To Build or Not to Build

Risk-Based Screening Tool for Selecting Existing Commercial Office Buildings for Conversion to Multifamily Residential: Seattle Perspective

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Abstract

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Since the COVID-19 pandemic, office vacancy rates have increased substantially, contributing to blight in dense urban cores. At the same time, the demand for housing remains high. Meanwhile, the built environment is responsible for 40% of global carbon emissions, significantly contributing to climate change. In Seattle, Washington, recent legislative efforts around office-to-residential conversions reflect an interest in addressing vacancy concerns, creating more housing stock, and bolstering sustainability and resiliency. However, concerns exist regarding the high uncertainty of such conversions, as there is no standardized approach for risk management. As a result, the decision to proceed with potential office-to-residential conversions is often made on a case-by-case basis. In response, this study aims to develop a qualitative

risk-based screening tool to evaluate the viability of a given Seattle office building for conversion to multifamily residential, based on a list of factors that impact conversion feasibility. The literature review establishes a direct correlation between building features and conversion feasibility. Repurposing a building for a different use entails new spatial, functional, and code requirements, affecting conversion costs and, therefore, financial risk — a major decision-making factor. To understand the factors with the greatest impact on conversions, professionals in the architecture, engineering, and construction industry are interviewed about their experiences with office-to-residential (O2R) conversions, highlighting the most impactful factors. Interview results are analyzed to create the O2R Screening Tool — a checklist — for professionals to use in preliminary screening of potential office-to-residential candidates. To test the applicability and effectiveness of the checklist in prioritizing the most viable buildings for conversion, a twofold validation process involving (i) a multi-case study and (ii) an online survey of industry experts is conducted. The main study outcome is a decision-making approach that identifies factors likely to pose challenges to a conversion and therefore serves as a risk management strategy for office-to-residential conversions. The findings of this study will help stakeholders and policymakers qualitatively understand the feasibility of converting existing office stock and focus strategies towards the most feasible candidates.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1 : INTRODUCTION

1.1 THE ADAPTIVE REUSE MOVEMENT

The practice of repurposing existing structures for new uses has prevailed for centuries. Buildings have often outlived their original uses — known as functional obsolescence — and, as a cost- and time-effective alternative to demolition and new construction, been repurposed for a more relevant use. This strategy of adaptive reuse has gained further momentum in recent times, driven by growing awareness of the role of the built environment in climate change (Lanz & Pendlebury, 2022). In the past two decades, the adoption of initiatives such as the 2030 Challenge has signaled an increased desire for accountability, sparking both academic and practical interest in extending the useful lives of buildings through adaptive reuse strategies.

In the United States, adaptive reuse has also become a critical tool to combat urban decline in post-industrial cities, particularly in the midwestern and eastern parts of the country (Mohamed et al., 2017). Detroit, Michigan, is a prominent example of this, where the conversion of obsolete industrial infrastructure has played a major role in countering urban blight and declining property values. Over the past decade, the city has experienced a significant resurgence, largely due to city-wide, policy-driven efforts to repurpose unused industrial building stock (Lynch, 2022). Although adaptive reuse strategies have traditionally been directed towards buildings of historic or aesthetic value, these trends have expanded the focus to include not only landmark buildings, but also more 'ordinary' and ubiquitous structures — warehouses, shopping malls, and commercial offices. The post-pandemic landscape has further highlighted the relevance of adaptive reuse, as many American cities, including Seattle, Washington, struggle with declining demand for commercial office space and resulting urban blight (Moody's Analytics, 2024). Coupled with the ongoing need for housing, this has sparked a growing interest in office-to-residential conversions (often abbreviated as ‘O2R’) as the need of the hour and a promising strategy for downtown revitalization across major U.S. cities.

1.2 CURRENT PRACTICES

A number of cities are actively developing and beginning to implement office-to-residential conversion efforts. In Chicago, Illinois, efforts to revitalize the Loop, Chicago’s central business district, resulted in the LaSalle Corridor Revitalization initiative — a plan for four adaptive re-use proposals to redevelop vacant office space as mixed-use properties, including 1,000 housing units (Kaufmann & Eng, 2024; Mercado, 2024). City and county leadership in Denver, Colorado, identified 16 buildings (O’Donnell, 2023) that were being considered for potential office-to-residential conversions in 2023, eight of which are thought to be active as of January 2025 (Geiger, 2025).

Seattle is among these cities as well, with the Office of Planning and Community Development inviting conversion proposals, easing design requirements, and waiving the city’s Mandatory Housing Affordability (MHA) fees for office-to-residential conversions (Braxton, 2024). Industry discourse and policy efforts both indicate significant momentum for office-to-residential conversions, however their execution remains slow, with Seattle yet to see its first office-to-residential conversion. Repurposing an existing building for a new use can be difficult for a number of reasons, and office-to-residential conversions present a number of challenges. These projects are physically complex and characterized by uncertainty and risk, reducing their financial appeal. Currently, determining a vacant office building’s suitability for conversion into a multifamily residential property involves robust feasibility studies which are usually a collaboration among property owners, developers, and various consultants. This time- and effort-intensive process can be mitigated by using a structured approach for evaluating conversion feasibility.

Geraedts and van der Voordt (2004) proposed one such framework to assess the feasibility of office conversions, considering various aspects of the property's location and the building itself. However, the model is over 20 years old and may not sufficiently address contemporary issues. More recently, the architectural practice of Gensler has developed an algorithmic tool called Conversions+™ (*Conversions+™ by Gensler,* n.d.) to determine if buildings are viable for residential conversion, assigning scores to buildings based on their suitability for conversion. However, a challenge with a proprietary tool such as this can be accessibility across industry stakeholders. Current models do not allow for quick and easy preliminary feasibility evaluations that are accessible to any user — owner, developer, architect, contractor — who may be seeking an early-stage, qualitative determination regarding the feasibility of a potential office-to-residential conversion.

1.3 STUDY OVERVIEW

In response, this study aims to develop a qualitative risk-based screening tool to evaluate the viability of a given Seattle office building for conversion to multifamily residential. The literature review for this study, outlined in Chapter 2, establishes a direct correlation between building features and conversion feasibility. The primary research effort focuses on developing a tool to facilitate a simplified and clear decision-making process for use in making early-stage judgements about the likely feasibility of an office-to-residential conversion.

1.3.1 Research Objectives

The three main research objectives of the study are:

- To identify the factors affecting office-to-residential conversion feasibility,

- To determine the impact the identified factors have on a building's feasibility for conversion from office to multifamily residential, and
- To propose a screening tool incorporating the identified factors, to be used by architecture, engineering, and construction professionals to screen potential office-to-residential candidates.

1.3.2 Summary of Methodology

- Literature Review: The literature review is used to define the broader context of the study, as well as gain familiarity with the existing body of knowledge. It is also the first step in identifying the list of factors that impact conversion feasibility, which forms the basis of the screening tool.
- Interviews: To further understand the factors with the greatest impact on conversions as well as examine the challenges posed by conversions, five professionals across the architecture, engineering, and construction industry are interviewed about their experiences with office-to-residential conversions. Interview results are analyzed for use in the development of the screening tool.
- Validation: After the development of the screening tool, a two-step validation process is conducted. The first step is a multi-case study, wherein the checklist is applied to eight Seattle offices to determine their feasibility for conversion and order them from most to least feasible. Secondly, an online survey of industry users is conducted to gather feedback on the usefulness of the screening tool and its potential for practical application.

1.3.3 Research Outcomes

This study aims to contribute to a growing body of knowledge around office-to-residential conversions and adaptive reuse feasibility. The main study outcome is a decision-making approach that identifies factors likely to pose challenges to a conversion and therefore serves as a risk management strategy for office-to-residential conversions. By facilitating early-stage evaluations, the screening tool can help focus industry efforts towards the most feasible buildings and mitigate the case-by-case nature of office-to-residential conversions.

CHAPTER 2 : LITERATURE REVIEW

2.1 THE CASE FOR OFFICE-TO-RESIDENTIAL CONVERSIONS

2.1.1 COVID-19 and Office Vacancies

The work-from-home revolution of the COVID-19 pandemic fundamentally changed society's relationship with work and the work*place.* This has raised a number of questions about the future of office spaces in downtowns across the U.S. and the world. Since 2020, office vacancy rates have risen substantially: in the U.S., national office vacancy rates increased from 16.4% in 2019 to a historic high of 20.1% in 2024 (Moody's Analytics, 2024). This is concerning for the real estate industry, as current and future cash streams are threatened by the sudden decline in projected office demand (Gupta et al., 2022). Added to these record-breaking vacancy rates is the persistence of remote work culture. A survey of 30,000 Americans shows that the number of remote workdays is expected to increase fourfold relative to pre-pandemic levels (Barrero et al., 2021). For firms, continuing to hold on to these declining properties would negatively impact their overall financial stability. So, in addition to employees' lasting preferences securing the future of remote work culture, employers have also invested in aligning corporate infrastructure and resources around the work-from-home movement, which includes reducing their physical office space (Gupta et al., 2022). Furthermore, the phenomenon also presents a concern for local governments, as lowering property values directly impact the volume of tax revenue collected from commercial offices as well as neighboring retail properties (Chernick et al., 2021), all of which contributes to urban blight and creates an 'urban doom loop' (Gupta et al., 2023). It is imperative that a concerted effort be made to address the high vacancy rates being seen in the commercial office sector.

2.1.2 Housing Crisis

At the same time, the U.S. continues to grapple with a severe housing crisis, characterized by insufficient housing supply and severe unaffordability (Kolachalam, 2022). According to the U.S. Department of Housing and Urban Development (HUD), “many of the same cities that have experienced increases in office vacancy rates also have severe housing shortages” (HUD PD&R, 2023), with the country short of as much as four million houses, according to an analysis from real estate marketplace Zillow (2024). The market is considered unaffordable, with over 21 million renter households spending more than 30% of their income on housing in 2023, qualifying them as ‘cost-burdened’ (U.S. Census Bureau, 2024). High-density cities exhibit the worst of these problems, due to limited space for new construction, high costs, and complex permitting processes (Gupta et al., 2023). The co-existence of the oversupply of office space and the undersupply of residential space makes the prospect of office-to-residential conversions highly appealing, as a comprehensive solution to more than one complex issue. And there is significant precedence for this approach — for instance, in New York City, non-residential conversions, specifically office-to-residential conversions, have actually been an important source of housing supply (Aldana et al., 2024).

2.1.3 Office-to-Residential Conversions in 1990s New York

New York City offers a compelling case for conversions as a strategy to tackle declining office properties. Here, the last incidence of record-high vacancy rates prior to the pandemic was seen in the 1990s, when speculative office development led to high vacancy rates and, ultimately, a recession in 1990 (Campion, 2022). In response, the local government implemented the Lower Manhattan Revitalization Plan (LMRP) in order to address concerns of urban blight caused, in part, by the lowering values of office properties (Aldana et al., 2024; Beauregard, 2005). Among various other revitalization efforts such as crime reduction and the growth of the IT sector, this plan outlined tax incentives and zoning modifications for enabling conversions of obsolete office space into residential apartments. As a result of the LMRP, office vacancy rates reduced from over 26% in early 1995 to 13.8% in late 1997 (*Mayor's Press Release Archives #693-97*, 1997). The effort created 12,865 housing units in the area between 1996 and 2006, resulting from the conversion of more than 90 office buildings (Campion, 2022). Buildings considered for conversion at this time included 70 Pine Street, 40 Wall Street, 20 Exchange Place, 1 Wall Street, and 30 Broad Street.

