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Envisioning the New Normal:

Real Estate + Life Sciences

Written by Nicole Riley, Michael Litchman, Julie Tibbets, Mikaela Keegan and Adam Harper

Part 7: Building Flexible (and Sustainable) Laboratory Spaces for the Future

Flexibility provides the greatest value in laboratory space design for both owners and users of life sciences real estate. Science and technology are evolving at such a rapid pace that it is difficult to predict future needs. Bespoke spaces can become obsolete before they are even occupied. Spaces that can easily adapt to changing needs not only support the science long term but they can provide the most sustainable solution as well. Below we explore the various interests of investors, developers, owners and users that must be considered as well as how these concepts of flexibility and sustainability can be realized when creating a laboratory space with an eye toward the future.

What Do We Mean When We Say "Lab?"

We often think of laboratory spaces as highly-specialized and highly-technical rooms filled with lab benches, covered in sensitive equipment and with fume hoods peppered throughout. While this may sometimes be the case, it is worth breaking down what we mean when we say "lab." Laboratory spaces are often broken down into two categories: 1) wet labs, and 2) dry labs (though there is a broad spectrum of space types within each category).

Wet labs, true to their name, support experiments that involve fluid chemicals or biological specimens. Dry labs can range from spaces where individuals work with dry-stored materials to spaces where electronics are developed to those where individuals deal with mathematical analysis using cutting-edge computing systems.

Every lab ultimately becomes highly specialized, but the specialization often changes drastically over time as science, technology and business priorities evolve. Laboratory spaces should maximize the variety of specializations they can support to ensure their long-term utility.

What are the Owner, Developer and Landlord Considerations When Designing and Building a Lab Space?

Given the fact that wet and dry labs cover such a broad range of activity, it is critically important for an owner or developer to figure out how their space can be utilized. This is especially true in an instance where there is no specific tenant or end user in mind.

Owners and developers of real estate generally have to walk the fine line between seeking to attract maximum prospective tenant interest through things like amenities and unique spaces, and creating the highest possible return on investment based on a projection of what the future holds. The life sciences industry presents a unique opportunity and challenge to create a space design that can adapt to the market. Given the lifecycle of a life sciences company is very different from a typical office user and is less likely to live out a full seven or 10+ year lease in a space, it is important to make sure that the second generation space will be just as attractive to the next tenant. It is similarly important to make sure that, if the demand one day is for biology space but in five years servers and storage for digital health machine learning development is the market driver, a building can pivot to serve the needs of those companies.

Eye-popping tenant improvement packages are also very common with long-term life sciences leases. While it is true that landlords and tenants are often both investing in these spaces beyond any improvement packages, it is not a sustainable business practice for an owner to have to keep spending significant tenant improvement dollars every few years as companies cycle in and out of the space. Designing a flexible space from the get-go (including both base building systems and tenant-specific improvements) and controlling tenant alterations through approval rights in a lease are two ways to ensure an owner is able to maintain flexibility and maintain that important ROI.

What are the End User and Tenant Considerations When Designing and Building a Lab Space?

From a tenant or end user perspective, if a group cannot conduct necessary discovery experiments and investigations in a space, there is no point to leasing it. To the extent a life sciences company requires a highly-specific space in which to perform research, development or manufacturing of its product, being able to have that space developed within their premises is crucial. It is also important to recognize that regardless of the tenant improvement allowance packages being provided by landlords, the cost to develop a lab can often dwarf the numbers being provided by the landlord and require a significant capital investment by a tenant. Many of the improvements being done to a space by a tenant are also improving the space and generating value for a landlord given it is more expensive to remove an emergency generator or specialized mechanical, electrical and plumbing engineering systems, for example, than it is to just leave it in place for the next user.

Another reality for life sciences users is the necessity to lease for growth. Given how quickly life sciences companies can increase their employee counts, having to plan for exponential growth year over year requires more square footage while a company grows into a space. Being able to design flexible spaces where another company can sublease or sublicense excess space during a so-called “lease up” period is important. If excess space can be programmed for uses from a collaboration space to a laboratory, it would provide the user with the largest amount of flexibility for a company’s long-term needs.

Finally, life sciences companies face particular pressure to get products to market quickly, so if the lab space is easily flexible from a programming perspective, it can easily accommodate one study to the next – helping a company’s R&D costs and efficiencies. Return on R&D for life sciences (pharmaceutical companies, in particular) is declining by the year, so a flexible lab space is a great opportunity for that company to save on R&D costs.

How Does Technology Help in Integrating Flexibility Into Such Technical Spaces?

Flexibility and adaptability can be easily achieved in lab spaces by implementing a strategic approach to design. Planning for the future through building systems, support spaces and a flex zone will offer the greatest value for all project stakeholders. Flexible lab furniture will allow the tenant to maximize a building’s potential.

