confirmation and the schematic design phase.

In summary, the typical process for engaging an architect involves defining the project goals, soliciting qualifications or proposals from architectural firms, evaluating and shortlisting candidates, conducting interviews, selecting the preferred firm, and negotiating a formal agreement for services. This structured approach helps owners identify an architect with the appropriate expertise, ensures transparency and fairness in the selection process, and establishes a clear framework for the successful design and delivery of the project.

The Difference Between the Design Architect and the Architect of Record

On some high-profile building projects—particularly museums, historic buildings, and landmark civic structures—it is common for more than one architectural firm to be involved in the design. In these situations, the project often includes a Design Architect and an Architect of Record (AOR). Each firm has distinct responsibilities, and the contractual relationship between them can vary depending on the project structure and the owner’s procurement strategy.

Most commonly, the owner hires both the design architect and the architect of record, either through separate contracts or through a joint arrangement led by the design architect. However, in many projects the design architect recommends or selects a local firm to serve as the architect of record, subject to the owner’s approval. The exact arrangement depends on the owner’s preferences, local regulations, and the complexity of the project.

The design architect is typically responsible for the overall creative vision of the building. This role is often filled by a well-known or internationally recognized architect who is selected specifically for their design expertise and artistic reputation. The design architect develops the building’s conceptual design, including its form, spatial organization, aesthetic expression, and overall architectural character. They usually lead the early phases of the project, such as concept design and schematic design, and may remain involved throughout the project to ensure that the original design intent is maintained.

However, design architects may not always be licensed to practice in the jurisdiction where the project is being built, or they may not have the local technical staff needed to produce detailed construction documents and administer the construction process. For these reasons, a local architect of record is often engaged to take on the technical and regulatory responsibilities required to deliver the project.

The architect of record is the firm that assumes legal responsibility for the architectural documents submitted for permits and construction. The AOR must typically be licensed in the state or country where the building is located and is responsible for ensuring that the design complies with local building codes, zoning regulations, accessibility requirements, and other regulatory standards. The architect of record also typically leads the preparation of the detailed construction documents, coordinates engineering consultants, and manages the technical aspects of the design.

During the design development and construction documentation phases, the architect of record works closely with the design architect to translate the conceptual design into buildable drawings and specifications. This involves developing details, coordinating building systems with engineers, ensuring constructability, and

preparing permit submissions. The AOR also plays a significant role during the construction administration phase, reviewing shop drawings, responding to contractor questions, and visiting the site to verify that construction conforms to the design documents.

While the architect of record handles the technical execution of the project, the design architect typically continues to provide design oversight. This may include reviewing key drawings, approving design-related decisions, evaluating material selections, and ensuring that any changes made during the construction process remain consistent with the original design vision. In many cases, the design architect participates in important design reviews and may also contribute to major decisions involving finishes, façades, public spaces, or other highly visible elements.

The relationship between the two architects is therefore collaborative but clearly defined. The design architect focuses on design leadership and creative direction, while the architect of record focuses on technical documentation, regulatory compliance, and construction delivery. Together they form a partnership that combines visionary design with practical expertise in building systems, codes, and local construction practices.

In summary, on projects involving both a design architect and an architect of record, the owner usually hires both firms, although the design architect may recommend the local architect of record. The design architect is responsible for the artistic and conceptual aspects of the project, while the architect of record assumes legal responsibility for the construction documents, ensures code compliance, coordinates the engineering team, and oversees the technical delivery of the building. This arrangement allows projects to benefit from internationally recognized design talent while ensuring that the building can be successfully permitted, constructed, and completed according to local regulations and professional standards.

Prima Donna Architects

There are several well-known architectural firms that have designed major landmark buildings and who work extensively in the museum market. Their work is highly acclaimed. It is an honor to be chosen by them to work on a project as part of the design team, and an even greater honor when they choose you for a second project years later. They can be very demanding and expect nothing less than perfection, especially when it comes to aesthetics. But they can be reasoned with. My billable time as a consultant has to increase when I work with these artists because it takes more time to achieve perfection, to ponder alternates, to conceal motion detectors or camera from view and to design solutions never before attempted. This is especially complex when the building includes historic fabric issues which I address later.

And there are a few architects who have been very successful with regard to their design, but who have little respect for the budget or the future cost of ownership of their creation. On one project there were nearly 1500 changes and almost 2000 RFIs because the contractor needed clarification due to inadequate drawings. Some changes will always be necessary, but there is no excuse for the architect not making up his mind before the job goes to bid especially when an expensive mock-up was built and there was no guess work in how the outcome would look. These architects are problematic on every project they do. And one characteristic of these *prima donnas* is that they employ a small army of twenty-five-year-old proteges who are even more demanding than the master, generally with regard to aesthetics. If they had their choice, there would be no security, HVAC, or lighting systems because they cost money that would be better spent on interior finishes. Security closets, custodial closets, electrical closets are not included until late in the construction document phase when the design team finally demands they be identified and then they are rarely stacked one above the other or sized with any

thought. Cameras are out of the question and fire pull stations are OK only if they are hidden from view and not placed near an exit door where code requires them to be. One such young woman gave me a lecture on how disappointed she was that I, unlike previous consultants she worked with, had the audacity to design galleries with two-inch by three-inch motion detectors mounted at eight feet above the floor in the corner of each gallery. She had previously demanded they be removed from her ceiling, so I moved them to the walls. She continued to insult me until I pulled out a museum catalog from a previous landmark project in London her firm had designed and showed her photos of even larger motion detectors similarly mounted in the same locations by their previous security consultant. Directly above the motion detector was a wall mounted camera. Over the years I have grown weary of educating these want to be *prima donnas* that we have codes and standards that must be met and that no amount of demands will change that.

My point is that before you hire a famous architect seek detailed information and references from that architect's previous clients including the current building manager who can tell you volumes about the excessive cost of ownership due in part to custom components like doors. If you decide that a pretty building is worth the cost, that is your decision but expect cost over runs and delays. Above all, your new building has to function, and you need to maintain it.

Engaging the Design Team

In a typical new building construction or major renovation project, the architect generally selects and leads the design team, including engineers and specialty consultants, although the owner may have input or approval authority depending on the project structure and contract arrangement. The process is usually collaborative, but the architect typically serves as the prime design consultant responsible for assembling and coordinating the full design team.

In most projects, the owner first selects and contracts with the architect as the lead design professional. Once engaged, the architect forms the broader design team needed to complete the project. This team commonly includes mechanical engineers, electrical engineers, plumbing engineers, structural engineers, civil engineers, and various specialty consultants like security, conservation, lighting, etc. Because these disciplines must closely coordinate with the architectural design, the architect is usually best positioned to identify firms with the appropriate technical expertise and collaborative working style but often when one consultant has been working with the museum over multiple projects, the museum can benefit from using their regular consultant who knows their situation.

Under the most common contractual structure, the architect retains these consultants as subconsultants under the architect's agreement with the owner. In this arrangement, the architect is responsible for selecting the consultants, negotiating their scopes of work, and coordinating their services throughout the design process. The architect's contract with the owner typically states that the architect will provide engineering services through qualified consultants. Although the architect selects these consultants, the owner is often given the opportunity to review and approve the proposed design team members before they are formally engaged.

The architect's responsibility for selecting consultants reflects the integrated nature of building design. Mechanical, electrical, structural, and other engineering systems must be carefully coordinated with the architectural layout, building envelope, and spatial planning. By assembling a team of trusted consultants with whom the architect has experience, the design process can proceed more efficiently and with better communication among disciplines. The architect then manages the work of the consultants, ensuring that their designs align with the project goals, schedule, and budget.

In some cases, however, the owner may participate more directly in selecting members of the design team. For example, an owner may request that certain consultants be included due to previous working relationships, specialized expertise, or institutional requirements. Public-sector projects or large institutional developments may also involve formal procurement procedures where engineering consultants are selected through separate qualification processes. In these situations, the consultants may contract directly with the owner rather than with the architect, though the architect still works closely with them to coordinate the design.

Another variation occurs when owners have in-house engineering staff or standing consultant agreements. In such cases, the owner may require the architect to work with those specific consultants. Even then, the architect remains responsible for coordinating the design work among all disciplines to produce a cohesive set of construction documents.



Regardless of the exact procurement method, effective collaboration between the owner and architect is important when assembling the design team. Owners may review consultant qualifications, participate in interviews, or provide final approval before contracts are executed. This ensures that the team has the experience and capabilities needed to deliver the project successfully while maintaining clear lines of responsibility for design coordination.

In summary, the architect typically selects and manages the members of the design team, including mechanical and electrical engineers and specialty consultants, because the architect serves as the lead design professional responsible for coordinating all design disciplines. However, the owner often participates in reviewing or approving the proposed team, and

in some cases may directly select or contract with certain consultants. As a result, while the architect generally leads the process, the final composition of the design team is often determined through collaboration between the architect and the owner.

Hiring the Security Consultant

Every museum and library project requires a security consultant on the design team. It is never acceptable to assign responsibility for security to the engineering firm designing the fire and electrical systems. The project is only partly about system selection and design. Primarily it is about assessing the unique risk every museum faces due to its location, adjacencies, and other factors. If you have a trusted security consultant who teams up with an engineering firm and they divide up the work according to their expertise, then this collaboration may meet your needs. But be certain that the engineer does not perform risk assessments or advise the museum on issues such as using technology to replace guards or training of guards as this should be the prevue of the museum security expert.

One major engineering firm claims extensive experience working on museum projects. They claim to have a security expert who guides their engineers. This does not mean that the in-house consultant has ever worked in a museum and even if the firm has worked on dozens of museum projects over the life of the firm, that doesn't mean that the engineer on your project ever worked on a museum project.

When Should the Security Consultant Get Involved?

The security consultant should be brought in from the very beginning of the project, certainly before the programming phase, and should take an active role in representing the security department in the programming process. I can assure you that if you ask for a fixed fee for a defined scope of work, you will pay less by involving the security consultant early rather than later. Many of the tasks he or she will undertake, especially in a renovation project or an expansion via a new wing of the building, must occur early. This may require two contracts, the first to perform consulting not directly associated with the architectural process and another with the architect to perform the design team duties. The first is between the consultant and the museum and the second is between the consultant and the architect.



What Pre-Construction Tasks Should the Security Consultant Perform?

The scope of work preliminary to the start of design should include:

1. A discussion of the planned project to understand its scope
2. A traditional risk assessment survey of the current operation to identify deficiencies that might be corrected by the project.

3. Determination of what if any security locations (guard posts, command centers, storage spaces, etc. will be disrupted or eliminated as a result of construction or demolition.
 4. If this is a renovation or new wing-type project, the consultant must fully understand the current electronic systems. Can they be salvaged and expanded? Are they expandable or do they need to be replaced. If they are expandable, do you want to expand them if they can be replaced? What is the remaining service life of the existing systems and their components? What disruption will occur to the rest of the museum if the existing system is replaced?
 5. What impact will this project have on the current command center? Will it have adequate space after the renovation/expansion to meet post construction needs?
 6. Are modifications needed to the systems to meet current security national standard, loan requirements, and accreditation?
 7. The consultant will need to understand how the post construction building will function. In many projects the museum may not have decided on these issues, but this process makes them aware that they need to quickly address them.
 - a. How is the building cleaned? When is it cleaned? For example, are custodians contract employees who clean at night? What impact does this have on security? Who lets them in and oversees their work? Who turns alarms on and off for them?
 - b. Are café workers contractors? Same issues.
 - c. Is the museum staffed 24/7 by a guard or guards?
 - d. Who opens the building in the morning if not a guard? When are alarms turned off?
 - e. What after-hour events are hosted? Where? How many?
 - f. Is there a designated employee entrance?
 - g. Do employees have after hour access? Can they come in and work at night? Offices? Galleries?
 - h. Does the museum have employee ID cards? Are they made in house?
 - i. Does the museum have a card access system? What product? What is the spare capacity on each reader panel?
 - j. Is the museum happy with its current alarm system vendor?
 - k. Are any security systems leased?
 - l. Is there spare capacity on the alarm system?
 - m. Does the museum have a policy manual? What changes will be required after renovation?
 - n. How are keys handled? What locking system is used so that post construction locks match existing if possible? Are keyways proprietary?
 - o. Does the museum have fire system annunciator in the security command enter? Is the current fire system likely to be expanded into the new space? Is it expandable? Spare capacity? Where is the FACP in relation to the command center?
 - p. Does the museum have an existing object protection system? Type? Case alarms? Wireless?
 - q. Does the museum have a preferred security contractor based on past experience?
 8. Develop a plan for securing the museum during switch over from old alarm system to new system. This will probably involve running both systems at once.
 9. Survey the various spaces used by Security and understand their current purpose.
- Before the renovation is complete:
1. Assist the museum with a revised staffing plan

2. Identify policy changes due to physical plant changes
3. Assist with policy manual development or manual revision

When I ask questions about cleaning of the building, these questions are important in that the museum should not give the alarm codes to de-activate the alarms to a contract company who works unattended around the collection then assume they will lock up when they leave. When I ask who will turn off the alarms first in the morning if there is no 24 hour guard, I ask for a very good reason. I have had museums tell me that whichever curator arrives first turns off the alarms. This might be possible with a simple keypad system but if the new museum alarm system now requires a computer interface, this may be more difficult and pose training problems.

Because answers to these questions often drive the selection of the product we specify and thus affect the budget, I always include the answers in by “Basis for Design Report “ to document my due diligence. Very often this process forces the museum to make early decisions on these important issues that should have been made earlier in the process. More on the Basis for Design Report later.

What Design Team Tasks Should the Security Consultant Perform?

1. Conduct a preliminary survey to determine if existing systems can be expanded or must be replaced.
2. Schematic Design submittal
 - a. Preliminary budget
 - b. Line diagram showing the relationship between existing systems and new systems
 - c. Line diagram showing relationship between non-security systems and security systems, i.e., phone, intercoms, fire system(s), computer network
3. Design Development Phase
 - a. Drawings, outline specification, product cut sheets (two submittals—one at 50% DD and another after 100% DD)
 - b. Coordination with design team—on site
 - c. Coordination with electrical engineer, mechanical engineer, door and hardware, fire protection engineer, computer network consultant, other via Zoom.
 - d. Aesthetic coordination with architect
 - e. Wall elevation coordination with architect
 - f. Reflected ceiling plan coordination with architect
 - g. Basis of Design Report
 - h. Revised budget
4. Construction Document Phase
 - a. Final coordination as required
 - b. Pre-submittal to design team so they can revise their drawings if necessary and for permitting
 - c. Formal submittals Drawings, specification, device schedules, product cut sheets (revised)
 - d. Revise Basis of Design Report
5. Final 101% submittal if required.
6. Bidding Phase
 - a. Prepare a bid form with alternates if required. (site visit)
 - b. Conduct a pre-bid conference with bidders

- c. Receive and respond to RFIs
- d. Review bids, make recommendations, and negotiate.
- 7. Construction Administration
 - a. Respond to RFIs
 - b. Review shop drawings
 - c. Respond to change order revisions
 - d. Modify drawings as required with deltas and bubbles indicating authorized changes
 - e. Site visit for compliance with the spec and presence of conduit where required
 - f. Site visit for compliance with the spec and wire management
 - 1. During visit, meet with owner on post construction issues
 - g. Final acceptance test site visit
 - 1. Review pre-inspection report
 - 2. Review as built drawings
 - 3. Review training submittal
 - 4. Review manuals submittal
 - 5. Prepare punch list
 - h. Retest of system if punch list necessitates

OPTIONAL BEYOND THE SCOPE IF NEEDED

Value Engineering Phase

- i. Revise plans and spec and re-submit
- j. Review contractor re-bid
- k. Revise Basis of Design Report

What Drawings Are Typically Included in the Security Drawing Set?

Cover sheet with notes and symbols

Floor plans, each floor including roof and sub-basement levels with symbols (Include all levels even if you do not have devices on that level. This enables the contractor to know if he is missing a sheet)

Detail drawings of each device on one or more detail sheets

Elevation drawing of each security closet (wall and rack elevation)

Security command center wall and console elevations

Security network riser diagram showing switches, server, and terminals

Alarm, access control, CCTV, intercom, and object protection system block diagrams

Security riser diagram

Device schedules listing each alarm initiating and alarm indicating device, each electric lock, camera, reader, electric lock, control panel, etc. and providing mounting details, product make and models, etc.

Coordinating Contracts

At some point in the contracting process the owner’s representative should conduct a review of the contracts submitted by the architect and the design team including any specialty consultants paid directly by the museum such as the exhibit designer who will begin the design of exhibits and display cases very late in the process, to see if anything is missing.

Speaking from the perspective of the security consultant, one missing task is almost always the security for display cases unless they are part of the scope of work of the building’s main architect. This is because many museums contract directly with an exhibit design firm to design and construct the interior exhibits. During the design process, members of the design team will coordinate aspects of their work that impacts the work of others.

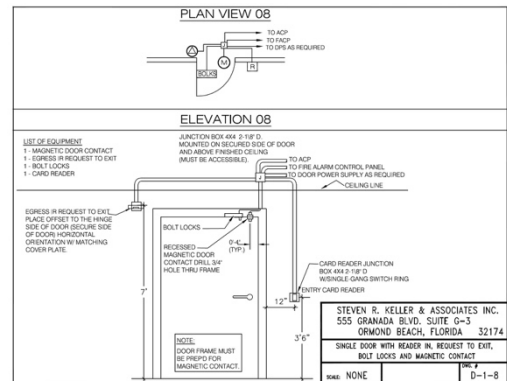


For example, major security components like computer racks holding Power over Ethernet switches and wall panels containing reader controllers and alarm input panels all require power and give off heat. So, one task of the security consultant is to coordinate with the electrical engineer the amount of power and the quantity and type of electrical outlets and their location in the closets and elsewhere that are needed. He will also coordinate with the mechanical engineer how much air conditioning he needs in the closet to cool the equipment. This type of work is expected. The electrical engineer is always a licensed engineer, and his drawings must be stamped and sealed by the code authority certifying they meet local codes and it is assumed that the security

system design, being low voltage, does not require this. So, the electrical engineer already includes in his work the need to design the higher voltage outlets for the security system. He just needs to know your needs just as the mechanical engineer needs to know your heat loads to provide air conditioning.

But some questions remain as to whose responsibility certain tasks will be, and this often involves billable time. So it is necessary to define in advance who is going to be responsible for what. Some of these tasks that need to be clarified before the work begins, include:

- Who specifies the security system conduit, the security consultant or the electrical engineer? Since it is always better to buy all conduit under one contract, conduit is generally designed by the electrical engineer and is purchased as part of his specification. But the security consultant needs to show the conduit from the device to the closet and specify the minimum size acceptable.
- Who specifies the electric door hardware associated with the access control system such as electric locks and strikes, power transfer hinges, and door power supplies? I prefer that the door and hardware contractor provide, and the security contractor install all of the above equipment, but



where specialty doors and hardware are involved, it is often better to buy these under the door and hardware contract and let the door contractor install, these. Often power supplies are not typically part of the door and hardware contractor's product list, so this has to be agreed upon in advance. Regardless, the security consultant defines this.

- Will there be banners hanging from the ceiling as part of the interior design? They block cameras, so more cameras may be required. This affects the budget, and the space required for monitors thus the size of the command center. Similarly, if you don't know the location of the exhibits yet because the exhibit design won't be complete until late in construction, you can't place cameras. Will you be compensated to do an additional revision later in the design process?
- The security system requires a dedicated fiber network for alarms and access control and another for security CCTV systems if you want to assure that it is isolated from cyber attacks. Who will specify this network, the security system designer or the computer consultant? Does that network start at the camera or at the PoE switch? Who will design the CAT-6 cabling or fiber from the camera to the switch in the closet? I have always told the network specifier what I need and let them specify it. My plans show the CAT-6 from the camera to the closet but all of this should be coordinated so it is always included, and the owner doesn't pay for something twice.
- Who will design and specify any security intercoms, the communications consultant or the security consultant? Because they can probably be purchased cheaper from a communications contractor than a security contractor, this needs to be coordinated.
- Who will design and specify a rapid entry key box for fire department's rapid entry (Knox Box) and who will specify the interconnection of the access control system and the fire alarm control panels? Who will verify which product the fire department uses (Knox, Supra, other)?
- In renovation projects, who does patching and painting? This needs to be specified.
- Who specifies the phone lines needed to transmit the alarms out of the building including cellular back-up if included? What special security provisions are being made to secure a digital phone system from compromise if it is used to transmit alarm signals now that Plain Old Telephone System (POTS) lines are no longer available. How many phone lines are needed in the command center? You need to tell the communications consultant what you need so it gets done,

There are other tasks that need to be clearly defined early in the process and while most engineers and consultants will not adjust their fee proposal as a result of some extra work, others may, so this is an important step since billable time is involved.

After the initial decisions are made, coordination continues by phone or video conference throughout the design and construction administration process. Remember that you don't get to bill for all of this coordination on a fixed fee project so do the work up front and reduce your time and effort later.

The Coordination Process

The design of a new building or major renovation is a highly collaborative process involving many professionals, including architects, engineers, specialty consultants, cost consultants, and representatives of the project owner. Because each discipline is responsible for designing different systems and components of the building, effective coordination during the design process is essential. Coordination ensures that the work of each team member is integrated into a unified design and that conflicts between building systems are resolved before construction begins.

The architect typically serves as the lead designer and coordinator of the design team. In this role, the architect manages communication among all consultants and ensures that each discipline's work aligns with the overall project goals and design intent. Coordination begins early in the design process, often during the programming or pre-design phase, when the architect and consultants review the project requirements and establish a shared understanding of the owner's objectives, budget, and schedule. Early discussions may also address site constraints, building codes, and the selection of major building systems.

As the project moves into the schematic design phase, coordination focuses on developing the overall concept of the building while ensuring that the major building systems can be accommodated within the architectural design. During this phase, the architect proposes preliminary layouts, building massing, and spatial relationships, while the engineers evaluate how structural systems, mechanical equipment, electrical distribution, and plumbing infrastructure can be integrated into the design. For example, the mechanical engineer may identify the space needed for equipment rooms or ductwork, and the structural engineer may recommend structural systems that support the building's form. Regular design meetings are often held to discuss these issues and ensure that the design evolves in a coordinated manner.

Coordination becomes even more detailed during the design development phase. At this stage, the design team refines the building layout and develops more specific information about materials, building systems, and construction methods. Engineers begin to design the building's structural framework, HVAC systems, electrical distribution systems, and plumbing systems in greater detail. Because these systems often share the same spaces within walls, ceilings, and service shafts, careful coordination is necessary to avoid conflicts. For instance, ductwork must fit within the structural framework and ceiling spaces while allowing room for lighting fixtures, piping, and other equipment. The design team reviews drawings together and resolves potential conflicts before the drawings are finalized.

The coordination process continues during the construction documents phase, when the design team produces the detailed drawings and specifications that contractors will use to build the project. At this stage, coordination focuses on ensuring that all drawings are consistent and that the information provided by different disciplines does not contradict or interfere with each other. Architects and engineers review each other's drawings to verify that dimensions, materials, and system locations are compatible. For example, the architect may confirm that structural columns align with walls and that mechanical equipment fits within designated mechanical rooms. Electrical and mechanical engineers must coordinate the routing of ducts, conduits, and pipes so that they can be installed without conflict.

Regular design coordination meetings are an important tool in this process. These meetings allow team members to review progress, discuss challenges, and make decisions about how different systems should interact. The architect typically leads these meetings and ensures that decisions are documented and incorporated into the design drawings. In addition, digital modeling tools such as Building Information Modeling (BIM) are often used to assist with coordination. BIM allows the design team to create a three-dimensional model of the building, which makes it easier to identify potential conflicts between systems and resolve them before construction begins.

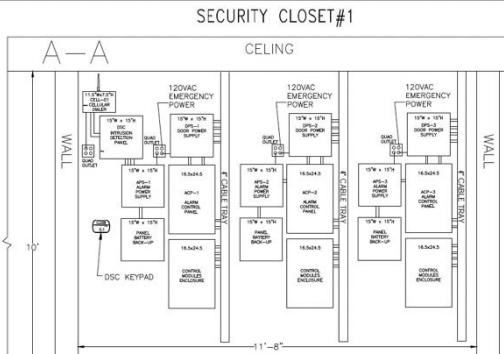
Coordination also involves collaboration with specialty consultants, such as lighting designers, acoustical consultants, sustainability experts, façade engineers, security consultants, gallery lighting consultants or landscape architects. These specialists provide expertise in specific aspects of the building design and must integrate their work with the architectural and engineering systems. For example, a lighting designer must coordinate lighting fixtures with ceiling layouts and mechanical systems, while an acoustical consultant may recommend materials or design adjustments to improve sound control within certain spaces. If exterior cameras are to be included, the landscape architect must be consulted so your underground cables don't obstruct tree roots. It is often impossible to know early in the design process exactly how tall trees will be when planted as this may depend on the available stock and season of the year. Cameras must view under or over trees and tree growth can't block the camera view. This is especially critical in outdoor sculpture gardens.

Throughout the design process, coordination also includes cost and schedule considerations. The cost consultant may review the developing design and provide feedback on how design decisions affect the project budget. If certain design features exceed the available budget, the team may work together to identify alternative materials or construction methods that maintain the design intent while controlling costs. Similarly, coordination with the owner and project manager ensures that the design remains consistent with the overall project timeline.

Effective coordination during design is critical because resolving conflicts during the design phase is far less costly and disruptive than resolving them during construction. When drawings are well coordinated, contractors can build the project more efficiently and with fewer changes or delays. Conversely, poor coordination can lead to construction conflicts, change orders, and increased costs.

