Adaptive Reuse Practice Guide

Supporting architects pursuing adaptive reuse projects

Presented by

The BPKC Adaptive Reuse Goals and Action Plan Task Group
AIA Building Performance Knowledge Community
American Institute of Architects

Action Plan Team
BPKC Adaptive Reuse Goals and Action Plan Task Group

Committee Chair
Joe Deringer

Task Group Members
Paul Johnson
Brad Gellert
Drake Wauters

Task Contributor
Dan Kinkead

Objective

To promote expanded adoption of Adaptive Reuse in architectural practice and support architects in pursuit of the many benefits of reusing existing buildings in lieu of constructing new buildings through various levels of renovation, urban design, historic preservation, and performance retrofits.

General Overview

Architects, owners, and other team members involved in strategizing, assessing conditions, planning, and designing projects that could feasibly reuse existing buildings and site amenities, in whole or in part, to support new projects and uses and to optimize existing ones with the goals of conserving resources and supporting solutions addressing climate change.

Stakeholder Organizations

Organizations tasked with planning new facilities, facility upgrades, or assessing existing facilities; be they architects or allied professionals. Organizations may be consultants, communities, in-house facility teams, investors, or other organizational stakeholders.

Practitioners

Architects as well as Owners, Developers, Community Leaders, Planners, Urban Designers, Engineers, Historians, Interior Designers, and future practitioners through Educators and Students.

Summary

Promote adaptive reuse to architects, owners, and developers in lieu of new building development.

Roughly 97-98% of buildings are existing and 2-3% are new buildings in the United States. As such, existing building stock, including related site improvements, represent the vast majority of the built environment in the US. These buildings represent a tremendous capital and carbon investment by past and current generations. Recouping and retaining these previous investments through new projects or prolonging the useful life of existing buildings, presents an enormous national opportunity to reduce both new capital and new carbon expenditures. The opportunity to reduce such expenditures will enhance both the financial and environmental performance of projects and the communities they serve. This approach is vitally important as the nation faces both the fiscal and environmental challenges of today and tomorrow.

What is the Desired Outcome?

Helping expand architectural practices through successful Adaptive Reuse projects.

Supporting pathways to reduce the carbon footprint of projects while leveraging the embodied carbon of existing buildings and sites.

Supporting local, state, and national carbon sequestration goals through project planning and innovation that seeks as many opportunities as possible to meet such goals including carbon neutral and carbon negative solutions.

Helping illustrate the cultural enrichment retained through Adaptive Reuse such as sustaining senses of place and character and supporting historic context and storytelling through the architecture of past generations and former uses.

Supporting high levels of occupant wellness and flexibility and addressing design responses to the changing landscape of epidemiology.

Encouraging increased involvement for architects at the earliest planning stages, often before a project is defined or funded.

Process

Development Steps

• Develop strategic goals for your practice. Create a list of actions which are clearly defined and achievable in the coming year. Revisit your goals annually to consider successes and challenges and to adjust course. Include feedback from as many people as possible for the best level of information.

• Assess your market for existing building stock that could be reused. Some regions have a much higher percentage of existing and even unused or underused building stock while others do not.

• Take some time to understand cultural norms in your region. Does the community have a strong affinity for historic buildings and neighborhoods? Is there already a sense of pride about the stories that created the region – stories that can be supported through Adaptive Reuse? Is there already support for retaining embodied carbon through Adaptive Reuse?

• Assess your market for Adaptive Reuse acceptance. If already well accepted in your region, access to subconsultants and joint venture opportunities could be greater but so could competition. Has the local media already highlighted successful Adaptive Reuse outcomes?

• Assess the availability of clients comfortable with Adaptive Reuse. Are current clients on board or are could they be candidates for accepting Adaptive Reuse in their portfolios?

• Seek opportunities to support communities and stakeholders before projects might be traditionally defined. Consider voluntary efforts to problem seek and help clarify needs and study possible solutions.

• Assess in-house versus subconsultant resources to best support your Adaptive Reuse practice. Is your staff experienced with Adaptive Reuse, can training help, or are new hires required to address shortfalls? Are joint-ventures an option for your practice, to round out the skills and experience required.

• Determine if subconsultants with expertise in existing buildings are available in your region. If not, can more distant consultants feasibly support your practice?

• Consider including subconsultants as early as possible throughout the design process, if not before, to help provide the timeliest feedback and design ideas while encouraging their support on important decisions.

• Discuss any changes in your practice with legal counsel and your insurers. Existing buildings pose different opportunities and risks than new construction. Support from these essential corners is a foundation for successful practice.

• Determine best practices an confirm that model contracts and conditions are well suited to your practice or change in practice.

