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Owner's Project Requirements

Setting the stage for project success

One of a series of white papers by Page professionals

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About Page

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PREFACE

The morning of Monday February 18, 2013, the phone rings at the office of Facility Management for a Class A office building in downtown Houston. A cold front has rolled in over the weekend and the morning is much cooler than average. A tenant reports that the conference rooms lining the north side of the 19th floor suite are too cold. Could someone please stop by to take a look?

The afternoon of Wednesday August 29, 2012, the phone rings in the HR Director's office with a report that everyone located at the workstations along the south wall of floor 11 are reporting they are too hot. Some employees have moved to different offices to get more comfortable, and a few simply left early to work from home.

In both of the cases above, the respondent checks the thermostat serving the area to find that it seems to be within the correct temperature range. What's going on?

Funding has finally been approved in a lab for three new electron microscopes enabling the expansion of lab activities. After installation, Investigators discover the electron microscopes cannot be focused correctly or consistently. What's different about the new facility?

This, and countless similar complaints, are heard by Facility Managers across the country every business day of the year. While it may not be possible to respond to the temperature needs of a group every day of the year, close attention to occupancy needs and usage patterns will help to reduce the number of "hot and cold calls".

To do this effectively, the building's design and operations procedures must be finely tuned to these needs. Too often, these needs are not well understood even from the beginning of the design process. How can a building's thermal comfort system respond to these needs when it hasn't been effectively and carefully designed from the outset?

The best way to maximize the potential for success in thermal comfort, energy efficiency, water conservation, or any other performance metric, is to understand - and document- the owner's project requirements at the beginning of the design process. This documents serves as a primer to this often misunderstood, and rarely undertaken, exercise.

PURPOSE

The purpose of this Primer is primarily educational and is intended to answer the following three questions.

1. What are Owner's Project Requirements (OPR)?

2. How do project teams gather these requirements?

3. How should the requirements be organized and presented in the final OPR document?

Consequently, this P

Part One: Definition

Part Two: Process

Part Three: Content and Organization

The intended audience includes the full spectrum of building design and construction professionals: Engineers, Architects, Owners, Facility Managers, Commissioning Authorities, Developers and Contractors.

DEFINITION

Several definitions of Owner's Project Requirements (referred to as "OPR" in this Primer) are found throughout industry publications and references, all of which attempt to shed light on this often misunderstood document. Examples of definitions include:

"A written document that details the requirements of a project and the expectations of how it will function. These include project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting documentation. "
-Building Commissioning Association

"A written document that details the ideas, concepts and criteria that are determined by the Owner to be important to the success of the project"
-LEED version 2009 Reference Guide EA P1
Section 13 Definitions

Likewise, the OPR may be utilized in multiple ways. For example, the design and construction industry may utilize two (2) primary types of OPRs. The first, and most commonly understood, is an OPR which addresses the performance of the building's mechanical and electrical systems; and the second is an OPR which addresses the performance of the building envelope (sometimes also referred to as enclosure).

For the purposes of this Primer, the OPR refers to the performance of all building systems: envelope, mechanical and electrical systems, Audio/Visual, furniture etc. For example, if ancillary systems are to be Commissioned (such as furniture systems) the team may choose to incorporate these requirement into a single document, or the document may include separate volumes. The primary focus of this primer is the Owner's Project Requirements as they pertain to the most commonly Commissioned systems: MEP systems and building envelope.

The OPR has been referred to as "the heart and soul of the Commissioning Process" (ASHRAE Guideline 0-2005) and has been tasked with the responsibility for documenting everything from the building's program space requirements to the Owner's decision making process.

In reality, the OPR may be all of these things provided that the project team views the development of the OPR as a tool for success.

OPR and the Commissioning Process

According to ASHRAE GUIDELINE 0-2005 - The Commissioning Process is a quality-oriented process for achieving, verifying, and documenting that the performance of facilities, systems, and assemblies meets defined objectives and criteria. For new construction projects, the commissioning team uses methods and tools to verify that the project has been designed and constructed to perform as the Owner expects.

Naturally, this verification requires the team to have a detailed understanding of these expectations. For example, is the sequence of operations correctly programmed and operational according to occupant needs? The OPR is intended to be the repository of all information relating to how the building mechanical and electrical systems should perform.

It also lays the groundwork for the development of the Basis of Design (BOD).

OPR and BOD

The OPR and BOD form a kind of "call and response" relationship. The OPR "sends out the call" by detailing the project requirements regarding quality, function and purpose for systems; and the BOD responds to this call by reporting on the quantity, type and size for systems. It forms the bridge between the OPR and the contract documents.

According to ASHRAE Guideline 0-2005

"This Basis of Design document records the major thought processes and assumptions behind design decisions made to meet the OPR."

Both documents are intended as "living documents" which are not static snapshots in time; rather, they are to be updated at project milestones as the design progresses. Since the OPR documents the projects benchmarks for success, the Commissioning Authority relies on its accuracy and completeness.

"..if you don't know where you're going... you might not get there"

PROCESS

Who is the author of the OPR?

Although it is reasonable to conclude that the Owner is the author of the Owner's Project Requirements, ASHRAE Guideline 0-2005 indicates that the CxA (Commissioning Authority) "may assist" the Owner in developing this document.

Some Owners may have the resources in house to produce the OPR, but this is rare. This primer supposes that the author is an individual (or group) on the Cx team who possesses strong communication skills and has a solid understanding of building engineering systems and high performance building strategies.

The author must also have an understanding of the building program (if available), the Commissioning process, the LEED process (if applicable), and the various reference standards common to high performance buildings (such as, ASHRAE, Energy Star, or Water Sense).

What about alternate documents?