It is important to note that submittals are due when the architect says they are due. Miss a deadline without good cause and you likely won't work for that architect again. Other consultants who you need to coordinate with are on the same submittal schedule as you are. If your design includes closet elevation drawings showing the number and placement of outlets for your equipment in that closet, you can't wait until the day before the submittal is due to provide the electrical engineer with a copy of your drawings. He needs several days to incorporate your needs into his submittal. If your drawings are due with a submittal on the tenth of the month, you need to give others a copy of your finished drawings a week before that submittal date so they can get your needs into their submittal package. The later it is in the design, the more urgent this becomes.

In summary, the coordination process during the design of a new building or renovation involves continuous communication and collaboration among the architect, engineers, consultants, and the owner. The architect typically leads this process, ensuring that the work of each discipline is integrated into a cohesive design. Through regular meetings, drawing reviews, and digital modeling tools, the design team identifies and resolves potential



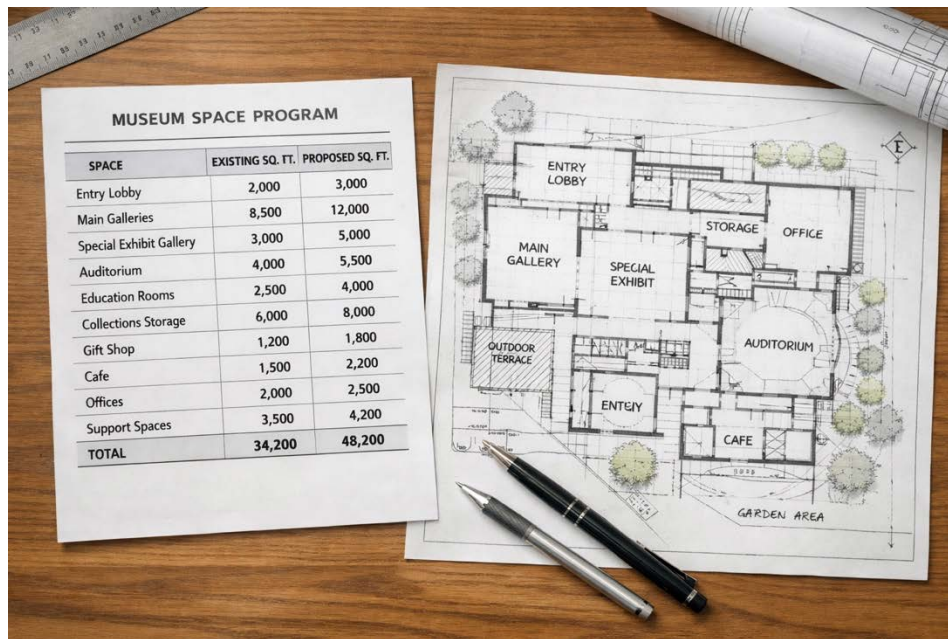
conflicts between building systems while maintaining alignment with the project's goals, budget, and schedule. Effective coordination ultimately helps ensure that the building can be constructed efficiently and that the final result meets the owner's functional and aesthetic expectations.

Phases of the Architectural Design Process

Architectural projects follow a structured sequence of phases that guide the development of a building from an initial idea to a completed structure. In the United States, these phases are commonly defined by the American Institute of Architects and are reflected in standard professional agreements such as AIA Document B101. Although individual firms may use slightly different terminology or combine certain steps, most building projects progress through six primary phases: pre-design or programming, schematic design, design development, construction documents, bidding or procurement, and construction administration. Each phase builds upon the previous one, gradually transforming a client's vision into a fully realized building.

The Programming Phase

The first phase of a building project is pre-design, often referred to as programming. During this stage, the architect works closely with the owner and other stakeholders to define the fundamental goals and requirements of the project. This process typically involves meetings and interviews to understand the owner's needs,



priorities, and expectations for the building. The architect also analyzes the project site, evaluating factors such as zoning regulations, access, utilities, environmental conditions, and potential constraints that could influence the design. A key component of this phase is the development of a space program, which identifies the types of rooms required, their approximate sizes, and their relationships to one another. Preliminary studies of feasibility, cost, and schedule may also be prepared. The primary purpose of the pre-design phase is to establish a clear and realistic foundation for the project before design work begins.

Schematic Design Phase

Once the project requirements are defined, the process moves into schematic design. This phase focuses on developing the overall concept and general organization of the building. Architects explore different design ideas and translate the program into preliminary layouts and forms. Early sketches, diagrams, and digital models are often used to examine building massing, orientation, circulation patterns, and the relationship between the building and the site. Basic floor plans, site plans, and exterior elevations are typically produced, along with conceptual studies of structural and building systems. At this stage the design remains flexible, allowing the owner and design team to evaluate options and refine the overall direction of the project. The goal of schematic design is to establish a clear architectural concept and general building arrangement that satisfies the program and aligns with the owner's vision.

Design Development Phase

Following approval of the schematic design, the project advances to the design development phase. During this stage, the architectural concept is refined and expanded into a more detailed and coordinated design. Floor plans and building layouts are further developed, and decisions are made about exterior materials, façade systems, and interior finishes. At the same time, engineers work with the architect to integrate structural, mechanical, electrical, and plumbing systems into the building. Coordination among these disciplines is a critical part of design development, as conflicts between building systems must be resolved before detailed documentation begins. Drawings produced in this phase typically include more precise plans, sections, and elevations, along with outline specifications describing major materials and systems. By the end of design development, the building's appearance, organization, and technical systems are largely defined.



Construction Documents Phase

The next phase is construction documents, which transforms the developed design into a complete set of technical instructions used for construction. Architects and engineers prepare detailed drawings that show the exact dimensions, materials, assemblies, and relationships required to build the project. These documents typically include architectural plans, building sections, construction details, schedules for doors, windows, and finishes, and comprehensive written specifications describing materials and workmanship standards. Structural and engineering drawings are also finalized during this phase. The completed construction documents serve multiple purposes: they are submitted to authorities for permits, used by contractors to prepare bids, and

ultimately guide the construction of the building. Precision and clarity are essential at this stage, since contractors rely on these documents to accurately interpret the design.

Bidding Phase

Once the construction documents are completed, the project enters the bidding or procurement phase. During this stage, the drawings and specifications are issued to contractors so they can prepare proposals for building the project. The architect often assists the owner by organizing pre-bid meetings, answering questions from potential bidders, and issuing clarifications or addenda if necessary. After bids are received, the architect may help the owner evaluate the proposals, review qualifications, and compare costs. The ultimate objective of this phase is to select a qualified contractor and establish a construction contract that reflects the project scope and budget.



Construction Administration Phase

The final phase of the architectural process is construction administration. During construction, the architect's role shifts from design to oversight and coordination. The architect periodically visits the site to observe the progress of the work and determine whether it generally conforms to the design intent and construction documents. Contractors submit shop drawings and product information for review, and the architect responds to requests for information when clarifications are needed. The architect may also review applications for payment, evaluate proposed changes to the work, and issue supplemental instructions if adjustments are required. Near the completion of construction, the architect typically conducts inspections and prepares a punch list identifying items that must be corrected or completed before final acceptance. The purpose of construction administration is to support the owner and help ensure that the building is constructed according to the design and contractual requirements.

Together, these phases form a comprehensive framework that guides the design and construction of a building. Beginning with the identification of project goals and ending with the completion of construction, each phase plays a distinct role in shaping the final outcome. By moving systematically from conceptual ideas to detailed documentation and construction oversight, the architectural process helps ensure that complex building projects are planned, coordinated, and executed successfully.

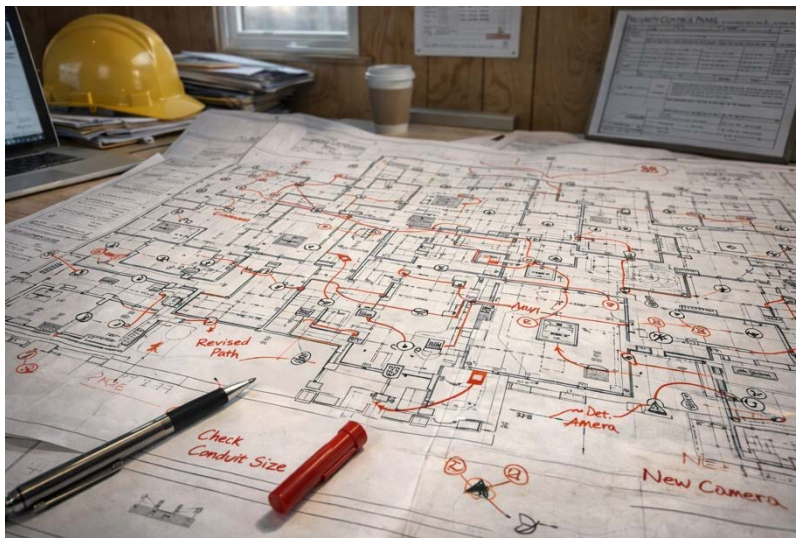


Requests for Information



Through-out the design process the architect will meet with the design team as needed and with the owner's representative on a regular basis and maintain the flow of information. The objective is to assure that the owner gets the building they want and can afford. There is a free flow of communication between both the design architect and the architect of record through the architect of record. If the museum director or owner's rep feels that communication is inadequate it is their job to request more communication. In a perfect world the owner's representative takes the burden of communication off the shoulders of the museum staff.

When a sub-contractor such as the security system installer has a question or needs clarification as to the intent of something in the specification, he issues a Request for Information (RFI) to whoever can best answer the question but this is always done through the architect and from the architect to the appropriate design team member or museum staff member through the owner's representative. This assures that a paper trail documents the question and the agreed upon answer, and that if further coordination is needed with others on the team that it gets done in a timely and orderly manner.



When a project reaches the point where shop drawings have been created by the sub-contractor, RFIs may result in Change Orders. To assure that all of the changes ordered get made and that all of the work is done as agreed after careful response to RFIs by the design team, the consultant whose system is involved in the RFI and the subsequent changes, resulting from the RFI process, maintain detailed records to document the change. Without this meticulous record keeping, there can be chaos and legal disputes at the end of the project when the museum

paid for a change order, but the work didn't get done in the field because the contractor in the field didn't get the word. How this is handled differs with each engineer or consultant on the design team.

In my case, I include in my specifications wording that requires that the contractor keep a working set of shop drawings on site and available for my inspection at all times. I require that for each RFI or change, the contractor mark up the approved shop drawings in red pencil showing each RFI at the device or locations where the question is most relevant. I required that the word "RFI #" followed by the RFI number be printed on the plan, and that a copy of the RFI be maintained in a file near the blueprint. When a change order is issued, the words "Change Order #" followed by the number of the change. Mark-ups must occur in real time. If they don't occur in real

time, they will not be accurate at the end of the job. Prior to final testing and acceptance, the drawings are to be submitted to the contractor's draftsman, and the CAD drawings modified into as-built or record drawings which I must review and sign off on. Final payment is never paid to the contractor until this obligation is completed.

Very often before a final response is made to the contractor issuing the RFI, someone representing the museum is consulted. If you are asked to respond to an RFI, understand the purpose and importance of this procedure.

Mistakes Often Made in the Programming Phase

The programming phase is one of the earliest stages of a new building or major renovation project. During this phase, the owner, architect, and key stakeholders work together to clearly define the project's goals, functional requirements, and space needs before the design process begins. Programming is sometimes referred to as architectural programming or pre-design planning, and its purpose is to establish a clear understanding of what the building must accomplish so that the subsequent design phases can respond effectively to those needs.

During the programming phase, the design team gathers and analyzes information about how the building will be used. This process typically involves meetings, interviews, and workshops with the owner and future users of the building. Stakeholders may include administrators, facility managers, staff members, and other individuals who will occupy or operate the building. These discussions help the architect understand operational requirements, workflows, spatial relationships, and functional priorities. For example, the programming phase might explore how different departments need to interact, what types of rooms are required, and how many people will occupy various spaces. A good example might be to assess the collection storage needs. How many square feet of collection storage is needed? How many separate spaces is this to be divided among, i.e., paintings, decorative arts, etc. What security is required on collection storage? How large are the items to be stored in these spaces? How high must the ceilings be in these spaces? How high and wide must the doors be in the spaces? The hallway between collection storage and the galleries must be able to handle large items on carts. How high must these ceilings be so that ducts and light fixtures don't obstruct movement of collections. What spaces qualify as collection storage-like spaces such as the Mount Making Studio, the Photography Studio, and Wet Labs where accessioned items are kept overnight while being worked on.

Another important activity during programming is the analysis of project goals and constraints. The design team works with the owner to establish priorities such as sustainability goals, performance expectations, accessibility requirements, technology needs, and security considerations. At the same time, the team considers constraints that may affect the project, including budget limits, site conditions, zoning regulations, and project schedule. Understanding these factors early helps prevent major conflicts later in the design process.

The programming phase also involves developing a space program, which identifies the types and sizes of spaces required in the building. The architect typically prepares a list of all spaces needed--such as offices, meeting rooms, laboratories, classrooms, or storage areas--and assigns approximate square footage to each space. These spaces are often grouped by department or function to illustrate how different activities relate to one another. The architect may also prepare adjacency diagrams or relationship diagrams that show which spaces should be located near each other for efficient operation. Adjacency issues might include not running water mains through the ceiling of collection storage, providing safe fire-resistant storage for storage containers in areas subject to fire spread. I always determine what special security hardware is needed for each type of space. This is often omitted. Collections storage may require the following:

- Hollow metal door with no window glass.
- Hinges on the protected side of the door.
- A car reader in and a REX out

- An electric mortised lockset with integral REX
- Motion detection to UL Extent 2 or Extent 4
- Concealed magnetic contact on door
- Windowless room
- Fire extinguisher
- LLL infrared camera on exterior viewing door activity.
- If the space is for storing gems, firearms, etc. interior safes, vaults or cabinetry may be needed and wall protection such as shock sensors are needed.

In addition to space requirements, the programming phase often includes a preliminary assessment of the project site. This may involve reviewing property boundaries, access points, utilities, environmental conditions, and zoning restrictions. For renovation projects, the team will also study the existing building to understand its structure, systems, and limitations. This information helps determine whether the proposed program can realistically fit within the available site or building.

The information gathered during programming is compiled into a document known as the Program, often called the Programming Report or Architectural Program. This document is the primary work product of the programming phase. It serves as a written summary of the project's requirements and provides a clear reference for the design team as the project moves into schematic design. If something critical is omitted in the program phase it can sometimes be added when the omission is discovered, but on most projects, omissions are not added later.

The programming report typically includes several key elements. It may begin with a project overview describing the owner's goals, the intended use of the building, and the overall vision for the project. It then includes a detailed space program, listing all required spaces and their approximate sizes. The report often includes diagrams that illustrate functional relationships between spaces, as well as descriptions of special requirements for certain rooms or departments. Additional sections may address site considerations, operational needs, sustainability goals, budget constraints, and schedule expectations.

The programming document is important because it establishes a clear foundation for the design process. Once the owner approves the program, the architect uses it as a guide when developing schematic design options. If the program is well developed and accurately reflects the owner's needs, it helps ensure that the design will support the intended functions of the building and reduce the likelihood of major changes later in the project.

In summary, the programming phase is the stage in which the architect and owner define the functional, spatial, and operational requirements of the project before design begins. Through meetings, research, and analysis, the design team identifies the spaces needed, their sizes, relationships, and special requirements. The primary work product of this phase is the programming report, a document that organizes and communicates these requirements and serves as the foundation for the building's design.

Involving the Employees Early in the Process

Every institution preparing for a major project must involve their key employees in the planning process from the very beginning of the process. Begin with identifying who those employees are. In a new building project where everyone is involved in some way, every department head will play some role. In a major new wing or building addition, not every employee will be fully involved, but will probably be impacted, so at some point in the process employees will need to be briefed on the details of the project and department heads for departments

directly involved should be brought in from the beginning. Museums should stop treating major projects like these as some sort of event whose information must be controlled and released in bits and pieces. Some do it to control information to the press and others do it to avoid in-house politics where employees lobby for more physical space, a better office view, or other construction related concessions that slow the project. The museum director must step up and manage the process by getting key employees to approach the project as a team that serves selflessly. If this is not possible, then the role of leader of the project must be delegated to an owner's rep who, with the input from the director or his or her designated representative takes control of the process.

Training Your Employees to Fulfill Their Role

Begin by not assuming anything. There is no shame in the fact that few museum employees know anything about the process and most lack the basic skills to play their role in the process. You can't, for example, review and understand blueprints if you don't already know how to read blueprints. If you don't know where to find architectural elevations in a set of plans, or you don't know how to determine ceiling heights, how can you know if you can wheel art on a cart down the hall whose ceilings are full of ductwork and light fixtures. So early in the process give everyone a day long briefing that explains the process they will be involved with. This may not involve every guard or janitor in every step, but it may. Even these employees may have input to provide that is valuable.

Early in the design process will be the programming phase where every department head will work with an architect or program consultant to identify their needs in the new space, if any. Managers must be made to understand that this process is critical to them, but it is not a ticket to grab more than their share of space. They must be taught exactly what the program consultant will ask them to do and how they should comply with the request.

For purposes of this exercise, let's assume that the security office is being renovated into new collection storage space and a new security department space will be provided for one of only two departments in a major museum that functions twenty-four hours per day three hundred and sixty-five days per year. Traditionally, the Facilities Department and the Security Department are both housed in less desirable space in a sub-basement. Now might be the time to educate the programmers that these departments need to be adequate to function properly.

The Problem with Architectural Programmers



Far too many architectural programmers simply go into a department and observe what functions are already provided for, measure the space, and provide an equal amount of space in the new wing. This is the biggest mistake made in nearly every project I have been involved with. I have never in forty years been involved in a programming phase where the Director of Security had been sufficiently briefed on his or her responsibility to represent the department and use this as a once in a lifetime opportunity to solve real pressing problems, many of which have been costing the museum money each and every year for decades. And can only be fixed by a renovation or major architectural changes.

So, before the process begins the department manager, the security director in our example, must take a close look at what problems they are having that are architectural in nature and decide if this construction project can solve them. Since this can be a complex issue, it is often wise to hire a consultant who has proven experience in this process to work with the department head. Using a programming firm to do this may not be your best approach. At least one major programming firm working in the museum field is, how do I say this gently, incompetent, in spite of their reputation as the “go to” firm. Over the years I have offered to meet with the company’s owner and explain why their reports often do more harm to security than good but they rejected my offer of free advice. My offer was prompted by their recommendation that a space be protected by window foil to detect window glass break and infrared beams to detect motion. This recommendation was part of their program report in 2015. Window foil stopped being used in the 1960s and active infrared beams stopped being used in the 1970s. National standards now define what security is required for collection storage (UL Extent of Protection Level 4 with Extent 2 preferred) and they should understand these standards but unfortunately, they don’t.



Program for the Future Not the Present

The goal of this process should not just be to determine how much space is currently being used, but to identify how much space is needed to perform all essential operations. If you want your security supervisors to be present on the floor and not socializing in the office, don’t provide them with offices, provide a single shared workstation that they can use when completing the occasional report. If they are managers at the assistant or associate department head level and you expect them to be productive, they need an office. And if that work involves administering discipline or conducting investigations where privacy is important, a doorless cubicle isn’t sufficient.

My recommendation is that the museum hire a consultant who understands the needs of the department to represent the department and help set priorities, but who also understands that not every “want “ of the department head will make it into the program, The truth is that if something is not addressed in the program, the design

architect almost certainly will not include it in their design, and it is very difficult and disruptive for the security consultant on the project design team to try to wrestle space from another department after it has been allocated, so get it right the first time.

By discussing this programming process in advance with each department head so they understand their responsibility they can prepare well before the process begins. Start with an articulate discussion of what the department does and why requests are important. Don't assume that the architectural programmer understands or appreciates the role of security (or whatever department he is doing the programming for). I have even met programmers who for whatever reason minimize the value and importance of certain departments.

Examples of How Programmers Often Fail Without Employee Involvement

Again, using our example of the program for the security department, here are some of the functions and their space requirements nearly every programmer overlooks:

- Security officers wear uniforms. They can't change clothes in a restroom. A locker room is needed. But wait. A security force does not just consist of old men. This is the 21st Century and women actually hold jobs, too. Why has every architect I have ever worked for failed to provide for female guards? We need two locker rooms, and these need lockers. Because multiple full-time equivalents are often used to fill one position in many museums, and seasonal guards are hired for special exhibitions and traveling shows, we need more lockers than we have full-time positions. And we don't hire guards by gender based on available lockers we have. We hire with the assumption we will have a locker for them in their private, secure locker room with its gender specific restroom. So your locker room may consume more space than your program architect feels is necessary. The burden of educating them falls on your department head who himself may not fully understand the criticality of getting it right the first time.
- While hiding the security department away in basement space seems efficient, employees from all departments must interact with the security department on a daily basis to get ID cards, check lost and found, pick up keys, and participate in meetings of all types. So, there must be a public facing entry point into a security suite with access to private areas more controlled.
- Security departments need secure storage space for locks, keys, key blanks, access cards, and associated tools and equipment.
- They need a space for the ID card camera and the ID card making process.
- They need storage for lost and found and it needs to be accessible to staff and the public as it is accessed daily.
- They need storage space for uniforms and equipment, and this is more than a small closet.
- If the new construction will result in new systems like an electronic key storage system for employee high security keys, then space must be provided. If a lobby management system is specified for access control, space must be provided.
- If parcel control is to be maintained, the coat and parcel check room must be provided at public entrance and outside the security perimeter. I'll bet that you can't find an architect who can define the security perimeter of a museum
- Programmers need to be made aware that the most important security space is the command center and it cannot be some unusable space under a staircase with a ceiling so low it intersects with the

floor. If someone is going to sit in front of CCTV monitors displaying as many as a thousand camera images and emitting ten times more radiation than your home TV, the space must be large enough to be ergonomic and safe for the operators. It must have space for critical equipment including fire alarm control panels, critical building system annunciators, and radio battery chargers. In virtually every project, I as the project's security consultant have to aggressively advocate for sufficient space in the command center and fight for an optimum location. An optimum location often reduces staffing costs. By functioning as both a secure command center and an employee entry post substantial money can be saved each year.


My point is that many problems museums face today can only be resolved with architectural changes. The most important step in the process for cost savings over the life of the building is the programming phase and it is often not taken seriously by the architect and rarely well represented by the museum staff.

If you feel that your staff is not up to the task of handling this themselves then hire specialty consultants and assign the task of overseeing the programming phase to someone who can properly represent security's interests.

The Project Budget

Estimating and managing the project budget is a critical part of planning and designing a new building or major renovation. Because the design evolves over time, the project budget is not determined all at once but is instead developed progressively as more information becomes available. Early estimates are based on limited information and broad assumptions, while later estimates become more detailed as the design is refined. This process helps ensure that the project remains financially feasible and aligned with the owner's expectations throughout the design and construction phases.

In the early planning stage, the project budget is typically estimated using high-level cost information and



Category	Estimated Costs	Modified Costs	Actual Costs	Variance
Site Work	\$150,000	\$100,000	\$155,550	+5,550
Foundation	\$175,000	\$175,000	\$155,550	+19,450
Structure	\$475,000	\$150,000	\$778,400	-3,400
Exterior	\$325,000	\$480,000	\$312,750	-1,000
Interior Finishes	\$800,000	\$320,000	\$812,500	-11,500
Mechanical Systems	\$250,000	\$825,000	\$233,650	-16,350
Electrical	\$250,000	\$875,000	\$773,000	-102,000
Plumbing	\$825,000	\$270,000	\$128,300	-696,700
Additional Costs	\$185,000	\$150,000	\$72,400	-112,600
Totals	\$2,675,000	\$2,735,000	\$2,714,550	-\$20,450

benchmarking data. At this stage, the building design has not yet been developed, so the estimate relies on general assumptions about the type, size, and quality of the building. Owners and project planners often use cost per square foot data derived from comparable projects to establish an initial order-of-magnitude estimate. For example, if recent office buildings in a region cost approximately a certain amount per square foot to construct, that figure can be multiplied by the proposed building area to generate a preliminary budget range. Adjustments may then be made to account for factors such as building complexity, site conditions, sustainability goals, or market conditions.

The early budget may also include allowances for soft costs, such as design fees, permitting costs, project management expenses, contingencies, and financing costs. Because information is limited at this stage, these estimates are often expressed as a range rather than a precise figure. The purpose of the early estimate is to determine whether the project is financially feasible and to guide decisions about project scope and program before significant design work begins.

As the project moves into the design phases, the budget estimate becomes more detailed and accurate. During schematic design, the architect begins to develop the building's overall form, layout, and major systems. At this stage, the cost estimate may be refined by breaking the building into major components such as foundations, structural systems, exterior envelope, interior finishes, mechanical systems, and electrical systems. Estimators may assign approximate costs to each component based on historical data and industry cost databases.

During design development, the design becomes more detailed, and the cost estimate can be further refined. At this stage, quantities of materials and building components become clearer, allowing for more precise calculations of cost. The estimator may analyze the project by building systems or assemblies and evaluate the cost of structural systems, façade materials, mechanical equipment, and other elements in greater detail.

By the time the project reaches the construction documents phase, the design is largely complete. At this point, the cost estimate may be based on more precise quantity takeoffs, where the estimator measures specific quantities of materials and components directly from the drawings and specifications. These quantities are then multiplied by current unit costs for labor and materials to produce a more accurate estimate of construction costs. The final project budget at this stage provides a strong indication of whether the project will remain within the owner's financial limits before it is issued for bidding.

A key participant in this process is the cost consultant, sometimes referred to as a cost estimator or quantity surveyor. The cost consultant's role is to provide independent professional expertise in evaluating and forecasting construction costs throughout the project. Cost consultants help the owner and design team understand the financial implications of design decisions and ensure that the project remains aligned with the established budget.

