



Adapting Office Buildings into Residential

*Navigating Challenges and Maximizing Opportunities in the Conversion Process
(a joint whitepaper between JLS Architects, LLC and Loney Engineering & Consulting LLC)*

Overview

In the years following the coronavirus pandemic, office occupancy rates have continued to drop dramatically, as work-from-home and hybrid work models become increasingly normalized. According to a nationwide study by Moody's Analytics, the national office vacancy rate was 19.6% during the final quarter of 2023, increasing 0.8% over the previous year.¹ As office spaces sit vacant across the country and the need for housing continues to rise, many developers see an opportunity to convert vacant office space into apartments and condominiums. Cities in the Northeast, including Philadelphia, Washington DC, and New York, offer unique opportunities as they contain a significant share of older, prewar, office buildings. These office buildings were generally designed using different programmatic and structural requirements from residential construction, and converting them to residential poses several challenges.

Philadelphia topped the list of cities with the most adaptive reuse apartment units in 2020 and 2021, with 1,863 new units created.²

Planning Challenges

Due to their program, office buildings often have deeper floor plates in comparison to residential construction. Residential units become narrow and deep, limiting natural light exposure and reducing window

frontage by as much as 75%. Exterior glazing is traditionally non-operable, reducing the chance for natural ventilation. Opportunities for exterior private space are also limited, due to a lack of exterior penetrations.

The largest concern, however, results from the change in occupancy from Group B to Group R-2. This results in a shift to a higher egress hazard category and the need to meet many requirements of new construction. Depending on the construction type, this can significantly limit the allowable square footage, height, and number of stories of the building. For example, a sprinklered multistory Type IIA office building is allowed 112,500 SF of floor area, while a residential building of the same type is only allowed 72,000 SF. Other requirements also vary between the two uses. Offices typically have very little sound and vibration insulation between individual floors. Rectifying this for residential use requires adding additional layers to already deep floor assemblies.

Structural Challenges

Structural challenges often arise in converting office buildings to residential use. While the minimum uniformly distributed live loads required by the International Building Code (IBC) are similar for office and residential uses, the type of construction can limit the flexibility needed to execute a residential conversion. For example, post-tensioned concrete floors are more difficult to modify for additional floor openings. In

these cases, the engineer may require a ground penetrating radar (GPR) scan to determine the existing rebar placement. Steel and wood-framed buildings are more conversion-friendly but may also require strengthening or replacement.

With post-tensioned slabs, atriums or exterior balconies may require significant structural retrofit. Changes to these systems often require a thorough structural investigation and custom engineering solutions.

Lastly, a change in the risk category or a certain percentage of area being altered may trigger additional structural upgrades. Office and residential occupancies usually fall within Risk Category II of the IBC, which would not trigger an upgrade of the structural system based on a change in occupancy alone. However, local jurisdictions may require structural and seismic upgrades depending on the amount of work proposed. This could lead to significant structural changes depending on the Codes that were in effect when the building was originally built.

Environmental Concerns

Depending on the age of the existing building, there also may be significant concerns regarding indoor air quality and general environmental conditions. Asbestos and asbestos-containing materials (ACM) were commonly used in construction up until the mid-1980s in various applications from tile to pipe wrap. Lead paint is also a concern in buildings older than the late 1970s and likewise could require significant resources to remediate.

Summary

The conversion of office buildings to residential presents a promising solution to address the increasing office vacancy rates in the wake of changing work dynamics post-pandemic. While a conversion strategy offers significant opportunities, it also comes with a myriad of challenges that must be carefully navigated. As developers continue to explore this avenue to meet the growing demand for housing, a comprehensive understanding of the unique challenges and opportunities inherent in repurposing office spaces into residential dwellings will be crucial for ensuring the viability and sustainability of such projects in the future.

Citations

1. Bahney, Anna. 2024. CNN Business. January 8. Accessed March 24, 2024. <https://www.cnn.com/2024/01/08/economy/office-space-vacancies-hit-a-record-high>.
2. Ciuntu, Alexandra. 2021. RentCafe. October 6. Accessed March 24,