Often, Owners will provide the project team with guidelines and standards which are also intended to communicate requirements. Larger institutions typically publish their own design criteria. While these may address preferred performance goals, they are rarely specific to a given project. In this case, the goal for the OPR process is to capture this information and customize it for the given project. For example, design criteria are not likely to contain information relating to the operating hours for the building or the preferred maintenance procedures for a project.

Alternate documents such as design criteria may be very valuable in serving as the point of beginning for the OPR. They may include specific information such a preferred suppliers or manufacturers for equipment, lighting standards, or interiors standards.

PROCESS

Please recognize that it is not possible to collect all pieces of information using a single, clear and linear process. While all projects types and sizes benefit from the OPR process, it is not possible to pursue a "one size fits all" approach. Like the design process itself, the development of an OPR is equal parts art and science.

The approach presented in this primer is a scientific approach which may be easily quantified and followed; it is repeatable and comprehensive. However, the Commissioning Authority (or other team member) developing the OPR must also consider the art in this process. In other words, the reader is encouraged to continuously judge for himself the right course of action for a given project. An effective OPR is accurate and complete; however, certain components may need to be expanded or contracted to fit the complexity of the project.

For example, the OPR for a project involving a highly varied occupancy schedule may investigate and document the schedule extensively, yet the OPR for a less complex project may simply report on regular business hours.

Gathering Information

The standard approach to gathering information is twofold: circulate a questionnaire and conduct a live charrette. These strategies are detailed further below.

OPR Questionnaires

Writing and circulating a questionnaire is the best way to start the process. It requires the author to begin considering the information already available on the project and to look for deficiencies in project understanding.

Success in gathering information via questionnaires involves writing questions which are specific enough to be useful, but general enough to be flexible. The author of the questionnaire should keep in mind the position and body of knowledge of the intended respondent.

For smaller projects, a single contact person may be able to gather and relay the information requested. Larger projects, or projects may require responses from multiple parties including the Owner's PM and a member of Facility Management. Every project is unique, it is best to remain flexible.

QUESTIONNAIRE

The following sections (with accompanying sample questions) are only a beginning. The reader will see that, in some cases, they are quite specific to building type. The more specific the question, the more complete the answer is likely to be.

Note: consider crafting two types of questions: questions meant to be sent ahead of the charrette, and questions to be asked during the charrette. In many cases, these two lists will be identical, but this dual approach affords the Owner time to gather information, and it affords the project team greater flexibility to refine the charrette agenda.

GENERAL PROJECT REQUIREMENTS

The following are general questions to consider.

1. Please provide previously utilized OPR documents for similar projects you've conducted (if any).
2. Please provide program document for project (If program is already written. See separate discussion in this Primer on the relationship between OPR and program).
4. Please provide current floor plans of the existing space.
5. If known, what regulatory bodies will govern this project?
6. Please confirm the project schedule- including transfer to Owner and move-in.
7. What is the life expectancy for the building? Roof systems?
8. Are there campus design guidelines (or similar) which

PROCESS

OPR and Programming

Please note the difference between information gathered as part of architectural programming, and information needed for an effective OPR.

At times, the OPR information gathering stage may be conducted after the completion of the programming stage. If so, first mine the program document for available information and customize the questionnaire accordingly. Often, information you're seeking is contained in a published program document (or other project statement or basis of design). If this information is available, consider omitting this from the questionnaire and use the live charrette to verify the project understanding.

When programming is thoroughly conducted, this process reveals the project's primary intent; it uncovers the Function Form, Economy and Time of the project. Program documents, therefore, traditionally include information on the goals, facts, concepts and needs. The document will include an understanding of the number of occupants, the space list, the site information, the project budget and schedule. In essence, it defines the project enough so that it may be designed on time and on budget.

However, even the most thorough program documents do not address the performance goals for the project. Specific goals relating to sustainable outcomes, stormwater management, water conservation, energy efficiency, waste management and occupant well being are omitted from this process. For example, conversations conducted during programming sessions pertaining to lighting may touch on aesthetic considerations for lights, but they typically do not include an understanding of the sequence of operations for lighting controls. This is where the program document ends, and the OPR begins.

In rare cases, the OPR process may precede programming. In this case, there may be significantly less information available, and the Owner may be considering the intended use for the project for the first time. This poses a challenge in that the project team may be determining two different things at the same time: project scope and project performance goals.

In this case, the OPR process has the opportunity to perform overall project visioning in lieu of simply project performance visioning. The challenge however, lies in keeping the respective goals of the OPR and the program separate and distinct.

govern this project?

USABILITY REQUIREMENTS

1. Please provide occupancy schedule information.

2. Please describe specific acoustical requirements. For example, where there are enclosed offices or meeting rooms, which ones require particular attention?

3. Are there other rooms or spaces which require acoustical separation from adjacent spaces?

4. Provide information (if available) on any parking lot security equipment and sequencing.

5. Do you anticipate significant office churn? (occupants moving workstations or private offices) If so, please describe.

6. Have you ever conducted an occupant survey on lighting controllability or thermal comfort?

SITE

Site questions may or may not be appropriate. This information may already be available to the team. If so, review it before this process begins to see if it is clear and complete.

1. Will visitors be picked up and dropped off at the facility? Is there a desire for a covered entry or a small covered area for a person to wait for their pick up? (perhaps a family member will retrieve the car from a garage on site? Impact on circulation?

2. Is there a need to install a permanent irrigation system.

3. Is there a preference to only install plants which can thrive from normal local rainfall rates. If no permanent irrigation system is to be installed, consider recommending that they devise a way to irrigate landscaping in the event of a seasonal drought. For example, do they have an employee green team

PROCESS

OPR charrettes are worksessions where building performance goals are established which help to define the success of the project. Charrettes are best held with multiple team players to ensure every relevant perspective is considered and all disciplines are able to have its needs met.