One of the primary responsibilities of the cost consultant is to prepare cost estimates at different stages of design. At the earliest stage, they may prepare a conceptual estimate based on building type, area, and quality level. As the design progresses, the cost consultant performs more detailed analyses, comparing the proposed design to historical data and industry cost benchmarks. They also monitor trends in labor costs, material prices, and local market conditions that may affect the project budget.

Another important role of the cost consultant is cost control and value analysis. If a cost estimate indicates that the project is likely to exceed the established budget, the cost consultant works with the architect and engineers to identify potential cost-saving alternatives. This process, often called value engineering, may involve evaluating alternative materials, construction methods, or system designs that maintain the project's functional requirements while reducing costs.

Cost consultants typically use several methods to estimate a project budget. One common method is unit cost estimating, where the cost per square foot or per unit of building area is applied to the project size. Another method is assembly or system-based estimating, which breaks the building down into major building systems—such as the structural frame, exterior walls, roofing, mechanical systems, and finishes—and assigns costs to each system based on typical construction data. In later design phases, cost consultants may perform detailed quantity takeoffs, measuring the exact quantities of materials from drawings and applying unit prices to calculate the total cost of construction.

In addition to estimating construction costs, cost consultants may also evaluate contingencies and allowances to account for uncertainties and potential changes during construction. They may also assist the owner during the bidding phase by reviewing contractor bids, comparing them with the estimated budget, and helping the owner evaluate whether the bids are reasonable and competitive.

During my career I have been very generous with my time on projects. Most consultants are not so generous and bill for every hour worked. Many charge extra for every change made by the museum when they fail to take the initial advice of the consultant. I had a "client from hell" once who refused to tell me what they had planned to pay for their security systems. It was as though they thought I was going to spend every cent they budgeted for security but if they hid their real expectation from me, I might not spend it all. Following that experience, I resolved to charge for re-designs whenever the client refused to trust my expertise and share budget information with me then requested a re-design. I do not design by trial and error until we get a budget number they like. There are several types of clients. The first refuses to discuss budget expectations with their consultants and a second asks for the latest bells and whistles running the cost up way beyond their means then expect that I redesign a less grand system. The client from hell asked me to totally re-write my seventy-five page specification because they were told by their current alarm system vendor that a system his company sells would save them

money. When my revised budget showed that this was incorrect, the client asked me to re-specify the system a third time with still another system. Most experienced consultants can look at a project and offer an “order of magnitude” estimate after the first meeting. By trusting that your consultant is on your side and will not play games with your budget the way many museum employees might do, the consultant can determine what make and model systems you can afford and begin the design with some degree of confidence that you won’t be value engineering later to meet your budget. The consultant will tell you right up front what you won’ be able to afford on that budget so the client an look for more money. Work with your consultants on the budget. Trust them. I guarantee you that if the architect has developed an estimated budget in the early pre-design phase without consulting the security and other consultants, the budget he developed will not be accurate. I also guarantee that if the architect used the services of a cost estimator to estimate the security system costs, it will be about fifty percent of the actual final cost, due to a flaw in their software and methodology that has existed for half a century. The security budget for a museum is not something that can be easily estimated by someone who is not totally familiar with the museum security standards and best practices. We design to a set of rules. During the early stages of building design, we often see space configurations that add to the cost and we point out these potential savings to the architect whenever possible. We don’t place motion detectors on walls or ceilings in places they are not absolutely needed. We select the product needed to meet the codes and standards we design to. If the standard says that to get insurance you need a contact on a door and a motion detector in the space, then this is what is needed and if you want insurance and loans from other institutions, we can’t change it.

Cost consultants estimate the security system costs on a cost per square foot basis but that simply doesn’t work in a museum space. Why might that be? The cost consultant might acknowledge that a gallery needs cameras. He may not understand that the cameras, if properly placed, can often function for both surveillance and object protection. So they under-estimate the number of cameras needed. Then along comes the architect who demands that because the building is a work of art itself, the cameras must be mounted and concealed from view in expensive custom-made light cans on special order light tracks. Boom! Double the budget. Or the architect feels that one zoom, tilt and pan camera located in the middle of the gallery allows a 360 degree view. This never works. One operator can’t possibly operate sixty cameras without missing something and the recording is only being made of what the camera is viewing at any one time. The cost consultant makes his estimate after seeing a drawing of an empty gallery and before hanging-walls and display cases are added. (Besides I can buy four fixed cameras for the price of one PTZ camera and watch and record everything all at the same time).

Avoid having champagne tastes if you only have a beer pocketbook. Let us do what we do. We will provide a Basis for Design Report for your review and approval, and we expect that you will either agree to it or reject it. We expect that later in the project you won’t change the rules and ask us to redesign for some technology we know you can’t afford based on something you saw in a science fiction movie. My experience has been that every budget problem resulting in the need for value engineering or redesign have generally been the fault of the client not being able or willing to discuss budget expectations early in the project with the consultant and wanting more than they can afford only to request a redesign when the reality of the budget shocks them back to reality. You need to trust the experience of your experts and let them give you the best security your budget permits and that meet all codes, standard and security guidelines. Expect that if you change the rules after the consultant has devoted hundreds of hours of time doing the scope of work you agreed to, you will be billed for a redesign that further erodes your budget.

working relationship with them through the project and need to avoid conflict. Stabbing one's client with a ballpoint pen is rarely productive.

My estimate at the Construction Document Phase is usually accurate to 10% and often more accurate than that.

Don't Let Your Consultants or Your Security Director Waste Your Money and Your Risk Your Security

I love technology. I would like nothing more than to work for a client with sufficient money to use the latest state of the art security systems and equipment. I don't mean the stuff we all consider state of the art. I mean DOD level stuff you and I have never even dreamed existed. Unfortunately, these clients don't exist. Today every client wants me to design a system for them that uses artificial intelligence. I refuse. I don't want AI anywhere near your alarm and access control system. During the design process I design into the system many countermeasures that help prevent someone from hacking into your system or infecting your network or introducing a denial-of-service attack so as to bring your computer-based alarm and access control system down and enabling someone to break in and rob your museum. Obviously, I can't discuss these countermeasures here. But after spending tens of thousands of dollars securing your system from cyber-attack, I have clients who insist that I find a way to include AI so that the systems can replace a fifteen dollar per hour guard. At least when an alarm occurs, the guard can respond. We are decades away from having AI that can respond. But think about that. After making the network resistant to hacking I am asked to take an intelligent entity and place it inside your system. It has little to do but sit there and study your system from the inside and if it chose to do so to try to figure out your passwords

Artificial Intelligence available commercially to the public (not the Department of Defense) is not sufficiently secure that we can't be sure that someone can't remove the guardrails built in that prevent the AI from being party to a robbery of your museum. If AI decided—or was instructed—to try to steal your password it is sitting inside your computer wide awake amusing itself, surfing the web or talking to other AI with plenty of time to write its own program that would run billions of combinations of password strings until it eventually hits the correct combination. AI can gather every bit of information an outsider needs to rob your museum and easily email it out of your computer to its accomplice. Our countermeasures prevent hacking in not hacking out. The very worst thing we can do is introduce AI to our security systems

Further, everything you ask AI or assign it to do, every photo you upload, everything you tell it, is now sitting on a server in a data center and can be shared with other subscribers to that AI. Nothing is private and everything is being used to further train AI.

How many years has Windows been on the market? It has been decades. Nevertheless, every Tuesday Windows is updated with more fixes to prevent people from successfully hacking it. All these years and it is still a vulnerability. Yet clients want me to specify for them the latest new products still running their version 1 software on a Windows computer. I do not experiment with my clients. We buy and test security products constantly and are able to compromise most of them. Our products of choice are the ones that have been around a long time and have shown that they are effective and reliable and that all of the bugs have been fixed. You might say that we are doing you a disservice when we do this. This is not true. The systems we specify for you are used to protect the White House, dozens of museums including the Smithsonian, every Bank of America branch in the world, and military bases. I understand that you want bragging rights with your colleagues that you have the newest product available, but my job is to make your museum secure, not make it less secure.

I also select products that are made by financially sound companies not likely to be acquired by third parties. I want you to be able to get service for your systems ten years from now. Any security consultant or engineer who doesn't follow this philosophy better have good insurance and you should not hire them b=to be your consultant.

So how bad is AI? First let me say that I am obviously not a Luddite afraid of the newest technology. I just don't trust that companies haven't put products with vulnerabilities on the market to help their stock market price. It was recently reported that Microsoft's new AI included with Office 360 has been found to be surfing your company network and stealing documents created with Office. It sends the files to a data center and uses it to train other AI. Remember that risk assessment survey I did for you last year. You stored it on a folder on your computer or in the company cloud. Well, it may very well be in some server being used to train AI meaning it is accessible to anyone with access. It may also be revealed in whole or in part by AI responding to a request from another Microsoft customer.

["Tech Radar Pro"](#) newsletter reports that a recent study revealed that Microsoft Copilot, Microsoft's AI tool, has access to millions of files on company networks potentially including, in the case of museums, collection records, shipping schedules, donor information, insurance values of your collection, institutional financial data, HR data, and possibly even information such as guard patrol schedules, access system data, alarm schedules, access system passwords, incident report information, and other highly confidential information. In another article in the computer trade press, the author stated, "...if they are not secure, AI deployments can lead to more problems than benefits. Without proper safeguards, AI can introduce vulnerabilities that open the door to cybercriminals rather than strengthen defenses. He went on to say, "Unfortunately organizations are not thinking enough about security. 77% of organizations lack foundational data and AI security practices and only 20% express confidence in their ability to secure generative AI models."

Deploying AI without security can be a major risk. The article said that "rushing ahead without securing these systems is like building a skyscraper on sand," and he was referring to systems like your HR database, Excel and Microsoft Word. Now imagine the risk when AI is part of your alarm, access control or CCTV systems.

I have been studying AI for years and can give you many additional examples of why I am fearful of much of the new technology today until it has been carefully tested.

If you are a consultant please do not put your clients at risk just so you can say you designed a high-tech system that gives bragging rights to your client and you.

Buying the Building

There are several ways a building owner can contract for the construction of a building (or design and construction of a building) and have the building built. Your architect will discuss these with you and help you make a decision, or you may have already made your decision to engage a design-build firm from the very beginning of the project. I am discussing this here so that you are aware of the various options. This is especially useful information for the consultants involved because in some methods, decisions must be locked in early in the process and this can be problematic if your museum client has difficulty making decisions or is prone to make changes down to the very end of the project. In nearly all of the projects I have worked on, I submitted my proposal and signed the contract before the method of contracting with the general contractor was known. With some methods my work as a consultant requires more time so if I had known the procurement method, I may have set higher fees reflecting the additional time involved. Let's look briefly at the various methods of contracting for the design and construction of a building

When a new building is constructed, the owner must decide how the project will be contracted and managed. This decision determines how the architect, engineers, and contractors interact with one another and with the owner. The contracting method affects the project's cost control, schedule, risk allocation, and the level of collaboration among the parties involved. Several common construction delivery methods are used in the building industry, including Design-Bid-Build, Design-Build, Construction Manager at Risk (CMAR), and Construction Management as Agent (often called GMO or CM-Agent). Each method has advantages and disadvantages depending on the owner's goals and the complexity of the project.

The Design-Bid-Build method is the traditional and historically most common approach to constructing buildings. In this model, the owner first hires an architect and engineering team to design the project. The design is completed in phases—concept design, schematic design, design development, and construction documents—until a full set of drawings and specifications is produced. Once the design is complete, contractors are invited to submit bids based on those documents. The contract is then awarded to the lowest responsible bidder.

One advantage of Design-Bid-Build is that it provides the owner with a clear competitive bidding process that often results in a predictable construction price. Because the design is completed before bidding, contractors are pricing the same set of documents, which can promote fairness and transparency. This method is particularly common in public sector projects where procurement rules require open bidding.

However, Design-Bid-Build also has disadvantages. Because the contractor is not involved during the design phase, opportunities for cost-saving construction input may be missed. In addition, if design errors or omissions occur, they may lead to change orders once construction begins, potentially increasing cost and delaying the schedule. The sequential nature of the process—design first, then bidding, then construction—can also extend the overall project timeline. If you are constructing an office building, there might be less concern about which CCTV system you include in the project than there would be in a museum. But if you are building a museum, you may want a specialty CCTV system that also functions as a video-based object protection system. If the general contractor is not a specialist in museum security, he may not be aware of the specialty equipment used in museums and you may end up with the same CCTV system he uses in all of his projects but has no object protection capabilities whereas if your design team consists of people chosen because they are specialist in

museum projects you are more likely to get the HVAC, lighting, security and other specialty systems museums need. So, the contractor not being involved in the design process is not always a disadvantage.

Another widely used delivery method is Design–Build. In this approach, the owner hires a single entity—the design-builder—to provide both design services and construction services under one contract. The design-builder may be a construction company with in-house architects and engineers or a joint venture between a contractor and a design firm.

Design–Build offers several advantages. Because design and construction are integrated under one contract, communication and coordination are often improved. The contractor’s construction expertise can be incorporated early in the design process, which may reduce costs and improve constructability. Additionally, design and construction phases can overlap, which often shortens the project schedule. The owner also benefits from having a single point of responsibility for the entire project.

The disadvantages of Design–Build include reduced direct control by the owner over design decisions. Since the design-builder controls both design and construction, the owner must rely heavily on the performance specifications and trust that the design-builder will meet the project’s quality expectations. In some cases, the competitive bidding aspect may also be reduced because the design-builder is selected before the final design is completed. If the museum wants the building designed by a world-famous architect, this method may not be their choice.

A third method is Construction Manager at Risk (CMAR). In this model, the owner hires a construction manager during the design phase to provide input on cost estimating, scheduling, and constructability. Later, the construction manager becomes the general contractor and guarantees the project will be built for a Guaranteed Maximum Price (GMP).

The advantage of CMAR is that the contractor’s expertise is introduced early in the project, helping the design team develop a more practical and cost-efficient design. The Guaranteed Maximum Price also provides the owner with a level of cost protection. Because the construction manager assumes financial risk for delivering the project within the GMP, they are motivated to control costs and manage subcontractors effectively.

The disadvantages of CMAR include a somewhat reduced level of price competition compared with traditional bidding. Although subcontractors are usually bid competitively, the owner has already selected the construction manager before the final price is established. Additionally, if the design is not well developed when the GMP is established, changes can still result in additional costs. In this method, the owner better hire experienced and skilled consultants and engineers because specifying performance requirement for an alarm system is difficult leaving you open to the contractor providing you with the lowest cost system available. In my experience, if the architect lacks discipline in-house and is still working out details of custom specialty items like louvers on skylights to control lighting and custom wood slatted ceilings, I as the security consultant have been unable to finish my work because what I specify will depend upon their final decision. I have had many GMP project drawings and specs in the hands of the contractor before they were completed due to such indecision and this creates more work and more liability for me.

Another approach is Construction Management as Agent, sometimes referred to as CM-Agent or GMO (General Management Organization). In this method, the owner hires a construction manager who acts as the owner’s advisor rather than the builder. The construction manager helps coordinate the project, schedules work, and manages contractors, but does not perform construction or hold the trade contracts. Instead, the owner contracts directly with each trade contractor, such as electrical, mechanical, and structural contractors.

The advantage of this method is that it gives the owner a high level of control over the project. Because the owner holds the contracts with each trade contractor, the construction manager acts purely in the owner's interest. This approach can also create cost transparency because the owner sees the actual bids from each trade contractor.

However, the CM-Agent method places more responsibility and risk on the owner. The owner must manage multiple contracts, and if disputes occur between trade contractors, the owner may need to resolve them. This method therefore works best for experienced owners who have the organizational capacity to oversee complex projects.

Other variations also exist, such as Integrated Project Delivery (IPD), where the owner, architect, and contractor enter into a collaborative contract that shares risks and rewards. This model encourages close teamwork and transparency but requires a high level of trust and cooperation among all participants.

In summary, the method used to contract for building construction significantly influences how the project will proceed. Traditional Design-Bid-Build offers strong price competition and clear separation between design and construction but may result in longer schedules. Design-Build provides a single point of responsibility and faster delivery but gives the owner less direct design control. Construction Manager at Risk combines early contractor involvement with a guaranteed maximum price, while CM-Agent or GMO provides strong owner oversight but requires the owner to assume greater management responsibility. Choosing the appropriate method depends on the owner's priorities for cost, schedule, risk, and level of control.

Basis of Design Report

A Basis of Design (BOD) Report is an important document developed during the design of a new building project. It explains the technical reasoning, assumptions, criteria, and standards that guide the design of the building and its systems. While project drawings and specifications show what will be built, the Basis of Design explains why the design team made specific decisions and how the design meets the owner's needs. In essence, it serves as the technical bridge between the owner's goals and the final design solutions created by the project team.

The primary purpose of a Basis of Design Report is to translate the Owner's Project Requirements (OPR) into a clear and coordinated design approach. The OPR describes what the owner wants the building to accomplish—such as performance targets, sustainability goals, space requirements, operational expectations, and budget constraints. The BOD describes how the design team intends to achieve those goals through architectural, structural, mechanical, electrical, plumbing, and fire protection systems. By documenting these decisions early and updating them as the project progresses, the report ensures that the entire design team shares a common understanding of the project objectives.



Another key purpose of the Basis of Design Report is to promote coordination among the various design disciplines. Modern buildings are complex systems where architectural features, structural systems, and building services must function together. The BOD provides a central reference that outlines system selections, design criteria, and performance expectations for each discipline. This documentation helps prevent misunderstandings and conflicts between team members and ensures that the design remains consistent with the original intent throughout the design and construction process.

The report also plays a crucial role in commissioning, which is the process of verifying that building systems are installed and operate as intended. Commissioning agents use the BOD as a benchmark to test building systems and confirm that they meet the design criteria established by the design team. Without a clearly written Basis of Design, it would be difficult to determine whether a system is performing as expected. In addition, the document becomes a valuable resource for facility managers and operations staff after construction, providing insight into system capacities, control strategies, and the assumptions used during design.

A typical Basis of Design Report begins with a project overview, describing the building type, size, location, occupancy, and general project goals. This section may also summarize the owner's expectations for building performance, sustainability, and functionality. The report then identifies the codes, standards, and regulations governing the project, such as building codes, energy codes, accessibility requirements, and relevant industry

standards. Establishing these regulatory frameworks ensures that all design decisions comply with legal and safety requirements.

Another important component of the report is the description of design criteria and assumptions. This section outlines the environmental conditions and performance targets used to size and select building systems. Examples include outdoor temperature ranges, wind and seismic loads, indoor comfort conditions, ventilation rates, and lighting levels. These criteria serve as the technical foundation for the engineering calculations that follow.

Each major design discipline then contributes its own section to the Basis of Design. The architectural section typically addresses building orientation, envelope performance, materials, and strategies for daylighting and energy efficiency. It may describe the building's spatial organization and the performance characteristics of walls, roofs, and glazing systems. The structural section explains the structural system chosen for the building--such as steel framing, reinforced concrete, or composite construction--and identifies design loads, foundation strategies, and considerations related to wind or seismic forces.

The mechanical engineering section generally provides the most detailed information, as heating, ventilation, and air-conditioning systems play a major role in building performance and occupant comfort. This section describes the selected HVAC system type, the basis for heating and cooling loads, equipment capacities, ventilation strategies, and control approaches. It may also include information about energy recovery systems, filtration levels, and sustainability features intended to improve energy efficiency.

The electrical section outlines the building's electrical infrastructure, including utility service, voltage levels, power distribution, lighting design, and emergency power systems. It also explains lighting control strategies and energy-efficient technologies such as LED lighting or daylight sensors. The plumbing section addresses domestic water supply, sanitary drainage, stormwater management, water heating systems, and fixture requirements. Similarly, the fire protection section describes the fire suppression and alarm systems, including sprinkler types, fire pumps, standpipes, and other life-safety features required by code.

Many Basis of Design Reports also include a section on energy and sustainability strategies, especially for projects pursuing high-performance building standards or green building certifications. This section may discuss energy modeling assumptions, target energy use intensity (EUI), renewable energy systems, and water conservation measures. Another valuable section describes control strategies and sequences of operation, explaining how building systems will function during different conditions such as occupied hours, unoccupied periods, or emergency events.

In some cases, the report may also summarize design alternatives that were considered and explain why the final system selections were made. Documenting these decisions helps owners and project stakeholders understand the rationale behind major design choices. Finally, the report may include preliminary equipment schedules, system capacities, and commissioning requirements that define how building systems will be tested and verified during construction.

The preparation of the Basis of Design Report is a collaborative effort involving the entire design team. Architects, structural engineers, mechanical engineers, electrical engineers, plumbing engineers, fire protection specialists, and sustainability consultants all contribute to the document. Each discipline provides the technical explanation for its respective systems while coordinating with the others to ensure an integrated and coherent design.

In summary, the Basis of Design Report is a foundational document that explains the technical reasoning behind a building's design. It documents how the design team interprets the owner's requirements and translates them into specific systems, performance criteria, and engineering solutions. By clearly communicating design

intent, facilitating coordination among team members, and supporting commissioning and building operations, the Basis of Design Report helps ensure that the final building performs as intended and meets the owner's expectations.

Working With Historic Fabric or With Preservation Requirements

When a building with historic or highly decorative architectural features is renovated, the design process must carefully balance the need for modernization with the responsibility to protect and preserve the building's historic character. This character is often described as the building's "historic fabric", a term that refers not only to the original materials and construction of the building but also to the visual qualities, craftsmanship, spatial relationships, and overall atmosphere that give the building its historical and architectural significance. Preserving the historic fabric of a building is an important goal in many renovation projects, particularly when the building is historically designated, culturally significant, or architecturally distinctive.

Historic fabric includes the physical components that were originally part of the building or that contribute to its historic character. These components may include structural elements, walls, floors, ceilings, moldings, windows, doors, decorative finishes, and ornamental details. In many historic buildings, these elements reflect traditional craftsmanship and materials that may no longer be commonly used in modern construction. For example, historic plasterwork, carved wood paneling, decorative stonework, and original lighting fixtures may all contribute to the building's historic identity. Preserving these elements helps maintain the authenticity of the structure and allows the building to continue telling the story of its historical context.



However, historic fabric extends beyond individual materials or decorative elements. It also includes the visual and experiential qualities of a space, such as its proportions, lighting conditions, color palette, and the relationships between architectural elements. The character of a historic space may be defined by how light enters through original windows, the scale of rooms and corridors, or the way decorative features frame views within the building. Allow me to use Mount Vernon, home of George Washington, as an example. This important

historic site has fought hard to protect its view scape across the river so that visitors see exactly what President Washington saw when he sat on his porch. Exterior lighting remains dim, just as it was when his guests arrived for dinner and it is the responsibility of the security system designer to not only conceal modern CCTV cameras from view but also to make them work in almost total darkness. These qualities contribute to the atmosphere or sense of place that occupants experience. For this reason, preserving historic fabric requires careful attention not only to physical materials but also to the broader visual environment and architectural composition.

During the design process for a renovation, architects and preservation specialists begin by documenting and evaluating the existing historic conditions. This often includes historical research, detailed surveys, photographs, and drawings that record the building's current state. By studying original construction methods, materials, and decorative features, the design team gains an understanding of which elements are historically significant and

should be preserved. In many cases, preservation guidelines or regulatory requirements—such as local historic preservation ordinances or national preservation standards—provide additional direction on how historic buildings should be treated.

Once the historic elements of the building are identified, the design team develops strategies to protect and integrate them into the renovation design. One key principle in historic preservation is to minimize alterations to original materials and features whenever possible. Instead of removing or replacing historic elements, designers aim to repair and conserve them. For example, damaged plaster or woodwork may be restored by skilled craftspeople rather than replaced with modern materials. When new systems or equipment must be added to the building, designers often look for ways to incorporate them without disturbing the original architecture. This may mean that new alarm system wiring must use existing holes drilled in previous installations when running wires and mounting the detector on a small stand behind doors that would be in plain view normally but are out of sight from the perspective of visitors on a tour. My company’s philosophy is to never damage elements like historic moldings even if it means running a camera or alarm wire a short distance over the surface rather than behind the moldings. We are just one generation from wireless systems and long-life batteries that can comfortably be used, and I don’t want to be the guy who damaged the moldings or drilled unnecessary holes. The final decision of exactly what is to be done to solve each challenge rests with the architect and preservationist. The final agreed upon means of installation must be carefully defined in the plans and specification given to bidders. Only bidders who have demonstrated skill and craftsmanship on past projects are invited to bid to assure absolute compliance with preservation requirements

Another important principle is that new interventions should be carefully integrated so that they do not visually overwhelm or detract from the historic character of the building. Modern building systems—such as lighting, mechanical equipment, security systems, or fire protection systems—are often necessary to meet current building codes and operational needs. However, these systems must be installed in ways that minimize their visual impact. Designers may choose locations that are less visible, conceal equipment within architectural features, or route wiring and piping through existing cavities or service spaces. By thoughtfully integrating modern elements, the design team can maintain the historic appearance and atmosphere of the building while still providing contemporary functionality. Camera based object protection systems like Art Sentry need to be carefully detailed and installed to make them nearly invisible.



Lighting design can play an especially important role in preserving the character of historic spaces. Both natural and artificial lighting contribute to how architectural features are perceived. When new lighting is introduced, designers must consider how it will affect the appearance of historic materials, colors, and decorative elements. In some cases, lighting may be designed to highlight important architectural

details or to recreate the ambiance that originally characterized the space.