• Assess applicable code requirements and local code official comfort with Adaptive Reuse. Determine additional

measures local officials may require for existing construction, such as compliance with fire district rules or reviews by historic preservation or neighborhood boards.

• Determine what carbon, energy, and water conservation measures are feasible for the project and site, which are proven and perhaps encouraged and what the project tolerance is for climate supporting carbon negative solutions.

• Familiarize your team with the codes and fire regulations for existing buildings in your region.

• Determine specific, and perhaps changing, issues related to your region such as local change, flood risks, insect damage, expansive soils, high chloride water and soils, changing water tables, sink holes, poor bearing conditions, storm and tornado risks, lightning risks, hail risks, wildfires, crime statistics, and vibration damage risks.

• Determine what design practices best support building occupant wellbeing.

• Confirm successful design practices and planning measures allowing for operational flexibility that may be necessary to address current and likely public health challenges.

• Confirm the hazardous materials risks for the project. Customarily this is handled by the client directly. Confirm that hazardous materials reports are available to the design team in a timely manner so as not to require redesign due to late information. Confirm how hazardous materials will be addressed and how that may impact the design and contract documents. Most common hazardous materials include asbestos, lead based coatings, and PCBs and mercury. However, other issues such as volatile organic compounds in the soils, methane or radon emissions, and mold or legionella can be an issue.

• Confirm that your project team has the resources to assess the existing building or buildings to determine viability of reuse and expected costs to the owner of addressing deficiencies.

• Confirm that interaction between project programming and feasibility studies and test fits are an option for the owner, as robust interaction may result in the most thoroughly resolved design solution.

Practice Group

Consider assigning a person or internal group or a studio to steward and mentor the practice on Adaptive Reuse in the firm, often called technical direction or a center of excellence. Persons who are detail oriented, organized, and who are excellent communicators are the best fit for such roles. Include an annual budget for non-billable hours in support of the practice, especially in the early years of any practice transformations.

Publicity Opportunities

Community engagement and advocacy, developing a reputation for being proactive and networking.

Exposure through the AECO (architecture, engineering, construction, and owner) focused press. Exposure through established media and publications.

Presentations by thought leaders via national conferences and symposiums. Cooperative efforts with interested authors and publishers.

Cooperative efforts with high profile firms and clients.

Design competitions and program participations that rank excellence such as the AIA's COTE Top 10.

Cooperative efforts with those researching high performance buildings and low carbon design.

Project Considerations

Site Selection – Verify that project sites being considered can viably meet the project requirements.

Historic Register – Confirm if the existing building is on the register or in the process of application.
Confirm if other limits on the use or changes to the use based on local requirements have been enacted.

Tax Credits – Confirm the client's intent to pursue tax credits or special relief for the project and how those conditions impact the design parameters and project goals.

Sustainability – Identify what level of sustainability will be pursued and what, if any, special requirements apply to existing buildings. Confirm the owner's project requirements. Include all design disciplines, when possible, to help assure the most comprehensive results.

Embodied Carbon – Reuse buildings instead of constructing new ones. Renovation and reuse projects typically save between 50 and 75 percent of the embodied carbon emissions compared to constructing a new building. Identify what embodied carbon can be retained, how new work can best sequester carbon, and what opportunities exist for additional sinking of carbon over time, such as longer building lifespans, carbon sinking landscape solutions, and reduce maintenance and landscaping services.

Wellness – Confirm with the owner what measures are achievable that could enhance occupant wellness and support the success of the project in addition to jurisdictional requirements.

Building Science – Confirm that the design team includes the expertise in building science to assess the existing conditions and to validate proposed changes and additions. Confirm that as-built information is well recorded for use by the team - measured drawings and ample photography is essential. Identify what invasive observation may be required to support the design. Assessments should also include how previous alterations or current design options may alter structural load paths, seismic risks, hygrothermal performance, or fire risks.

Hazardous Materials – Confirm that the client's hazardous materials consultant has completed their reports and made them available to the design team. Confirm with the client and their consultants how hazardous materials will be addressed.

Testing and Inspection – Identify what testing such as soil conditions, structural conditions reports, and material testing are required.

Building Chronology – Confirm the original building's construction as well

as the construction of renovations or additions through record drawings. Confirm how changes to the building over time may impact the design and construction.

Building Codes – Confirm building codes applicable to existing buildings and central to Adaptive Reuse projects and the code trends supporting or discouraging Adaptive Reuse. Local ordinances and the ICC code suite are updated often. Confirm any special requirements applicable through the zoning ordinance or district classifications, such as a fire district or historic district.

Epidemiology – Confirm best practices for your project type related to limiting the spread of disease and the design for flexibility during operation to help respond to public health challenges.

Constructability – Encourage owners to conduct constructability reviews to identify possible constructability challenges early in the design phase.