The exact extent, organization and process for the charrette will vary based on project type, scale, and level of complexity, though the recommendations contained in this primer are intended to address most projects. Recommendations are provided in (2) categories: Preparation and Attendance.

Preparation

Begin preparing for the charrette by first analyzing all available information and identifying areas needing further clarification or areas which remain unclear. Analysis may include study of the site, the budget and schedule, the program document, or any other statement of purpose for the project.

It is also critical to study and analyze the written responses to the questionnaire. Consider developing an "easily digestible" document which summarizes the responses for the charrette participants, especially if the response indicated strong or unusual requirements.

Make an agenda.

Coordinate on the resources available in the location. The location should be accessible to all participants and should be large enough to not only accommodate each seated person, but it should also have extra room for display of ideas on the wall and enough circulation space. Depending on the number of participants, the room should have enough space for break out sessions.

Bring an example OPR for a similar project if possible. Sometimes seeing a picture of the destination helps explain the journey.

Bring lessons learned documentation (from previous projects which may have conducted a lesson learned worksession).

QUESTIONNAIRE

ENERGY EFFICIENCY GOALS

Writing questions pertaining to energy efficiency goals will require research ahead of time. Before embarking on the task of writing questions pertaining to this important and highly charged topic, do your homework.

Does the Owner already have published energy efficiency goals? Are they rigid or flexible? Are they conservative or aggressive? Are they appropriate for the specific project? To what extent will the project team be required to meet those goals? Generally, more experienced Owners will already have guidelines for new and renovated facilities, and the line of questioning on this topic should start by exploring these areas.

Less experienced Owners (for example, Owners who are designing their first and only building) are not only less likely to have standards, they are also less likely to know how to discuss establishing them. Not surprisingly, the project team will need to guide them through this process. Knowing the Owner's primary sustainable design objectives and their knowledge or energy conservation measures will indicate how much "hand holding" may be necessary.

MECHANICAL / ELECTRICAL SYSTEMS

Consider questions pertaining to how the systems are to perform.

1. Is there a desire to be able to monitor the building's energy consumption patterns using computer aided facility management software?

PROCESS

Attendance

Strongly consider the following attendees:

Owner / Owner's rep / Decision Maker - the primary task is to identify the Owner's Project Requirements, there may be several different people filling this role

Facility Manager- system performance goals must relate strongly to the ability of Facility Management to operate and maintain the installed system type. FM participation is strongly recommended whenever possible

Architect / Programmer / Designer - design team representation can be crucial, especially at the earliest project stages

Construction Manager / General Contractor - Issues relating to budget, schedule and constructability must be identified

MEP Engineer - the engineering team may represent mechanical and electrical and plumbing disciplines depending the project type and complexity.

What is a Charrette?

A Meeting at which all stakeholders in a project attempt to resolve conflicts and map solutions.- Oxford English Dictionary

An alternate (more succinct, yet cryptic) definition is simply "a small cart". The origin of this definition stems from Parisian students of l'Ecole des Beaux Arts who would ride in the cart sent to retrieve their final art and architecture projects. While en route to the school in the cart, students hurriedly worked together to complete or improve the work. From this obscure origin, the meaning of the word has evolved to imply an intense brainstorming session.

Perhaps a more fitting definition is simply this. "A worksession focused on building consensus among stakeholders, developing specific design goals and, motivating participants to work towards reaching those goals. Participants represent all those who can influence project outcomes. "

2. Is there a plan in place for installing Energy Star rated equipment wherever possible? (office equipment as well as other equipment as applicable)

3. Describe the use of the building after an emergency event (such as a hurricane or blizzard)?

4. Consider widenening these ranges on temperature setback. For example, if these limits are generally no cooler than 65 in winter and no hotter than 80 in summer, are there any spaces which may have more flexible temperature ranges?

5. Is there a desire for a permanent water supply connection for coffee makers in break rooms?

6. Which spaces require negative pressurization? (all labs?)

7. Which spaces require positive pressurization? (bio-vestibules? corridors.

8. Will the stove in the kitchen be electric or gas?

LIGHTING and ELECTRICAL

1. How will task lights be handled in office environments? Lab environments? Other environments?

2. What systems (or what rooms or what pieces of equipment) must have uninterrupted power supply?

3. What other components need to be back online within a limited timeframe? (for example, the fridges in xyz lab can only be down for 1 hour)?

4. Which spaces require dimming? Use the accompanying spreadsheet to identify rooms (or types of rooms) which require dimming or dual switching. (or, provide a tool to use which categorizes spaces by type)

PROCESS

BE CREATIVE

Many owners have difficulties providing detail on goals relating to energy and water efficiency, ventilation or "unseen" building systems; however, most Owners have very clear ideas how the building should function on a personal and tactile level. For example, while it may be difficult to express specific energy efficiency goals, most Owners know exactly which rooms would have acoustical privacy, built in millwork, specific temperature ranges or lighting controls.

This information may be solicited and gathered by distributing a Special Criteria matrix, like the one shown on the following page, This matrix helps to organize information from various representatives (for example, department heads) to complete the matrix and return it to the team.

Of course, any Special Criteria matrix will depend strongly on the building type. This framework can be customized to suit the needs of most building types. Depending on the Owner's decision making structure, this may not require followup, or followup may be incorporated in the sustainable design charrette. One of the most important reasons to use a technique like this is to enable decision makers to know that they are being heard. It also serves as a central location for displaying performance related information by space type.

QUESTIONNAIRE

AUDIO – VISUAL

1. Do conference rooms have any special needs (such as A/V etc.) Will a projector be installed in all conference rooms? If so, should it be ceiling mounted? Should there be a roll down projection screen? Or, simply use a blank wall?

ACOUSTICS

1. What are the acoustical requirements for the building? (which spaces or space type require strong speech privacy or a quiet environment)? 250 seat Auditorium? Multi-purpose room?