2.1.4 Climate Crisis

While the drivers for adaptive reuse are primarily functional obsolescence and economic considerations, the environmental benefits of building conversion have garnered much attention in recent years. The built environment continues to play a major role in climate change, with roughly 40% of global greenhouse gas emissions being attributed to buildings. Reducing carbon emissions across the construction industry is increasingly a priority, as some cities have begun to enact laws penalizing building owners for exceeding established emissions limits, such as Seattle’s Building Emissions Performance Standard and New York City’s Local Law 97. Existing literature emphasizes the embodied carbon benefits of office-to-residential conversions and presents the approach as a viable sustainability strategy (Gavu & Peiser, 2024; Gupta et al., 2023).

2.2 UNDERSTANDING RISK: THE CHALLENGE OF CONVERSIONS

Although office-to-residential conversions present a promising solution to high office vacancy rates and the housing crisis, several risks and challenges complicate their feasibility. Repurposing a building for a different use entails new requirements — spatial, functional, systems and code-related, all of which affect conversion costs and, therefore, the degree of risk. The literature review highlights various hurdles related to financial concerns, regulatory issues, and the buildings themselves.

2.2.1 The Economics of Conversions

While all risks will have some financial impact associated with them, office-to-residential conversions do present some overtly financial considerations as well. A core challenge is the high monetary cost of conversion. Sources vary on the specific costs per square foot (Hamman & Sims, 2024), however, there is a shared opinion across industry professionals that conversion is an expensive effort. The significant upfront investment places pressure on developers to ensure that the conversion remains financially viable. Moreover, demand for quality still drives the pricing of apartment units, even in a tight housing market (Remøy & Van Der Voordt, 2014). On top of that, in most markets, commercial properties still typically earn higher rent than residential ones (Kolachalam, 2022). So, ultimately, there is pressure on developers to both manage the initial costs of conversion and also deliver high quality apartments that can generate enough revenue for the development to 'pencil out'.

2.2.2 Zoning and Building Codes

Another significant risk is related to zoning issues (Hamman & Sims, 2024; Remøy & Van Der Voordt, 2014). Office-to-residential conversions typically entail proposing residential developments in zones not designated for residential use, which requires some degree of exceptions to be allowable. Overcoming zoning classifications and negotiating permission to proceed can be expensive and time-consuming (Hamman & Sims, 2024), with no guarantee of a favorable outcome. However, as the momentum around office-to-residential conversions builds in major cities, this issue is being mitigated with policy changes and the support of various local governments (Braxton, 2024).

Local and state building codes present yet another substantial risk in conversions (Hamman & Sims, 2024). Residential requirements are different from those of offices in many ways, and the additional work and costs associated with bringing a building up to code can entail a heavy financial risk. Secondly, there is an element of subjectivity in the interpretation of codes and the determination of whether or not a converted building complies with applicable local building codes. This adds uncertainty to the process, increasing the possibility of unexpected delays or additional costs that are difficult to predict until a proposal is developed and reviewed for approval.

2.2.3 Knowledge of Building Conditions

The feasibility and efficiency of any adaptive reuse effort relies on clear and accurate understanding of existing conditions. In other words, the accuracy of the information available at the conception of the project greatly determines the degree of risk (Othman & Mahmoud, 2022). Incorrect or missing information about the condition of the building, particularly regarding any problems such as structural issues or contamination, can cause delays and cost overruns (Remøy & Van Der Voordt, 2014). Considering this, it is no surprise that developers often report unexpected costs on adaptive reuse projects, typically about 10% over initial estimates (Shipley et al., 2006).

Ultimately, office-to-residential conversions are marked by a high degree of uncertainty, which translates to a high degree of risk. Even after accounting for typological similarities across all office buildings, each building presents different existing conditions and varying states of repair. Moreover, there are inherent inefficiencies in repurposing a building for a use other than what it was originally intended for — especially with purpose-built offices (Kolachalam, 2022). All of this creates uncertainty, which means office-to-residential projects have to operate on a case-by-case basis, requiring significant investment in the initial stages and increasing the overall risk.

2.3 IDENTIFYING FACTORS IMPACTING CONVERSION SUCCESS

Researchers and professionals tackling office-to-residential conversion projects identify several key characteristics common to buildings that undergo successful adaptive reuse. Existing literature identifies these factors based on a combination of results from individual feasibility studies, analysis of building codes and regulations, and consideration of typical features of the office and residential building types.

2.3.1 Size: Floor Plate Depth and Square Footage

One factor that is consistently identified as having an impact on conversion feasibility is the floor plate depth, or the distance from the core of a building to the perimeter walls. The floor plate depth impacts the daylighting quality of the interior space. Some sources indicate an ideal range such as, between 30 and 80 feet (Kolachalam, 2022), while others, like Gupta et al. (2023), propose a hard maximum; in this case, 60 feet. Others describe “shallow” floor plates qualitatively instead of setting a specific limit (Aldana et al., 2024).

Square footage is also frequently cited as a factor impacting feasibility. However, both the ideal square footage as well as the reasons why this aspect is important vary. According to Aldana (2024), “smaller properties tend to attract conversion” whereas large ones don’t. Kolachalam (2022) sets a minimum limit of 5,000 square feet for the floorplate while the buildings converted as part of New York’s LMRP efforts were 8,000 square feet or less (NY Times, 1995). On the other hand, Gupta et al. (2023) focus on total square footage instead, contending that a minimum of 25,000 square feet is needed to make the conversion worthwhile.

2.3.2 Location

The location of the subject property is also considered impactful since it determines access to transportation and amenities (Aldana et al., 2024; Graham & Dutton, 2021; Remøy & Van Der Voordt, 2014). According to analysts at Moody’s Analytics, properties within 500 feet of a public transit stop make for more suitable conversion candidates. Additionally, according to Gupta et al. (2023), focusing on midtown and downtown areas (in the case of Manhattan) is key as the “negative externalities from office vacancy are the strongest” in those parts of the city.

2.3.3 Age

Most authors comment on the age of the building in one way or another. Some point to a particular year of construction as a cut-off date, considering only buildings before 2010 (Kolachalam, 2022) or before 1990 (Moody's Analytics, 2024; Gupta et al., 2023). Others indicate periods of time like pre-World War II buildings (Campion, 2022). The general preference for older buildings is justified for various reasons, including the floor plate size (older buildings have smaller floor plates) and building form (pre-World War II buildings have U- and L-shaped structures). Aldana (2024) also mentions that buildings from certain other time periods are particularly ill-suited to conversions. “The mechanical [systems]...inoperable windows, and deep floor plates of the 1980s and 1990s place…limitations” on the feasibility of residential units. Age also impacts building depreciation, which impacts the viability of redevelopment as opposed to conversion.

2.3.4 Other Factors

Other factors appear less consistently across the breadth of the existing literature. Kolachalam (2022) sets a minimum height limit of 5 stories for buildings in Denver while the buildings converted through New York’s LMRP were more than 15 stories above the street to address daylighting concerns. Meanwhile, Aldana (2024), qualitatively states that “taller” buildings are better conversion candidates than “shorter” ones. Structural considerations are also mentioned frequently, although from a perspective of structural integrity rather than characteristics of the system. However, Aldana (2024) does mention the presence of post-tension cabling in the building stock of the 1980s and 1990s as a deterrent to conversion.

Additionally, Remøy and van der Voordt (2014) describe how “dense structural grids” hinder conversion, while buildings with open floor plans are more suitable.

2.3.5 Gupta et al. (2023) Model to Select Candidates for Conversion

A 2023 working paper published for the National Bureau of Economics (NBER) by a group of researchers at New York University and Columbia University was especially informative for the literature review. In addition to describing how declining values and increasing vacancy rates of downtown office buildings contribute to urban blight, the paper also highlights upcoming regulations aimed at reducing greenhouse gas (GHG) emissions from buildings, which add another layer of scrutiny to vacant office buildings, particularly older, energy-inefficient ones — or “brown office buildings”, as termed by Gupta et al. The paper outlines an algorithmic process to select the commercial office building stock viable for conversion to apartments. The approach is one of elimination, rather than selection or screening of a specific property for feasibility. Emissions data and CompStak (a data set that contains detailed property and leasing characteristics for office buildings) are used to create an initial dataset. Then, the following sequential criteria are used to retain a set of office buildings that are viable candidates for conversion to residential:

1. Location: Only buildings in midtown and downtown Manhattan are retained
2. Date of Construction: Only buildings constructed before 1990 are retained
3. Building Class: Only Class B and C buildings are retained
4. Square footage: Only buildings larger than 25,000 SF are retained
5. Depth of Floor Plate: Only buildings with a floor plate depth of up to 60 feet are retained
6. Vacancy: Only buildings with no (or few) major long-term leases left are retained
7. GHG Emissions: Only buildings that exceed the 2030 GHG limit per NYC Council’s Climate Mobilization Act are retained

In this way, Gupta et al.'s (2023) proposed approach creates a list of available building stock suitable for office-to-residential conversions. Using the broader CompStak data (and sometimes other similar and relevant databases), the research team has generated such lists for a number of major cities across the United States. The list for Seattle forms the starting point for this study, as explained in subsequent chapters.

2.4 GAPS IN LITERATURE

The literature review establishes that office-to-residential conversions are considered risky by professionals due to the high degree of uncertainty associated with them. A significant portion of this uncertainty comes from the difficulty in determining whether or not a building is suitable for an office-to-residential conversion. Currently, the process entails significant initial investment in terms of time, effort, and capital — at the end of which, a project may not be viable after all. This makes already daunting projects even less appealing to various stakeholders involved.

Various sources describe the building characteristics (factors) that are found to make certain office buildings more suitable candidates for conversions. They also explain why these factors are important and how they impact the suitability of a building for conversion. However, the existing literature does not provide a clear prioritization of those factors based on the degree to which they impact the feasibility for conversion. In other words, the relative importance of these various factors to each other is not clear. In response, the effort of the thesis is to not only identify factors but understand the relative importance of the factors to each other in determining conversion feasibility.

Finally, Gupta et al. (2023) provide a list of viable (per that study's criteria) building stock for conversion in major cities, including Seattle. That list of buildings forms the departure point for this study.

CHAPTER 3 : RESEARCH METHODOLOGY

3.1 APPROACH

The literature review highlights some of the challenges of office-to-residential conversions and the building characteristics that make certain buildings more suitable for conversion than others. To gain a better understanding of the issue within the context of the Seattle building industry and to keep up with more current developments that might outpace academic publishing, the literature review is supplemented with interviews of Seattle industry professionals. Five professionals are interviewed about their experiences studying office-to-residential conversions and the building characteristics that most impact conversion feasibility. This process allows for the development of a more comprehensive screening tool.

Interviews are conducted in two stages: first, one preliminary interview is conducted to discuss the issue more broadly. Then, four in-depth interviews are conducted to dive into discipline-specific aspects of office-to-residential conversions. Interviewees for the in-depth interviews are selected based on their participation in feasibility studies for potential office-to-residential conversion projects in Seattle. At the time of this study, there are a number of contenders for the “first office-to-residential conversion” in the city, however, none has yet been initiated. After the interviews, a multi-case study and an online survey of industry professionals are used to test the usefulness and applicability of the proposed screening tool. Throughout the process, the author’s own expertise, derived from an undergraduate education and professional experience in architecture, inform the analysis of various findings. Hence, the author also serves as a subject matter expert for portions of the study, particularly the analysis of floor plans and spatial issues. Figure 3-1 summarizes the methods used to achieve the research objectives and the deliverables of each research activity.