The preservation of historic fabric also requires careful construction planning and oversight. During construction, contractors must take precautions to protect historic materials from damage. This may involve covering or temporarily enclosing delicate features, controlling dust and vibration, and restricting certain construction methods that could harm fragile surfaces. Preservation projects often involve specialized craftsmen and conservators who have expertise in traditional materials and restoration techniques.

Throughout the design and construction process, architects must balance preservation with adaptation. Historic buildings often need to accommodate new uses, accessibility requirements, and modern safety standards. Achieving this balance requires creativity and sensitivity. Designers must find ways to introduce necessary upgrades while respecting the historic character that makes the building valuable. In some cases, new elements may be designed to be distinguishable from the original fabric so that the history of the building remains legible, while still harmonizing with the existing architecture.

In summary, historic fabric represents the physical materials, craftsmanship, spatial qualities, and overall atmosphere that define the historic character of a building. Preserving this fabric is a central goal when renovating buildings with significant architectural or cultural value. Through careful documentation, thoughtful design strategies, and sensitive construction practices, architects and preservation specialists work to protect historic features while allowing the building to continue functioning in a modern context. By respecting the integrity of the historic fabric, renovation projects can extend the life of historic buildings and ensure that their architectural heritage remains visible and meaningful for future generations.

Work Beyond the Construction Area

Some of the most complex projects I have been involved with involved additions to existing buildings. In these projects the museum generally assumes that they can just add the additional security detectors and cameras to the existing systems, and everything will be just fine.

This may be true if you recently upgrade

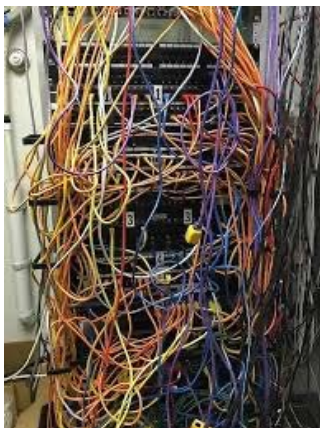
d your systems and we will be working with a current product. But you should not assume that someone can just snap their fingers and make this plan work. Never make this assumption.

If this is your plan, you need to verify whether this will work, and if it will work, whether it is in your best interest to use the existing system. For sure, you need one system that serves the entire building. Your idea is not a bad one. But with technology changing yearly, it may actually be more expensive to expand the existing systems into the new wing than it would be to upgrade it to a new system. And if you contract with the architect to design a new wing, that is all he will do unless you amend his contract to include work beyond the new construction area. So, you need to know if it is feasible to expand the existing systems before you hire your architect.



Elsewhere I discuss the role of the security consultant. Assessing your existing systems and determining if it is feasible to expand it would be part of his or her pre-construction duties. The consultant will determine the following:

- Is this a panel-based system or a computer-based system? If it is a panel-based system, it most likely won't be able to be expanded and still perform effectively. If it can be expanded it might still require buying more hardware and since this is old technology, you will be saving a few thousand dollars now but facing major costs and construction disruptions again later.
- If this is a server-based system, is the server robust enough to handle the added devices?
 - Does the server's software require a software upgrade? Are additional software licenses required?
 - Is existing wire management problematic?
 - Do the alarm and reader control panels have spare capacity for inputs, outputs, and reader doors or are additional panels required? If so, how many?
 - If panels are otherwise adequate, do they need firmware upgrades?
 - What is the remaining service life of each detector, reader, electric lock, request to exist device, annunciator, etc.
 - If the product is existing system is replaced with a new one, do end of line resistors need to be replaced throughout the building?
 - Will existing detectors and annunciators work with a new system?



- Are there other reasons why the current system should be changed to a new product?
 - Is the UL listing adequate?
 - Has there been service issues that might be expected to continue?
 - Is the reader technology unsecure (mag stripe, Weigand)
 - What savings are there in buying a new system that is under warranty compared to buying a service agreement which is not needed during the warranty period?
 - Is your system leased or on any long term contracts that must be settled first?
- Similar questions need to be asked about the CCTV and object protection systems.

Your security consultant can tell you the advantages and disadvantages of expanding the existing system or replacing the existing system with a new system and expanding it into the new wing.

A pre-design assessment can also determine whether other areas of the building will be impacted by construction. For example, your alarm and access control system almost certainly consists of alarm panels, and computers connected to the server by a network. If that network runs through a demolition area and that network is cut, everything “down-stream” of the cut will go off-line. Provisions must be made for such outages, and the project sequence may require that work occur outside the demolition area to re-route existing wiring. A similar survey must be done for all existing systems. Make sure that your contract with the architect includes this work and budget accordingly. While I am addressing the impact on the security systems, there may be similar issues with utilities, the computer network, the HVAC system, etc.

Operationally, you need to visualize the disruptions to the property to determine its impact on parking, staging, after hour special events, deliveries, etc. and include them in your project by making alternate accommodations. Will the project interfere with access for the disabled? With school groups? Think seasonally. Will the storage of materials outside the building be an issue in hurricane season or fire season or during snow removal?

There is much to do before the real work gets started.

Protecting the Museum During Construction



From time to time, you may encounter an issue that is very difficult to deal with without careful planning. This occurs when construction creates conditions that put the building at risk that it may not normally face. At the Louvre in 2025, criminals climbed construction scaffolding around the building's exterior, entered the gallery via a window on an upper floor that is not normally alarmed, and stole the crown jewels of France. This should not have happened. As far back as 2007, I did a project that included a limited survey at the Louvre prior to a loan by an American museum and found a scaffold up the building to the gallery where my client's loan would be displayed and warned them about this.

But there are other conditions that occur that also need to be immediately identified and the risk abated. In one project I was involved with, the driving of pilings adjacent to an exterior museum wall caused extreme vibration to artwork hanging in the adjacent gallery. The vibration was sufficient to cause serious conservation concerns. On another project, the contractor knocked down an exterior wall of a gallery that was being renovated. While there were no collections in the construction area, someone could have walked through the gaping hole in the wall and move freely through the building stopped only by plastic dust barriers. The contractor had agreed to notify us should something like this occur, but they failed to do so.

Part of your job in the pre-planning is to plan for any possibility. In the first example, work was immediately stopped and artwork removed to secure storage, and in the latter example, we designed and had custom made some portable battery-operated pylons containing both wireless motion detectors and a wireless smoke detector that integrated with the building's alarm system. Designed with an attached hand truck, the security director wheeled in a half dozen of these pylons and turned them on. Within minutes the gaping holes in the wall, now covered with plastic sheeting, were securely alarmed. A portable alarm system like these custom designed pylons could have detected the intruders at the Louvre.

I recommend that you prepare--or have your attorney prepare--legal requirements defining the responsibility of the general contractor for making sure that the construction area is kept free of debris daily, that might facilitate the spread a fire, always provide a fire watch at the end of the day and during welding and similar defined activities, and assure that their employees and sub-contractors cooperate with safety, fire, and security requirements and security policies. The museum's security director and shift commanders should



oversee a plan to maintain security during utility outages, water line breaks, chemical spills and adverse environmental events, and other dangerous incidents. He or she should audit activity on the construction site to assure compliance.

Every project is different so I can't provide further advice here. Include your owner's representative and security consultant in the identification of what might go wrong on your project and take decisive action to have the resources on hand to resolve issues effectively.

Architectural Design Drawings

In a new building construction or major renovation project, the architect and the design team produce a comprehensive set of construction drawings that visually describe the design and provide the technical information needed for contractors to build the project. These drawings are part of the contract documents and are used for permitting, bidding, construction, and coordination among the various trades involved in the project. Each type of drawing serves a specific purpose and communicates different aspects of the building's design, dimensions, materials, and systems.



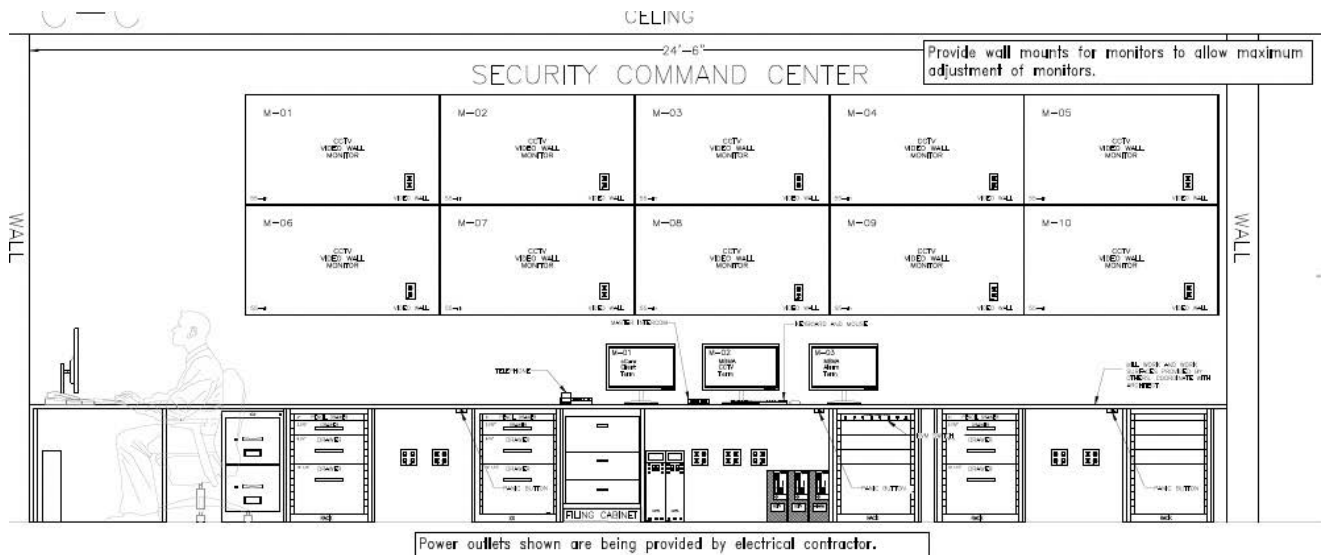
One of the most fundamental drawings produced by the architect is the site plan. The site plan shows the location of the building on the property and illustrates how the building relates to surrounding features such as property boundaries, streets, sidewalks, parking areas, landscaping, and utilities. It typically includes building setbacks, grading information, and access points for vehicles and pedestrians. The purpose of the site plan is to demonstrate compliance with zoning requirements and to guide the construction of site improvements.

Another essential set of drawings is the floor plans. Floor plans are horizontal sections through the building that show the layout of rooms, corridors, walls, doors, windows, and major fixtures on each level of the building. They indicate dimensions, room names, and circulation patterns, providing a clear representation of how the building will function internally. Contractors use floor plans to understand the spatial organization of the building and to construct walls, openings, and other architectural elements accurately.

The architect also produces building elevations, which are exterior views of the building from each side. Elevations show the appearance of the building's façade, including materials, windows, doors, rooflines, and architectural features. These drawings communicate the aesthetic design of the building and provide information about vertical dimensions, heights, and exterior finishes.

Closely related to elevations are building sections. A section is a vertical cut through the building that reveals how different components are assembled from the foundation to the roof. Sections show the relationship between floors, walls, ceilings, structural elements, and roof systems. They help contractors understand how building systems are layered and connected, and they clarify important height relationships that may not be obvious in floor plans.

The design team also prepares detail drawings, which provide enlarged views of specific parts of the building where precise construction information is required. Details might illustrate how a window is installed in a wall, how roofing connects to a parapet, or how materials meet at corners and joints. These drawings help ensure that complex assemblies are constructed correctly and perform as intended.



In addition to architectural drawings, the engineering consultants on the design team produce specialized drawings for the building's structural and building systems. The structural engineer prepares structural drawings, which show the structural framework of the building, including foundations, columns, beams, slabs, and structural connections. These drawings ensure that the building will safely support its loads and meet structural design standards.

The mechanical engineer produces mechanical drawings that illustrate heating, ventilation, and air-conditioning (HVAC) systems. These drawings show equipment locations, ductwork, piping, air distribution systems, and control components. Their purpose is to ensure that the building's environmental systems provide adequate comfort, ventilation, and energy performance.

The electrical engineer prepares electrical drawings, which show power distribution systems, lighting layouts, electrical panels, wiring routes, and emergency power systems. These drawings guide the installation of electrical infrastructure needed to power the building and provide lighting and communication systems.

The plumbing engineer produces plumbing drawings that describe domestic water supply systems, sanitary drainage, stormwater systems, and plumbing fixtures. These drawings indicate pipe routing, fixture locations, and system connections required to provide water and remove wastewater safely and efficiently.

In addition to these major categories, the design team may also produce reflected ceiling plans (RCPs), which show ceiling layouts, lighting fixtures, air diffusers, and other elements mounted in the ceiling. These drawings help coordinate lighting, mechanical systems, and ceiling materials within interior spaces.

Another important type of drawing is the schedule, which is usually presented as a table within the drawing set. Schedules provide detailed information about repetitive elements such as doors, windows, finishes, and equipment. For example, a door schedule lists the size, type, material, hardware, and fire rating of each door in the project.

Together, these drawings form a coordinated set of visual instructions that communicate the design intent and technical requirements of the building. Their overall purpose is to clearly describe the building's form, layout, materials, and systems so that contractors can accurately estimate costs, obtain permits, and construct the project according to the design developed by the architect and engineering team. By providing precise information and coordinated documentation, the drawings help ensure that the finished building meets the owner's functional, aesthetic, and performance expectations.

AutoCAD 2D or REVIT BIM 3D Drawings?

Architects will draw your building using computer aided drafting (CAD) software. The standard in the industry is AutoCAD. All consultants are required to also work in AutoCAD. In recent years we were occasionally required to work in a software called REVIT BIM on several projects. This is important to understand for a couple of reasons. Facility Managers often prefer BIM for reasons that may become obvious after reading this chapter. There are also many advantages for electrical and mechanical engineers to work in BIM. For example, if the electrical engineer runs conduit through a space already scheduled to be occupied by ducts drawn by the mechanical engineer, the software alerts both members of the design team that there is going to be a problem so that one of them can find another pathway. Once a building is drawn in CAD, built and put into service, the facility manager needing to replace a light fixture need only click on the symbol for the light fixture on the plan, and the make, model and manufacturer for that fixture appears on the screen. And during the design phase, the museum director, wishing to see what her new gallery might look like can take a virtual tour through the space on the computer.

The problem is that this is new changing technology and the software is expensive. There is a long learning curve for an experienced AutoCAD operator to master the new powerful software. And all of this is expensive, a cost that the museum ultimately pays. My fees are just a tiny part of the building design costs but I add at least eight thousand dollars to my fees if I am required to design in REVIT BIM. I pay several thousand dollars per license per year for my several CAD operators to have this software on their desktop and laptop computers.

Since security products are constantly changing, we need to do a thorough review of our “go to” products prior to each job to make sure that the information we input into the database for each is up to date, and we needed to add new products to the database prior to using them on a project. This might take an hour or more per device. I pay about \$4,000 per year for just one software license for one computer and your project may last several years. Since I need a copy of the software on my office computer and my laptop so I can reference the BIM model while visiting the jobsite, I actually need more than one license. Small companies that don't have multiple major projects in progress at one time have no choice but to pass these costs on to you.

If your architect sees overall savings by using REVIT BIM, then this is no problem. They may have decided to use REVIT BIM for all drawings. But I am certain that for years to come, smaller companies like your security consultant, lighting consultant, and other specialty consultants will charge as much as 25% more in fees to use REVIT BIM. While BIM was the craze when it first came out, fewer projects are requiring it for systems like security. You really don't need a 3D view of your alarm system.

When you commission a new building, you need to ask yourself whether you really need this extra cost.

If you are the security consultant and you are negotiating a project, with an architect you need to make it clear that the price quote you offer is for AutoCAD and that if the architect wants your devices in the BIM model, they will have to input this themselves. The architect will be placing your ceiling mounted devices on his reflected ceiling plan and your wall mounted devices on his elevations and your system's conduit and power will be drawn by the electrical engineer so there is no reason for your flat floor plans to be created in 3D. Since REVIT BIM was released, I only lost one job because I was not comfortable working yet in a new complex technology.

So, what do you need to know about CAD technology?

In the design and construction industry, the terms AutoCAD, Revit, and BIM (Building Information Modeling) are often used together, but they refer to different concepts and tools. Understanding the distinctions between them is important for anyone involved in architecture, engineering, construction, or specialized consulting fields such as security system design for buildings and museums.

AutoCAD is a computer-aided drafting (CAD) software program developed by Autodesk. It was introduced in the early 1980s and became the standard digital replacement for manual drafting on paper. In AutoCAD, designers create precise two-dimensional drawings and, in some cases, simple three-dimensional models. These drawings represent elements of a building such as floor plans, elevations, sections, and technical details.

In practice, AutoCAD functions primarily as a digital drawing board. Lines, arcs, and shapes are used to represent walls, doors, equipment, and other building components. However, these objects are essentially graphic representations rather than intelligent building elements. A wall drawn in AutoCAD is simply a collection of lines unless the user manually assigns additional information to it.

For many decades, AutoCAD was the dominant tool used by architects, engineers, and consultants. Even today it remains widely used for shop drawings, construction details, and specialized technical diagrams, particularly when the goal is to produce precise documentation rather than an intelligent building model.

Revit, also developed by Autodesk, represents a different approach to building design. Revit is software specifically created to support Building Information Modeling, often abbreviated as BIM. Instead of drawing buildings as collections of lines, Revit models buildings as digital representations of real physical components.

In Revit, a wall is not merely two lines on a drawing. It is a wall object that contains information about its thickness, materials, fire rating, insulation, structural properties, and relationships to other building elements. Doors know which walls they belong to. Windows cut openings automatically. Ceiling heights, structural beams, lighting fixtures, and mechanical equipment all exist as parametric objects with embedded information.

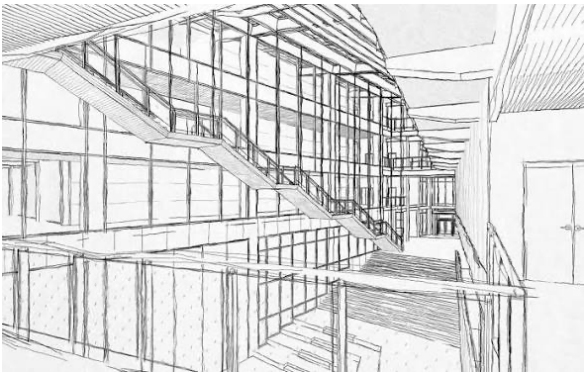
Because these objects contain data, a Revit model acts as a centralized database of the building. When a change is made in one view of the model, the change automatically updates everywhere else. For example, if a door is moved in the floor plan, it will also move in the elevation, section, and schedule. This dramatically reduces coordination errors and improves collaboration among design professionals.

While Revit is software, BIM is a broader concept or methodology. BIM refers to the process of creating and managing digital information about a building throughout its entire lifecycle, from planning and design to construction and even long-term facility management.

In other words, BIM is not a specific computer program. It is a way of working in which all building components are represented as intelligent digital objects that contain information useful to architects, engineers, contractors, and building owners.

Revit is one of the most widely used software platforms designed to implement BIM, but it is not the only one. Other software systems can also support BIM workflows. What defines BIM is the integrated digital model and the shared data environment, not the particular software used.

The difference between AutoCAD and Revit therefore reflects a fundamental shift in the design industry. AutoCAD is primarily a drawing tool, whereas Revit is a building modeling platform. AutoCAD focuses on



producing documents that represent a building, while Revit focuses on constructing a digital building model from which documents are generated automatically.

The difference between Revit and BIM is more conceptual. Revit is a software application, while BIM is the overall methodology or process of creating and managing building information in a coordinated digital model.

To summarize, AutoCAD allows professionals to draw buildings accurately in two dimensions, much like digital drafting. Revit enables designers to construct an intelligent digital model of a building with embedded data about every component. BIM, in turn, is the broader philosophy and workflow that uses tools like Revit to manage building information across the entire design, construction, and operational lifecycle.

This shift from drafting to modeling has transformed modern building design. Projects today increasingly rely on BIM models to coordinate architecture, structural engineering, mechanical systems, electrical systems, and specialized systems such as security and life safety. For consultants working in fields such as museum security or building technology integration, understanding these differences is essential because design coordination increasingly occurs within BIM environments rather than through traditional CAD drawings.

Other Project Drawings

In addition to the architectural and engineering drawings prepared by the design team, several other types of drawings are commonly used during the design and construction of a new building or major renovation project. These drawings provide important information about the existing site or building conditions, the fabrication and installation of building components, and the final configuration of the completed work. Three common types of drawings used in this process are existing conditions drawings, shop drawings, and record drawings (often called as-built drawings). Each serves a different purpose and is prepared by different parties involved in the project.

Existing Conditions Drawings

Existing conditions drawings are prepared at the beginning of a project to document the current state of a site or building before design and construction work begins only if needed. These drawings are especially important for renovation or expansion projects, where the design team must understand the layout, structure, and systems of an existing building. Existing conditions drawings typically include floor plans, elevations, and sections showing the current configuration of walls, structural elements, mechanical systems, and other features. They may also include site information such as property boundaries, utilities, and topography. The purpose of these drawings is to provide accurate baseline information so that the architect and engineers can develop a design that integrates properly with the existing structure or site conditions. Existing conditions drawings are usually prepared by the architect or design team, often based on field measurements, site surveys, and information from previous drawings or records. In some cases, specialized surveyors or consultants may assist in documenting structural, mechanical, or utility systems. You may be asked to provide these if you are working on a major system upgrade on a project with no architect involved. I only prepared them a half dozen times in forty years.

drawings to the owner. I always specify that the security contractor will modify his shop drawings in real time in the field as changes are made or conditions require and that he convert them to as-built drawings before final payment is issued. If you don't do this, you will have to prepare them.

In summary, existing conditions drawings, shop drawings, and record drawings each serve distinct roles in the building process. Existing conditions drawings document the starting conditions of the project and are typically prepared by the architect or design team. Shop drawings provide detailed fabrication and installation information for specific building components and are prepared by contractors or manufacturers, then reviewed by the architect and engineers. Record drawings document the final constructed conditions of the building and are generally compiled by the contractor at the completion of the project. Together, these drawings help ensure that the project is accurately documented from the initial investigation of existing conditions through construction and final project completion.

Reflected Ceiling Plans

A Reflected Ceiling Plan (RCP) is a drawing that shows the layout and components of a building's ceiling as if the viewer were looking down at a mirror placed on the floor that reflects the ceiling above. Its purpose is to clearly communicate the design, location, and coordination of all elements that are attached to or integrated into the ceiling. An RCP is not included in the security consultant or engineer's submittals, but the specifier generally coordinates the exact placement of ceiling mounted security devices with the architect who places them on the RCP and includes an RCP in the drawing package.

While reflected ceiling plans are primarily prepared by the architect, although they incorporate information from mechanical and electrical engineers and other consultants. The drawing typically shows ceiling heights, ceiling materials, soffits, and ceiling patterns. It also identifies the locations of items installed in the ceiling such as lighting fixtures, air diffusers and grilles, sprinkler heads, speakers, smoke detectors, access panels, and other ceiling-mounted devices.

One of the main purposes of the RCP is to coordinate multiple building systems within the ceiling space. Because lighting, HVAC equipment, fire protection components, and communication devices often share the same ceiling area, the reflected ceiling plan helps ensure that these elements are properly arranged and do not conflict with each other. It also helps contractors understand where to install each device relative to the architectural layout.

The security system designer's primary responsibility is to work with the architect to make sure that security equipment is not obstructed or diminished. Motion detectors, for example, cannot be immediately next to an air supply. A camera should not be immediately next to a light can due to the heat generated by the light fixture. And most security device should not be obstructed so that they are useless. Remember that light fixtures are constantly being re-aimed as exhibits change so some thought must go into camera and detector placement to make them unlikely to be obstructed. A camera that looks directly into a bright light or views the back of a light



can be useless. It should be noted that architects protect their ceilings like they are holy temples that cannot be visually compromised. If they could get away with having nothing whatsoever on their ceilings, they probably would. At the same time, one ceiling mounted motion detector is equal to several wall mounted motion detectors due to the presence of “hanging walls” that intersect galleries. So mounting devices on ceilings is inevitable.

In summary, the reflected ceiling plan provides a clear visual guide for the design, placement, and coordination of ceiling finishes and ceiling-mounted systems, ensuring that all elements fit together correctly and meet the aesthetic and functional requirements of the space.

The Project Manual

A specification, often referred to as a construction specification, is a written document that accompanies the architectural and engineering drawings for a building project. While drawings illustrate the layout, dimensions, and relationships of building components, specifications provide the detailed written requirements describing the materials, workmanship, installation methods, performance standards, and quality expectations for the project. Together, drawings and specifications form the contract documents used to build the project. All of the specifications from various systems comprise the Project Manual.



The primary purpose of specifications in a new building design or major renovation project is to clearly define what materials and products must be used, how they must be installed, and what standards they must meet. Specifications help eliminate ambiguity by describing the technical requirements that cannot easily be shown on drawings. For example, drawings may indicate the location and size of a wall, but the specification explains the type of gypsum board, insulation requirements, fasteners, fire ratings, finishing standards, and installation procedures. By providing this level of detail, specifications help ensure that the contractor understands the design intent and constructs the building according to the architect's and engineers' requirements.

Specifications also serve an important legal and contractual function. They are part of the formal agreement between the owner and the contractor and therefore establish enforceable standards for the project. If disputes arise during construction regarding materials, quality, or installation methods, the specifications provide the written reference that determines whether the work complies with the contract requirements. In this way, specifications protect both the owner and the design team by defining expectations for performance and quality.