2. Are all enclosed offices required to have walls which extend from deck to deck?

3. Are there any special acoustical separations which should be upheld between specialty spaces?

4. Are there noise considerations in the neighborhood (for example from a busy street adjacent to the site)?

VISITORS TO SITE

1. What is the anticipated number and pace of visitors to the site?

2. What would they like visitors to know about their green building? What green attributes would they be proud to display?

GREEN BUILDING CERTIFICATION

1. How do you define a successful green project? (For example, is it one which serves as a positive green influence in the neighborhood? Is it a highly energy efficient building or simply one which achieves LEED certification?

PROCESS

Special Criteria by Space Type

Space Types	Security	Acoustics	Flooring	Special Temp Needs & Controls	Window	Special Lighting Needs & Controls	Built In Millwork	Other requirements
Enclosed Offices								
Administration area, clinical dept enclosed offices (Dental, Family, OB, Optometry, Imaging, Lab, Pharmacy)								
examples notes:	door locksets, access up to Admin via escort only	walls to deck for acoustical privacy	Carpet tiles	ASHRAE 55 compliant	Natural light for all enclosed offices, no window blinds, privacy window coating	Each enclosed office has on/off switch for main light, desire task light with occ sensor integral with furniture	No built ins inside any enclosed offices	
Open workstations								
Eligibility Intake, PBX Operator, Admin receptionist, Billing, Dental, Family provider touchdown, Family, OB and Optometry Registration, Medical Records								
examples notes:	N/A	yes, desire some way to control excessive noise in open areas	Carpet tiles	ASHRAE 55 compliant	Natural light for all offices, no window blinds, glare control window coating	desire task light with occ sensor integral with furniture	N/A	
Exam Rooms								
Typical exam rooms, Infectious Isolation exam room, Immunization private room								
examples notes:	no locking required	not a high priority	non porous flooring	Infectious isolation room requires negative pressure & zoned separately	Natural light for exam rooms, but high on wall- no vision glass for privacy	desire task light on physician work surface for writing	yes with integral sink and upper cabinets	wall notification system for exam room occupancy
Conference Rooms								
Dept Conference rooms								
examples notes:	lockset	strong acoustical privacy in all conf	carpet tiles	ASHRAE 55 compliant	natural light must be controlled to near black out	no task lighting needed	yes, millwork with base cabinets, but no upper cabinets	ceiling mounted projector, automated projection screen

If certification is desired, provide information on different rating systems and the advantages and process for certification.)

SECURITY

1. What are the security requirements for the site and the building? (pedestrian, vehicular, access to the building itself)
2. What are the access requirements for the garage?
3. What types of parking controls are envisioned? (just a lever arm which lifts for all cars? Is parking free?)
4. Is there a need for any CCTV or security cameras on site? Explain that the project team can decide on exact locations during design.

INTERIORS

1. Please see accompanying spreadsheet with questions regarding the criteria for different space types. (see sample completed spreadsheet on following page)
2. Will there be a Nursing Mother's room? Are there any special considerations for it?
3. Is there a desire to include baby changing stations in both the womens and mens rooms? Only the main bank of restrooms or other restrooms as well?
4. Please indicate if any existing free standing furniture is to be reused. (do you have an inventory of pieces to be reused?)
5. Please describe any problems or complaints which have been reported by occupants in your current space?

PROCESS | CASE STUDY

Good Neighbor Healthcare Center Case Study

The OPR process for the Good Neighbor Healthcare Center followed the completion of the program stage and took place concurrently with the initial concept studies.

The team began by drafting a preliminary questionnaire for distribution to the Owner ahead of a pair of OPR worksessions. The OPR process was divided into two parts for this project due to its unique decision making process. Although the Owner was a novice at conducting new building projects, there was a clear vision for how the building should perform, and the decision making process was clearly defined.

The first two (2) hour long session included the Owner's representatives, a representative from the CxA team, the green building consultant, the mechanical engineer and the construction manager. The purpose of the first session was to introduce the process, begin to explore possible answers to the questionnaire, and to discover the Owner's primary requirements for building performance.

The followup meeting was conducted about two weeks later during which the team was able to explore specific requirements in much greater detail. One of the primary requirements for the building was the housing of relief workers after an emergency event. This single requirement raised questions ranging from site access to emergency power, to operations for building elevators.

The follow up meeting also explored the Owner's other primary requirement regarding the need for uninterrupted power vs backup power. Specific spaces were identified for continuous operation and this meeting resulted in a strong understanding of two different emergency "scenarios": a. areas which remain continuously operational and b. areas which should be back up and running within a few days.

The OPR document itself included a table which itemized building functions which would be supported by two different generators: a natural gas powered generator on site and part of the scope of construction work, and a temporary generator brought on site as needed.

QUESTIONNAIRE

ENVELOPE

1. What are the expectations on envelope maintenance? Will maintenance be handled by the Owner's own Facility Management department, or will this service be outsourced?

2. How will window cleaning be handled? (Especially important in mid and high rise structures.)

3. Has the Owner ever needed to address glare control issues; how was it managed? (This is especially important for structures which may have multiple roof levels where an upper floor may overlook the roof of a lower volume which has a reflective roof.)

4. What are the Owner's expectations on building signage?

5. In some cases, the team may suspect that roof mounted equipment may be visible from the ground. What are the Owner's requirements regarding visual screening etc?

6. To what extent should building entrances be protected from the elements? For example, will there be frequent pick up/ drop off activity for visitors?

7. Are there strong environmental considerations? For example, is there a need for glazing strength to resist hurricane force winds?

WASTE MANAGEMENT

1. Start to consider some possible locations for recycling stations. (You don't need a floor plan to know functionally where they would be best located.)