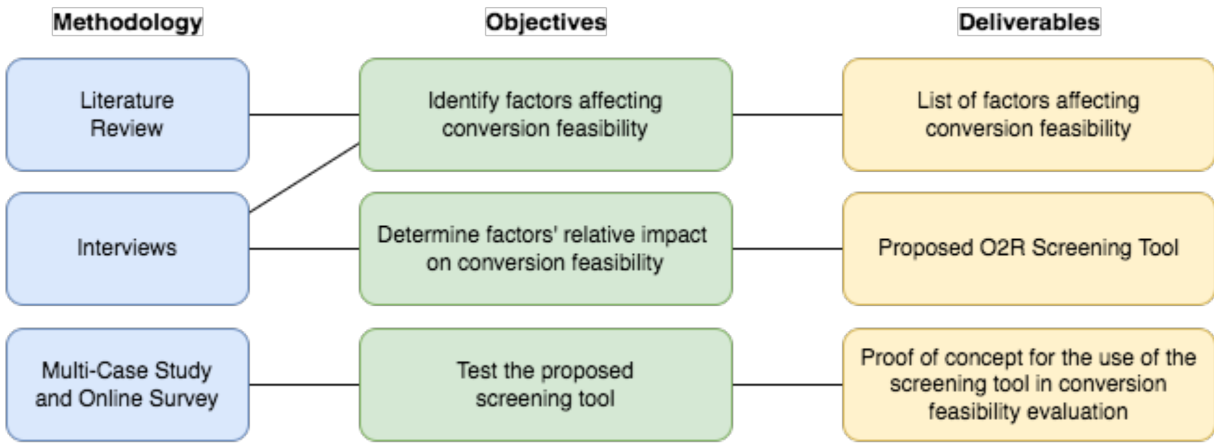

Figure 3-1. Research Framework

3.2 INTERVIEWS

The interview activities were reviewed and approved through the Institutional Review Board (IRB) process of the Human Subjects Division at the University of Washington (Approval ID STUDY00020453).

The preliminary interview aimed to gain an overarching understanding of the realities of office-to-residential conversions, as well as validate what the literature review indicated about the context surrounding the issue. For this, the interviewee was selected for their previous research experience on similar issues as well as current industry role at a multi-family residential development firm. This candidate possessed knowledge about a variety of issues relevant to office-to-residential conversions and was thus an appropriate choice for a preliminary interview. The interview highlighted the challenges that the “change-of-use” process of conversions bring. It also shed light on the spatial issues that need to be addressed for viable and functional residential units to be created within an office floor plan.

The second stage of interviews was focused on understanding the conversion challenges identified by various disciplines within the industry namely, architecture and design (building code and functionality), real estate investment (financial incentives and underwriting), construction management (estimating and preconstruction), and MEP engineering (systems and services). Interviewees shared insights and lessons learned from their experiences conducting feasibility studies on office buildings being considered for conversion into multifamily residential properties. There was also a discussion about the factors identified from the literature review. Finally, interviewees were asked to provide a ranking of various identified factors, using the Likert scale method. The interview questions varied slightly depending on the interviewees' professional background and area of expertise, as well as the stage of development of the checklist — however they covered the same broad topics. A comprehensive list of interview questions is included in the Appendix.

3.2.1 Interviewee Profile

Table 3-1. Interviewee Backgrounds

Interview #	Interviewee Job Title	Interviewee Firm Type
Preliminary	Senior Project Manager	Multifamily Residential Developer
Interview 1	Associate Principal	Multidisciplinary Design
Interview 2	Director of Development	Commercial Real Estate Investment
Interview 3	Senior Preconstruction Manager	Construction Services
Interview 4	Project Executive	Construction and Energy Services

Table 3-1 provides a summary of the selected interviewees' professional backgrounds. The candidates selected for the in-depth interviews were all locally or regionally based in the Seattle industry and represented various disciplines within the AEC sector. The interviewees included senior professionals at a reputed design practice, prominent regional development firm, a large construction firm, and a national MEP (mechanical, electrical, and plumbing) and energy services firm. In addition to possessing a distinct expertise within the industry, each interviewee had also been involved in at least one feasibility study for an office-to-residential conversion project in Seattle, either as prospective clients or as consultants for potential clients. Some had also participated in the Seattle Office of Planning and Community Development's (OPCD) call for submissions related to office-to-residential conversions. This diverse group of interviewees provided a broad range of perspectives on relevant considerations for conversions. The participants were also able to bring firsthand and current knowledge on the subject, making their insights especially valuable.

3.2.2 Interview Structure

The objective of the interviews was twofold: (i) to learn about the interviewees' experiences with office-to-residential feasibility studies in Seattle and (ii) to gather feedback on a developing list of factors influencing office-to-residential conversions. The interviews were semi-structured, with predetermined questions and talking points. Each interview lasted approximately one hour and was conducted either in person or via Zoom. Prior to each interview, the participant received a brief summary of the research objectives and interview goals via email. Notes were taken during each interview to document the conversations and capture specific feedback on the list of factors.

During the interviews, participants were shown the most current version of the list of factors impacting office-to-residential conversions, which had primarily been developed through the literature review. They were asked whether these factors were indeed relevant to the feasibility of such conversations, and to suggest any additional factors they felt were missing. In addition, each interviewee was asked to identify the factors they considered most critical in determining the feasibility of office-to-residential conversions. Participants also shared their own experiences working on feasibility studies, describing property specifics, proposed floor plans, cost estimates, challenges faced, and lessons learned.

The analysis of the interview data collected involved reviewing the notes to identify patterns. Factors mentioned consistently across interviews received greater focus in subsequent discussions and in the refinement of the list, especially if they also aligned with the literature review findings. After each interview, the list of factors was revised to either eliminate significant factors or incorporate newly identified important ones. Interviewees' Likert scale rankings were also studied to further inform the list.

3.2.3 Key Talking Points

The interviews highlighted building characteristics, regulatory considerations, and differing perspectives from industry professionals. Floor plate characteristics were consistently identified as a significant factor in determining a building's suitability for office-to-residential conversion. While interviewees seemed to agree that there is an ideal floor area for a conversion, the specifics varied among interviewees, which aligned with the literature review findings. The structural system and the age of the building were also discussed for their impact on conversion feasibility. Building systems, particularly MEP systems, were emphasized as critical to the success of such conversions. Regional issues, such as the Seattle building code's 'Substantial Alteration' requirements, which trigger considerable seismic and energy upgrades, were repeatedly discussed as major factors affecting feasibility.

Depending on their respective disciplines, interviewees focused on different aspects of the conversion process: structural integrity or the need for new mechanical systems took precedence for those primarily considering the complexities of the actual construction process, while the creation of enough, optimally sized units was a greater concern for those envisioning a project pro forma and financial viability.

All interviewees stressed the importance of direct and focused involvement from the City of Seattle, particularly through tax incentives and code flexibility, to advance office-to-residential conversions in the Seattle area. While they all agreed that no conversion is effortless, certain features were identified as making some office buildings more suitable for residential use than others.

3.3 MULTI-CASE STUDY

Using interviewees' inputs, including their Likert scale ranking of the various factors, the list of factors impacting office-to-residential conversion feasibility was refined and transformed into the O2R Screening Tool — a checklist for industry professionals to use in preliminary screenings of potential conversion candidates. To test the usefulness and the applications of the tool, a multi-case study was conducted on a subset of Seattle building stock already deemed as "suitable candidates for conversion" by Gupta et al. (2023). The buildings used in the study were selected as follows:

3.3.1 Case Selection

- The list of viable Seattle buildings generated by Gupta et al. (2023) formed the starting point for the study. Since data on building vacancy can be difficult to acquire and verify, Gupta et al.'s list was treated as the stock of vacant office buildings to be considered for conversion to multifamily residential use.
- For the purposes of this study, only buildings in Seattle were considered, since the tool was developed using Seattle-specific input. This geographical limit was also established in order to limit the scope of the research work. Out of 91 buildings on Gupta's list, 62 are located in the City of Seattle.
- Of those 62 buildings, eight buildings had floor plans accessible through real estate databases. Thus, the availability of data drove the case selection at this stage.
- The O2R Screening Tool was applied to this set of eight buildings.

3.4 ONLINE SURVEY

Finally, industry professionals with expertise in office-to-residential conversions were surveyed to provide feedback on the proposed O2R Screening Tool. Professionals were invited to complete an online survey regarding the tool's usefulness in evaluating the feasibility of potential office-to-residential conversions. Similar to the interview participants, the survey respondents also represented a diverse range of disciplines with the industry.

CHAPTER 4 : INTERVIEW FINDINGS

4.1 LIST OF FACTORS IMPACTING CONVERSIONS

The interview process was crucial in the development of the O2R Screening Tool. Firstly, it validated the major factors that were identified through the literature review such as floor plate factors, property location, and age. It also helped identify additional factors such as the vertical core placement, daylight considerations, and structural factors, to name a few. The interviews also enhanced the screening tool with contextual knowledge of Seattle-specific issues that impact conversion feasibility on a local level. Additionally, the interviews enabled a more detailed understanding of why these factors are important, how they impact conversion feasibility, and the degree to which they impact conversion feasibility, all of which was impactful in the development of the O2R Screening Tool.

4.1.1 Floor Plate Characteristics

Floor plate characteristics — particularly floor plate depth — were determined to be among the most impactful factors impacting office-to-residential conversion feasibility. In addition to daylight penetration, these also impact the ability to create reasonably sized units, and properly sized hallways to enable necessary circulation. The location of the vertical core impacts the overall layout of the floor as well, affecting circulation requirements and access to units. The ideal square footage (per floor) was also discussed due to its impact on the number of units and unit mix that can be generated. While interviewees agreed on its importance, opinions varied on what constitutes an ideal floor plate area for office-to-residential conversions.

4.1.2 Structural Systems

The discussion on structural systems highlighted the need to address certain challenges in adapting office buildings for residential use. The typical structural bay in an office floor plan does not align well with that of a residential floor plan, which can impact the efficiency of the proposed layout. The condition of the building's structural system also impacts conversion feasibility. Any necessary repairs can both be costly and also involve complex construction activities. Finally, the type of structural system can also play a role — post-and-beam systems are often considered easier to work with compared to post-tensioned (PT) concrete, particularly if rework such as coring and rewiring is needed. However, some professionals contend that the challenges of working with PT concrete are not significant enough to prevent conversions, and that methods such as using rear-discharge fixtures can address these challenges without significant added costs.

4.1.3 Age-Related Upgrades:

The age of the building and the timeline of prior work performed on it also impact its suitability for conversion. As noted in the literature review, older buildings typically feature smaller floor plates, which are considered more suitable for conversion. However, they also likely require significant upgrades to meet current seismic and energy codes. It is important to note, though, that existing building code upgrade requirements are relatively lenient compared to those for new construction and depend on the extent of proposed rework. Even so, the discussions generally indicated that upgrading older buildings poses a significant challenge. On the other hand, newer buildings are more compliant with current codes, but also may lack other favorable characteristics. Some interviewees suggested that a building originally constructed decades ago that has been recently renovated could be an ideal candidate for conversion, balancing the presence of ideal floor plate characteristics with modern code compliance.

4.1.4 Systems Considerations:

Building systems play a major role in the success (or lack thereof) of office-to-residential conversions. From a constructability and functionality perspective, new — or mostly new —

MEP systems will likely be required for a number of reasons. Residential systems need to be vertically stacked, but the existing office systems may not be. Issues of capacity and distribution come up as well — existing systems may be able to provide the required volume of services and utilities, but the locations of vents, electrical and plumbing outlets, etc. do not often align with residential user needs. MEP aspects are also closely linked to structural considerations, as the type of structural system can impact the effort required to rework existing systems. Finally, building code requirements may require upgrades to the building's MEP systems as well.

4.2 UNDERSTANDING THE SEATTLE CONTEXT

4.2.1 Building Codes and Standards

All the interviewees emphasized the major impact that local and regional building codes have on office-to-residential conversions, particularly in Seattle. For example, Seattle codes have requirements pertaining to the provision of amenity areas (Seattle Municipal Code, 2025), which influences how factors like the floor plate square footage are evaluated for conversion feasibility. Furthermore, Seattle's Existing Building Code treats any office-to-residential conversion as a "Substantial Alteration", triggering seismic and energy upgrades that would likely not otherwise be required. As a result, elements like the building envelope system become relevant, as they have a direct impact on compliance with these requirements. This also highlights the importance of understanding the building's history of prior work. The edition of the code under which the building was last permitted or entitled are key factors in determining the scope of necessary upgrades.