Another key purpose of specifications is to assist with the bidding and procurement process. Contractors rely on specifications, together with the drawings, to prepare accurate cost estimates and construction bids. Because specifications identify acceptable products, performance criteria, and testing requirements, they help ensure that contractors base their bids on the same technical standards. This improves fairness and consistency in competitive bidding.

Specifications also guide construction administration. During construction, architects and engineers refer to the specifications when reviewing shop drawings, evaluating product submittals, inspecting work in the field, and determining whether completed work meets the required standards. The document therefore serves as a continuing reference throughout the life of the project, from bidding through construction and project closeout.

Specifications are typically organized into a standardized format to ensure consistency across the construction industry. In North America, the most widely used system is Master Format, developed by the Construction

Specifications Institute (CSI) and Construction Specifications Canada (CSC). Master Format organizes the contents of specifications into a structured system of numbered divisions and sections so that contractors, architects, and engineers can easily locate specific requirements.

Within each section of the specifications, the content generally follows a three-part format:

Part 1 – General

This section includes administrative and procedural information related to the work. It typically covers references to applicable standards, submittal requirements, quality assurance provisions, delivery and storage requirements, warranties, and project conditions that affect the work.

Part 2 – Products

This section describes the materials, products, equipment, and components that must be used for the work. It identifies acceptable manufacturers, performance requirements, material properties, and fabrication standards.

Part 3 – Execution

This section explains how the products must be installed or constructed. It includes preparation requirements, installation methods, field quality control procedures, tolerances, cleaning requirements, and protection of completed work.

Together, these three parts ensure that each specification section addresses administrative requirements, material requirements, and installation procedures in a consistent and organized manner.

All of the specifications for a project are compiled into a document called the Project Manual. The project manual typically includes the specifications along with other contractual and administrative documents such as bidding instructions, general conditions of the contract, supplementary conditions, and other project requirements.

The specification sections within the project manual are organized according to the CSI Master Format Divisions. The modern Master Format system includes 50 divisions, grouped according to types of construction work and building systems. Some of the most commonly used divisions include:

Division 00 – Procurement and Contracting Requirements

Includes bidding instructions, contract forms, and procurement information.

Division 01 – General Requirements

Covers administrative procedures, project management requirements, temporary facilities, quality control, submittals, and project closeout procedures.

Division 02 – Existing Conditions

Includes site investigation, demolition, and remediation of existing structures or materials.

Division 03 – Concrete

Covers cast-in-place concrete, reinforcing steel, concrete finishes, and related work.

Division 04 – Masonry

Includes brick, stone, concrete masonry units, mortar, and related components.

Division 05 – Metals

Covers structural steel, metal fabrications, metal stairs, and miscellaneous metal work.

Division 06 – Wood, Plastics, and Composites

Includes rough carpentry, finish carpentry, wood panels, and composite materials.

Division 07 – Thermal and Moisture Protection

Covers roofing, waterproofing, insulation, air barriers, and sealants.

Division 08 – Openings

Includes doors, windows, skylights, glazing, and hardware.

Division 09 – Finishes

Covers interior finishes such as drywall, plaster, tile, ceilings, flooring, and paint.

Division 10 – Specialties

Includes items such as toilet accessories, signage, fire extinguishers, and lockers.

Division 11 – Equipment

Covers specialty equipment such as kitchen equipment, laboratory equipment, and athletic equipment.

Division 12 – Furnishings

Includes casework, furniture, window treatments, and related items.

Division 13 – Special Construction

Covers unique building systems such as pre-engineered structures, clean rooms, or swimming pools.

Division 14 – Conveying Equipment

Includes elevators, escalators, and lifts.

Division 21 – Fire Suppression

Covers sprinkler systems and fire suppression systems.

Division 22 – Plumbing

Division 23 – Heating, Ventilating, and Air Conditioning (HVAC)

Division 26 – Electrical

Division 27 – Communications

Division 28 – Electronic Safety and Security

Additional divisions address site work, transportation systems, utilities, and process equipment.

In summary, a construction specification is a detailed written description of the materials, quality standards, and installation requirements for a building project. Its purpose is to complement the drawings, establish contractual requirements, support bidding and procurement, and ensure that construction meets the intended design and quality standards. Specifications are typically organized within a project manual using the CSI Master Format system, which divides the work of construction into standardized divisions and sections, allowing all participants in the project to reference requirements clearly and consistently. If you are a security consultant on a job without an architect such as a security system upgrade, be certain to write a very definitive spec then make it an attachment to the contract with the security contractor so it becomes part of the agreement as to what is being purchased and how the work is to be done.

What Are Product Cut Sheets?

Many architects require the specifying engineers and consultants to submit product cut sheets for all systems and equipment being specified. This includes all devices visible to the public so that the appearance of the devices can be approved for use in the various locations where they occur as well as for components like network switches that must conform to certain standards required by the IT department. Product cut sheets also show the bidders the exact technical requirements for each component in case “equals” are permitted and a different but “substantial equal” is provided in the contractor’s bid. Similarly, if a contractor requests to substitute certain products, make them submit a formal request that includes the cut sheet with technical information on the substitution so you can see if it is an equal in every pertinent way.

During the design and construction of a building, architects and engineers often require contractors or suppliers to submit product cut sheets for the products they are supplying so they can be approved as meeting the definition of a substantial equal. This also facilitates the consultant’s review of the product before accepting it and before materials or equipment

A product cut sheet is a document contains detailed information about a specifications, dimensions, materials, installation requirements. The documents is part of the broader that the products used in construction in the drawings and specifications.

The process typically begins during coordination the visual impact of again just before the contractor has begins preparing to procure materials documents prepared by the architect and design team identify required products or performance standards in the specifications. In many cases, the specifications list several acceptable manufacturers or define performance criteria that products must meet. Before ordering these materials, the contractor must submit documentation confirming that the proposed product meets the specified requirements. This documentation often takes the form of a manufacturer’s product cut sheet.

Because museum buildings, especially those designed by renowned architects, are themselves considered a work of art, all of the visible components could potentially have a negative visual impact and must be approved by the architect. It is not uncommon for the specifying engineer or consultant to include in in the spec a sole source requirement based on the appearance of each component. This may require approval from the owner’s procurement department for government owned projects but if approved assures that if the architect approves a two inch by two inch square motion detector the contractor does not provide a six-inch diameter round device which may clash with the other devise in the view scape.



provided by a manufacturer that specific product, including its technical performance characteristics, and submission and review of these submittal process, which helps ensure comply with the requirements defined

the design phase when the architect is components on the building and occurs been awarded the project and before he and equipment. The contract

A product cut sheet generally includes a variety of technical information about the product. It may describe the product's dimensions, materials, finishes, performance ratings, certifications, testing standards, and installation guidelines. It may also include diagrams, photographs, or drawings that illustrate how the product is assembled or installed. For example, a cut sheet for a lighting fixture may include electrical requirements, lamp types, mounting details, and photometric data. A cut sheet for a door closer may describe the device's materials, operating force, mounting options, and compliance with applicable standards.

The contractor or subcontractor responsible for the particular product prepares the submittal package and forwards it to the architect, usually through the general contractor's submittal management process. The contractor may highlight the specific model or configuration being proposed if the manufacturer produces several variations of the product. This helps the design team quickly identify the exact item that will be used in the project.

Once the cut sheet is submitted, the architect and relevant design consultants review it. The purpose of the review is to confirm that the proposed product complies with the requirements established in the contract documents. The architect typically checks whether the product meets the specified performance criteria, dimensions, materials, and aesthetic requirements. If the product involves building systems such as mechanical equipment or electrical components, the appropriate engineer may also review the submittal to ensure that it meets technical and performance standards.

It is important to note that the architect's review of product cut sheets is generally limited to verifying compliance with the design intent, not to checking every detail of fabrication or installation. The contractor remains responsible for verifying field dimensions, coordinating the product with other components, and ensuring that the product is installed correctly. The architect's review is therefore not a guarantee of the product's performance but rather a confirmation that it appears to meet the requirements described in the drawings and specifications.

After reviewing the cut sheet, the architect typically marks the submittal with a status such as "approved," "approved as noted," "revise and resubmit," or "rejected." An approved submittal indicates that the product appears to comply with the project requirements and may be used in the project. "Approved as noted" means that the product is acceptable provided that the contractor addresses certain comments or conditions. If the architect determines that the product does not meet the specified requirements, the contractor may be required to revise the submission or propose an alternative product.

Another consideration might be that if the security consultant specifies a curtain pattern motion detector sweeping a curtain pattern over exterior windows and the contractor substitute a standard pattern that saturates the room, the consultant can easily see this substitution. The consultant may have specified a curtain pattern to allow night patrols to occur without setting off every detector in the building during a patrol but still secure the perimeter. The bidder may mean well but does not have access to the full security system design intent of the consultant.

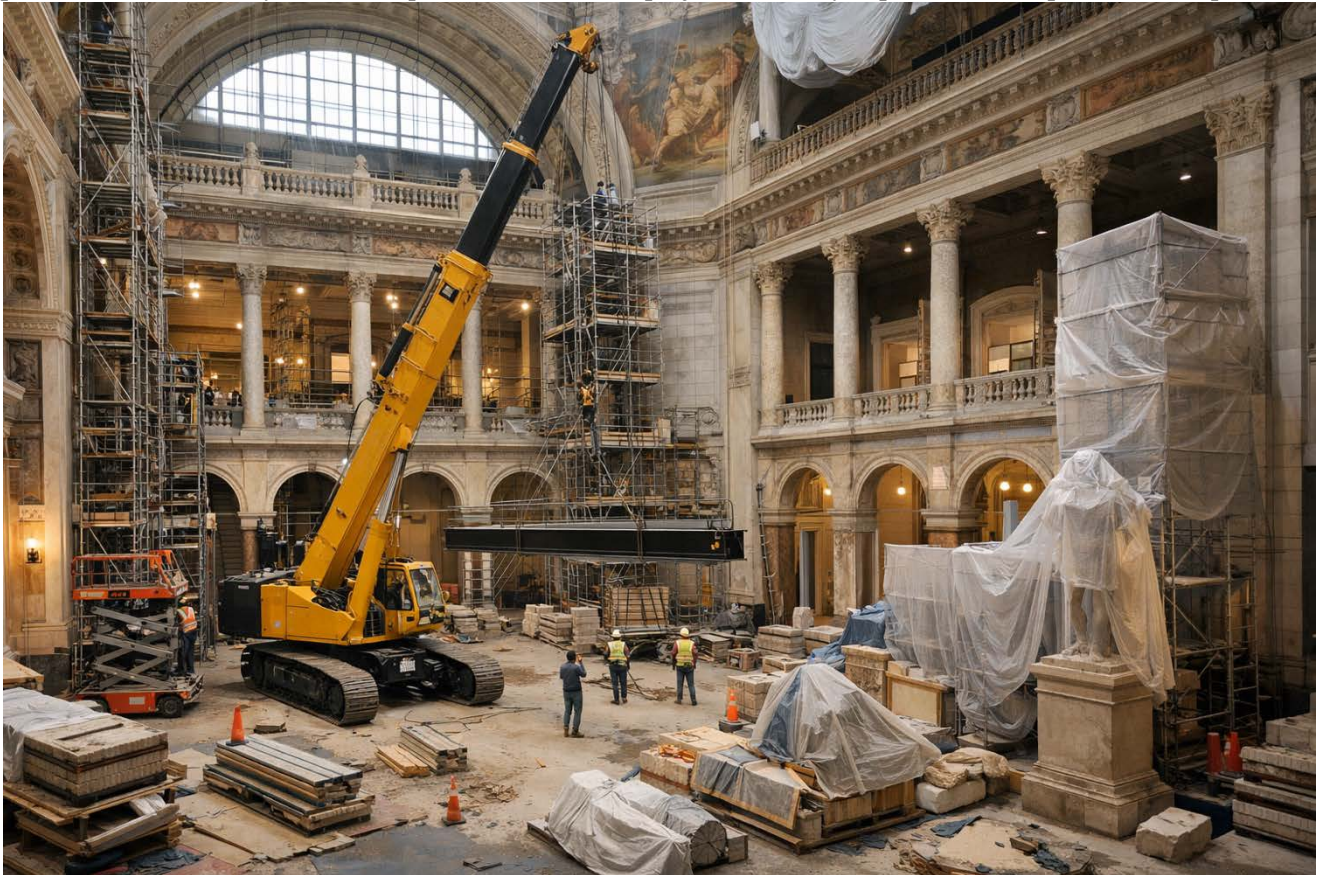
The product cut sheet review process plays an important role in quality control and coordination during construction. By reviewing these documents before products are purchased and installed, the architect and engineers can verify that materials and equipment meet the design requirements and performance standards established for the project. This process helps prevent the use of incorrect or non-compliant products and reduces the risk of costly corrections or delays during construction.

In summary, a product cut sheet is a manufacturer's document that provides detailed technical information about a specific building product. During construction, contractors submit these cut sheets to the architect and

design team for review as part of the submittal process. The architect reviews the documents to confirm that the proposed product meets the design intent and the requirements of the project specifications. Once approved, the contractor may proceed with purchasing and installing the product, helping ensure that the materials used in the building align with the project's design and quality standards.

Items That Are Too Often Missing from Specifications

I review the plans and specs for many museums I have worked in that were not prepared by me. Many consultants and electrical engineers prepare a minimal specification that leaves as much leeway to the bidder to offer an alarm, access control and CCTV system at the lowest cost. I never do this. I always specify a particular product then reluctantly allow an equal if I must. As the project's security expert and the expert on which products



work best for which type of client. I consider cost, but it is not my primary consideration. But to be sure, I will write the spec around the system I feel is best for my client. Museums are not Walmart stores. An alarm system in a Walmart store protects a few million dollars in merchandise. No one will break in and steal it all. But many museums have as much value in one work of art, one gem collection or one moon rock than Walmart has in its entire store inventory. No one will spend millions of dollars to hack the network carrying Walmart alarm signals, but they would, to steal a \$100 million painting. So, an engineer used to writing a spec for Walmart stores doesn't have to think about this type of risk and they don't want to spend more for the alarm system than the highest risk TV sets are worth at the wholesale level. So, seeking bids for the lowest cost access control system that simply opens a door when card key is presented is acceptable at retail store. Missing from far too many specifications are the exact make and model of not only the system but also the major components.

What else is missing from many spec?

1. Are substitutions permitted? If so, are there requirements for pre-approval?
2. If the specifier uses a canned spec provided by the system manufacturer, what components are not to be included. Canned specs generally include every add on feature. Canned specs provided by the manufacturer rarely include installation quality requirements as they can increase the cost and the manufacturer wants to make the sale.
3. Is there a section that defines what you want included in the shop drawings? Don't allow the contractor to just add his title block to your plans and call them shop drawings. The requirement for shop drawings is where the contractor who knows his product better than you do corrects errors on your spec with regard to riser diagrams, panel input board drawings, etc. His drawings are instructions from the engineer in the office to the installer in the field. Let's see exactly what they plan to do to meet your requirements. If you specify 24 hours of battery back-up, the shop drawings should show calculations as to how they decided what battery to provide. You will never see this if you don't ask for it. If you want them to show end of line resistors you need to ask for it. Shop drawings need to indicate wire types being used, include panel loading charts as a drawing on the plans, a detail drawing for each device or components in the system, a one-line diagram for each system (alarm, access control, CCTV, object protection systems. Fabrication drawings for the command center console. Is there a badging sub-system included? It won't be if you don't specify it. Does it define the camera and printer to be provided? It should. Does the access control system spec require a printer be included? It should.
4. If you want a warranty, specify it but define what that includes, define response time, and other details.
5. If you want alarms to annunciate at an off-site central station, specify it.
6. If you want a back-up cellular dialer, specify it but require the UL level it must meet because not all dialers are created equal.
7. If you want the latest version of application software at the time of final acceptance require it. If not, you will get the version from the date the contract was awarded which could be years out of date.
8. If you want the security systems to run on dedicated networks, you need to specify them.
9. If any camera run is longer than can be carried on a standard network cable, and you want them on fiber cable or to use network cable extenders, you need to specify them or you will be paying for a change order later.
10. You need to specify each computer in the system and each server. How much memory, drive storage etc.?
11. If you want contractor submittals in a specific format, you need to define the format.
12. Who provides and who installs door hardware associated with the access control system?
13. Who provides and who installs the security conduit and what is the minimum size conduit you will accept to allow for future changes?
14. If you want spare fibers in the network, say so.
15. Who provides and installs the network switches?
16. If you want the security contractor to program the access cards and graphic floor plans, specify it.
17. Who provides equipment racks? Specify them.
18. Who provides plywood backboards to which panels mount? You need to specify this.
19. If you want the security contractor to train your employees on the operation of the systems, specify this and define the training for the manager and for the operators and how many hours are to be dedicated to this task. If you want that training reviewed and approved in advance specify it.
20. If you want panel enclosures to be protected by tamper switches you need to specify this.

21. What operation manuals and maintenance manuals is the contractor to provide to you on your new systems. Digital or on paper?
22. Do you want tamper switches on panels? If so which panels?
23. How do you want the security contractor to document on his copy of the shop drawings changes based on RFIs. Specify that this must occur in real time and be marked up in red on the installing technician's copy of the shop drawings.
24. If you want a local contractor so you can get quick service, specify and define local.
25. What happens if the system fails the final acceptance test? Who pays for your return visit to re-test? What constitutes a failure? What constitutes a final acceptance test? Who from the contractor's team must attend? Who provides radios and fresh batteries to be used in the test?
26. When does the warranty begin? Hint: When all requirements for successfully completing the final acceptance test are approved by you and when final as-built drawings are also submitted and approved.
27. Reference the museum's rules for contractors for all work that occurs after the museum opens or collections are installed.
28. Specify the sizes of CCTV hard drives to achieve the minimum 30 day of recording for all of your cameras at a specified frame rate.
29. If you want the contractor to pre-test and correct all problems before you arrive for final acceptance testing, you need to specify this.
30. Do you want a software support agreement included in the base bid?
31. Do you want ceiling mounted cameras to be secured from falling in an earthquake? Specify and define this.
32. Who is responsible for stubbing down conduit when the junction box is obstructed by ducts? Define this.
33. Do you have wire management requirements. Define it.
34. Do you want surge protection. Specify it.
35. If you want UPSs on servers and terminals specify the UPS and require it in the spec.
36. Be certain to specify point by point annunciation and not alarms annunciating as zones or groups.
37. Specify that all wires will be run in conduit or cable trays and if cable trays, high voltage and low voltage won't be mixed to prevent interference.
38. Specify who is authorized to instruct the security contractor? If you don't specify this the contractor will take instructions from the architect or security director and not include you and you will not know about authorized changes you might not like.
39. Specify the type of lock on security panels and who takes delivery of keys and when they are to be delivered. (to the security consultant). If you want all panels keyed alike specify it.

System Commissioning

System commissioning is the formal process that occurs near the end of a construction or renovation project to verify that all building systems have been installed correctly, operate as intended, and meet the design requirements established during earlier project phases. Commissioning serves as a final quality assurance step before the building or system is accepted by the owner and placed into full operation.

During commissioning, the design intent, construction documents, and installed conditions are carefully compared to ensure that the system functions as planned. The commissioning process is typically coordinated by a commissioning authority or project engineer, but it involves collaboration among the architect, engineers, contractors, installers, and the owner's representatives.

For a security system, commissioning involves a detailed verification of every component and function of the system. One of the most important steps is the walk test, in which each device in the system—such as motion detectors, door contacts, cameras, panic alarms, access control readers, and other sensors—is physically tested. The technician activates each device to confirm that it communicates properly with the control panel or monitoring software and that the expected alarm or notification occurs.

In addition to testing physical devices, the system programming is reviewed in detail. This includes confirming that alarm points are correctly labeled, zones are properly configured, camera views correspond to



their assigned locations, access control permissions are accurate, and automated responses such as notifications or door releases operate correctly. Programming errors discovered during commissioning are corrected before final acceptance.

Another important step in commissioning is the verification of as-built drawings. During construction, installations sometimes differ slightly from the original design drawings due to field conditions or adjustments made by contractors. The as-built drawings document the system exactly as it was installed. During commissioning, these drawings are compared with the actual installed equipment to ensure they are accurate. Accurate as-built documentation is essential for future maintenance, troubleshooting, and upgrades.

The quality of installation is also evaluated. Inspectors review cable routing, mounting of equipment, labeling of wires and panels, and general workmanship. This ensures that installation meets industry standards and that equipment is protected, accessible for maintenance, and installed in a professional manner.

As issues are discovered during commissioning, they are recorded on a punch list. The punch list is a document identifying incomplete work, defects, or corrections that must be addressed by the contractor. Examples might include a camera that is not properly focused, a detector that does not trigger correctly, mislabeled wiring, or programming errors. The contractor is responsible for correcting these items, after which the system is retested.

Once all punch list items are resolved and the system is confirmed to function properly, the commissioning process concludes with system acceptance by the owner. At that point, the system is considered fully operational and ready for normal use. Often the final steps also include training for the owner's staff and delivery of documentation such as operating manuals, maintenance instructions, and final as-built drawings.

Be aware that the testing of the fire detection system may take days and will be disruptive creating alarms constantly. The burglar alarm system can only be tested when the building is totally empty of employees and contractors. We try to do this overnight, but we can't always do so. Too often, museum employees are also pressed for time trying to get the galleries installed often working until midnight. But since the building is not truly secure until certified as such this can be a problem. Staff must understand that motion detection can't be tested if they are setting off alarms as they move through the building. You may not be insured until this test is completed.

In summary, commissioning is the process that ensures a system works in real-world conditions exactly as it was designed. It confirms functionality, accuracy of programming and documentation, quality of installation, and readiness for operational use before the project is formally completed.

Don't Rush Your Grand Opening

Over the years, I have worked on numerous projects where the museum staff was moving collections into the building while contractors were still in the building and the alarm, access control and CCTV system were not yet fully functional. Keep the likelihood of delays in mind when you set a grand re-opening or grand opening VIP party. From a security perspective, there are many things that must occur after the final scheduled day of construction. It is useless to argue that the contractor is in violation of the contract if the building is not clean and ready for the big event. If it is not ready, it is not ready. Things happen. In the last decade supply chain issues have dominated the list of reasons for delays. Computer chips were in short supply for several years. Prior to that it was Covid. So build enough time into your schedule so that you can be assured that the building is ready and secure before collections are installed. Have a plan and a budget in case of delays.



In one recent project the issue was the late delivery of critical doors. If the door has not been delivered it can't be installed. And if it can't be installed the security contractor can't install the card reader, door contact, and locks. Once installed there will be painting and touch-up. And the programming for the card access system probably won't be done. Unless you want to pay for a return visit for the inspection team, final commissioning for the security system won't occur because the contractor won't call for the visit until everything is finished. Once the door and security devices are installed there may be issues where the door binds so coordination must occur with the door installer. No one will move their tools and ladders off the property until all issues are resolved. It's complicated and often you can't throw money at the problem to fix it. Plan accordingly.

The Museum After Construction

Ideally, every consultant and engineer on the design team will include warranty terms and terms for a service agreement in their specification for the system they design, and the museum will buy at least some of the service agreements. This has not always been necessary in the past, but in a digital world where nearly every component of the security system is a computer or contains a computer chip, a service agreement is essential. Another reality is that if you don't have a service agreement you will not get quick service. So, any mission critical system needs such a service agreement.

Many museums defer purchase of the service agreement that extends the warranty for an additional period of time, generally to make sure that the contractor is the contractor they want to be married to for an extended period



of time. They use the warranty period to assess the responsiveness of the contractor before extending the warranty. The fact is that prices are increasing every year and buying the extended warranty as part of the initial negotiated purchase has its advantages and should be considered.

Museums should set up a system for logging service issues with their new systems. That log should clearly explain the issue being reported, the date it was discovered, the date reported to the contractor and who was notified, and the date the

contractor responded to make a correction. If the issue was resolved that should be noted. If not, then this too should be noted and a new service request initiated. Such a log makes the enforcement of the warranty much more efficient.

Sixty days prior to the end of the initial warranty, the consultant or engineer who designed the system should make a visit to review the log and walk test the system once again to identify any issues that must be fixed before the end of the warranty period.

As part of the final acceptance test, if the consultant has done his job correctly, the contractor should have submitted as-built drawings that document the system. Since museums are a changing environment, the museum may add new or change existing detectors and components. They may add new cameras, move detectors, add operator terminals, etc. A policy needs to be established assigning responsibility to one security manager to assure that no changes are ever made without them being documented by amending the as-built drawings. This can be done by an in house or contract draftsman or by modifying the as-built drawings as part of the contract for every change made. The museum should be meticulous in keeping the drawings current. Modifications should not be limited to showing the new component on the plans. They should show additional wiring routes, which point on the alarm input board the new detector is assigned to, which output on the PoE switch a camera is connected to, etc. This will ultimately save money on future service agreements because service agreements assume that every input and output and every reader terminal on the reader circuit board are used. If you can show the spare points on panels, you can negotiate savings.

While detectors can last decades, components like video monitors do not. A system should be developed to provide for annual upgrades to component whose quality is diminished like video monitors. High tech systems require regular upkeep and, good maintenance of the new system must be maintained.

Conclusion

I hope that by sharing some of my experience with you, your next construction or renovation project goes well, and you enter it with confidence, and you can successfully navigate your way through it. If you are a museum director or administrator or perhaps the museum employee designated to lead the project within your institution, you now have a fair idea how to hire an architect and owner's representative who will then give you the more detailed information that you need to get through each step. And you understand the importance of hiring people as consultants who really understand museum security and how to write a quality spec. You get what you pay for.