2. Is there is no regular pick up service for recycling at the site? If not, you may start to consider how you will remove the recycling from the building.

By including this level of detail, the OPR contains the information needed to develop a sequence of operations early in the design stage, allowing time for contractor pricing and design accommodation.

Selected questions from the questionnaire required the Owner's confirmation. Written answers were not made available to the team until after the second meeting. The Owner was also able to fill in the Special Criteria Matrix provided to them. Both Owner documents were incorporated into the OPR, though the answers to the questionnaire were located in the Appendix. Inclusion of questionnaire responses helps ensure these directions are not lost in the design process.

The OPR for Good Neighbor Healthcare Center also included a short section containing "Unanswered Questions". These are issues which remain unresolved at the time the first draft of the OPR was published.

Including Unanswered Questions in the OPR helped the team to keep these issues in mind moving forward, and the requirements for these issues were incorporated into subsequent versions of the OPR as they became known. This is an example of the OPR as a Living Document; the Unanswered Questions section should no longer be required by the end of the design process.

Examples included: exact type of parking controls, configurations for specialized exam rooms, and site lighting requirements.

3. Is there a desire to compost the food waste in the kitchen? Has the Owner ever done this before?

4. Would the Owner consider offering community services such as battery recycling areas?

In general, consider questions which address the following issues:

a. floodproofing (dry vs wet floodproofing)

b. termite / pest control measures

c. concerns about vandalism

Finally, include requirements on the following:

a. the need for system mockups

b. requirements for design peer review

c. code requirements for wind/snow/seismic

Information may come to the project team in multiples ways. It is possible that the OPR may not yield a complete set of answers, even with questions provided ahead of time. If information is gathered during subsequent meetings, make sure it is captured in the next version of the OPR.

Once the initial information gathering exercise is complete, it must be assembled into a coherent document. The final section of the Primer, Content +Organization, addresses the document itself.

PROCESS | ASKING THE RIGHT QUESTIONS

All projects benefit from an early understanding of owner's requirements. Even small or uncomplicated projects gain from an early understanding and documentation of performance goals. Especially where an Owner aims to achieve a sustainable project (whether 3rd party certified or not), discussions surrounding operating patterns, stormwater management, landscaping, water conservation and energy demand reduction and waste management should be established early.

Be flexible during this process. Although the scope of work for various consultants may be in place, it is important to discuss strategies early. Some projects may have only one or two meetings held with just a few people, but larger projects may require an extensive charrette experience conducted over the course of several days with various groups. Plan accordingly.

Lastly, be sure to incorporate all applicable guidelines. Many projects are bound by institutional design guidelines, tenant design guidelines or similar.

Gathering pertinent information depends on asking the right question in the right way. Although one of the goals of the process is to reveal performance goals (especially ones relating to the efficiency or functionality of a project), it may be difficult to gather this information by simply asking for it.

Examples of questions to avoid (and ways to improve upon them):

1. What are the project goals relative to sustainability?

Why avoid?

It may be very difficult to answer this question fully, even for experienced Owners.

Consider instead:

Listen carefully to the Owner they he/she/they talk about the project. You will gain a sense for the priorities and can ask more specific questions on these topics.

2. What are the project goals relative to energy efficiency?

Why avoid?

This question has the potential to fall flat and yield an answer such as "we want to save energy, but we don't want to spend too much money on an expensive system". This response, while it may have some truth, does not aid the design team or the CxA.

Consider instead:

Offering examples of energy conservation measures which could be feasible for their project. Be prepared to discuss opportunities and challenges or each.

3. What are the project goals and requirements for building facade that will impact energy use?

Why avoid?

This question is likely too general for inexperienced Owners.

Consider instead:

Including performance and functionality of envelope types under consideration as well as building orientation.

PROCESS | CONSIDER ASKING INSTEAD....

Considering asking questions directly related to functionality such as:

1. What is the anticipated occupancy schedule (numbers of full-time occupants and part-time visitors) for all occupied spaces?

This is the project team's opportunity to gather information not only related to hours of occupancy (which is required for mechanical sequences of operations) but also on how the facility may operate outside of these hours. It may lead to discussions of visitors, departments where employees work extra or unusual hours and how access to the facility is controlled.

2. How is the building used after hours (if at all) ? How do occupants access the building after hours?

If the above question does yield this information, ask is specifically. This can also yield information on how parking controls must work or how building safety must be ensured.

3. Which building occupants require the ability to control the thermal comfort in their own spaces? What problems do you currently experience with thermal comfort?

This question opens a conversation regarding the number and locations of thermostats. Some Owner may have this in their building design guidelines, others will not. Some may simply rely on the engineer's best management practices. Consider inquiring further to ensure you understand the need for controllability.

4. How will the facility be operated? Who will operate the facility? (Facility Management as member or staff or as consultant?)

This is the opportunity to gain information on maintenance capabilities and the sophistication level of Facility Management. Do not install mechanical systems (or any other systems) which are beyond the local ability to operate and maintain the system.

5. Will the facility be connected to an EMCS? If so, does Facility Management have prior experience?

This information helps to develop an overall energy conservation strategy for the project; it also indicates this software will be a component of the commissioning testing protocols.

6. If the opening of the building is to be on the front page of the local newspaper, what would you like the headline to read?

This question can yield information pertaining to any one of the Owner's Project Requirements, especially information pertaining to the building's aesthetics.

7. How often do office/work arrangements change? Do people move workstations / offices a lot? How much time is spent at a desk vs another type of workspace (conference room, training rooms, lab, exam room etc.)

Understanding the anticipated office churn helps to identify the potential need for raised floor access cabling, underfloor air distribution, demountable partitions, Wireless Local Area Networks (WLAN) and raises the question of thermal controllability.