4.2.2 Market Trends

The interviewees also discussed broader trends that impact office-to-residential conversions. Financially, the decreasing property values of commercial office buildings, coupled with the high costs of new construction creates momentum for such conversions. This is what makes properties such as Class B and Class C offices more viable candidates for conversion, as they tend to be valued lower compared to Class A offices, which remain in high demand and are valued at higher prices. The economics of these conversions are also influenced by external factors such as support from the city. Tax incentives and code flexibility are critical elements in making conversions financially viable.

4.3 RELATIVE IMPORTANCE OF FACTORS

A key objective of the interview process was to determine the relative importance of the various factors impacting conversion feasibility, in order to organize the screening tool in a logical and meaningful manner.

The physical characteristics of the building itself emerged as the primary consideration, as they determine whether the conversion is physically possible or not, as well as influence its financial viability. While contextual issues specific to Seattle, such as regulatory requirements, play an important role, the challenge of navigating these broader issues is inherent in any potential conversion in the region. Therefore, it is more practical to evaluate a building's suitability for conversion by first examining its physical attributes.

Among these physical characteristics, the floor plate is a critical starting point, as it impacts access to daylight and the potential layout of residential units. The building's structural system is the next key factor — both its integrity and its capacity to accommodate functional residential units within the existing framework are essential. These elements also affect aspects like egress, plumbing, HVAC, and the availability of amenities.

All of these factors impact the financial viability of the project, as they determine the ease or difficulty of adapting the existing floor plan. This, in turn, affects the number of units that can be created, their mix, quality, and functionality — all of which influence future demand and rental rates. Moreover, any required rework of the building’s systems adds to the initial cost of conversion, further impacting financial viability. This aligns with findings from the literature review, which underscores the need to balance project costs with long-term revenue potential and highlights this effort as a critical challenge in executing office-to-residential conversions.

4.3.1 Likert Scale Ranking

The interviewees were asked to complete a ranking table, evaluating a tentative list of factors to be included in the screening tool. Each factor was assigned a score of 1 (“least important”), 2 (“somewhat important”), 3 (“important”), 4 (“very important”), or 5 (“most important”), based on its impact on office-to-residential conversion feasibility. While the scores varied among participants, floor plate characteristics were generally ranked as the most important, followed by structural factors. The age of the building was also considered important, insofar as it influenced the extent of required upgrades. A summary of the scores is presented in Table 4-1 below. The table summarizes the percentage of respondents who assigned different Likert scale rankings to various factors. Each percentage represents the proportion of respondents who assigned a specific factor a given Likert scale score (from 1 to 5). For instance, 67% of respondents assigned a score of 4 to ‘Location of Core’.

Table 4-1. Likert Scale Ranking of Factors

Factors		Likert Scale Ranking				
		1	2	3	4	5
Floor Plate Factors	Floor Plate Depth				67%	33%
	Square Footage	33%			33%	34%
	Location of Core				67%	33%
Structural Factors	Structural System			67%	33%	
	Structural Bay Spacing			33%	67%	
	Window Mullion Spacing	33%	33%		33%	
Age & Date Factors	Date of Construction				50%	50%
	Building Code Edition				67%	33%

CHAPTER 5 : O2R SCREENING TOOL

5.1 TOOL OVERVIEW

5.1.1 Designing a New Approach

The literature review and the interviews highlighted several important factors influencing the feasibility of office-to-residential conversions. The interviews provided valuable and current insights, particularly relevant to the Seattle real estate and construction industries. They also helped understand the relative importance of these factors in determining conversion feasibility. The literature review supported these findings and also highlighted existing approaches for selecting suitable office buildings for conversions. Building on these insights, the study proposes its own list of factors that impact the feasibility of office-to-residential conversions, with a particular focus on the Seattle context. This list is synthesized, along with the findings from the literature review and the interviews, into the O2R Screening Tool — a checklist designed to facilitate initial feasibility evaluations for potential office-to-residential conversions.

This tool aims to address the inefficiencies and challenges arising from the case-by-case decision-making approach that currently dominates discussions about office-to-residential conversions. The O2R Screening Tool allows professionals to conduct preliminary screenings of potential office-to-residential candidates, offering a qualitative evaluation of the conversion's likely feasibility. By simplifying and expediting this initial assessment, the tool aims to make the early stages of the conversion process more efficient and accessible. The following section presents the screening tool in the format intended for user interaction.

5.1.2. O2R Screening Tool

O2R SCREENING TOOL

The O2R Screening Tool is designed to help AEC (Architecture, Engineering, and Construction) professionals evaluate the potential for converting an existing commercial office into a multifamily residential building. This tool provides a structured framework for evaluating feasibility at an early stage. It is organized as a checklist divided into three key phases. Each phase is color-coded to guide the user through the evaluation process. The phases are sequential, and the user should progress through them in order.

How to Use the Tool

Red Phase (Prerequisites): This phase identifies the essential requirements that must be met before considering a conversion. If the user answers "no" to any question, the building is not suitable for conversion, and further evaluation is not necessary.

*Proceed to the Yellow Phase **only** if all answers in the Red Phase are "yes".*

Yellow Phase (Critical Factors): This phase considers important physical factors, such as the building's floor plate, structure, and exterior features. "Yes" answers indicate that the building has characteristics that support conversion. If several answers are "no", the conversion will face significant challenges. While some factors may be mitigated, significant deficiencies will generally result in a low feasibility for conversion.

Proceed to the Green Phase if most or all answers in the Yellow Phase are "yes".

Green Phase (Preferred Factors): This phase evaluates regional factors specific to Seattle's building and energy codes. A "yes" answer suggests that the building aligns well with local standards, making compliance relatively easier. A "no" answer indicates that more extensive work will be needed to meet code requirements. While these factors help evaluate relative feasibility, they do not necessarily make a conversion infeasible.

O2R SCREENING TOOL

PRE-REQUISITES	
• Vacancy: Is the building considered vacant? • Building Class: Is the building a Class B or Class C office building?	Yes / No
FLOOR PLATE CHARACTERISTICS	
• Floor Plate Depth: Is the floor plate depth (core-to-window) at most 60'? Impact: Access to Daylight Unit Depth Circulation	Yes / No
• Location of Core: Is the vertical core (stairs and elevators) located towards the middle of the floor plate? Impact: Unit Layout Access to Daylight	Yes / No
• Floor Plate Area: Is the floor plate area between 10,000 and 20,000 square feet? Impact: Unit Size Access to Amenities Circulation	Yes / No
STRUCTURAL CHARACTERISTICS	
• Structural Bay Spacing: Is the typical structural bay between 20'-30' wide? Impact: Unit Layout	Yes / No
• Type of Structure: Is the existing structural system a post-and-beam system? Impact: Systems Upgrades	Yes / No
EXTERIOR CHARACTERISTICS	
• Location: Is the building located in an urban context near amenities? Impact: Access to Amenities	Yes / No
• Southern Exposure: Is the south-facing facade equipped with windows and unobstructed? Impact: Access to Daylight	Yes / No
• Building Form: Is the building form rectangular, square, U-shaped, L-shaped, or otherwise generally “regularly-shaped”? Impact: Unit Layout Systems Upgrades	Yes / No

DATE AND AGE CHARACTERISTICS	
● Effective Year: Is the effective year* of the building 1980 or later? Impact: Code Upgrades Building Quality	Yes / No
● Date of Renovation: Is the date of the most recent renovation 1990 or later? Impact: Code Upgrades Building Quality	Yes / No
PERFORMANCE CHARACTERISTICS	
● ENERGY STAR Score: Does the building have a rating of 80 or higher? Impact: Energy Upgrades	Yes / No
● Site EUI: Does the building have a Site EUI below 38.4 $kBTU/ft^2$? Impact: Energy Upgrades	Yes / No
● EUI Targets: Is the building EUI within its estimated CBPS** target? Impact: Energy Upgrades	Yes / No

*as used by tax assessors
**Clean Buildings Performance Standard

5.1.3. Application

The intended application of the O2R Screening Tool is preliminary screening and decision-making regarding office-to-residential conversions. As highlighted in previous chapters, conducting detailed feasibility studies for each individual potential conversion can be time- and effort-intensive, at least in part because no standardized approach currently exists for this process. The screening tool offers a practical solution for AEC professionals – or even property owners with some knowledge of the construction process – who want to quickly and efficiently evaluate the feasibility of a potential conversion. To make the most of the checklist, users would need to have access to basic information about the building and would be aiming to make an initial qualitative judgement. The tool may also be used to help prioritize which buildings are most viable for conversion when reviewing multiple properties.

5.2. PROPOSED SCREENING CRITERIA

5.2.1. Prerequisites

PRE-REQUISITES	
• Vacancy: Is the building considered vacant? • Building Class: Is the building a Class B or Class C office building?	Yes / No

Figure 5-1. O2R Screening Tool: Pre-Requisites

Vacancy: Vacancy rates are a significant driver in conversions and so, they are the first prerequisite in the screening tool. Vacancy can be assessed in several ways. For instance, Gupta's (2023) approach uses expiring leases as an indicator, while other sources suggest a 25% vacancy rate as a threshold for considering conversions (Kolachalam, 2022). The screening tool does not adopt a strict definition of vacancy. Generally, owners and property managers maintain vacancy data, and whether or not an owner is concerned about vacancy often depends on their own metrics and thresholds. For the purposes of the screening tool, it is important that the building meets the owner's defined vacancy criterion before further evaluation is conducted.

Building Class: The building class is the second prerequisite in the screening tool. According to the Building Owners and Managers Association (BOMA), buildings are classified as Class A, B, or C based on their quality, age, location, and amenities. Class A represents the highest quality, while Class C represents the lowest. Class B and C office buildings are better suited for conversions, as they tend to be older but still functional and are valued at lower prices. This makes their redevelopment into residential units potentially more financially viable than trying to attract office demand. On the other hand, converting Class A buildings is highly unlikely to be financially viable. The initial conceptual and practical driver of repurposing declining office properties does not apply to Class A buildings, as they are in relatively high demand and maintain a strong market value.

5.2.2. Floor Plate Characteristics

FLOOR PLATE CHARACTERISTICS	
• Floor Plate Depth: Is the floor plate depth (core-to-window) at most 60'? Impact: Access to Daylight Unit Depth Circulation	Yes / No
• Location of Core: Is the vertical core (stairs and elevators) located towards the middle of the floor plate? Impact: Unit Layout Access to Daylight	Yes / No
• Floor Plate Area: Is the floor plate area between 10,000 and 20,000 square feet? Impact: Unit Size Access to Amenities Circulation	Yes / No

Figure 5-2. O2R Screening Tool: Floor Plate Characteristics

Floor Plate Depth: Floor plate depth refers to the front-to-back distance of a building, and half of this distance is the "core-to-window" metric, as discussed by Gupta et al. (2023). The most significant impact of floor plate depth is its effect on access to daylight. The deeper a floor plate, the greater the distance of the building's core is from its windows, which limits the extent to which daylight can penetrate through to the center of the building. While this may be acceptable in office buildings, in residential buildings, it is key for each unit to get daylight. Natural light is highly desirable for users, who want well-lit living spaces. Given this, the checklist considers 60 feet to be the maximum allowable core-to-window distance to ensure sufficient daylight in the residential units. Additionally, unit depth is impacted by the floor plate depth; deeper floor plates might result in larger and/or deeper units, impacting functionality. Circulation is also affected by floor plate depth, as interior hallways must be adequately sized to serve residents, provide egress pathways, and allow for an efficient floor layout.