If you are the director of security and your institution is facing a major renovation or construction project, you now have a good overview of what is about to happen. You now know that your architect will pick someone to define what security is needed and what will be purchased as part of this project. Almost certainly, the architect's security consultant will not seek your input although he or she may ask you to answer some questions. Unless the architect's security consultant has been in your shoes as a security director, communication with him or her could be minimal. There is a good possibility that the consultant hired will be an electrical engineer and not a security practitioner like yourself. Engineers are highly qualified to design a major security system but may not have the slightest understanding of how museum thefts occur and what the countermeasures should be to prevent them from being successful. The architect's goal will be to give you security after the project that is equal to what you have now, but it will certainly not over fund your part of the project if he can get away with it. You now know that you can insist that your current consultant be included on the team and if the architect's consultant is an engineer and not a security practitioner, you can insist that the consultant of your choice define with your participation your security needs and that the engineer simply help make everything happen. You now understand the critical need for your participation in the programming phase and the need for you to insist that you exit that phase with the physical space you need so you can, to resolve the problems that can only be fixed by providing you the space to fix it. You can't operate a command center in a closet. And you now understand that a construction or renovation project is not an opportunity to grab as many resources you can grab to buy as many new toys as you can just because you are a sucker for bells, whistles and every new piece of technology that some vendor offers. You are about to enter a team project where no one gets everything they want and you as a department head for a major department must set priorities. If you play a role in this project, you will be judged as a manager by how well you play as part of the team.

If you are someone who wants to step up and fill the vacuum that currently exists (as of the winter of 2026) in the security consulting field, you now have an important piece of information from a highly successful museum security consultant and hopefully you can move your career forward and fill that vacuum. If all you do as a consultant is an occasional risk assessment survey, you aren't a real consultant. You have a part time gig to pick up a few extra dollars. To make the type of living that you think consultants make, you need to work full time as a full-service non-product affiliated consultant and security technology advisor. If you can't prepare yourself to be qualified to provide this level of service, keep your day job and save museums the problems that amateur's pretending to be a consultant cause.

I am writing this because there is currently no one ready to fill the vacuum and provide the services our industry is used to. To be ready you need to prepare yourself by developing your knowledge and expertise, hone your skills as a writer, invest time and money building your company, hire support staff that you absolutely will need, and develop the credentials needed to be a player on the national or international level.

Following this document, I have included a chapter specifically directed to people who want to be a museum security consultant who functions at a level where they can make an income equal to or better than they could as a director of security for a major museum. If you simply want to do an occasional risk assessment survey and pick the low hanging fruit, this won't be useful to them. But if that is the case, they should just resign themselves to the fact that they will never be recognized as a major player in the consulting field and eventually their client base will recognize you as a junior varsity player. You are not the first museum security director who has attempted to become a successful consultant. It takes a real commitment to succeed.

To be clear, if you are good at just doing risk assessments and all you want is a few thousand dollars for a vacation or whatever, that is OK. Just don't advertise your services and take jobs you aren't qualified to do. There are several people consulting today who don't know the right answer so how can they make quality recommendations to clients?

To my clients, I am still here to help you with smaller projects and advise you on many more complex construction-related projects but in my remaining years, I am stepping aside and hopefully a small number of talented people will come forward and earn your support as my replacement.

About the Author



Steve Keller is the founder of Steve Keller and Associates, Inc., the leading museum security consulting firm in the U.S. and President of Museum Training Resources, Inc. a provider of training for museum employees. Steve holds a BA in Public Administration from American University in Washington, DC. After college he joined the Washington, DC, Metropolitan Police Department where he rose to the rank of Detective Sargent where he worked child abuse and other juvenile related cases. He left there for a position as a bodyguard for Dr. Arthur Burns, Chairman of the Federal Reserve Board, and held a commission as Deputy United States Marshal. In 1979 he was named Executive Director of Protection Services for the Art Institute of Chicago where he served for eight years through numerous construction projects.

He is a well-known speaker and teacher and in 2019 he was a visiting lecturer at Harvard University. He has also lectured at New York University, State University of New York at Buffalo, and the Cooperstown Management Institute. He is the author of over 35 articles in professional publications and producer of more than 20 videos on security topics.

In 2006, Steve was inducted into the AAM's Centennial Honor Roll that identified 100 individuals who it called the most influential people to work in the museum profession in the past 100 years. It is considered to be the museum industry's highest honor.

In 2020, Steve worked as technical advisor to Netflix on the production of a multi-part documentary on museum theft, "This is a Robbery" that began streaming in 2021. He also appeared in that program. In 2023, he appeared as a subject matter expert on "History's Greatest Heists with Pierce Brosnan" on the History Channel in a segment about a museum theft.

Steve Keller and Associates, Inc. was established in 1986 and works exclusively on projects involving museums, libraries and other cultural properties, and in 1989 began offering architectural support services to museums and their architects. Since 1986, Steve has served 920 unique cultural institutions and private collectors in over 2500 different projects worldwide. At one time the company had offices in Florida and Los Angeles.

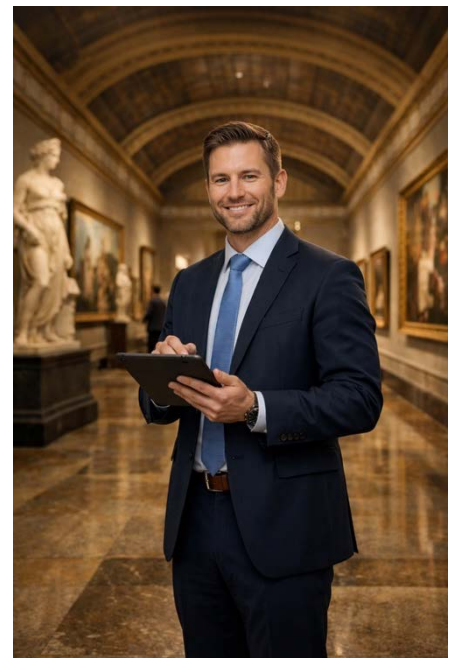
In 2023, Steve and his partners formed Museum Training Resources, Inc. for the purpose of developing a collection of computer-based, interactive training programs and in 2024 introduced the "*Museum Defendersm*" computer-based, interactive basic museum security officer training program, the most comprehensive program of its kind and in 2026 they introduced Shift Readysm" roll call training program. The company also created online programs for security supervisors and on report writing.

Steve lives in Leesburg, Virginia.

PART 2

So You Want to Be a Security Consultant

When an experienced security manager decides to become a security consultant, the transition involves more than simply offering advice based on experience. Successful consultants combine deep professional experience with a disciplined approach to analysis, communication, client relationships, and business development. Preparation should therefore focus on strengthening several areas: consulting methodology, analytical skills, communication ability, credibility, and business operations. What does this actually mean? It took me decades to develop a master checklist for conducting a risk assessment survey. It's not that I couldn't do it without a checklist, but to be competitive and still do a good job, a consultant needs to be efficient and reduce fees and expenses that the client must pay. I needed to develop a way of showing definitive evidence that crime is increasing or decreasing so I could justify my advice about re-deploying limited resources. I had to cover more points than my competitors for less money for the client to perceive value in what they paid me. I had to learn business methods executives expect to see when I tell them they need to spend a million dollars on something they hoped they wouldn't need. I had to develop a concise report format with clear examples because my clients didn't have time to read a lot of fluff, and at the same time my reports had to speak to people with varying amounts of experience with security and security technology. So much of my work product was educational and the rest was analytical. I had to fully understand how a modern museum functions and is funded and be able to justify re-allocation of limited resources by explaining risk without appearing like Chicken Little.



First, an aspiring consultant should develop a structured consulting methodology. Managers are accustomed to solving problems inside their own organizations where they understand the culture, authority structure, and history. Consultants, however, enter unfamiliar organizations and must diagnose problems quickly and objectively. Learning common consulting frameworks, such as root-cause analysis, process mapping, SWOT analysis, and cost-benefit modeling, helps transform experience into a repeatable problem-solving process. Studying case studies of consulting engagements can also teach how consultants scope problems, gather information, test assumptions, and present solutions. Over time, you will develop an understanding of how other museums deal with similar problems, but in the meantime, you need to justify every recommendation clearly.

Second, a consultant must refine analytical and diagnostic skills. Consulting work often requires evaluating operations, finances, organizational structures, or systems with a fresh perspective. Preparation might include coursework or self-study in business analysis, financial interpretation, strategic planning, and performance metrics. Learning to interpret data, identify patterns, and distinguish symptoms from root causes is essential.

Many consultants also become proficient with tools such as spreadsheets, data visualization software, and presentation tools that allow them to communicate findings clearly.

Third, consultants must master communication and facilitation skills. Inside a museum, a manager may rely on authority to implement decisions. A consultant typically has no authority and must rely on persuasion and credibility. Therefore, preparation should include training in executive presentation, report writing, and meeting facilitation. The ability to explain complex issues clearly to senior leaders is one of the consultant's most valuable skills. Equally important is the ability to listen carefully, ask the right questions, and guide discussions so that clients feel ownership of the solutions.

Every now and then I encounter a museum whose security department is totally inadequate and yet the security manager is invited to a neighboring museum to provide free consulting. I cringe at the thought of this, but it is indicative of a deficiency I see often. Some people simply don't know what the right answer is themselves so how can they advise others. I can understand when this happens. We were all young and inexperienced once. But all too often I find experienced security managers selling their services as a consultant and giving advice that is contrary to every best practice, national standard, and insurance recommendation. I have been doing this for forty years and had solid experience of over a decade before entering consulting and I still learn something on every project. The majority of young entry level consultants I know suffer from one major deficiency: they think they know all of the answers when many don't know all of the questions. They don't know what they don't know. And this applies to basic security consulting. Technical security, security engineering, and working on complex architectural projects are a whole different part of the business. In my own company I employed a series of engineers and technicians. They were frequently with me on jobs. Clients would ask them questions and they would regularly answer with solutions that involved technology. If all you have is a hammer, every problem looks like a nail.

Fourth, credibility is critical. Clients hire consultants when they believe the consultant brings recognized expertise and professional judgment. Building credibility may involve documenting past achievements, developing thought leadership, publishing articles, teaching seminars, or speaking at industry conferences. Some consultants pursue certifications or additional education such as an MBA or specialized professional credentials, though these are not always required if the consultant's experience and reputation are strong. While an MBA

is very useful it is often out of reach to many of us. One essential credential is the Certified Protection Professional. Lesser certifications are, in my opinion, a waste of time. You can fool some in our profession with

Steps to Success

1. Thoroughly understand codes standards, guidelines, loan and insurance requirements, and best practices. Just because you did it this way doesn't make it the right way.
2. Know how museum thefts, fires, and vandalism occur. Learn to identify and assess risks and set priorities with limited resources.
3. Develop a structured methodology for doing your work and preparing your work products.
4. Refine your analytic and diagnostic skills.
5. Master communication and facilitation skills.
6. Establish your credibility and reputation.
7. Know your client's business, as well as he does.
8. Know how to run your own business: profit, loss, debt, taxes, cash flow, cost center management, plan for the future.
9. Adopt a personal code of ethics.
10. Understand technology not just management.
11. Understand business modeling for museums.
12. Understand the basic concepts of museum security.
13. Practice makes perfect.

a certification from organizations like the IFCPP, but these certifications are for people who are not ready to sell their advice as consultants. If you can't achieve a CPP you probably have no business taking money from clients for your consulting services. And most museum CEOs and CFOs know this. They have advanced degrees from major universities. That certificate for the first aid class you took just isn't all that impressive to them.

Fifth, the aspiring consultant should prepare for the business side of consulting. Consulting is often an independent business, even when operating as a sole practitioner. This means learning how to market services, develop proposals, negotiate contracts, price engagements, and manage client relationships. Many new consultants benefit from studying consulting business models, writing a simple business plan, and building a network of professional contacts who may become clients or referral sources. Start by hiring a security consultant for your current employer before entering the consulting profession yourself. See the proposal your consultant offers, learn how he or she sets fees and charges for expenses, and bills. Study your consultant's work product and understand how his report is structured.

Another important preparation is learning the ethics and boundaries of consulting work. Consultants must maintain confidentiality, avoid conflicts of interest, and provide objective advice even when the client may prefer a different answer. Professional integrity and discretion are essential to building long-term trust. You cannot be affiliated in any way with any product or service. You must guarantee to your clients that you have no such conflict of interest and sell only your experience. The International Association of Professional Security Consultants allows consultants to sell books they have written or resources like training materials that save their clients' money and enable them to purchase fewer consulting hours. But anything that even remotely appears to be a conflict must be disclosed.

All of this sounds like a major challenge, a lot to learn and prepare for. Now add to this the need to fully understand modern state of the art electronic systems of the type used by your client. You can't just wing it when assessing your client's technology. It isn't enough to know what an alarm system does and what its components are. You need to know how to design a complex system applying all necessary codes and standards to the design. There are alarms, access control systems, CCTV systems, object protection systems, exhibit case alarms, radio systems, intercoms, lobby management systems, and even computer networks. You need to know how alarms are transmitted to the off-site central station and the standards that apply. Since technology is constantly changing, a consultant is always in learning mode. When I began my career in museum security, risk assessments and burglar alarms were all that we had to know. Then came CCTV which became digital CCTV. Coaxial cables became fiber optic technology. Not only do you have to know all of this, you need to be able to write a detailed specification defining them in detail. Since the real money in museum security consulting is working for the architect on major projects, ask your facility manager if they have retained the construction documents for any previous projects. If so, ask to see the specification and learn the CSI master specification format and study the blueprints. Never plagiarize the work product of others but use what you can to learn. Procure codes and standards like the National Electrical Code, the Life Safety Code and the various fire codes of the NFPA that pertain to museums and read them until you understand them fully. Read the "Recommended Guidelines for Museum Security" and understand how they apply. You will be working with these resources for the rest of your career. Never miss an opportunity to learn.

Finally, the future consultant should consider gaining experience through smaller engagements before launching fully. This might involve advisory work for colleagues, mentoring managers in other organizations, participating in industry working groups, or assisting established consultants on projects. Such experiences help refine consulting skills while building confidence and reputation.

In summary, the transition from manager to consultant requires shifting from being a decision maker inside an organization to being an independent problem solver and trusted advisor. Preparation should therefore focus on developing structured analytical methods, communication and facilitation skills, professional credibility, and the ability to operate a consulting business. When these elements are combined with real management experience, the individual is well-positioned to become a successful consultant in their field.

My Advice to Aspiring Security Consultants

Here is your dilemma as I see it. There is a vacuum to be filled but you are only ready to fill a small part of it, the part that everyone else is able to fill, so you are not likely to be able to quit your job and work as a consultant full time and pay the rent. If you quit your job and consult full time before you are ready, you almost certainly couldn't make a good living. If you can keep your day job working at a museum and do some consulting on the side, that will stake out your claim to part of the market but not establish you as a major player until you get experience, references, and the ability to do more than basic risk assessments. Be aware that you only have so much vacation time to take off from your day job and your museum is not likely to let you off to work for someone else on the museum's time. Now what?

It isn't hopeless. We all started somewhere. Assess your skills and weaknesses. If you are weak on security technology team up with someone who is strong in that area. Remember that you can't be competitive if you submit a proposal for you and an associate to both travel to a project site to do a security survey. But it might be possible for you to travel to the site and gather information and bring your associate into the project via Facetime. Just know that you only get one shot at gathering all of the information you need. You can't fly back when you forgot to look at the access control system. Not only are you able to pursue more projects this way but you can also learn from your associate and he or she from you. Just know that being a full-service consultant requires skills and knowledge that take years of active study and experience, and being a full-service firm is really the only way you can succeed financially.

Take an Inventory of Your Skills

Begin by taking an inventory of your skills. Err on the side of judging yourself to be inadequate of doing the job with perfection. I find that most people over-estimate their ability and under-estimate what the task involves. Be honest with yourself and don't offer a service you aren't ready for or don't fully understand. Here are some of the more common services consultant's offer and what they entail:

- Risk assessment surveys
 - Identify natural and man-made disaster risks to this specific institution
 - Analyze crime statistics and trends to help determine how to spend limited resources and set priorities
 - Assess internal and external risks for theft and vandalism this institution faces
 - Discover physical security deficiencies (locks, keys, glazing, lighting, etc.)
 - Discover electronic security deficiencies
 - Walk test the alarm system
 - Look for unprotected perimeters

- Check adequacy of detection coverage in collection bearing areas
 - Assess security staffing
 - Assess the security department's policy manuals and evacuation plans
 - Assess compliance with codes, standards, guidelines and best practices
 - Evaluate the quality and effectiveness of the security training programs
 - Basic new officer training
 - Ongoing and roll call style training
 - Specialty training
 - Identify missing and needed management systems
 - Assess access control, property control and internal security
 - Command center and alarm monitoring assessment
 - Proprietary central station
 - Off-site UL listed central station monitoring
 - Command center design and video walls
 - Adequacy of staffing in the command center
- Training
 - Develop and present training programs
- Policy Manual preparation
 - Develop quality a policy manual custom to a specific institution
- Security system design and construction documents
 - Programming, plans, specs, plan reviews, system commissioning, construction management
 - Conduit system design (sizing, grounding and bonding)
- Value engineering
 - Evaluate bids for electronic systems, service agreements, contract guard agreements
- Security department cost reduction studies
 - Staff reduction through technology
- Long range and master planning studies
- System upgrade studies including grant request expert justification
 - Remaining life of existing system components
 - Upgrade vs. replacement studies
- Walk testing of a museum's alarm, access control and CCTV systems
- Exhibition security and collections in transit escorts
- Planning for blockbuster exhibitions (ticketing, crowd control, staffing and staff hiring, etc.).
- Guard force conversions (proprietary to contract and contract to proprietary).
- Recruitment and background checks
 - Compliance with Fair Credit Reporting Act
- Expert witness depositions and testimony
- Object protection studies and system recommendations/cost estimates
 - Hard wired vs wireless
 - CCTV-based vs on-the-exhibit sensors
 - Paintings and exhibit cases
 - Uncased three-dimensional objects

- Dedicated computer network design and cyber security countermeasures

Determine which of these tasks you know for certain you could offer and successfully complete. Determine which of these you aren't certain what work or approach they require and determine which you probably couldn't successfully perform with your current experience, skill set and financial resources. Remember that except for a couple of these, the demand for most of these services is rare. A small security consulting company might do a half dozen risk assessments and take on one new major construction job each year. Concentrate on offering the services you are likely to be offered. (Think revenue, not number of projects. A typical risk assessment might involve 80 billable hours while a new building project might involve 300 to 400 billable hours at the same hourly rate).

Take several weeks and determine what you have to do to learn the new skills needed to take on some of these larger, more lucrative projects. For example, if you decide that you want to offer architectural support projects, but you don't know how to write a specification, buy a book about spec writing and learn to do it. But learn it now, not after you are hired to work on a new building. If you decide that you lack basic technology skills, develop a plan of action to learn those skills. How might you do this?

When the rest of your colleagues are in seminars at the ASIS Annual Seminars and Exhibits, on subjects you already know about, I am down on the exhibit floor talking to the engineers. I don't talk to the salespeople. I want someone to explain to me how an access control system works, how a camera is able to see in the dark, how is it possible to import data from a DSC alarm panel into a Software House C-Cure iStar panel. I ask about the architecture of an access control system, I want to know what each component does, and why it works the way it works. When computer hacking became a threat, I learned to hack. I spent hours hacking into the CCTV systems of my clients then telling them how to fix the vulnerabilities I found. Remember, I am not an engineer. I am essentially self-taught. I talked manufacturers of several access control systems into sending me their software just so I could become familiar with it. This is how you really learn. I learned far more doing this than I ever learned in college. I encourage you to be curious. Soon you will understand security technology. Take a course in AutoCAD at your local technical or community college.



If your background is with the FBI, stop going to seminars about investigations. It always amazes me that so many of you only attend seminars and training programs you are already an expert in. Instead learn about budgeting and cost estimation. If you are not a strong writer, take a course in business writing.

Another approach is to treat your current job as you would a consulting client. Write a proposal to yourself offering to do a risk assessment survey where you look at every aspect of your current security. The first thing you will learn from this is how to write a proposal and estimate how much time it will take you to do the survey and write the report. Now objectively evaluate your current security program item by item. Do you have a comprehensive security department policy manual? Is it properly formatted, Is it all inclusive. Can an outside observer like your insurer

fully understand your security program in its entirety simply by reading that policy manual? The odds are that you don't know what a really good policy manual looks like. If it doesn't have about 100 individual policies uniformly formatted each addressing a separate topic, it may not be optimum. Now assess your training program. If it consists of assigning a senior officer to show a new officer around and there are no lesson plans or training for the trainer programs included, your training program has failed. Do you keep required training records so you can defend yourself in a failure to properly train lawsuit?

Now walk test your own alarm, access control and CCTV systems. Identify deficiencies and ask yourself why these exist and you are just now discovering them. What management system is missing from your program that allowed this to happen? Are you missing camera views? What areas need more coverage? Can someone break a window and reach an item from the collection without being detected? How easy would it be to stay behind and break out? Once you identify the problems, prioritize the solutions. Put some thought into your priorities. Your client will ask you to justify your priorities.

Now write a thorough comprehensive report to yourself explaining your findings and convincing your "client" that they need to make corrections. You will learn how difficult it is to write a seventy-five-page report for each project and how badly you mis-estimated the time it takes to perform a comprehensive survey. Bill yourself for the agreed upon time. This gives you an opportunity to set up a billing system. If during this exercise you find only praise for your security program, hire a consultant to perform a survey and recognize that you probably aren't ready to open your doors advising others.

When you are comfortable moving on, begin to advertise your consulting services through your network on LinkedIn and social media. Start writing articles for professional journals. Set up a website with real content and give that content to anyone who needs the content. Join committees and aspire to be the committee's chair. Remain visible among your colleagues. Study for that CPP exam. If you can pick up a project here and there, do so. Use these jobs to hone your skills at report writing. Meanwhile, build both your office and your internal administrative systems. You need a filing system, you need for your files to be secure on your computer and you need a billing system. Set all of this up. Obtain your IRS FEIN number and incorporate as an S-Corporation or an LLC to at least partially sheltering yourself from liability if you give bad advice or fail to give the correct advice. Buy professional and general liability insurance! This is important and a bit expensive. It can be very expensive if you work for architects on system designs. Use the next couple of years to expand your skills and build your business basics. Just be aware that while you are "in school", one or two of your competitors are hiring engineers and working directly with architects, insurance companies, and major clients. You don't have forever to get yourself up to speed.

Eventually you may feel you are ready to quit your day job, go full time as a consultant and run with the big dogs. You can do this by either doing your CAD work yourself or affiliating with someone who can do your CAD for you, but you and your CAD associate need to understand that you can't bill for every hour worked. You need to accurately estimate the time you will have in a project and offer a fixed fee for a defined scope of work. This means that your associates who are not on your direct payroll can't bill you every time the architect makes a minor change. Changes are many and assumed to be included in your fixed fee.

One of the worst things you can do is take on a project you are not qualified to do and fail to please a client. This is a small world and museum directors talk to each other. They check references.

I rarely spend money advertising and get nearly all of my work by referrals from museum directors, architects, and other professionals who have used my services before. Several museum directors have used my services at every museum they worked at, taking me along as they move up to larger institutions. I have done projects for

over twenty museums and libraries on one college campus, all by referrals. Never disappoint a client, or the whole world will know about it. You may need to advertise early in your career but once you are established the referrals will come.

When I left the Art Institute of Chicago after eight busy years there, I had already established myself as a leader in the field. I had published articles in “Security Management” magazine and a European counterpart. I printed a hundred copies of an excellent security department policy manual and gave them away to colleagues. This was years before the digital age. I had been a speaker at the Smithsonian National Conference several times and was chair of an ASIS committee. And most important, I inherited a very inadequate security program and made many improvements. It didn’t hurt that by coincidence, I was featured on the cover of “Security” magazine the week I left the Art Institute and hung out my shingle. Nevertheless, in spite of having announced my departure to consult and in spite of there being a vacuum to fill due to the retirement of several well-known consultants, my phone didn’t ring for over a month--literally.

I called in some favors from colleagues who agreed to fly to Orlando and speak at a seminar I sponsored. I had an impressive group of speakers including the director of security for the Smithsonian, and about 75 museums sent their security director. The seminar was free but signaled to attendees that I was now the person to call if you need a consultant. I looked successful, something that is very important.

Once I established myself in business, advertising was no longer needed. I just had to keep my name in front of potential clients so that when they felt they needed a consultant, I was on their short list of those people being considered. Today, a new consultant can gain even better exposure by offering to present webinars for groups like the Cultural Safeguard Alliance, AAM, etc. Just avoid making a pest out of yourself by posting nonsense daily on LinkedIn or other social media as some do.

Setting Up Your Company

One of the most frequently asked questions I receive from people wanting to open their own company is “How do I do this, and do I need a lawyer and an accountant to do it for me? And “Do I have to incorporate?” There are several types of company structures, and they all have different tax ramifications. Some are more complicated to run but you can make more money by saving on taxes while others are easier to operate now but not as good for you tax-wise when you begin making money or employing others. You should spend the money and consult an accountant about your personal financial situation with regard to taxes, and an attorney to actually set up the company formally. Sometimes an accountant can do that all for you. My company is an S-Corporation but if I was just starting out today, I would incorporate as an LLC and elect to be taxed as an S-corporation later when business improved. Let’s take a closer look.

When a small consulting firm is being formed, the choice between operating as a Limited Liability Company (LLC) or electing S Corporation taxation is often framed as a decision between two distinct business types. In reality, this framing is somewhat misleading. An S Corporation is not a separate legal entity at all, but rather a tax election that can be applied to an LLC. As a result, the more accurate comparison is between an LLC taxed under its default rules and an LLC that has elected to be taxed as an S Corporation. The distinction matters less for liability and far more for taxation, administrative complexity, and how the owner chooses to take income from the business.