This question (and others) may have already been discussed during other PreDesign efforts occurring before, or concurrently with, the OPR information gathering effort. It is important to actively seek the Owner's project requirements by engaging the Owner, users, Architect, Programmer, MEP engineer, CxA, sustainable design consultant, and Facility Management in an integrated manner.

CONTENT + ORGANIZATION | COMPONENTS

Given that the development of the OPR is still new to many project teams, it is understandable to hear many questions raised regarding the organization of content.

The most often cited "list of criteria" is drawn directly from ASHRAE Guideline 0-2005 Table J-1 which lists (29) criteria for inclusion in an OPR.

ASHRAE

1. Project Schedule and Budget
2. Commissioning Scope
3. Project Documentation
4. Owner Directives
5. Restrictions and Limitations
6. User requirements
7. Occupancy requirements
8. Training requirements
9. Warranty requirements
10. Benchmarking
11. Operations and Maintenance
12. Equipment maintainability
13. Quality requirements
14. Allowable tolerances
15. Energy efficiency
16. Sustainable goals
17. Community requirements
18. Adaptability
19. Systems Integration requirements
20. Health, hygiene & IAQ
21. Acoustics
22. Vibration isolation
23. Seismic requirements
24. Accessibility
25. Security
26. Aesthetics
27. Constructability
28. Communications requirements
29. Applicable codes and standards

While this list of criteria appears to be comprehensive, it's lack of organization prevents the OPR from reaching its full influence and potential; it does not suggest how the information should be organized, which detracts from its usefulness to the project team and CxA.

The General Services Administration has also published guidelines on developing an OPR for its own projects which lists the following performance criteria:

General Services Administration (GSA)

1. Accessibility
2. Acoustics
3. Comfort
4. Communications
5. Constructability
6. Design Excellence
7. Durability
8. Energy
9. Fire Protection and Life Safety
10. Flexibility
11. Green Building Concepts
12. Health and Hygiene
13. Indoor Environment
14. Light
15. Maintenance
16. Security
17. Standards Integration
18. Adaptability
19. Structural Safety

There is strong overlap in these two lists, with some very notable differences. For example, the GSA performance criteria list recommends documenting information on design excellence (is public recognition/ award desired?), light (both artificial and natural light) and structural safety (is progressive collapse a requirement?). Further, certain GSA criteria, such as indoor environment, are likely to encompass several requirements ranging from acoustics to quality.

CONTENT + ORGANIZATION | COMPENENTS

The outline provided by the LEED New Construction v 2009 Reference Guide is purposefully generalized, there are ways of integrating the more the specific list of criteria into this framework. An example of this integration from the United States Army Corps of Engineers is offered at right.

U.S. Army Corps of Engineers

1. Owner and User Requirements
- *a. Primary Purpose, Program and Use*
- *b. Project History*
- *c. Broad Goals*

2. Environmental and Sustainability Goals
- *a. Energy Efficiency Goals*
- *b. General*
- *c. Siting*
- *d. Building Façade*
- *e. Building Fenestration*
- *f. Building Envelope*
- *g. Roof*
- *h. other*

3. Indoor Environmental Quality Requirements
- *a. Intended Use*
- *b. Occupancy Schedule*
- *c. Accommodations for After-Hours Use*
- *d. Lighting, Temperature, Humidity, Air Quality, Ventilation, Filtration*
- *e. Acoustics*
- *f. Occupant Ability to Adjust System Controls*
- *g. Types of Lighting*

4. Equipment and Systems Expectations
- *a. Space Heating*
- *b. Ventilation*
- *c. Air Conditioning*
- *d. Refrigeration*
- *e. HVAC Controls*
- *f. Domestic Hot Water*
- *g. Lighting Controls*
- *h. Daylighting Controls*
- *i. Emergency Power*
- *j. Other*

5. Building Occupant and O&M Personnel Requirements
- *a. Facility Operation*
- *b. Energy Management + Control System*
- *c. Occupant Training and Orientation*
- *d. O&M Staff Training and Orientation*

The Building Commissioning Association includes a description and recommended organization in the Building Commissioning Handbook, second edition. It lists the following performance criteria:

Building Commissioning Association (BCA)

1. General Project Description
Brief description of project scope and purpose

2. Objectives
Image, sustainability, and other major needs

3. Functional Uses
Description of work performed by space type

4. Quality of Materials and Construction
Description of the quality sought by design

5. Occupancy Requirements
Hours or operation and visitor information

6. IEQ Requirements
Special temperature or humidity needs

7. Performance Criteria
Equipment life expectancy, Co_2 levels, other

8. Budget Considerations
Description of budget and schedule

Ultimately, not all performance criteria will pertain to all projects; however, the process of asking the right questions may yield surprising answers which have strong impacts on how the building should perform.

CONTENT + ORGANIZATION | OPR AND LEED

As a basic building block of the building Commissioning process, development of the OPR is a specific requirement in the LEED EA Prerequisite 1 Fundamental Commissioning of the Building Energy Systems.

The LEED New Construction v 2009 Reference Guide outlines the requirements for the content of an OPR in generalized terms and includes (5) categories of information:

1. Owner and User Requirements

2. Environmental and Sustainability Goals

3. Indoor Environmental Quality Requirements

4. Equipment and Systems Expectations

5. Building Occupant and O&M Personnel Requirements

EA PREREQUISITE 1: FUNDAMENTAL COMMISSIONING OF BUILDING ENERGY SYSTEMS

All fields and uploads are required unless otherwise noted.

ALL OPTIONS

DOCUMENT REVIEW

Required Signatory EAp1-2. Owner/Agent

The Owner has approved the Owner Project Requirements (OPR).

Select one of the following:

Owner/Agent Signature. Provide a digital signature affirming the required signatory statement directly above.

Initial here:

OR

Upload EAp1-RS2. The project team will provide the following documents in the upload below:
1. A copy of the form, signed and dated by the owner, AND
2. A document with all relevant required signatory statements, copied directly from the form, signed and dated on owner letterhead.