Location of Core: The location of the vertical core is a critical factor. The "core" refers to the vertical infrastructure of the building, primarily elevators and stairs. The more centrally located the core is within the floor plate, the more feasible it makes a potential conversion. Firstly, a central placement optimizes the use of the "middle" of the floor plate, which otherwise would be difficult to utilize for residential units due to the lack of daylight. It also frees up the outer edges of the building to accommodate well-lit residential units. Secondly, a centrally located core tends to allow for efficient access to all units, reducing the need for long, inefficient hallways, meeting egress requirements, and ensuring functional circulation.

Floor Plate Area: The floor plate area, in this context, refers to the square footage of a typical floor. The floor needs to be of a reasonable size to accommodate a healthy number and mix of units — insufficient square footage limits the number of units that can be created, while excessive square footage may create uncertainty regarding demand and pricing for larger-than-typical units. Larger floor plates can also make it more challenging to provide egress pathways that comply with requirements regarding maximum lengths and avoiding dead-ends. In the screening tool, a floor plate area ranging from 10,000 to 20,000 square feet per floor is considered an indicator of higher conversion feasibility.

5.2.3. Structural Characteristics

STRUCTURAL CHARACTERISTICS	
• Structural Bay Spacing: Is the typical structural bay between 20'-30' wide? Impact: Unit Layout	Yes / No
• Type of Structure: Is the existing structural system a post-and-beam system? Impact: Systems Upgrades	Yes / No

Figure 5-3. O2R Screening Tool: Structural Characteristics

Structural Bay Spacing: The size of the structural bay impacts how residential units are arranged within the existing office floor plan. Typical residential units generally require dimensions of at least 20' for a 1-bedroom and 30'-40' feet for a 2-bedroom unit, based on common bedroom and living room dimensions. A structural bay spacing of 20'-30' offers greater flexibility for the unit layout, allowing for appropriately sized units and more efficient use of space. Smaller bay spacing can create challenges, such as columns within units, and can make it harder to use space effectively and create desirable units. Accordingly, larger bay spacings of 20’-30’ are considered an indicator of higher conversion feasibility in the O2R screening tool.

Type of Structure: The type of the existing structural system — a post-and-beam (framing) system or a tensile system — impacts conversion feasibility, as highlighted in the interviews. The structural system can affect how easy or difficult it is to make major changes, particularly if any penetrations or major alterations are required. In the screening tool, a post-and-beam system is considered favorable for conversion, while other types may pose challenges.

5.2.4. Exterior Characteristics

EXTERIOR CHARACTERISTICS	
• Location: Is the building located in an urban context near amenities? Impact: Access to Amenities	Yes / No
• Southern Exposure: Is the south-facing facade equipped with windows and unobstructed? Impact: Access to Daylight	Yes / No
• Building Form: Is the building form rectangular, square, U-shaped, L-shaped, or otherwise generally “regularly-shaped”? Impact: Unit Layout Systems Upgrades	Yes / No

Figure 5-4. O2R Screening Tool: Exterior Characteristics

Location: A building located in a relatively urban area, such as downtown, is a strong indicator of conversion feasibility. Proximity to amenities — such as retail, businesses, public transit, and public outdoor spaces like parks — would make the proposed residential development more desirable. These conveniences enhance the building’s overall appeal and functionality as a residential property. This is also important in the broader context of revitalizing downtown areas. As discussed in the literature review, converting office buildings in these areas can help reverse trends of decline. In the screening tool, a location in an urban area near amenities is considered an indicator of higher conversion feasibility.

Southern Exposure: Southern exposure refers to how well a building's south-facing facade is designed to maximize daylight entry. This is important because access to daylight is a critical consideration in the design of viable residential units. If the south-facing facade is equipped with few or no windows, it significantly limits daylight and reduces the feasibility of the conversion. Major obstructions, like a large neighboring building casting shadows, would also further decrease access to daylight. Conversely, a south-facing facade with ample windows and minimal obstructions enhances the conversion potential. In the screening tool, a south-facing facade with good window coverage and minimal obstructions is considered a strong indicator of higher feasibility.

Building Form: The building form plays an important role in conversion feasibility. Regular forms, such as rectangular, square, or even H-, U-, or L- shaped configurations, allow for more efficient floor plan layouts. These forms make it easier to optimize space and ensure functional residential units. In contrast, buildings with awkward or irregular footprints require more effort to optimize and often result in wasted space and inefficient layouts. In the screening tool, a regular building form is considered favorable for conversion.

5.2.5. Date and Age Characteristics

DATE AND AGE CHARACTERISTICS	
• Effective Year: Is the effective year* of the building 1980 or later? Impact: Code Upgrades Building Quality	Yes / No
• Date of Renovation: Is the date of the most recent renovation 1990 or later? Impact: Code Upgrades Building Quality	Yes / No

Figure 5-5. O2R Screening Tool: Date and Age Characteristics

It is important to note that the date and age characteristics should be considered comparative factors. All conversion projects will require some degree of code-related upgrades. These factors help evaluate how closely a building likely aligns with current Seattle standards compared to older, less updated structures. The general idea is that a building already more aligned with modern codes will require relatively fewer updates to achieve compliance. For example, a building constructed in 1920 with no renovations would likely require more extensive work than a building built in 1920 but renovated after 1980. However, since both buildings will require upgrades regardless, it is not useful (for the purposes of the checklist) to deem one infeasible solely based on the need for code-related upgrades.

Effective Year: The effective year refers to the date used for property tax assessments, indicating when a building is either considered to have been constructed or last substantially renovated. This date can help determine which building codes may apply to the conversion, with a more recent effective year suggesting that the building is more likely to comply with modern codes. In Seattle, buildings constructed or renovated after 1980 are more likely to meet newer seismic standards (introduced following significant regional earthquakes in 1965 and 1971). As a result, in the screening tool, an effective year of 1980 or later indicates a greater likelihood that the building aligns more closely with current local standards, particularly in terms of seismic safety, making the conversion more feasible.

Date of Renovation: The date of renovation refers to the year when a building was last renovated. This provides insight into the modernization of a building and how closely it might align with current building codes. In Seattle, buildings renovated after 1990 are more likely to incorporate greater seismic improvements (in response to the 1989, 1994, and 2001 earthquakes) and to better reflect the city's energy codes, which have progressively become stricter over time. In the screening tool, a renovation date of 1990 or later indicates that the building is more likely to align with current codes, making the conversion more feasible.

5.2.6. Performance Characteristics

PERFORMANCE CHARACTERISTICS	
• ENERGY STAR Score: Does the building have a rating of 80 or higher? Impact: Energy Upgrades	Yes / No
• Site EUI: Does the building have a Site EUI below 38.4 kBTU/ft^2? Impact: Energy Upgrades	Yes / No
• EUI Targets: Is the building EUI within its estimated CBPS** target? Impact: Energy Upgrades	Yes / No

Figure 5-6. O2R Screening Tool: Performance Characteristics

The performance characteristics are developed using a logic similar to that of the date and age characteristics. The specific metrics listed below have been selected because they are used by the City of Seattle to track buildings' energy performance through the Seattle Energy Benchmarking database. Since these metrics help measure compliance with the city's energy goals, they provide a meaningful basis for evaluating how closely a conversion candidate aligns with current energy performance standards.

ENERGY STAR Score: The ENERGY STAR score measures a building's energy efficiency relative to similar buildings, with a score of 75 or higher indicating the top 25% of energy-efficient buildings. The score is useful as an indicator of how closely a building aligns with modern energy standards, which may make conversion more feasible. In Seattle, the median score is 79. Therefore, in the screening tool, a score of 80 or higher indicates a greater likelihood that the building aligns more closely with current local standards, in terms of energy efficiency, making the conversion more feasible with fewer energy-related upgrades.

Site EUI: Site EUI (Energy Use Intensity) measures the total energy use per unit area on a property, including all energy sources consumed by the building. A lower site EUI generally indicates better energy efficiency. Similar to the Energy Star score, site EUI is used to gauge how closely a building aligns with modern energy standards. The median Site EUI in Seattle is 38.4 kBtu/ft^2, so a site EUI lower than this suggests a greater likelihood that the building meets current energy efficiency standards, making it a more feasible candidate for conversion.

EUI Targets: The Washington Clean Buildings Performance Standard (2019) sets EUI targets for commercial and multifamily buildings. If a conversion candidate meets its CBPS EUI target, it is likely highly energy efficient. Similar to the Energy Star score and Site EUI, this can indicate better alignment with current energy standards. In the screening tool, being within EUI targets suggests a greater likelihood that the building meets modern energy efficiency requirements, making it a more feasible candidate for conversion.

5.3. CHECKLIST SEQUENCE

A key benefit of the O2R Screening Tool is its sequential structure, which provides a clear and logical framework for evaluation. The checklist is designed to be followed from top to bottom, ensuring an intuitive and easy-to-follow process. The sequence is determined by several key considerations to enable a smooth progression through the feasibility evaluation.

5.3.1. Determining the Sequence:

The checklist sequence is based on the following considerations:

Relative Importance: The questions are ordered according to the relative significance of each characteristic in determining the conversion feasibility of a building. The factors' importance is determined through a collective analysis of the literature review, interview findings (with a focus on the Likert scale rankings), as well as the author's own judgement as a subject matter expert. For example, a core-to-window distance of under 60' is a highly impactful factor, as it directly impacts unit sizes and layouts. On the other hand, factors like building form, while important for floor plan efficiency, have less overall impact on feasibility and therefore appear lower on the list. Renovation date and energy efficiency are considered bonus factors — they may simplify upgrades but are not essential for feasibility, since all buildings will require code-related upgrades in Seattle. While code challenges are inevitable, avoiding deeper floor plates is more critical, making floor plate depth a more useful selection factor than energy efficiency.

Ease of Answering Questions (Data Availability): The checklist progresses from questions that are easier to answer (such as vacancy rate or important dimensions) to those that are more difficult to obtain, like performance metrics. This sequence helps streamline the process and supports the tool's goal of providing a quick and efficient initial evaluation.

General to Specific: The checklist begins with characteristics that are broadly applicable to a wide range of office-to-residential conversion candidates. For instance, the location of the core is relevant in most cases, so it is addressed earlier on. More specific performance metrics (like Site EUI relative to the City's median) depend on the building's unique context and associated standards, so they appear later in the checklist. Essentially, the first two sections are more generalizable outside of Seattle, while the later characteristics are more specific to the local context.

5.3.2. Red, Yellow, Green Phasing:

Another important feature of the checklist's sequential structure is its division into three phases — Red, Yellow, and Green — each focusing on different levels of requirements. In the Red Phase (Prerequisites), the building must meet essential criteria for it to be considered for conversion. The user must answer "yes" to all questions in this phase before proceeding. Next is the Yellow Phase (Critical Factors), which considers key physical characteristics of the building. After addressing the Red Phase and answering "yes" to most of the Yellow Phase questions, the user can move on to the Green Phase (Preferred Factors), which focuses on regional considerations and compliance with local codes. These factors are not essential for conversion but may make it easier.

5.4. INTERPRETING RESULTS

After completing the O2R Screening Tool, the user will have a preliminary understanding of the likely feasibility of converting a specific commercial office into multifamily residential space. If all Red Phase questions were answered "yes", the building meets the minimum necessary requirements. In the Yellow Phase, if most answers are "yes", the building has critical physical characteristics that support conversion, though some challenges may remain. The greater the number of "yes" answers in the Yellow Phase, the more feasible the conversion. If the Yellow Phase yields mostly "no” answers, it suggests that the building's physical features are not conducive to a successful conversion. When comparing multiple buildings, it is useful to evaluate the Yellow Phase answers to identify which building has a greater number of favorable critical characteristics. In the Green Phase, "yes" answers indicate that the building is more likely to align with Seattle’s current building and energy codes, suggesting that compliance and necessary upgrades could be easier to achieve.