Building systems are typically the largest investment on a lab project, for every stakeholder. Mechanical Electrical

and Plumbing (MEP) systems account for 30%-50% of total construction cost, and it is vastly more difficult and expensive to retrofit MEP systems than to build initially. Thus, it is critical to design building systems that can support the long-term evolution of a facility. Many lab spaces require significant mechanical conditioning (six or more 100% outdoor air changes per hour), but providing a building-wide system with this capacity is cost prohibitive. Further, very few projects are exclusively lab space, with the typical tenant using 40-60% of their space for office and collaboration space. Thus, providing lab-ready mechanical capacity (1.25 CFM per sf) for 60% of the useable area has proven the most valuable approach.

Considering a tenant's systems distribution requirements over a building's lifecycle is also critical. Renovations can be costly and disruptive, but a facility can be designed to limit the impact of future needs. The systems design can be fully developed for maximum capacity, for example, while the construction only delivers the bare minimum. This approach provides the space vertically (in risers) and horizontally (in ceilings) for future distribution by design. Multiple risers distributed throughout the building can also decrease cost, increase flexibility, and provide higher ceilings.

Research has shown that lab support spaces tend to change the most over time, as they can quickly grow and evolve along with advancing science. The correct design approach can ensure that these spaces are nimble enough to support rapid change. Following a modular approach to support labs offers the greatest long-term flexibility. Clusters of modular spaces can support different functional adjacencies by offering a variety of lab sizes. If a larger support lab is required, one can simply remove the wall between two smaller rooms. Grouping these spaces closer to the building core (where the risers are located) also allows tenants to bring new services into these spaces at lower costs and without sacrificing ceiling height. Locating these rooms closer to the core can also maximize structural load capacity and minimize vibrations for sensitive analytical equipment.

Designing a flex zone, which can serve as both lab or office space, is a differentiator in the life science market. Changes in functional space requirements are not limited to a tenant's Day One footprint. Over the course of a lease, there will often be a need to expand either the lab or office area into the opposite type. Planning for these needs reduces the impact of a renovation while providing several other benefits. Research has also shown that lab technicians like to be as close to their office desk as possible. Locating the flex zone between the office and lab areas can maximize the "shoreline" between the two, making it easy to expand one way or the other while also minimizing the paths of circulation between them. Further, locating collaboration spaces within the flex zone increases circulation through team areas, leading to more chance encounters and greater opportunity for innovation.

Flexible lab furniture has been the trend in life science design for over a decade. Metal lab tables, fed by overhead service panels, enable end users to rapidly adjust a room's layout without losing access to critical infrastructure. Flexible lab furniture systems typically require twice the initial investment, but come with the lowest lifecycle cost.

How Does Sustainability Fit Into Flexible Design and Construction of Lab Spaces?

Given the pressures and considerations noted above from owners and users, the question of how sustainability fits into flexible design is a natural thought progression. The ability to rapidly reuse existing space, as opposed to new bespoke construction, can dramatically reduce a company's carbon footprint. Additional lab design strategies can contribute to an even greater reduction. The impact of the air changes required by many labs, for example, can be minimized by reducing the total volume of lab spaces. The team can also identify spaces, such as freezer rooms and corridors, that do not require the air changes to reduce overall system capacity. A modular approach to building systems also allows individual tenants to right size their own systems. This approach often reduces a building's carbon footprint versus an oversized single house system, creating the most flexibility while also saving cost. This approach also supports separate systems for the office and lab areas, which maximizes efficiency. Finally, scale can play a major role in the success of sustainable strategies. These strategies, like renewable energy, are much easier to realize when the design is considered at a campus level. All project stakeholders should examine the potential for sustainable design before committing to a specific approach.

CONTACT THE AUTHORS

NICOLE RILEY

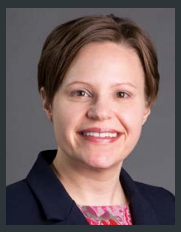
Counsel, Boston

+1 617 570 1763
nriley@goodwinlaw.com

MICHAEL LITCHMAN

Counsel, Boston

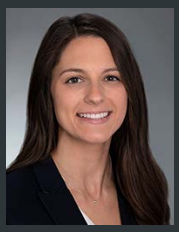
+1 617 570 1862
mlitchman@goodwinlaw.com



JULIE TIBBETS

Partner, Washington, DC

+1 202 346 4226
jtibbets@goodwinlaw.com

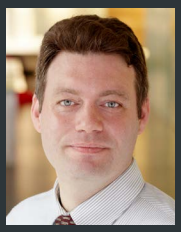


MIKAELA KEEGAN

Associate, Boston

+1 617 570 1503
mkeegan@goodwinlaw.com

GUEST AUTHOR



ADAM HARPER

Senior Associate, Gensler

+1 617 619 5845
adam_harper@gensler.com