Upload

The OPR includes the following elements

- ☐ Owner & user requirements
- ☐ Environmental and sustainability goals
- ☐ Energy efficiency goals
- ☐ Indoor environmental quality requirements
- ☐ Equipment and system expectations
- ☐ Building occupant O&M personnel requirements

EAp1 Fundamental Commissioning is one of the LEED credits which require the Owner's signature as part of project documentation.

The signature is intended to provide evidence that the requirements were collected, organized, documented and approved.

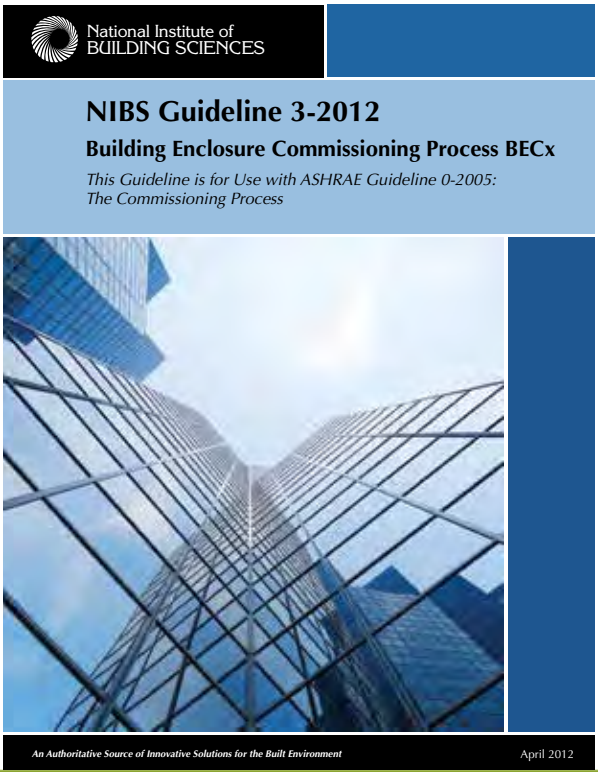
CONTENT + ORGANIZATION | OPR AND BECx

The Building Enclosure Commissioning Process (commonly abbreviated as BECx) is outlined in the National Institute of Building Sciences Guideline 3-2012 document which is intended as a companion document to ASHRAE Guidelines 0-2005 The Commissioning Process.

The envelope commissioning process mimics the process for mechanical systems commissioning, and according to Guideline 3:

"The Building Enclosure Commissioning (BECx) process is utilized to validate that the performance of materials, components, assemblies, systems and design achieve the objectives and requirements of the owner as outlined in the contract documents. The most effective Commissioning Process ideally begins at project inception (during the Pre-Design Phase) and continues for the life of the facility (through the Occupancy and Operations Phase)"

The OPR, therefore, also forms the basis for BECx as it does for mechanical systems Cx. The envelope requirements may pertain to aesthetics, durability, structural, thermal, moisture, or acoustic performance criteria.



The outline provided by the NIBS Guideline 3-2012 is shown below. Note where these criteria overlap with criteria offered by other agencies previously described.

NIBS Guideline 3-2012 for BECx

1. Building Objectives

   Project Description and high level requirements

2. Site Description and Requirements

   Neighborhood, Circulation/ Access, Zoning

3. Building Code

   Abbreviated code analysis

4. Sustainability

   Overall sustainability goals, 3rd party certification

5. Existing Facilities

   Description of any existing elements to remain

6. Program

   Description of program elements and functions

7. Enclosure Thermal Performance Criteria

Identifies major envelope performance criteria from applicable energy codes or referenced standards from certification systems

8. Enclosure Structural Criteria

Roof, Wind, Snow , Seismic loads, Structural framing, Progressive Collapse

9. Roofing

Reference standards, thermal criteria, existing roof conditions reporting

10-13. Exterior Wall Systems, Glazing, Skylights, Doors

Owner's general requirements, Fire resistance, acoustical performance, thermal performance criteria, air and water leakage tolerances, glare control needs

14-16 Foundation Systems

Insulation, structural requirements, moisture requirements, water leakage criteria, vapor control

17-20 Interiors, Accessibility, Acoustics, other criteria

Window treatments, window washing procedures, egress, STC, NC, radio frequency interference, odors, lightning protection

CONTENT + ORGANIZATION | RECOMMENDED ORG

While this list of criteria appears comprehensive, it does not provide the full picture of the potential of a well constructed OPR. Nor does it hint at how the information may be organized. Consider organizing the performance criteria into five (5) sections as shown below: Project, Usability, Architectural, Mechanical and Sustainable.

Preface

Purpose and Acknowledgements

Executive Summary

Background /Overall Goals

Project Description / Program Summary

Criteria

1 Project Requirements

a. Project Schedule and Budget
b. Community / Neighborhood
c. Project Directory
d. Project Documentation
d. Codes and Standards
e. Benchmarking
f. Commissioning

2 Usability Requirements

a. User requirements
b. Occupancy Schedules / After hours use
c. Acoustical
d. Security / Access
e. User equipment description
f. Building Occupant Education

3 Architectural Requirements

a. Indoor Environment / Daylight and Glare
b. Special Criteria by Space Type
c. Aesthetic
d. Envelope requirements
e. existing elements to remain/ reused

4 Mechanical Requirements

a. HVAC Environment
b. Ventilation and IAQ
c. Equipment Life Expectancy / Warranty
d. Submetering
e. Operations and Maintenance
f. Training / Facility Management
g. Allowable Tolerances
h. Emergency Power
g. Lighting Levels
h. vibration isolation
i. controllability

5 Sustainable Requirements

a. water conservations measures
b. energy conservation measures
c. materials stewardship goals
d. waste
e. health and wellbeing of occupants

Appendix

Glossary / Acronyms
Questionnaire
LEED Checklist (or other rating system)

Writing the OPR

Preface

The Purpose section describes the overall intent of the document, explores the lifecycle of the document and how it fits into the Commissioning process and the Integrated Project Delivery process

The Acknowledgements section offers the opportunity to identify and acknowledge the work of all OPR questionnaire, charrette and other participants.