CHAPTER 6 : VALIDATION

6.1 MULTI-CASE STUDY

6.1.1 Approach

Chapter 3 outlines the approach for selecting buildings to be included in the multi-case study. Using Gupta et al.’s (2023) list of suitable candidates as a starting point, only buildings located within the City of Seattle for which floor plans were accessible through real estate databases were selected. A total of eight buildings were screened using the O2R Screening Tool. Each building was evaluated individually, according to the sequence in which they appeared in Gupta’s (2023) list. For each building, compliance with the checklist (i.e., whether or not each factor was satisfied) was determined using various kinds of data outlined in Section 6.1.2. Upon the completion of each individual qualitative evaluation, the building was determined to have ‘good’, ‘moderate’, or ‘low’ feasibility. If a building did not meet the prerequisites, it was determined to be ‘not feasible’. Finally, these evaluations underwent a comparative analysis which produced a ranked list of buildings, ordered according to their feasibility, as summarized in Section 6.1.3. Detailed case study notes can be found in the Appendix.

6.1.2 Assumptions and Data Sources

For the purposes of the multi-case study, it is assumed that the buildings included in the list developed by Gupta et al. (2023) are vacant and therefore satisfy the vacancy pre-requisite of the screening tool. No additional data is used to determine the vacancy status of the buildings, especially since the O2R Screening Tool does not specify any particular metric for vacancy. In practical applications of this tool, the user would likely already know if a building meets the vacancy criteria, as the tool is intended for properties that are clearly established as vacant. Sources used for all other data are summarized in Table 6-1 below.

Table 6-1. Data Used in Multi-Case Study

Data (Factor)	Source
Vacancy	Assumed (see 6.1.2.)
Building Class	CoStar data
Floor Plate Depth	Floor plan visual analysis (plans obtained from CoStar)
Location of Core	Floor plan visual analysis (plans obtained from CoStar)
Floor Plate Area	CoStar data
Structural Bay Spacing	Floor plan visual analysis (plans obtained from CoStar)
Type of Structure	CoStar data
Southern Exposure	Exterior images, Google Maps data
Location	Real estate databases, Google Maps data
Building Form	Exterior images, Google Maps data
Effective Year	King County Assessor's eReal Property website
Date of Renovation	CoStar data
ENERGY STAR Score	Seattle Office of Sustainability and Environment
Site EUI	
EUI Targets	

The data used in conducting the individual building evaluations was accessed using a number of sources. A significant source was the database managed by the CoStar Group, a global platform for commercial and residential real estate data (*Home* | *CoStar Group*, n.d.). This provided real estate information such as the building class, type of structure, and typical floor plate area. This information also included floor plans, which were visually analyzed to extract information regarding the floor plate depth, location of the core, structural bay spacing, and building form. Additional data points, such as southern exposure, were also visually evaluated using images of the building exterior, available through publicly accessible sources like Google Maps and King County databases. The building's effective year was determined using public records from the King County Department of Assessments' online property database. Lastly, the energy benchmarking database maintained by the Seattle Office of Sustainability and Environment provided performance-related data.

6.1.3 Results of Multi-Case Study:

The multi-case study yielded a ranking of the evaluated candidates for conversion, from most to least feasible, relative to each other, as seen in Table 6-2 below.

Table 6-2. Ranking Conversion Candidates Using the O2R Screening Tool

	Candidate for Conversion	Building Information	Feasibility	Notes
1	**2Pine** *1601-1611 2nd Ave*	No. of Stories: 10 RBA*: 114,966 SF	Good	2/2 Red 6/8 Yellow 4/5 Green
2	**Hoge Building** *705 2nd Ave*	No. of Stories: 17 RBA: 115,294 SF	Good	2/2 Red 5/8 Yellow 5/5 Green
3	**4Pike** *1424 4th Ave*	No. of Stories: 10 RBA: 132,326 SF	Good	2/2 Red 5/8 Yellow 2/5 Green
4	**Lloyd Building** *601 Stewart St*	No. of Stories: 10 RBA: 47,000 SF	Moderate	2/2 Red 5/8 Yellow 0/5 Green
5	**Gibraltar Tower** *1525 4th Ave*	No. of Stories: 8 RBA: 42,243 SF	Low	2/2 Red 4/8 Yellow
6	**Fremont Building** *3417 Fremont Ave*	No. of Stories: 3 RBA: 21,000 SF	Low	2/2 Red 3/8 Yellow
7	**Plaza 600** *600 Stewart St*	No. of Stories: 20 RBA: 213,979 SF	Not feasible	1/2 Red
8	**1000 Second Ave** *1000 2nd Ave*	No. of Stories: 40 RBA: 589,921 SF	Not feasible	1/2 Red

*RBA (Rentable Building Area) is the usable area and its associated share of common areas. (*CoStar Glossary*)

The results of the individual evaluations can be summarized as follows: both Plaza 600 (600 Stewart St) and 1000 Second Avenue (1000 2nd Ave) are vacant but are Class A buildings. They do not meet all the prerequisites and so, they do not clear the Red Phase. The Fremont Building (3417-3429 Fremont Ave) is a vacant Class B building, so it clears the Red Phase and moves on to the Yellow Phase, where it meets only one each of the floor plate, structural, and exterior characteristics. Gibraltar Tower (1525 4th Ave) (see Fig 6-1) also similarly enters the Yellow Phase, where two exterior characteristics are satisfied while only one characteristic each is satisfied in the floor plate and structural characteristics. Both buildings do not satisfy enough of the factors in the Yellow Phase, and so the evaluations do not proceed to the Green Phase.

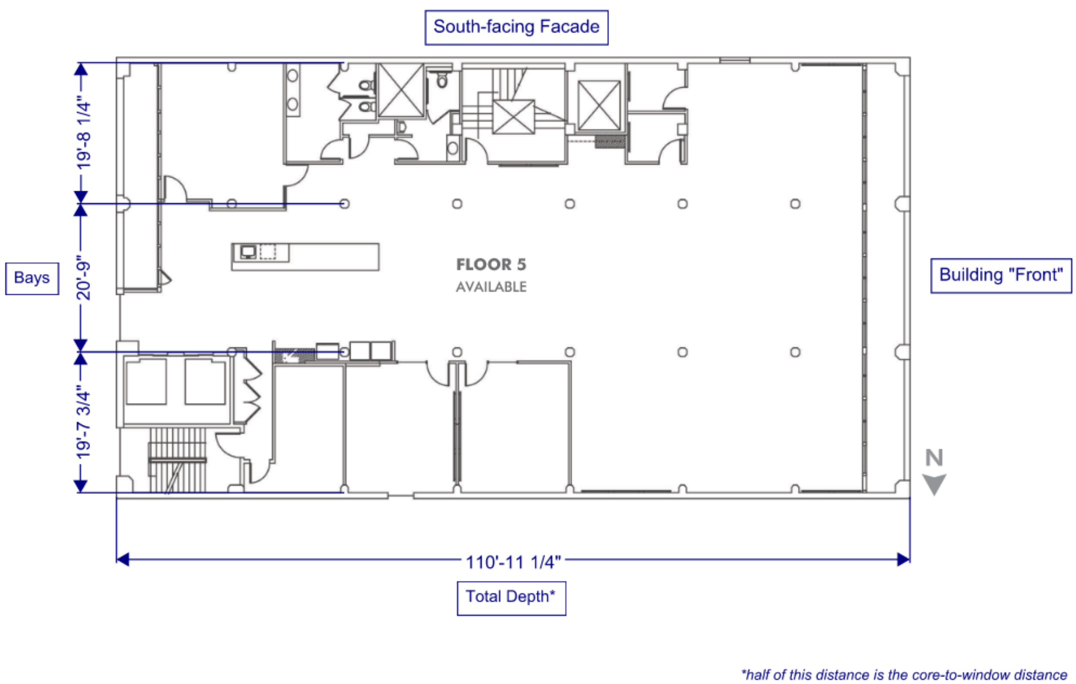

Figure 6-1. Floor Plan of Gibraltar Tower showing Critical Factors

The remaining four candidates — Hoge Building (705 2nd Ave), 2Pine (1601-1611 2nd Ave), 4Pike (1424 4th Ave), and 601 Stewart St (Lloyd Building) — all clear the Yellow Phase with most questions being answered ‘yes’. Of these, 2Pine satisfies the greatest number of factors in the Yellow Phase (six out of eight factors) while the other three satisfy five factors each. In the Green Phase, 2Pine and the Hoge Building perform very well, with the former satisfying four out of five factors and the latter satisfying them all. 4Pike only satisfies two performance characteristics (see Fig 6-2), while the Lloyd Building meets none. Table 6-3 below summarizes the individual evaluations, with an ‘X’ in a cell indicating that the criterion was satisfied.

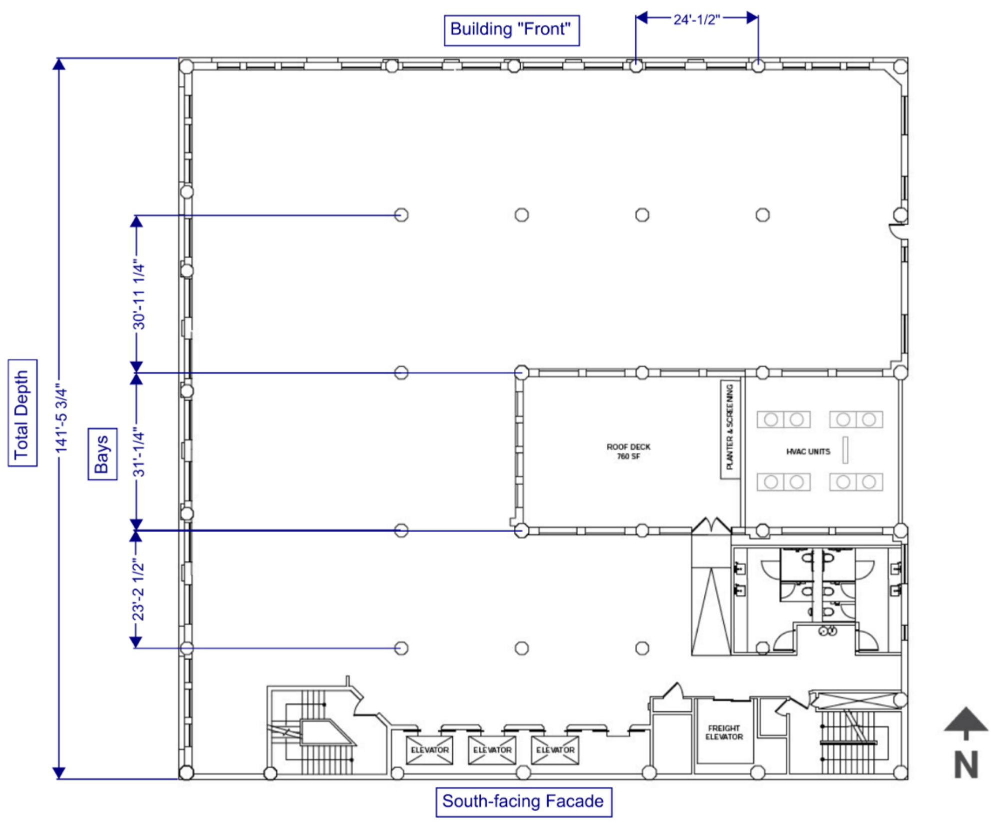

Figure 6-2. Floor Plan of 4Pike showing Critical Factors

Table 6-3. Summary of O2R Screening Evaluations

Factor	2Pine	Hoge Building	4Pike	Lloyd Building	Gibraltar Tower	Fremont Building	Plaza 600	1000 2nd Ave
Vacancy	X	X	X	X	X	X	X	X
Building Class	X	X	X	X	X	X		
Floor Plate Depth	X	X	X	X	X	X		
Location of Core	X	X		X				
Floor Plate Area	X		X					
Structural Bay Spacing			X	X	X	X		
Type of Structure								
Southern Exposure	X	X						
Location	X	X	X	X	X	X		
Building Form	X	X	X	X	X			
Effective Year	X	X	X					
Date of Renovation	X	X						
ENERGY STAR Score		X						
Site EUI	X	X						
EUI Targets	X	X	X					

Once the individual screenings were completed, a comparative analysis of each building's compliance with the checklist was conducted, and buildings were placed on the list based on the number of factors in each of the categories that were satisfied. Each building had to necessarily meet the prerequisites to be considered feasible. Two candidates did not meet the prerequisites (Plaza 600 and 1000 Second Avenue), receiving the result of 'not feasible' and ranking the lowest of the eight. The remainder of the rankings was assigned based on each building's performance with the critical factors and the preferred factors, with the critical factors receiving greater importance. In essence, the greater the number of factors satisfied, the higher a building was placed on the list.