There are only two major reasons to incorporate. The first is taxation and the second is limiting your liability in case you get sued and I address this later in more detail.

From a liability standpoint, there is little meaningful difference between the two approaches. Both structures provide limited liability protection, which means that the owner’s personal assets are generally shielded from business debts and legal claims. This protection is not absolute--it depends on maintaining proper separation between personal and business finances, avoiding fraudulent behavior, and operating the business in a legitimate and disciplined manner--but the baseline protection is essentially the same. Whether the LLC is taxed as a sole proprietorship or has elected S Corporation status, the legal shield remains intact. For a consulting firm, where risks are typically tied to professional services rather than physical operations, this protection is usually sufficient when combined with appropriate insurance coverage. But because I feel strongly let me just say that you could get sued and lose everything, incorporating shields you, but you must be meticulous in following certain rules. The most important is to never mix assets such as using the company credit card to buy personal items or borrowing money from the company when you are a bit short. It is a separate entity and not your private bank. When you fail to treat the corporation as a separate entity from yourself you are simply operating a sham corporation to try to beat the system and that removes the shield that incorporation provides for you and makes you personally liable. Let me give you one example. I went to a trade show in Orlando where I had a booth. I took my wife to help me work the booth. She was not an employee of my company, and I did not pay her. To the IRS this looks like I was spending company money to take my wife, at company expense, on a company paid vacation. I took the time to write a corporate resolution stating the need for her help so that her participation was on formal record and on the up and up. Taking her along is perfectly legal if she is contributing to the effort. It just looks shady, but by formalizing it, it looks less so.

The real divergence between an LLC and an S Corporation election lies in taxation. Under the default LLC structure, income is treated as pass-through income, meaning that all profits flow directly to the owner’s personal tax return. While this avoids the double taxation associated with traditional corporations, it does carry a significant cost: the entire net income of the business is subject to self-employment tax, in addition to ordinary income tax. For a successful consulting firm, this can represent a substantial tax burden, as self-employment tax is applied to every dollar of profit.

By contrast, an LLC that elects to be taxed as an S Corporation allows the owner to divide business income into two categories: salary and distributions. The salary portion is treated as wages and is subject to payroll taxes, while the remaining profits can be taken as distributions that are not subject to self-employment tax. This structure can create meaningful tax savings, particularly as the business becomes more profitable. However, this advantage is not without constraints. The owner must pay themselves what the Internal Revenue Service defines as a “reasonable salary,” reflecting what someone in a similar role would earn in the open market. Attempting to minimize salary excessively in order to reduce taxes can trigger scrutiny and penalties.

These tax benefits come at the cost of increased administrative complexity. A standard LLC is relatively simple to operate, often requiring minimal ongoing paperwork and no formal payroll system. In contrast, an S Corporation election introduces additional obligations. The business must run payroll, withhold and remit employment taxes, and file more complex tax returns. This typically necessitates the involvement of an accountant or payroll service, adding both cost and operational overhead. For some business owners, particularly those in the early stages of building a consulting practice, this added complexity can outweigh the immediate tax benefits.



For this reason, timing becomes an important strategic consideration. Many consulting firms begin as standard LLCs, benefiting from simplicity and flexibility during the early stages when revenue may be modest or inconsistent. As the business grows and profits stabilize--often in the range of \$75,000 to \$100,000 or more annually--the potential tax savings from an S Corporation election begin to outweigh the additional administrative burden. At that point, electing S Corporation status can be a logical next step in the firm’s financial evolution.

There are also secondary considerations that influence the decision. Both structures allow for retirement planning through vehicles such as SEP IRAs or solo 401(k)s, though the mechanics may differ slightly depending on how compensation is structured. State-level taxes and fees can also vary, with some states imposing additional requirements or minimum taxes on S Corporations. Additionally, S Corporations impose stricter rules on profit distribution, requiring that distributions align with ownership percentages, whereas LLCs offer greater flexibility in allocating profits.

In practical terms, the choice between an LLC and an S Corporation election is less about selecting one structure over another and more about determining when to layer tax optimization onto a flexible legal foundation. The LLC provides the essential framework of liability protection and operational simplicity, while the S Corporation election offers a mechanism for improving tax efficiency as the business matures. For most small consulting firms, the optimal path is sequential: begin with an LLC to establish the business and minimize complexity, then adopt S Corporation taxation when profitability reaches a level where the tax advantages justify the additional administrative responsibilities.

Ultimately, the decision reflects a balance between simplicity and efficiency. In the early stages of a consulting practice, simplicity often carries the greatest value. As the firm grows and generates consistent income, efficiency--particularly in the form of tax savings--becomes increasingly important. Understanding how these two priorities shift over time allows a business owner to make a decision that is not only technically sound ,but strategically aligned with the firm's stage of development.

What Is A “1099 Employee?”

The term “1099 employee” is widely used in everyday conversation, but it is somewhat misleading from a legal standpoint. In reality, there is no such classification as a “1099 employee.” The phrase is shorthand for what the IRS Form 1099-NEC reports: income paid to an independent contractor, not an employee. Understanding this distinction is essential because it affects taxes, legal responsibilities, benefits, and the overall working relationship.

There are two basic things you need to understand first. They are 1/ that you are a 1099 employee to your clients, and you will need to fill out some tax forms for them, and they will issue a 1099 form to you and to the IRS showing what they paid you each year. You then need to pay taxes on this income. Taxes are not withheld from each check as if you were a regular employee of theirs, and 2/ When you hire someone you may hire them either as an employee of your company or an independent contractor, i.e, what some commonly call a “1099 employee” in which case you need to report their income to the IRS. There are other things you need to understand but these are the basics although the other things are equally important.

When consultants first start out, they may find that they need help. I needed someone to do my drafting using AutoCAD, I needed a hardware specialist to assisted me on a major project that required a thorough knowledge of locks and door hardware which was not one of my strengths, and I needed occasional advice from an electrical engineer. Obviously, I couldn’t afford to buy a building to provide offices for a lot of employees, so I contracted with other small business owners who offered these services. As I grew, I hired an architect and an engineer as well as an office manager, and at one point I hired another consultant and second draftsman. Eventually we opened an office in Los Angeles with still another consultant. We also contracted with an accounting firm to handle our accounting and taxes.

At its core, a person referred to as a “1099 employee” is actually self-employed. Instead of being hired as a traditional employee who receives a Form W-2, the individual operates as an independent business--whether formally established as a sole proprietorship, LLC, or other structure--and provides services to a company under a contract or agreement. The company does not place this individual on payroll. Instead, if payments exceed a certain threshold during the year, the company issues a Form 1099-NEC reporting the total compensation paid.

This distinction carries significant implications for taxation. A traditional employee has income taxes, Social Security, and Medicare automatically withheld from each paycheck by the employer. In contrast, a 1099 contractor is responsible for managing and paying their own taxes. This includes not only income tax but also the full amount of Social Security and Medicare taxes, commonly referred to as self-employment tax. Contractors are typically expected to make estimated quarterly tax payments to avoid penalties. While this increases administrative responsibility, it also provides opportunities to deduct legitimate business expenses--such as equipment, home office costs, and professional services--thereby reducing taxable income.

What do I mean by “full Social Security and Medicare taxes”? When you are an employee of, say, a museum, you pay an amount required by the IRS into the Social Security fund which is taken out of your paycheck, but your employer matches that amount. So, when you open your business and begin to draw a paycheck, the same thing happens but the employer is you, so you pay both your share and the company’s share of that Social Security obligation.

Another key difference lies in control and independence. In an employer-employee relationship, the company generally controls how, when, and where the work is performed. Employees often follow set schedules, use company-provided tools, and operate under direct supervision. By contrast, an independent contractor retains control over how the work is completed. They may set their own hours, use their own equipment, and often provide services to multiple clients simultaneously. This independence is a defining characteristic and is one of the primary factors that regulators use when determining proper classification. You can required that the contract employee perform work in your office, but you can't tell him or her how to accomplish that work. This often requires that you prepare a written contract defining exactly what you want the contract employee to accomplish and what the work product will be so that it is clear that you are not micro-managing their work as you might an employee and they are defining the means and methods to achieve your goals.

The issue of classification is not merely academic; it has legal consequences. The Internal Revenue Service and other regulatory bodies apply specific criteria to determine whether a worker is truly an independent contractor or should be classified as an employee. Misclassification--whether intentional or accidental--can result in penalties, back taxes, and legal disputes. For this reason, businesses must carefully evaluate the nature of the working relationship rather than relying on labels alone.

From the worker's perspective, the 1099 arrangement offers both advantages and disadvantages. On the positive side, contractors often enjoy greater flexibility, the ability to choose clients, and potentially higher earnings, since they may negotiate rates based on expertise and market demand. They also gain access to a wide range of tax deductions unavailable to traditional employees. However, these benefits come with trade-offs. Contractors do not receive employer-sponsored benefits such as health insurance, retirement plans, paid time off, or unemployment insurance. They also assume greater financial risk, as income may be less predictable and entirely dependent on securing and maintaining client relationships.

In practical terms, the rise of the so-called "1099 employee" reflects broader changes in the modern workforce, including the growth of freelancing, consulting, and gig-based work. For professionals--particularly those transitioning from traditional employment into consulting roles--understanding this structure is critical. It requires not only technical knowledge of taxes and legal obligations but also a mindset shift toward operating as a business rather than functioning solely as an employee.

Ultimately, what people call a "1099 employee" is better understood as an independent contractor: a self-directed professional who provides services under a contractual arrangement, assumes responsibility for their own taxes and benefits, and operates with a greater degree of autonomy. Recognizing this distinction is the first step toward successfully navigating and leveraging the opportunities of this increasingly common way of working.

Elsewhere I recommended establishing a relationship with an accountant. It is hard to plan for the future when you are just getting started but do your best. My wife had a career until we started a family then she was a full-time mother. A professional editor and journalist, she decided to try her hand, writing a novel, something she could do from home in her spare time. Although she is now a successful novelist (eight published novels) and screenwriter, years ago she was not bringing home a paycheck. I needed someone to do my filing, make a few phone calls, and write some materials for me, but couldn't find someone willing to work part time with the skills

I wanted for the amount I could afford. My accountant suggested that I hire my wife who, with our daughter in school, was now free to come into the office. I could trust her, she could benefit the company, and she freed me up from administrative duties (non-billable hours) so I could devote more time to accepting more projects. Because she hadn't worked in a real paid job in years as she wrote her books, she was not paying into social security. But when she went to work for the company, and I was paying into social security for her, she eventually became eligible to collect Social Security upon retirement. I tell you this so you understand that owning a company has advantages you may not have thought about. A good accountant can advise you on the best ways to pay yourself and your staff some benefits, something you no longer collect from your pre-consulting employer.

Do I Need Insurance?

The answer to this question is “yes”, you do need insurance, several types in fact. For a small consulting business, risk does not usually come in the form of physical hazards or dangerous equipment, but rather through advice, judgment, and professional decisions. Because of this, understanding the difference between general liability insurance and professional liability insurance is essential. These two forms of coverage address fundamentally different types of risk, and together they form the backbone of a prudent risk management strategy for any consultant.

General liability insurance is the more familiar of the two and is often considered the baseline coverage for any business. It is designed to protect against claims involving bodily injury, property damage, and certain personal or advertising injuries. In practical terms, this type of insurance responds to incidents that occur in the course of normal business operations but are not tied to the quality of professional advice. For example, if a client visits your office and slips on a wet floor, or if you accidentally damage a client’s property while on-site, general liability insurance would typically respond to cover medical costs, repairs, and legal expenses. It also extends to issues such as libel or slander arising from marketing activities. For a consulting firm, especially one that occasionally meets clients in person or works at client locations, these exposures--though not frequent--are real and can be financially disruptive if uninsured. Bump into a work of art while doing your survey and you will quickly appreciate the value of insurance. I have never been sued for anything related to my business but only because I have insurance and they employ an army of lawyers eager to defend me. I was threatened with a suit once when I sponsored a training seminar in Florida. After the daily session a group of attendees assembled at the bar by the outdoor pool for a few drinks. I did not attend nor did my company plan, schedule or sponsor this unofficial get together. One male attendee used the “F” word several times. One of the attendees was a female



security director who took offense and threatened me and my company for sexual harassment asking for a financial settlement. While I fully agree that sexual harassment should not be tolerated, I note that this flower of southern womanhood was a twenty-year retired state trooper who almost certainly had heard the word many times before. When she learned that my insurance company would not settle and would fight her accusations, she immediately abandoned her claim.

Professional liability insurance, often referred to as errors and omissions (E&O) insurance, addresses a very different category of risk. It is specifically designed to protect against claims that arise from the professional services you provide. This includes allegations that your advice was incorrect, incomplete, or negligent, or that it caused a client financial harm. In a consulting context, this is the more significant exposure. A client may claim that your recommendations led to a failed project, financial losses, or missed opportunities. Even if the claim is unfounded, the cost of defending against it--legal fees, expert witnesses, and time diverted from your business--can be substantial. Professional liability insurance

covers both the cost of defense and any settlements or judgments, making it an essential safeguard for anyone whose business is built on expertise and guidance.

The distinction between these two forms of insurance becomes clear when considering the nature of the claim. General liability deals with tangible, physical incidents--someone is injured, something is broken, or a reputation is harmed through advertising. Professional liability, on the other hand, deals with intangible harm--financial loss resulting from advice, analysis, or decisions. One protects against accidents; the other protects against mistakes in judgment. For a consulting firm, where the primary product is knowledge rather than a physical good, professional liability insurance is often the more critical of the two, though it does not replace the need for general liability coverage.

Having insurance is important not only because of the direct financial protection it provides, but also because of the broader role it plays in the stability and credibility of the business. A single lawsuit, even if ultimately unsuccessful, can impose significant legal costs that threaten the viability of a small firm. Insurance acts as a financial buffer, allowing the business to continue operating while the matter is resolved. Beyond financial protection, insurance also signals professionalism and reliability to clients. Many organizations, particularly larger institutions and all architects, require proof of both general and professional liability coverage before entering into a contract. Without it, a consultant may be excluded from opportunities regardless of their expertise. Not only do they require insurance, they demand high coverage limits, many offer more than is available on the insurance market.

There was a thirteen-year period when neither general nor professional liability insurance were available to security consultants and museum security consultants—forget it! The risk was simply too high. I did a job for billionaire Paul Allen, co-founder of Microsoft. Art collection was valuable but lower in value than a typical entire gallery at a major museum. They demanded \$5,000,000 per incident and \$10,000,000 aggregate as I recall. \$1,000,000/\$1,000,000 was all I could get. Paul’s representative said, “Paul can get anything, call his agent.” I called and learned that even a billionaire could not get a higher limit policy to design an alarm system for an art collection. So even with insurance you may need to patiently negotiate a policy limit that you can actually find available on the world market.

I was nearly sued one time by a client for “error”. I designed an alarm, access control and CCTV system for a major New York City museum. The building bids came in over budget, so they entered a value engineering phase. When it was time to look at the security system, I sat across the table while the owner’s rep looked at every device, making me justify each one. I held firm, refusing to delete anything. Finally, the museum decided to force me to eliminate devices. They focused on several cameras they didn’t think were needed and told me to eliminate them. I pulled out a red ink pen and told them to cross out each camera they wanted eliminated and to initial each. I also asked the museum director to also initial each eliminate camera. I included a reference to this in my notes memorializing the meeting. About a year later the museum had a theft and I was asked to come to the museum and assist with the after theft *post mortem*. In that meeting a member of the board told me that the board intended to sue me for an inadequate design. “How could you leave us unprotected?” she asked. I pulled out the plans they had initialed and the meeting notes and showed my objections to their decision to eliminate cameras. They apologized and moved on.

ACCORD. CERTIFICATE OF LIABILITY INSURANCE

COVERAGES

COVERAGES	CERTIFICATE NUMBER	REVISION NUMBER	LIMITS
A. Commercial General Liability	AK00AG04710P02A	07/26/2008 07/26/2008	\$1,000,000 per occurrence \$1,000,000 aggregate \$1,000,000 per contract \$1,000,000 aggregate
B. Professional Services	DP0500030	07/26/2008 07/26/2008	\$1,000,000 per occurrence \$1,000,000 aggregate

CERTIFICATE HOLDER
Steve Koller and Associates, Inc.
1908 Kinshir Ter NE
Leesburg, VA 20176

My point in this example is that in addition to insurance, you need to look ahead at possible problems and legal ramifications and protect yourself. My contract also has wording limiting my liability because there is a real risk.

Because insurance can be hard to get when you work on museum projects, it may take time to find it and convince insurers that you are competent. They like to see professional certifications such as a license as an engineer but because I didn't qualify for that, I'm sure that having a CPP didn't hurt.

Insurance also complements the limited liability protection provided by forming an LLC or electing S Corporation taxation. While those structures help shield personal assets from business liabilities, they do not eliminate the risk of lawsuits or the costs associated with defending them. Insurance fills this gap by providing the resources needed to respond effectively to claims, reducing the likelihood that a legal issue will escalate into a financial crisis.

In the final analysis, general liability and professional liability insurance serve different but equally important purposes. One protects against the physical risks of doing business, while the other protects against the intellectual and professional risks inherent in consulting work. Together, they create a comprehensive safety net that allows a consultant to operate with confidence, pursue opportunities, and focus on delivering value to clients without the constant concern that a single incident or allegation could jeopardize the entire enterprise.

Building Value in Your Company

I am writing this as a senior consultant who can look back over a career and sing that “I did it my way.” I learned from doing. And I have chosen to share some of what I learned with you to give you a head start. In about 2006 I met a man who owned a large successful company and wanted to do business with museums. I had a large body of clients who were museums. He invited me to fly to California and talk to him about buying my company. We met and he made me an offer I couldn’t refuse. He paid me a large amount of cash, assumed responsibility for fulfilling all of my current contracts, agreed to employ me for five years to transition the company, agreed to retain my employees and give them (and me) medical benefits and a 401k plan, then after the transition I would ride off into the sunset and spend the rest of my life on a beach. I bought a beautiful luxury 3,000 square foot condo on the 8th floor directly on the beach in Florida and said to my wife, “Who knew that our company could be worth money to someone else?”

Three years later he decided (no fault of ours) that he really didn’t want to do business with museums and decided to shut down the company. To multi-millionaires, this is called a tax write off and just another Tuesday. My employees and I decided that since the company was not valuable to him and was in fact a liability since he wouldn’t finish current projects, we made him an offer to buy back the company for literally a small token amount. We agreed to finish the projects, and he avoided litigation for walking away. We separated as friends. We then began to re-build the company. We had substantial work on contract but no cash in the bank so we needed a loan to maintain cash flow. This time, I knew that companies can have considerable value and we decided to re-build the company with a future sale in mind. The first thing we did was re-name the company “Architect’s Security Group, Inc. because 80% of our income was derived from working for architects on museum projects, and I now had partners. It was no longer just about me. We added the line “formerly Steve Keller and Associates” to continue to capitalize on our good name. A year later, Florida passed a law that prohibited the use of the word “architect” in a company name unless it was licensed as an architectural firm. While one of my partners is an architect, we did not want to become an architectural firm, so we switched back to our original company name. I began the process of preparing my partners who were each employees of more than ten years to step into my shoes to assure continuity, since they were younger than me and I would probably retire first. Then the pandemic came and both partners, now approaching retirement age, decided to retire and I bought them out. Here is what I learned from that experience.

A person who sets out to build a consulting business often begins, quite naturally, by relying on the only asset immediately available--his or her own expertise, reputation, and relationships. In the early years, this is not only appropriate but necessary. Clients are buying judgment, experience, and trust--qualities that are inherently personal. Yet there is a subtle but profound distinction between building a successful consulting practice and building a valuable consulting firm. The former can provide an excellent income; the latter can become an enduring enterprise with transferable worth. Anyone who aspires to retire from their business, sell it, or pass it on must think beyond personal success and deliberately construct an organization that can live independently of its founder.

At the heart of this transformation is the concept of separability. A business has real market value only when it can function, generate revenue, and maintain client relationships without the constant presence of the founder.

If every client engagement depends on one individual's direct involvement, the business is, in effect, a job--albeit a well-paid and autonomous one. Buyers do not pay a premium for jobs. They pay for systems, teams, and predictable earnings. The founder must therefore shift from being the primary producer of work to being the architect of a structure that others can operate.

One of the most important steps in building such a structure is the intentional development of talent within the firm. Hiring capable professionals is only the beginning. The real objective is to cultivate individuals who can carry client relationships, deliver high-quality work, and eventually lead the business. This requires delegation not only of tasks but of responsibility and visibility. Clients must come to trust the firm, not just the founder. That trust is built when other team members are allowed to present, advise, and solve problems independently, while still operating within the standards and philosophy established by the founder. Over time, this creates continuity, an essential ingredient of value.

Equally important is the creation of systems and processes that standardize how work is performed. In many consulting practices, knowledge resides informally in the founder's mind. These include such skills as how to scope a project, how to price services, how to structure a report, how to manage a client relationship. While this may be efficient in the short term, it is a liability in the long term. A valuable firm captures this knowledge in repeatable methodologies, documented procedures, templates, and training materials. These systems not only improve consistency and efficiency but also make the business transferable. A buyer can step into a system, but they cannot step into someone else's intuition or business sense.

Brand identity also plays a critical role in long-term value. A firm that is synonymous with its founder's name may benefit from immediate credibility, but it risks becoming inseparable from that individual. When the time comes to sell or transition the business, prospective buyers may question whether clients will remain once the founder departs. By contrast, a firm with a distinct brand--one that represents a set of capabilities, values, and outcomes--can outlive any single person. This does not mean the founder's reputation is unimportant. Rather, it should be leveraged to elevate the firm's identity, not overshadow it.

Another key consideration is the nature of the firm's revenue. Businesses that depend on one-off projects, unpredictable pipelines, or a small number of clients are inherently less valuable than those with stable, recurring income. Long-term contracts, retainer agreements, and diversified client bases create predictability, which in turn reduces risk for a potential buyer. A consulting firm that can demonstrate consistent revenue streams, strong client retention, and a healthy backlog of work will command a far higher valuation than one that must constantly "start from zero" with each new engagement. A company relying on doing only risk assessments, has no re-sale value but one with a stable of famous architects who regularly use its services, has more value. A consulting company that offers retainers, pre-paid plans, holds an annual revenue producing seminar, and offers a wide range of services "to the trade" has real value. Work for the trade might include writing the specifications and designing the high tech systems for small start-up firms needing those services but lacking the expertise to do them themselves.

Financial discipline and transparency are also essential. A valuable business maintains clean, well-documented financial records, separates personal and business expenses, and demonstrates consistent profitability. Buyers will scrutinize margins, cost structures, and revenue trends. A firm that can clearly show how it makes money--and how that profitability can be sustained or improved--will be far more attractive than one with opaque or inconsistent financials.

Underlying all of these elements is the concept of risk reduction. From a buyer's perspective, the value of a consulting firm is largely determined by how risky it is to acquire. Key person dependency, client concentration,

undocumented processes, and erratic revenue all increase perceived risk and reduce value. Conversely, a strong leadership team, diversified clients, repeatable systems, and predictable income streams reduce risk and enhance value. The founder's task, therefore, is to systematically identify and eliminate these risks over time. I was able to do this by cross training my partners. In 2014 I went into the hospital to have open heart surgery to correct a hereditary defect in my heart that killed my father. I was off work for six months and my partners carried the company with flying colors.

It is also worth recognizing that value is not created at the moment of sale. It is built gradually, often over many years. Decisions made early in the life of the business--how services are structured, how clients are managed, how employees are developed--have long-term consequences. A founder who consciously builds with the end in mind can shape a firm that not only provides income during their career but also becomes a meaningful asset upon retirement.

Ultimately, the transition from individual consultant to firm builder requires a shift in mindset. The founder must begin to see the business not merely as an extension of themselves, but as an entity with its own identity, capabilities, and future. This often involves letting go of direct control, investing in others, and accepting that the firm's success will depend on people and systems beyond the founder's personal reach. It is not always an easy transition, but it is a necessary one for those who wish to create something of lasting value.

In the end, a consulting business becomes valuable when it can stand on its own--when clients trust the firm rather than the individual, when employees can deliver and lead without constant oversight, and when the enterprise generates reliable, transferable income. Such a business is not only more attractive to buyers, it is also more resilient, more scalable, and ultimately more rewarding for the founder who had the foresight to build it that way.

Advertising Your Services--Getting Recognized as an Expert

I am constantly asked how a new consultant should advertise their entry into the profession and thereafter. Earlier, I said that I rarely advertised. That's partially true. I didn't pay for advertising, but I did promote my company and myself.

A new security consultant entering the marketplace faces a paradox that has shaped the consulting profession for decades. Credibility must be demonstrated before it can be claimed, yet opportunities to demonstrate that credibility often depend on being known in the first place. The solution is not expensive advertising campaigns or glossy branding exercises, but rather the disciplined, consistent sharing of expertise in ways that allow the market to discover, evaluate, and ultimately trust the consultant. In this sense, effective promotion is less about "advertising" and more about building visible proof of competence over time.

At the foundation of this effort is a professional website that serves as the consultant's intellectual home base.



This need not be elaborate or costly, but it must be clear, well-organized, and purposeful. A concise description of services, a biography that establishes relevant experience, and, most importantly, a regularly updated blog, transform a static website into a living portfolio of thought leadership. Each blog post becomes an asset. Each demonstration of how the consultant thinks, solves problems, and communicates is important. Over time, these posts accumulate into a body of work that can rival far more expensive marketing efforts. I found that my website served me well over the years. My assumption is that before contacting me, prospective clients today visit my website. I think that three easily found pages that are particularly valuable are my biography, the list of past clients, and the page listed as "our portfolio." If you don't own your own web domain, what are you waiting for. Even if you don't plan on consulting anytime soon, buy all possible versions of your name or your preferred company name (.com, .net, .biz, etc.