Executive Summary

The Executive Summary indicated in the recommended Organization is intended to introduce background information on the project as well as to highlight topics requiring attention.

The Background and Project Description section offer a brief description of the project overall and its goals. More complicated projects may have extensive descriptions including a detailed summary of program elements.

The OPR Process section of the Executive Summary described the information gathering process undertaken and describes the lifecycle of the OPR as a Commissioning tool. If applicable, it may also be the place for Owner approval signatures. Approvals may be sought at each design phase, at the end of PreDesign or at the completion of Contract Documents. Keeping in mind that the OPR is intended to be a living document- updated as project requirements evolve- project teams should devise the approvals process which best suites each Owner.

The Unanswered Questions section is intended to highlight all outstanding issues at the time of publication. As each version of the OPR is published, this section should shrink until it can be removed altogether. Unanswered questions may pertain to any system in the building from lighting controls to elevator operations to emergency power needs.

Criteria

The Criteria section is the heart of the OPR and contains the specific Owner's Project Requirements. This section is divided into subsections to allow the reader to more easily navigate. The (5) sections are: Project, Usability, Architectural, Mechanical and Sustainable Requirements.

Project Requirements are general requirements which pertain to issues of the project schedule, team members and overall "measures of success" for the project. These measures of success may pertain to sustainability, long term maintenance, or cost of operations. This is also the location for information on the Commissioning process, the tasks performed, systems to be commissioned, and plans for future re-commissioning.

Usability Requirements address how the building is occupied and experienced, and is therefore one of the most important sections for the Commissioning Authority, This sections includes occupancy schedules, security procedures. and after hours procedures.

This is the recommended section to address acoustical separations and to document the team's understanding of work habits. For example, Human Resources members often require enclosed office environments due to the sensitive nature of employee conversations.

User equipment may also be documented in this section, especially existing Owner equipment to be reused in the new design. This helps to highlight the need for special attention, especially electrical requirements.

Architectural Requirements are included in the OPR to assist the design team in designing wall systems, facade systems, floor plan arrangements, and finishes which contribute towards to building's performance goals. Increasingly, the relationship between interiors, furniture systems and sustainability must be carefully navigated. For example, to decrease energy demand and provide task lighting for light sensitive tasks, systems furniture may be equipped with a built in task light which is controlled via occupancy sensor (or even photocell).

The Special Criteria by Space Type matrix (example shown on page 10 of this document). This matrix uncovers and organizes performance criteria such as lighting, daylighting, glare, thermal controllability, security and positive/negative/neutral pressurization.

Mechanical Requirements relate directly to the systems being Commissioned. This section should include a description of systems, a description of how these systems will be measured and verified, and a description of training requirements.

In addition, this section should include a detailed description of emergency power procedures and sequences. Identifying these needs early is critical for the design team and helps the CxA in several ways. If the CxA is performing a peer review of the design work, this review should coordinate the emergency power requirements detailed in the OPR with the documents under review for accuracy and consistency.

The Mechanical section should also include information relating to how the building and systems will be operated and maintained and should identify the need for any special criteria, such as vibration isolation.

Finally, the Sustainable Design Requirements should detail specific goals; a green building rating system such as LEED or GreenGlobes may serve as a framework tool if desired.

Goals should be documented for water conservation measures, energy conservation goals, materials stewardship, waste management and occupant well being. For example, provide a narrative describing any greywater reuse systems (rainwater or condensate capture) and the landscape irrigation strategy. Energy conservation measures may be expressed in terms of 3 strategies: demand reduction, increased efficiency and the introduction of renewables.

Waste management should be discussed and documented in this section as well. Will the building offer recycling stations? If so, what will be collected, where will it be stored and how and when will it be removed from the facility? Are there any other waste reduction strategies (for ongoing consumables or durable goods?)

Appendix

The Appendix of the OPR may include a glossary of terms and acronyms, as well as any additional information pertaining to the project performance. For example, include a LEED checklist as required. It is also very important to include a copy of the completed OPR questionnaire in the Appendix as a record of the decision making process.

Publishing the OPR

The OPR is to be updated at major design phase milestones to ensure the team revisits the project performance goals and keeps these goals in focus. Rarely do projects navigate the design process in a linear manner without any detours through Value Engineering ("VE") exercises (or similar). As the central location for project performance requirements, the OPR should be consulted during any VE exercise, and updated to respond to any changes made. This is especially true of changes to mechanical systems, but changes to glazing systems, envelope components or site design may also strongly impact project performance.

The OPR should be coordinated with the final design documents, updated with any changes made during construction, and included as part of the Systems Manual to be provided to Facility Management.

CONCLUSION

Conclusion

The proposed Organization is a general framework which can be applied to many (though not all) project types. It is useful to differentiate between requirements in this format to help the reader navigate the document and to help the author to organize disparate parts. There can certainly be additional subsections included to meet the needs or larger or more complicated projects. This organization represents a skeleton framework.

This primer recommends including an Owner's Approval Signature page, although this may not suit the style or taste for all Owners. At the very least, once the document is written in this format, a rough draft should be provided to the entire design team and the Owner for review, comment and consensus.

It is a normal and natural part of the process that the OPR is updated as the project develops over time. Consider keeping the term "DRAFT" on the document until Contract Documents are issued as a reminder that it is a living document which must be updated (or at least revisited) periodically.