6.2 EXPERT VALIDATION

6.2.1 Survey Design

A brief survey of industry professionals was conducted to gather feedback on the usefulness and applicability of the O2R Screening Tool. The responses were used to evaluate how accurately the tool captures key factors impacting conversion feasibility, how well it addresses relevant issues, and its potential use as a preliminary screening tool in real-world applications. Respondents were provided with the O2R Screening Tool (see Chapter 5) along with instructions for using the checklist and were then asked to respond to the survey.

Three professionals were surveyed, each from a different sector: one from architecture, one from real estate development, and one from construction management (preconstruction). All respondents had participated in at least one feasibility study of a prospective office-to-residential conversion. The survey consisted of five agree/disagree statements, with an option for additional comments. Prospective participants were contacted via email, and the survey was conducted via Google Forms.

6.2.2 Summary of Results

The survey results were generally positive. All respondents agreed that the O2R Screening Tool correctly identifies factors affecting office-to-residential conversion feasibility and that it has practical and valuable applications for the AEC industry, both in Seattle and beyond. Responses regarding the extent to which the tool reflects the relative importance of the factors and addresses key issues in office-to-residential conversions were also largely positive, with only one neutral response for each of these questions. A summary of the responses is provided in Table 6-4 below.

Table 6-4. Online Survey Results

STATEMENT	Respondent 1	Respondent 2	Respondent 3
This tool correctly identifies factors affecting office-to-residential conversion feasibility.	Agree	Strongly Agree	Agree
This tool reflects the relative importance of these factors in determining conversion feasibility.	Agree	Strongly Agree	Neutral
This tool takes into account key issues surrounding office-to-residential conversions.	Neutral	Strongly Agree	Agree
This tool has practical applications for the Seattle AEC industry.	Agree	Strongly Agree	Agree
This tool has useful implications for the broader AEC industry.	Agree	Strongly Agree	Agree

Overall, the O2R Screening Tool received positive feedback and was considered useful by the industry professionals, as evidenced by the respondents' additional comments:

- *"This is a great tool for property owners and architects looking at a building!"*
- *"Overall, the general approach is good."*
- *"The screening tool looks great as an initial filtering method."*

All three respondents also provided valuable suggestions for enhancing the tool's effectiveness in evaluating office-to-residential conversion feasibility. The considerations recommended include:

- Building Size: The overall building size impacts the total number of units and, as a result, the potential total income. A larger building size enables more effective economies of scale, indicating greater conversion feasibility.
- Prior Seismic Improvements: This factor was highlighted as a significant consideration for costs, particularly on the West Coast. If a building has not undergone any seismic retrofitting, it poses substantial costs and, therefore, financial risk.
- Envelope Performance: How the building envelope performs relative to current energy code requirements is another key factor which affects conversion costs.
- Existing Parking: The availability of sufficient parking is an important factor that determines how well the building aligns with its potential future needs.

6.2.3 Additional Validation

One respondent provided more detailed validation by applying the checklist to two buildings for which feasibility studies had already been conducted and the feasibility determined. They found that the checklist's evaluation aligned with their existing understanding of the buildings' suitability for conversion. This feedback was highly valuable in confirming and demonstrating the practical applicability of the checklist.

CHAPTER 7 : CONCLUSION

7.1 SUMMARY OF FINDINGS

In response to the recent record-high vacancy rates in commercial offices and the persistent undersupply of multifamily housing, office-to-residential (O2R) conversions have gained significant attention as a comprehensive solution with sustainability benefits. Several U.S. cities have already seen success with this strategy, while others — including Seattle — are still evaluating its feasibility in their specific local contexts.

A major challenge for industry professionals considering O2R conversions is the case-by-case nature of such projects, which makes it difficult to arrive at an early-stage, quick, and qualitative determination of the feasibility of a given conversion. To develop a solution to this problem, this study was conducted with the following objectives:

- To identify the factors affecting office-to-residential conversion feasibility,
- To determine the impact the identified factors have on a building's feasibility for conversion from office to multifamily residential, and
- To propose a screening tool incorporating the identified factors, to be used by architecture, engineering and construction professionals to screen potential office-to-residential candidates.

The study focuses on the city of Seattle. First, to identify factors affecting O2R conversion feasibility, a review of the existing literature was conducted. Following this, interviews with five industry professionals from the architecture, engineering, and construction industry were conducted to gain key insights. This effort resulted in a list of factors affecting O2R conversion feasibility. It also helped describe the impact that the identified factors have on conversion feasibility.

These findings were then synthesized into the O2R Screening Tool, designed for industry professionals to conduct preliminary screenings of potential office-to-residential candidates. The tool was formatted as a sequential checklist, addressing three types of factors impacting conversion feasibility — 'prerequisites', 'critical factors', and 'preferred factors' — by posing a series of Yes/No questions to the user evaluating the feasibility of a potential O2R conversion.

Finally, a two-step validation process was conducted. A multi-case study applied the checklist to eight Seattle buildings, and yielded a ranked list of conversion candidates, listed from most to least feasible. An online survey of industry professionals gathered feedback on the accuracy and applicability of the checklist as a practical industry tool. The results of this process demonstrated the checklist's effectiveness as an early-stage screening and decision-making tool.

7.2. CONTRIBUTIONS

7.2.1 Contributions to the Body of Knowledge

Existing models for selecting buildings suitable for O2R conversion generally rely on a list of factors and discuss their importance. Gupta et al. (2023) also follow a sequential approach, systematically applying a set of identified criteria to the existing building stock and eliminating unsuitable candidates, to identify the set of buildings considered suitable for conversion. However, this study places an emphasis on organizing the identified factors based on their 'relative importance', as outlined in Section 5.3. Accordingly, the O2R Screening Tool contends that the Pre-Requisites are more important than the Critical Factors, which are more impactful than the Preferred Factors. This represents the study's primary contribution to the body of knowledge.

7.2.2 Contributions to Practice

- A Model for Evaluating Conversion Feasibility

A key contribution of the study is the O2R Screening Tool, which provides users with an efficient approach to conduct preliminary evaluations of a property's office-to-residential conversion feasibility with limited initial knowledge. By simplifying and expediting this early evaluation, the tool makes the early stages of the conversion process more efficient and accessible. It also enables comparative analysis, which can help users prioritize properties with higher conversion potential. The checklist is best used for early screening, helping building owners or other stakeholders quickly identify whether a vacant office building is suitable for conversion. It allows them to identify key challenges upfront — such as structural issues — and integrate this information into their larger project planning process, thereby supporting better risk management. This 'risk-based' approach frontloads the identification of risks, ensuring that potential obstacles are understood early and accounted for in planning and decision-making.

- Regional Specificity

The study uses Seattle as its baseline to develop a context-sensitive tool that addresses local challenges and priorities. At the same time, while the tool is designed with Seattle-specific needs in mind, its sequence — from general to specific — ensures it remains adaptable to other cities facing similar challenges. This makes it valuable not only for Seattle properties but also as a model for developing similar context-sensitive tools for other cities.

- Role in Developing Broader Strategy

The checklist can also play a role in developing a broader strategy for facilitating successful office-to-residential conversions. By identifying patterns across the larger building stock of vacant offices — such as recurring criteria that are rarely met — it can inform strategies to address common challenges. Such information could help guide future policy or planning decisions to better support office-to-residential conversions and, as a result, downtown activation efforts.

7.3. LIMITATIONS

7.3.1. Geographic and Contextual Limitations

The O2R Screening Tool is limited to Seattle both in terms of industry and geography, which, while providing focus, restricts the tool's applicability to potential candidates in regions outside the city. In particular, the 'Preferred Factors' are most relevant to Seattle's building codes and local conditions. However, the 'Prerequisites' and 'Critical Factors' are more generalizable and can be applied to other contexts outside Seattle.

7.3.2. Simplification of Code Issues

The building and energy code considerations in the O2R Screening Tool are simplified to fit a yes/no format of questions, limiting the tool's ability to facilitate a comprehensive code evaluation. Determining code compliance often entails detailed analysis, such as site visits and analysis of building systems. The checklist also groups overlapping yet distinct energy standards, e.g., Washington state's CBPS (Clean Buildings Performance Standard) and Seattle's Energy Code. While meeting certain energy criteria may indicate ease of conversion, it does not rule out the possibility of costly upgrades to fully comply with all applicable codes. Ultimately, code requirements in Seattle, which are particularly stringent even within Washington state, add a significant layer of complexity to office-to-residential conversions, and the O2R Screening Tool should be supplemented with a detailed code analysis to fully capture the scope of these regulatory challenges.

7.3.3. Binary Evaluation System

The binary yes/no approach used in the checklist does not account for slight deviations or varying degrees of feasibility. A more nuanced scoring system utilizing a spectrum or a range — such as a fuzzy-based system — would offer a more accurate evaluation. The use of a fuzzy-based system would also help further minimize any subjectivity on the user's part that may affect the evaluation. Additionally, the checklist provides a qualitative and relative assessment rather than a quantitative one. Thus, while a "good" or "moderate" feasibility rating can guide initial decisions, a detailed feasibility study is necessary to fully determine the viability of a conversion.

7.4. FUTURE RESEARCH

7.4.1 Cost and Carbon Considerations

While the study acknowledges the importance of carbon emissions within the broader office-to-residential discourse, the O2R Screening Tool addresses these considerations indirectly through its 'Performance Characteristics' section. The study's qualitative focus also does not explicitly address cost beyond broad implications. The O2R Screening Tool is best used as an initial screening tool rather than to provide an exhaustive feasibility evaluation. Future research can explore issues of cost and carbon emissions with a stronger quantitative focus.

7.4.2 Validation Against Real-World Projects

Future research could evaluate the checklist's effectiveness by comparing its findings with those of more comprehensive feasibility evaluations conducted by building owners or other stakeholders. This comparison could help determine how well the checklist's results align with a building's true conversion feasibility, which could help refine its accuracy.

7.4.3. Expanding to Other Regions

Further research could also focus on adapting the checklist for different cities, with an emphasis on regional ‘preferred factors’ such as local building codes and energy standards. This would broaden the tool’s applicability and allow for more context-sensitive decision-making in office-to-residential conversions.

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APPENDIX

INTERVIEW QUESTIONS

1. Introduction and Context:
   - Can you please tell me about your position and role at [Firm]?
   - What made you want to pursue these conversion studies and what was your approach, broadly speaking?

2. Checklist Review and Feedback on Criteria:
   - Are there any important selection factors that are missing from this list? Are there any factors that should not be included but are?