Search engine optimization (SEO) plays a critical role in amplifying this content. A consultant who writes thoughtfully but ignores SEO risks remaining invisible. By contrast, one who intentionally uses keywords aligned with how clients search--phrases such as "museum security risk assessment," "security system design," "museum security consultant", or "museum security design consulting"--can steadily rise in search rankings. Simple practices such as writing clear titles, using descriptive headings, linking related articles together, and maintaining a consistent publishing schedule can dramatically improve visibility without any financial investment. Over time, search engines reward relevance and consistency, making the consultant easier to find precisely when potential clients are seeking expertise. The more websites that link to your site, the higher your ranking will be.

Beyond the website, social media offers a powerful and essentially free distribution channel. The goal is not to chase trends or accumulate followers indiscriminately, but to establish a professional voice in platforms where the security community gathers. A focused presence on LinkedIn, for example, allows the consultant to share insights, comment on industry developments, and engage directly with peers and potential clients. Short posts that distill lessons learned, highlight emerging risks, or respond to current events can reinforce the consultant's

expertise while driving traffic back to longer-form content on the website. Consistency matters more than volume. A steady cadence of thoughtful contributions builds recognition over time.

Publishing articles in professional journals and trade publications remains one of the most effective ways to establish authority. Unlike social media posts, which are fleeting, published articles carry a degree of permanence and third-party validation. Editors act as gatekeepers, and acceptance signals that the consultant's ideas meet a professional standard. Even a small number of well-placed articles can significantly elevate a consultant's profile, particularly when those articles address practical challenges faced by the target audience. Over time, these publications can be referenced, shared, and incorporated into proposals, reinforcing credibility in a tangible way. Publications like "Security Management" have an editorial calendar. They know today what each issue's content theme will be a year from now. While one month might feature museum security, another might feature "management skills" or "security for items in transit". You can contact the editor and ask how prospective authors can query the publication about submitting a specific article on a specific topic. This is a relatively standard procedure professional writers use to avoid wasting everyone's time by submitting something the publication isn't interested in. You, as a museum specialist, are not limited to submitting articles for the edition featuring museum security. You can submit an article on budgeting for the management issue or an article on shipping high value items for the edition featuring items in transit.

I worked hard to get my first article published in a professional journal. I queried, followed the advice they offered, and submitted re-drafts. After it was published, I sent a small basket of flowers to the editor and thanked her for giving me this chance. Thereafter, I was known as that nice guy who sent the flowers and eventually ended up on the cover of their publication.



For those willing to invest additional effort, writing a book, whether traditionally published or self-published, can serve as a cornerstone of professional identity. A book need not be lengthy or academic. A focused, practical guide that addresses a specific niche can be far more valuable. In the security consulting field, where clients often seek clarity amid complexity, a well-written book positions the consultant as a trusted guide. It also creates opportunities for speaking engagements, interviews, and further publications, each of which extends the consultant's reach. Being the guy who "wrote the book on museum security" can be an extremely valuable aid to your reputation.

Speaking at industry events is another powerful, low-cost method of promotion. Conferences, association meetings, and webinars are constantly in need of knowledgeable presenters. By proposing topics that address current challenges or emerging trends, a new consultant can gain access to audiences that would otherwise be difficult to reach. Speaking not only demonstrates expertise but also humanizes the consultant, allowing potential clients to see how they communicate and think in real time. Even smaller venues like local ASIS chapters, virtual events, or panel discussions at regional museum association meetings can be highly effective stepping-stones.

Service on professional committees and industry organizations provides a different but equally valuable form of visibility. Participation signals commitment to the profession and creates opportunities to collaborate with established practitioners. Over time, these relationships can lead to referrals, partnerships, and invitations to contribute to larger initiatives. Importantly, committee work is not overtly promotional. It builds reputation through contribution rather than self-promotion, which often carries greater weight within professional communities.

An email newsletter, though sometimes overlooked, offers a direct line of communication with an audience that has already expressed interest. Unlike social media, where algorithms control visibility, a newsletter reaches subscribers consistently. By sharing insights, summarizing recent articles, or offering brief commentary on industry developments, the consultant can remain present in the minds of potential clients. The key is to provide value rather than promotion. Provide information that readers find useful enough to continue receiving. Include an “unsubscribe” button and you will get instant feedback as to whether you are wasting your time. If you do an emailed newsletter and lack experience with layout and design, get help. People also judge you on your skills at making your materials look professional.

Underlying all of these efforts is a principle that distinguishes effective consultants from those who struggle to gain traction-- generosity of knowledge. The instinct to withhold information out of fear that it diminishes one’s value is misplaced. In reality, sharing expertise openly demonstrates confidence and competence. Most clients do not hire consultants because they lack access to information. They hire them because they need judgment, experience, and the ability to apply knowledge effectively. They hire them because they don’t have time to do the work the consultant will do themselves. By giving away insight, the consultant proves that they possess more of it. Over the years I have always maintained the policy that I will talk with anyone who calls me with a question and no one will ever get a bill. I have tested this on many occasions. Trust me on this. There were times when I had so much business I couldn’t handle more work, and when a museum director called me and asked about a solution to a complex problem, I would tell them everything they needed to do to solve the problem themselves hoping they wouldn’t hire me. Nearly every time the conversation concluded with the director hiring me to implement the solution for them. Be very generous with your free advice, and it will pay off.

Finally, consistency is the force that transforms these individual efforts into a cohesive strategy. A single article, a handful of social media posts, or a one-time speaking engagement will have limited impact. But sustained activity like writing regularly, engaging thoughtfully, and contributing consistently creates momentum. Over time, the consultant becomes not just visible, but familiar. And in a profession built on trust, familiarity is often the first step toward engagement.

In the end, announcing one’s entry into the security consulting field is not a single event but an ongoing process of demonstrating value. Through a combination of a well-maintained website, strategic use of SEO, active participation in professional networks, and a commitment to sharing knowledge, a new consultant can build a reputation that is both credible and enduring, all without significant financial investment. The market will respond not to the loudest voice, but to the one that consistently proves it has something worth hearing.

Now You Know the Job but Can You Do It All?

Becoming a self-employed consultant is often seen as the culmination of a professional career--a transition from executing within an organization to advising others based on hard-earned experience. It offers a compelling



mix of independence, intellectual challenge, and financial opportunity. Yet it also demands a level of discipline, resilience, and business acumen that many underestimate. Understanding both the advantages and disadvantages is essential for anyone considering leaving a corporate role to build an independent consulting practice.

One of the most attractive advantages of self-employment is autonomy. As a consultant, you control your schedule, select your clients, and determine the type of work you pursue. This freedom allows you to align your work with your interests and values. You are no longer constrained by internal politics, rigid organizational structures, or decisions made far above your level. For many, this independence is not just a professional benefit but a deeply personal one--it restores a sense of ownership over time and career direction. There is stress, but it is a different type of stress. When my boss at the museum gave me an assignment at 4:45 pm on Friday that he needs before I go home, that was stress.

But when you are your own boss responsible for collecting overdue payments from a client so you can pay your bills, that is another type of stress. It may not seem like the difference matters, but it does.

Closely tied to autonomy is the potential for increased income. Unlike salaried roles, consulting income is not capped by a fixed paycheck. Experienced consultants who develop a strong reputation can command high hourly or project-based fees. Over time, as efficiency improves and demand grows, profitability can increase significantly. Additionally, consultants often benefit from tax advantages available to business owners, such as deducting legitimate business expenses.

Another advantage is the intellectual variety and challenge. Consultants are exposed to different organizations, industries, and problems. This diversity keeps the work engaging and prevents stagnation. Each new engagement requires analysis, creativity, and problem-solving--skills that many professionals enjoy exercising at a high level. For individuals who thrive on continuous learning, consulting can be particularly rewarding.

However, these advantages come with equally significant challenges. Perhaps the most immediate disadvantage is income uncertainty. Unlike a steady paycheck, consulting revenue can fluctuate dramatically. I call it feast or famine. There may be periods of high demand followed by gaps with little or no income. I lived in Florida for most of my consulting career and looked forward to going fishing every October during our slack season. This unpredictability requires careful financial planning, including maintaining reserves to cover slow periods. When I had several employees who also traveled by air to projects, went to conferences and incurred expenses, I maintained a company bank balance of about \$75,000 at all times to assure that I had cash flow, and

could meet payroll and other obligations. As a sole employee of a small consulting company, you still need no less than \$30,000 cash on hand. I get nervous when I have less than that in the company account. With professional liability and general liability insurance as high as \$6,000 per year, for both, an office mortgage, accountant costs, payroll taxes, travel costs for myself and my associates, and payroll cash flow can be a problem during slow periods. All company expenses are paid using company credit cards to reduce accounting and tracking costs. Never in forty years did I just pay the minimum amount due on the credit card. It is important that you not use your company card for any personal expenses and that you pay the balance due in full each month.

Another major challenge is the responsibility of running a business. Consulting is not just about delivering expertise; it is about managing all aspects of an enterprise. In an active consulting business, you will devote one non-billable hour for every billable hour just doing non-billable tasks. This includes marketing, contract negotiation, invoicing, bookkeeping, and compliance with tax obligations. For example, a self-employed consultant must be disciplined in paying quarterly estimated taxes and, if applicable, payroll taxes. Failure to manage these obligations properly can lead to financial penalties and significant stress. Many highly skilled professionals struggle not because they lack expertise, but because they neglect the operational side of the business.

Client management is another critical area that can be both rewarding and difficult. Consultants must be adept at building trust, setting clear expectations, and communicating effectively. Unlike internal roles where authority may be implied, consultants must earn credibility quickly. They also need to handle difficult situations--such as scope creep, late payments, or resistance to recommendations--without damaging relationships. Emotional intelligence, diplomacy, and firmness are essential traits.

Success as a consultant requires a specific set of personal characteristics. Self-motivation is fundamental. Without a boss or organizational structure, the consultant must generate their own momentum--seeking opportunities, following up on leads, and continuously improving their offerings. Discipline is equally important. This includes maintaining consistent work habits, managing time effectively, and adhering to sound business practices such as accurate recordkeeping and timely financial management.

Resilience is another key trait. Rejection is part of the consulting business--proposals will be declined, projects will fall through, and clients may not always value your work as you expect. The ability to persist without becoming discouraged is critical. Alongside resilience is adaptability. Markets change, client needs evolve, and successful consultants adjust their services and approaches accordingly.

Strong communication skills are indispensable. A consultant must be able to listen carefully, ask insightful questions, and present ideas clearly and persuasively. This includes both written communication--such as reports and proposals--and verbal communication in meetings and presentations. The ability to translate complex concepts into actionable recommendations is often what distinguishes a good consultant from a great one.

For those considering leaving a corporate or museum job, several practical pieces of advice can improve the likelihood of success. First, avoid making an abrupt transition if possible. Building a consulting practice while still employed--on a limited and ethical basis--can provide valuable experience and initial clients. This reduces risk and allows you to test whether consulting is truly a good fit. Some have found that they simply can't get themselves into the office by nine o'clock without a boss checking up on them.



Second, develop a clear value proposition. Clients do not hire consultants simply for experience; they hire them to solve specific problems. Being able to articulate exactly what you offer, who you serve, and how you deliver results is essential for attracting business.

Third, establish strong business systems early. This includes accounting processes, contract templates, pricing strategies, and a method for tracking leads and projects. Treating the consulting practice as a business--not just a series of engagements--creates a foundation for growth and stability. This applies to your part time consulting gig. Use this time to build business systems, buy and learn software like QuickBooks, Microsoft Office, virus protection, and Acrobat Pro. If you work for architects, you will need CAD and BIM software.



Fourth, invest in professional visibility. Speaking at industry events, publishing articles, and participating in professional organizations can significantly enhance credibility and generate opportunities. Remember that once you leave your full-time management job, there is no one to pay your way to ASIS or similar programs. Consulting is often a relationship-driven field, and visibility plays a major role in building those relationships. For decades I bought a booth at the Smithsonian Conference and at the AAM Conference. Don't expect people to visit your booth or immediately buy your services. But when you begin to question the value of this participation, you will receive a request for proposal from a potential client who will tell you that ten years ago he heard you speak and visited your booth at a Smithsonian Conference or AAM.

Finally, maintain realistic expectations. The transition to consulting can take time, and early stages may involve lower income and higher uncertainty than anticipated. Patience, persistence, and continuous refinement of your approach are necessary. Everything you do should be seen as an investment in your business development. Set up templates for proposals, invoices, survey checklists, etc. You only have so many hours you can sell and once you waste an hour it can't be sold so reduce your administrative, non-billable time if you can.

Self-employment as a consultant offers substantial rewards, including independence, financial potential, and intellectual engagement. At the same time, it demands a high level of discipline, resilience, and business awareness. Those who succeed are not only experts in their field but also effective managers of their own enterprise. For individuals willing to embrace both the freedom and the responsibility, consulting can be one of the most fulfilling professional paths available.

Fees and Expenses

I cannot discuss hourly rates or tell you how much to charge because it would be illegal under U.S. law to do so in this document as it could be construed as price fixing. What I can say is that you need to think carefully about your hourly rate. Here are some random thoughts I developed over years that you may find helpful:

- Your hourly rate matters to the client but really isn't that big a deal. I only offer a fixed fee for a defined scope of work so the proposal I offer (which when signed becomes the contract) lists all of the tasks I will perform and how many days I will be on site and how many days I'll need in the office to prepare the report and offers a guaranteed fee to perform those tasks. If it takes me longer, I eat the added time. If it takes me less time, I still bill for the agreed upon fee. I also bill for expenses exactly as incurred without mark-up. If airfares increase between the time that I offer the proposal and the client signs the contract, I still am to be reimbursed for the exact amount paid. On rare occasions I include a not-to-exceed amount for expenses so the client knows I will not eat steak and lobster every night or travel first class. If, however, the client requests a site visit on short notice increasing the airfare, the not-to-exceed does not apply. I base my fixed fee on an hourly rate that I know is typical of the industry rate. And the amount of time I plan to be on site, in transit, and in the office working on this list of tasks. I strongly recommend that you not deeply discount your fees in an effort to win the job. I sometimes offer a slightly lower rate if the job is in Paris or Honolulu and I really want the project, but clients see an unusually low hourly rate as indicative of someone who is less qualified. It is not what you charge per hour that matters, it is how many hours it takes you to do the job and what the total amount the client will pay is going to be what matters. Fortunately for us, museum directors who hire security consultants see the consultant's study as important and they want a qualified consultant, not a discount. Most clients know what consultants of all specialties charge for professional services and don't bicker about fees or hourly rates.
- You need to submit a copy of a receipt in order to get reimbursed or to deduct the expenses from your taxes.
- You submit receipts for travel, lodging, transportation, food, tolls, and similar costs. If you include a CAP Index as part of your report to assess crime risks, that might be reimbursable. You never request reimbursement for office overhead like copying. The exception is that you may request reimbursement for large format blueprints you need to have printed to do your work.

Expense Account Form

Traveler: John Smith

Date: 04/22/2024

Date	Description	Airfare	Meals	Car Rental	Hotel	Parking	Total
04/17	Airfare (Coach)	\$500	\$75	\$60	\$75	\$ 40	\$635
04/17	Meals	\$75	\$75	\$60	\$75	\$ 40	\$655
04/18	Rental Car	\$75	\$75	\$60	\$75	\$ 40	\$355
04/19	Rental Car	\$75	\$75	\$60	\$75	\$ 40	\$355
04/19	Rental Car	\$75	\$75	\$60	\$75	\$ 40	\$355
04/20	Rental Car	\$75	\$75	\$60	\$75	\$ 40	\$355
04/21	Rental Car	\$75	\$75	\$60	\$75	\$ 40	\$355
04/21	Airport Parking		\$40		\$40	\$ 40	\$355

TOTAL EXPENSES: _____ \$2,295

TRAVELER SIGNATURE: _____ APPROVED BY: _____

- I am almost always the high bidder on most jobs. My clients are more than willing to pay for my experience and thorough reports. Architects use my company over and over because we never ask for additional money if their scope creeps or project is delayed.
- I always offer a guarantee of satisfaction. If the client is not 100% satisfied with my work product, they only need to tell me and give me one

opportunity to make them happy and resolve any misunderstanding and if they still are not satisfied, they do not need to pay me. No one has ever refused to pay me.

- I also offer free phone consultation for one year following my visit. They may call or email me with questions or to seek clarification regarding my recommendations and will never get a bill. This does not mean that if I recommend they write a policy manual that I will write it for them free in the following year a policy at a time on the phone. But I will discuss what should be in the policy they are writing.
- I include my professional and general liability insurance certificate with each proposal to a client.
- You may need Workers' Compensation insurance if your state requires it, but some states exempt the owner of a professional firm who works at desk from paying it. Many clients and all architects will require it, however.
- I request an amount equal to the estimated expenses as an advance retainer and the remainder when I deliver the report. This helps with cash flow.
- Payment is always "Net 30 days" but almost always takes 60 days or longer before it is received. Some clients are slow to pay due to their bureaucracy.
- Ascertain at the beginning of the job who gets the report. Ascertain who gets the invoice and what if anything they need with it. Ascertain if you need to put anything such as a purchase order number on the invoice or if the invoice needs to be in some special format. Do they prefer it be mailed or emailed?
- Occasionally, as client may respond to your proposal with a counter by saying that your expenses will be according to their in-house reimbursement rules. This is often the case with government agencies like the National Park Service. Be very careful here. They may limit your hotel reimbursement to some unrealistic amount less than half the prevailing rate for a low-cost motel. You are not eligible for the government rate as you are not a government employee so you will lose money. They also pay a per diem that is inadequate. And very often they require that their travel office make your air reservation. I lived in Daytona Beach and flew out of the Daytona airport. One travel office booked me out of Orlando (one hour and fifteen minutes and 90 miles away each way with \$40 per day parking. They saved \$45 on the airfare, and I ate almost \$500 in expenses and incurred three hours more time I couldn't bill for. Just say no!
- Some clients offer to pay with a credit card. For years we took credit cards because it assured quick payment, but it cost us more than it was worth, so we discontinued accepting cards.

How is Billing Handled with Architects?

When working for an architect, the proposal is much more complicated. I addressed the scope of work elsewhere in this document. Here are my random thoughts on getting paid by an architect on a new construction or renovation project:

- Spell out every task you will perform for the architect and carefully estimate how many hours it will take you and your employees to complete the work.
- If you use a contract draftsman to do your CAD, get him or her to give you a fixed fee plus expenses. Estimate high.
- I list the number of hours I will bill for each task after the task on the proposal. When I invoice, I invoice for each specific task, each a line item on the invoice.
- Be sure to include every site visit and every submittal since this is where most of your time is.
- Build in to your proposal an extra submittal or two. You are dealing with the project architect when estimating the job but the owner when you ask for more money. Project architects are not very good at articulating the atypical tasks they may need that require you to incur time and expenses like an extra submittal for GMP or permitting. So, build in an extra submittal or two.
- Make it clear that if they need more visits or more submittals they need to tell you because you won't perform them unless they are purchased in advance.
- Know that the architect will not sign your contract. He will use a special contract template from the AIA and expects you to sign it. Be sure that you get a signed copy before you begin work. Insist that your proposal be attached as Attachment "A (or whatever)". This assures that your list of agreed upon tasks is in that contract.
- Architects get paid when all of the work in a specific stage of design are completed. It is not unusual for payment to be held up for everyone if one consultant on the design team is slow to submit or if the cost estimate exceeds the budget. Your contract will always say that you get paid when the architect gets paid. That could possibly be months. I have had architects owe me as much as \$150,000 that was eight months overdue on a project with the Smithsonian.
- Many jobs with architects require that you bill by a certain date for a certain amount of your work to date. Don't miss that billing deadline.
- Your contract is generally with the architect and not the client. Your client is the architect in most cases.
- Architects have no problem asking you to do additional work. Include in your contract that you are authorized to perform additional billable work for additional fees when instructed in writing by the project architect. Require them to instruct you by email and respond by quoting them an amount for additional fees. Create a paper trail or you won't get paid. Maintain meticulous billing and expense records when working for architects.
- Work with architects is more demanding and more problematic but also more profitable.

What Does a Security Consultant's Report Look Like?

There is no right or wrong way to write a consulting risk assessment report. My reports begin with an Executive Summary which is basically a bulleted list of major recommendations. It reads like a book with a Table of Contents, Introduction, then each "Chapter" more or less follow the tasks as listed in my Proposal. In fact, my reports look a lot like this document you are reading.



Because I am writing to people with various levels of understanding in museum security, I include a lot of explanations that are intended to educate the reader, so everyone has the same level of understanding as to why I recommended what I recommended. I do extensive research as to the risk of flood, wildfires, earthquakes, winter storms, tropical storms, tidal waves, volcanos, etc. I include a CAP Index property management report because it estimates increasing and decreasing crime rates by category (and this is relevant) and I almost always include the CAP Index color coded map to illustrate the potential for spillover crime.

I discuss the concept of Protection Models which I developed twenty years ago. Just as businesses make their money by various business models, museums protect their collections by various Protection Models. If you are going to be a consultant, you need to understand this concept. I also devote time to discussing the four pillars of museum security: access control, property control, internal security, and cyber security. If you have control of each of these, your museum is totally safe from crime risks. This is another concept you need to know if you plan to be a consultant. I assess each client's access control, property control, internal security and cyber security (cyber security as it relates to the security systems). Of course I include other sections as needed. Each job is similar, but each job is very different. Each report is custom.

Because it is difficult for the consultant to communicate exactly where a problem was noted, I always include floor plans which I mark up in CAD or Acrobat Pro showing the location of a specific issue. For example, I might show a location on the floor plan with an arrow and dialog box that says, "This motion detector needs service, it does not cover the intended area".

In my closing summary I list minor issues that I noted. I recommend priorities for most critical things to be addressed, and I estimate costs of implementing my recommendations. As attachments to the report, I include product cut sheets for products I may have recommended in my specific recommendations. I often include a five-year plan for implementation.

I retain a copy of every report I ever wrote. They are encrypted and stored off-line where they can't be easily accessed. Why do I do this? Decades ago, a client carelessly stored my printed and bound report, and it was made public by an angry employee who wanted to embarrass the museum director. The museum was involved in internal litigation, and I was called to testify in court. While this was the client's fault due to the museum's carelessness, it illustrates that your reports can be controversial. Years later I discovered an issue with a different client where a high-ranking employee had done something that could easily have resulted in major litigation. I

notified the museum's general counsel and explained the findings to her. She then handled the problem. I omitted the evidence I uncovered from my report, and my conversation with her was privileged. And in another instance a university museum was closed by the university, leaving the collection to sit in a hot building with no air conditioning and no security. Because my report addressed this issue at the request of the museum director, I was called as an expert witness. My testimony helped the museum win its case and force the university to provide care for the collection the way the donor intended in his will. You will encounter many unusual situations like this in your career. For this reason, I also retain many notes and photos I took during my survey.

Because one of my employees and I both are self-taught hackers, we understand how vulnerable many of our clients are to cyber threats. In one month, we logged hundreds of attempts to hack into our network so nothing we consider confidential is stored on our network. It is inconvenient but it is something a responsible consultant must consider. Similarly, I never leave my computer, iPad, notebook or other materials in my car or hotel room.

How you write your report is for you to decide. Some consultants provide a minimalist report. Others favor a spreadsheet list of recommendations and little narrative, others favor a long, detailed narrative report. Just know that your report must be easy to read and understand. Always include an Executive Summary. Nothing can be written by AI as that creates a vulnerability.

Conclusion

The infographic on the next page summarizes my idea of the best way to move upward in the security consulting field. You may also find my book “How to Be a Successful Security Consultant” by Steve Keller, available on Amazon Books interesting and helpful.

Running your own business requires a commitment and takes time to develop. Sadly, you can’t make a real living consulting if you only provide risk assessments. If you are only interested in picking up beer money, then that may be all you need to offer. But if you want a real career in this field, I have given you the formula. If you want to discuss this with me in more detail, please feel free to contact me. We can talk on the phone. You won’t get a bill. You can always reach me through my web site at www.stevекeller.com. Maybe we can work together on a project someday.

If you are thinking of calling me, let me answer a few questions in advance:

- Can I send you my referrals or send my clients to you? If you have a full-service consulting operation with in-house CAD capability, good references, and can demonstrate to me that you understand museum operations, yes, I can refer architects to you and I might. Let’s talk. I am still doing risk assessments so, for these, no, not until I retire.
- Can I assist a new consultant on a project. Maybe. If you come to me with an RFP I already and proposing on, then no. But if you come to me with a proposal for a risk assessment or similar project that I have not been invited to submit a proposal on, then I will consider assisting you. I’m not doing your work for you, but I will help you get a good start. You need to contact me before you submit your proposal.
- Can I help you get insurance since it is hard to get for a new consultant. Yes, I will try.
- Can you work for me? Not as a full-time employee but maybe as a part time 1099 employee. Maybe.
- Can I mentor you? Isn’t that what I am doing right now by devoting three weeks of my life to writing a free document to help you? Call me. I have offered to mentor several others, but they weren’t serious about learning from me and were looking for a hobby. If I think I can help you succeed I’m here to help.

I hope I didn’t discourage you, but I have seen several people fail in this business even though they had pension income from police departments, FBI or major museums. You can succeed and I am proof of that, but you need to know that it won’t be easy.

Path to Becoming a Successful Security Consultant

A Practical Career Progression

