



## **DESIGN GUIDELINE 2.1**

### **OWNER'S PROJECT REQUIREMENTS AND BASIS OF DESIGN DOCUMENTS**

#### **Scope**

Beginning in the Schematic Design phase and continuing until the project has been as-built, the Architect/Engineer with input from the project team shall develop and periodically update an Owner's Project Requirements (OPR) document and a Basis of Design (BOD) document. These two documents together shall provide a complete description of the project's design intent.

The OPR is an inclusive, detailed description of the Owner's goals and requirements for the project, and the Owner's expectations on how the project will be used and operated.

The BOD is an inclusive, detailed description of the Design Team's concepts, assumptions, calculations, decisions, product selections and operating conditions to meet the Owner's project requirements and to satisfy applicable codes, standards and guidelines. It shall be formatted to coordinate with and respond to the OPR.

These two documents will be benchmarks by which the completeness, adequacy and acceptability of the project will be judged. They will be the standards by which the project will be commissioned. They will answer Owner questions after occupancy, and they will be the foundation for maintenance programs and future renovation projects.

#### **Related Sections**

##### **U-M Design Guideline Sections:**

[2.3 U of M Owner's Review](#)

[3.1 Sustainable Design and LEED® Requirements](#)

[3.2 Energy and Water Conservation](#)

[4.3 Building Commissioning](#)

##### **Reference Documents:**

ASHRAE Guideline 0-2005, "The Commissioning Process"

USGBC, "LEED® Reference Guide for Green Building Design and Construction"

USGBC, "LEED® Reference Guide for Building Design and Construction - Healthcare"

#### **Execution**

##### **Contents**

The OPR shall include at least the following information:

- Summary description of the building (functions of building, high or low rise, use and occupancy classifications, anticipated hours of operation, etc.).
- Project goals, assumptions, and known limitations.
- Donor and Sponsor program requirements.
- Building and site accessibility, architectural, landscaping and aesthetics goals.

- Building and site flexibility and expandability requirements (spare capacities, survivability, reliability, redundancy, back-up power and utilities, etc.).
- Operational assumptions (maximum occupancy on a room-by-room and aggregate basis), occupancy schedules, special activities, building diversity, potential future uses, potential future renovations, etc.).
- Building orientation and envelope aesthetic and materials criteria.
- Energy and water conservation goals.
- Environmental and sustainability goals.
- LEED Goals.
- Indoor services and technology requirements (clean room and bio-safety lab classifications, fume hood sizes and types, vivarium and environmental room conditions, furniture, marker boards, process water, gases, communications, data, security, card access control, audio/visual, etc.).
- Space-by-space design requirements (temperature, humidity, air change rates, room pressurization, sound level limits, light levels, glare limits, vibration criteria, EMF shielding, etc.).
- Space-by-space equipment heat loads and utility needs (water, gases, power, data, grounding, etc.).
- Anticipated types, classifications, and quantities of hazardous materials to be contained within the building.
- Architectural, mechanical and electrical systems operation and maintenance expectations.
- HVAC, lighting and audio/visual controls expectations.
- Summary of sole-sourced systems and equipment.
- Summary of Owner-furnished and Owner-installed equipment.
- Occupant and Maintenance training requirements.
- Project schedule.
- Project budget (UniFormat cost estimate). The U-M Design Manager will determine whether budget information should be included in the OPR or provided separately.

The BOD shall include at least the following information:

- Project background required to understand the design, including goals, requirements and decisions which significantly affect the design.
- Regulatory, site, schedule and budget limitations which affect the design.
- Codes, standards and guidelines applicable to the project.
- Code analysis describing code requirements specific to the project, e.g. smoke evacuation systems, if manifolded exhaust is permitted, special fire protection requirements, etc.
- Requirements of governing agencies (City, State, NIH, LEED, etc.).
- Climate, site, and utilities information.
- Architectural, mechanical and electrical systems descriptions (construction classifications, design loads, fire separations, base and spare capacities, diversity and reliability assumptions, redundancy, flexibility, back-up power, sub-metering, etc.).
- Outdoor summer and winter design conditions.

- Design assumptions (occupancy schedules, temperature, humidity, air change rates, room pressurization, sound level limits, light levels, glare limits, vibration criteria, EMF shielding, heat loads, water, gases, power, data, grounding, hazardous materials being stored, etc. for spaces not indicated in the OPR.
- Systems and equipment sequences of operation.
- Load calculations descriptions, including assumptions, software used, etc.
- Architectural, mechanical and electrical systems operation and maintenance requirements.
- Facility Condition Assessment list marked to indicate tasks included in the project.
- Appendices
  - Documentation of compliance to DG 3.2 (see Design Guideline 3.2 Appendices A and B for the Energy and Water Conservation Report standard format).
  - Energy Impact Statement (see Design Guideline 3.2 Appendix C for the Energy Impact Statement standard format).
  - LEED Checklist when required by Design Guideline 3.1.
  - Soils and utility services reports.
  - Building load calculations.
  - Systems and equipment sizing calculations.
  - Light level and watts/square foot calculations.
  - Effluent, dispersion, noise, vibration, and other studies.

## **Development and Updating**

Identify key concepts and specific requirements from the project's program and design concept report for inclusion in the OPR. Develop the BOD with descriptions of the systems, assemblies and conditions designed to meet the Owner's Project Requirements. Update the OPR and BOD as the project goals and requirements are defined and clarified. Submit them at the end of the Schematic Design, Design Development and Construction Document phases along with the other Design Deliverables. Each update shall incorporate new and revised project information including:

- Progress in project design.
- Changes in project goals.
- Changes in project scope.
- Code interpretations.
- Input from Occupants, Construction Managers and Contractors.
- Input from Plant Operations, Department of Public Safety, E, etc.
- Architectural, mechanical and electrical design coordination meetings.
- Value engineering sessions.
- Test reports on existing conditions.
- Design calculations.
- Equipment selections.
- The final power system short circuit, protective device coordination and arc flash hazard study including the electronic data file for long term updating by the Owner.
- Energy and water conservation calculations and modeling.
- Updates to LEED Checklist.
- Sound, effluent, dispersion, CFD, vibration, and other studies.

- Bid Alternates and Owner's Options.
- A list of all design deviations from U-M Design Guideline requirements.
- A list of all uncompleted Facility Condition Assessment (FCA) items within the project boundary.

### **Format**

Organize the OPR and BOD on a system-by-system basis, preferably in order by CSI Division, using a consistent style for each section. Organize each section from the more global to the more detailed and specific. Number each section and subsection in outline format. Provide a Table of Contents. Submit an electronic file copy along with the required number of printed copies.

### **As-Built OPR/BOD**

At the conclusion of the project, a final OPR/BOD document with “as-built” information shall be submitted by the Architect/Engineer. It shall incorporate all changes that arose during construction or in the immediate post occupancy period that impact the OPR/BOD and that the A/E was involved with. The update shall include revisions to room data sheets where changes occurred. It shall also describe discoveries made during construction and compromises accepted at project completion.

To facilitate the production of an as-built OPR/BOD document, identify changes during construction that impact the final OPR/BOD and notify the U-M Design Manager accordingly. When writing addenda, CCD's and RFI's, mark them with “Impact on OPR/BOD” if they affect the OPR or BOD.