



## DESIGN & TECHNOLOGY

### LABORATORY PLANNING FUNDAMENTALS

Scientific laboratories require safe, controlled environments to assure consistent, reliable results.

Thorough planning of this specialized space helps get a new lab up and running quickly.

Every scientific laboratory requires a safe, controlled environment which assures consistent, reliable results. This is true whether the laboratory is designed for biochemistry, chemistry, electronics or physical science and whether the function is analytical, experimental, academic or inventive in nature.

Proper planning of this specialized space is a critical step in getting a new laboratory up and running quickly. Although many laboratories require highly specialized space and systems - such as bio-level safety suites, clean rooms, hazardous waste storage, pilot plants, and production areas - they do not have to be expensive to function well.



*BSL3 Laboratory at the Wisconsin Veterinary Diagnostic Laboratory*

### TOP 12 LAB PLANNING TIPS

1. Dream big initially. The budget will help you prioritize later.
2. Allow time to plan, design and reflect - six months is ideal.
3. Involve lab users in the process.
4. The mechanical system's sophistication should match the ability of the staff who maintains it.
5. Anticipate that you will use instrumentation more and more. Plan accordingly.
6. Identify every piece of equipment and its function, so designers can plan for them.
7. Start with a clean sheet of paper; don't blindly repeat your existing building.
8. Involve each engineering discipline early in the process - building systems can represent 50 percent of your construction cost and cause most future maintenance issues.
9. Modular building layouts enable future flexibility.
10. Create a workflow diagram as a planning tool.
11. Identify the real scope of the project before you develop a budget.
12. Plan for efficiency and employee comfort to achieve maximum performance. Salaries are the largest cost involved in a building over its lifetime. (Building costs represent only five percent of the facility's total cost over its lifetime)

The most successful laboratories:

- / Offer a clean environment to control conditions, support consistent results and protect very delicate instruments.
- / Provide the safest environment possible to mitigate potentially unhealthy environmental conditions that result from certain laboratory activities.
- / Feature flexibility and adaptability to respond to unpredictable changes in processes and technologies.
- / Incorporate efficient design, materials and systems to offset the lab's high energy use.
- / Offer cost-effective solutions to control initial, operational and maintenance costs.
- / Provide a comfortable and stimulating environment for creative laboratory users who work long hours.

To achieve these goals, a scientific organization should collaborate with an experienced architect and engineer to conduct a very thorough laboratory planning exercise. This careful, up-front planning will result in a facility that most cost-effectively achieves your specific requirements for performance. Laboratory planning kicks off with a broad-brush analysis of the proposed facility's daily operation. Using diagnostic tools, such as a step-by-step flow diagram of your processes, the architect and engineer will guide you through the gathering and analysis of your special facility requirements. This method is known as facility programming.



***Bright surfaces and daylighting are important to the operations of the facility.***

*Laboratories are located along the perimeter of the Wisconsin Veterinary Diagnostic Laboratory to provide daylighting to those spaces and to enhance the comfort of those spaces when lab technicians are working for extended periods of time.*

One of the most important programming tasks is the identification of your particular equipment. This is what customizes your space and drives requirements for ventilation, power and pure water, among other things. Another important issue is emergency power to assure that experiments are uninterrupted. Security or off-site monitoring alarm systems and biohazard safety level requirements are other key considerations.

Programming concludes with preliminary room sketches that depict required furniture, equipment, support utilities and work flow. The diagrams also identify special temperature, pressure and humidity requirements; finishes; flexibility requirements; future expansion; and other critical information.

The programming phase of your laboratory planning project is the perfect time to review your processes and make improvements. You may want to benchmark similar laboratories to gather specific ideas on how to enhance your work environment and activities.

Once the user reviews and approves the facility program information, the architect and engineer focus on refining different design scenarios, as well as their cost implications. They also will help you prioritize facility amenities, and develop a detailed budget (laboratory space costs anywhere from \$80 to \$250/s.f.). The planning team also explores critical adjacencies within and between laboratory spaces that may improve functional efficiencies and overall business operations. The information gathered and evaluated during lab planning serves as the foundation of your building's design.

**FOR MORE INFORMATION ABOUT LABORATORY PLANNING, CONTACT STRANG AT (608) 276-9200 OR BY E-MAIL AT [INFORMATION@STRANG-INC.COM](mailto:INFORMATION@STRANG-INC.COM).**