3. Conversion Studies:
   - How did you select the set of buildings on which to conduct your studies?
   - What were the primary drivers or constraints for decision-making on these potential projects?
   - Did the building form pose any particular advantage or disadvantage?
   - Are there any major modifications needed to the office floors in order to make them feasible as residential units?
   - Were there any elements of the floor plans that you thought would be irrelevant but ended up being significant? Conversely, were there any aspects of the buildings that you thought would impact the proposal greatly but ended up being a non-issue?

4. Building Code:
   - What are the key aspects of the building and energy codes that someone considering a conversion should keep in mind?
   - What challenges come up because of code requirements?
   - What are some key regulatory challenges in Seattle that impact conversions?

5. What dimensions would you suggest for the following?
   - Maximum and minimum width for a hallway servicing a residential floor?
   - Maximum and minimum residential unit depth (window towards core)?
   - Maximum and minimum residential unit width?

Maximum and minimum residential unit square footage?

CASE STUDY NOTES

CASE #1: 600 STEWART ST

Red Phase (Pre-Requisites)

- Vacancy: **Yes** (see assumptions)
- Building Class: **No**
  This building is a Class A building.

All answers in the Red Phase are not “yes”. The evaluation stops here.

CASE #2: 705 2nd AVE (Hoge Building)

Red Phase (Pre-Requisites)

- Vacancy: **Yes** (see assumptions)
- Building Class: **Yes**
  This building is a Class B building.

All answers in the Red Phase are "yes". The evaluation moves to the Yellow Phase.

Yellow Phase (Critical Factors)

- Floor Plate Depth: **Yes**
  Using the floor plan, we measure the front-to-back distance as approximately 85'-8". The core-to-window distance would be half of this, approximately **42'-10".**
- Location of Core: **Yes**
  Using the floor plan, we see that the elevator core is towards the middle of the floor.
- Floor Plate Area: **No**
  Using real estate data, we note that the typical floor plate is 6,782 SF.
- Structural Bay Spacing: **No**
  Using the floor plan, we can approximate the column-to-column distance as 12'-13'.
- Type of Structure: **No**
  Using real estate data, we note that the building has a reinforced concrete structure.
- Location: **Yes**
  Using Google Maps data, we note that the building is located in the urban context of downtown Seattle, near restaurants, public transit, and other amenities.
- Southern Exposure: **Yes**
  Using the floor plan and exterior images, we note windows on the south-facing facade.
- Building Form: **Yes**
  Using the floor plan and exterior images, we note that the building is nearly rectangular, with a slight "U" shape.

Many answers in the Yellow Phase are "yes". The evaluation moves to the Green Phase.

Green Phase (Preferred Factors)

- Effective Year: **Yes**
  Using King County assessor data, we note that the effective year is 1995.
- Date of Renovation: **Yes**
  Using real estate data, we note that the building was renovated in 1992.
- ENERGY STAR Score: **Yes**
  Using the Seattle Energy Benchmarking Map, we note a score of 84.
- Site EUI: **Yes**
  Using the Seattle Energy Benchmarking Map, we note a Site EUI of 31.3 kBTU/ft^2.
- EUI Targets: **Yes**
  Using the Seattle Energy Benchmarking Map, we note the building is within targets.

CASE #3: 1525 4th Ave (Gibraltar Tower)

Red Phase (Pre-Requisites)

- Vacancy: **Yes** (see assumptions)
- Building Class: **Yes**
  This building is a Class B building.

All answers in the Red Phase are “yes”. The evaluation moves to the Yellow Phase.

Yellow Phase (Critical Factors)

- Floor Plate Depth: **Yes**
  Using the floor plan, we measure the front-to-back distance as approximately 111’.
  The core-to-window distance would be half of this, approximately **55’-6”**.
- Location of Core: **No**
  Using the floor plan, we see that the elevator core is towards the periphery of the floor.
- Floor Plate Area: **No**
  Using real estate data, we note that the typical floor plate is 5,287 SF.
- Structural Bay Spacing: **Yes**
  Using the floor plan, we can approximate the column-to-column distance as 20’.
- Type of Structure: **No**
  Using real estate data, we note that the building has a reinforced concrete structure.
- Location: **Yes**
  Using Google Maps data, we note that the building is located in the urban context of downtown Seattle, near restaurants, public transit, and other amenities.
- Southern Exposure: **No**
  Using the floor plan and exterior images, we note a mostly solid south-facing facade.
- Building Form: **Yes**
  Using the floor plan and exterior images, we note that the building is rectangular.

Half the answers in the Yellow Phase are “yes”. The evaluation stops here.

CASE #4: 1000 2nd Ave

Red Phase (Pre-Requisites)

- Vacancy: **Yes** (see assumptions)
- Building Class: **No**
  This building is a Class A building.

All answers in the Red Phase are not “yes”. The evaluation stops here.

CASE #5: 1601-1611 2nd Ave (2Pine)

Red Phase (Pre-Requisites)

- Vacancy: **Yes** (see assumptions)
- Building Class: **Yes**
  This building is a Class B building.

All answers in the Red Phase are “yes”. The evaluation moves to the Yellow Phase.

Yellow Phase (Critical Factors)

- Floor Plate Depth: **Yes**
  Using the floor plan, we measure the front-to-back distance as approximately 103’-8”. The core-to-window distance would be half of this, approximately **51’-10”**.
- Location of Core: **Yes**
  Using the floor plan, we see that the elevator core is towards the middle of the floor.
- Floor Plate Area: **Yes**
  Using real estate data, we note that the typical floor plate is 12,000 SF.
- Structural Bay Spacing: **No**
  Using the floor plan, we can approximate the column-to-column distance as 17’-18’.
- Type of Structure: **No**
  Using real estate data, we note that the building has a reinforced concrete structure.
- Location: **Yes**
  Using Google Maps data, we note that the building is located in the urban context of downtown Seattle, near restaurants and public transit. There are also amenities on the first floor.
- Southern Exposure: **Yes**
  Using the floor plan and exterior images, we note windows on the south-facing facade.
- Building Form: **Yes**
  Using the floor plan and exterior images, we note that the building is nearly a square.

Most answers in the Yellow Phase are “yes”. The evaluation moves to the Green Phase.

Green Phase (Preferred Factors)

- Effective Year: **Yes**
  Using King County assessor data, we note that the effective year is 1995.
- Date of Renovation: **Yes**
  Using real estate data, we note that the building was renovated in 2018.
- ENERGY STAR Score: **No**
  Using the Seattle Energy Benchmarking Map, we note that the building does not have a score.
- Site EUI: **Yes**
  Using the Seattle Energy Benchmarking Map, we note a Site EUI of 29.3 kBTU/ft^2.
- EUI Targets: **Yes**
  Using the Seattle Energy Benchmarking Map, we note the building is within targets.

CASE #6: 1424 4th Ave (4Pike)

Red Phase (Pre-Requisites)

- Vacancy: **Yes** (see assumptions)
- Building Class: **Yes**
  This building is a Class B building.

All answers in the Red Phase are "yes". The evaluation moves to the Yellow Phase.

Yellow Phase (Critical Factors)

- Floor Plate Depth: **Yes**
  Using the floor plan, we measure the front-to-back distance as approximately 110'-6".
  The core-to-window distance would be half of this, approximately **55'-3"**.
- Location of Core: **No**
  Using the floor plan, we see that the elevator core is towards the periphery of the floor.
- Floor Plate Area: **Yes**
  Using real estate data, we note that the typical floor plate is 11,760 SF.
- Structural Bay Spacing: **Yes**
  Using the floor plan, we can approximate the column-to-column distance as 23'-30'.
- Type of Structure: **No**
  Using real estate data, we note that the building has a reinforced concrete structure.
- Location: **Yes**
  Using Google Maps data, we note that the building is located in the urban context of downtown Seattle, near restaurants and public transit. There are also amenities on the first floor.
- Southern Exposure: **No**
  Using the floor plan and exterior images, we note no windows on the south-facing facade.
- Building Form: **Yes**
  Using the floor plan and exterior images, we note that the building is nearly a square with a slight U shape.

Most answers in the Yellow Phase are "yes". The evaluation moves to the Green Phase.

Green Phase (Preferred Factors)

- Effective Year: **Yes**
  Using King County assessor data, we note that the effective year is 1990.
- Date of Renovation: **No**
  Using real estate data, we note that the building was renovated in 1984.
- ENERGY STAR Score: **No**
  Using the Seattle Energy Benchmarking Map, we note that the building has a score of 72.
- Site EUI: **No**
  Using the Seattle Energy Benchmarking Map, we note a Site EUI of 46 $kBTU/ft^2$.
- EUI Targets: **Yes**
  Using the Seattle Energy Benchmarking Map, we note the building is within targets.

CASE #7: 3417-3429 Fremont Ave (Fremont Building)

Red Phase (Pre-Requisites)

- Vacancy: **Yes** (see assumptions)
- Building Class: **Yes**
  This building is a Class C building.

All answers in the Red Phase are “yes”. The evaluation moves to the Yellow Phase.

Yellow Phase (Critical Factors)

- Floor Plate Depth: **Yes**
  Using the floor plan, we measure the front-to-back distance as approximately 65’-8”.
  The core-to-window distance would be half of this, approximately **33’-10”**.
- Location of Core: **No**
  Using the floor plan, we see that the elevator core is towards the periphery of the floor.
- Floor Plate Area: **No**
  Using real estate data, we note that the typical floor plate is 7000 SF.
- Structural Bay Spacing: **Yes**
  Using the floor plan, we can approximate the column-to-column distance as roughly 20’.
- Type of Structure: **No**
  Using real estate data, we note that the building has a masonry structure.
- Location: **Yes**
  Using Google Maps data, we note that the building is located in the amenity-rich context of Fremont/Ballard, near restaurants, retail, and transit.
- Southern Exposure: **No**
  Using the floor plan and exterior images, we note obstructions near the south-facing facade.
- Building Form: **No**
  Using the floor plan and exterior images, we note that the building has a highly irregular shape.

Most answers in the Yellow Phase are “no”. The evaluation stops here.

CASE #8: 601 Stewart St (Lloyd Building)

Red Phase (Pre-Requisites)

- Vacancy: **Yes** (see assumptions)
- Building Class: **Yes**
  This building is a Class C building.

All answers in the Red Phase are "yes". The evaluation moves to the Yellow Phase.

Yellow Phase (Critical Factors)

- Floor Plate Depth: **Yes**
  Using the floor plan, we measure the front-to-back distance as approximately 53'-7".
  The core-to-window distance would be half of this, approximately 26'-10".
- Location of Core: **Yes**
  Using the floor plan, we see that the elevator core is towards the periphery of the floor.
- Floor Plate Area: **No**
  Using real estate data, we note that the typical floor plate is 4700 SF.
- Structural Bay Spacing: **Yes**
  Using the floor plan, we can approximate the column-to-column distance as roughly 20'.
- Type of Structure: **No**
  Using real estate data, we note that the building has a reinforced concrete structure.
- Location: **Yes**
  Using Google Maps data, we note that the building is located in the amenity-rich context of Fremont/Ballard, near restaurants, retail, and transit
- Southern Exposure: **No**
  Using the floor plan and exterior images, we note that a significant vertical section of the south-facing facade has no windows.
- Building Form: **Yes**
  Using the floor plan and exterior images, we note that the building has a highly irregular shape.

Most answers in the Yellow Phase are "yes". The evaluation moves to the Green Phase.

Green Phase (Preferred Factors)

- Effective Year: **No**
  Using King County assessor data, we note that the effective year is 1975.
- Date of Renovation: **No**
  Using real estate data, we note that the building does not seem to have been renovated.
- ENERGY STAR Score: **No**
  The Seattle Energy Benchmarking Map does not provide a score for this property.
- Site EUI: **No**
  The Seattle Energy Benchmarking Map does not provide a Site EUI for this property.
- EUI Targets: **No**
  The Seattle Energy Benchmarking Map does not indicate this for this property.