Project Delivery Options – Seek to support owner decision processes regarding construction delivery options that may best suit the project. Include possible phasing, permitting considerations, and special approvals related to review boards and neighborhood groups.

Industry Standards – Confirm standards applicable to reusing existing buildings and measuring project performance.

Cost Benefit Approach – Identify cost and benefit trades-offs for the project. Confirm client's agreement to trade-offs in writing.

Best Practices – Confirm best practices applicable to the project and communicate such requirements to the design team.

Continuing Improvement – Assess each project for design and construction lessons to be learned at the end of each project. Disseminate the lessons learned to the design team. Maintain an accessible database of lessons learned for the firm. Identify what information may be confidential or take measures to strip confidential information before adding to any firm wide database.

Examples of Online Resources

• **AIA Framework for Design Excellence** https://www.aia.org/resources/6077668-framework-for-design-excellence

• **AIA Materials** - 10 steps to reducing embodied carbon https://www.aia.org/articles/70446-ten-steps-to-reducing-embodied-carbon

• **Americans with Disabilities Act (ADA)** – 10 Lessons https://www.ada.gov/reachingout/lesson31.htm

• **American Planning Association** (APA) – Knowledge Center https://www.planning.org/knowledgecenter/

• **Architecture 2030** – Zero Tool http://www.zerotool.org/

• **Architecture 2030 -** New Buildings: Embodied Carbon https://architecture2030.org/new-buildings-embodied
Existing Buildings: Operational Emissions https://architecture2030.org/existing-buildings-operation/

• **Architectural Graphic Standards** https://www.graphicstandards.com/

• **ASHRAE** (American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.) https://www.ashrae.org/

• **Airborne Infectious Disease** https://www.ashrae.org/file%20library/about/position%20documents/pd_infectiousaerosols_2020.pdf
core-recommendations-for-reducing-airborne-infectious-aerosol-exposure.pdf (ashrae.org)

• **Association for Preservation Technology** – Building Technology Heritage Library https://archive.org/details/buildingtechnologyheritagelibrary

• **Brick Industry Association** (BIA) – Technical Notes https://www.gobrick.com/read-research/technical-notes

• **Building Research Information Knowledgebase** (BRIK) https://www.brikbase.org/content/browse

• **Building Science Corporation** – Posted Documents and Videos https://www.buildingscience.com/document-search

• **(The) Carbon Leadership Forum** https://carbonleadershipforum.org

• **Embodied Carbon in Construction Calculator** (EC3) https://carbonleadershipforum.org/ec3-methodology

• **Embodied Carbon Benchmark Study** https://carbonleadershipforum.org/embodied-carbon-benchmark-study-1

• **Embodied Carbon Benchmark** - Data Visualization https://carbonleadershipforum.org/embodied-carbon-benchmark-study-data-visualization

• **Global Status Report for Buildings and Construction**: 2020 https://carbonleadershipforum.org/2020-global-status-report-for-buildings-and-construction

• **Centers for Disease Control** (CDC) Mold https://www.cdc.gov/mold/cleanup.htm

• **Infectious Disease** (COVID-19 and additional resources with more specific recommendations) https://www.cdc.gov/coronavirus/2019-cov/community/pdf/Reopening_America_Guidance.pdf

• **District of Columbia** – Sustainability Guide for Older and Historic Buildings https://planning.dc.gov/sites/default/files/dc/sites/op/publication/attachments/SustainabilityGuidelines-October24-2019-small.pdf

• **Environmental Protection Agency** (EPA) – Asbestos / Lead / Mold / PCBs https://www.epa.gov/asbestos https://www.epa.gov/lead https://www.epa.gov/mold https://www.epa.gov/pcbs-EPA Site Specific National Cleanup Databases https://www.epa.gov/cleanups/site-specific-national-cleanup-databases

• **International Finance Corporation** (IFC) – EDGE Tool (EDGE Zero Carbon Certification) https://edgebuildings.com

• **International Living Future Institute** (ILFI) Zero Carbon Certification https://

living-future.org/zero-carbon-certification

• **(The) International Masonry Institute** (IMI) Technical Resources https://www.imiweb.org/masonry-detailing-series-3/

• **National Park Service** – Historic Preservation https://www.nps.gov/subjects/historicpreservation/standards.htm

• **National Park Service** – Preservation Briefs https://www.nps.gov/tps/how-to-preserve/briefs.htm

• **National Center for Preservation Technology and Training** (NCPTT) – Technical Resources https://www.ncptt.nps.gov/blog/category/product-catalog/

• **National Trust for Historic Preservation** https://savingplaces.org/stories/six-reasons-save-old-buildings#.YBdjXpeSmHs https://savingplaces.org/historic-tax-credits#.YBdj6JeSmHs

• **National Roofing Contractors Association** (NRCA) https://www.nrca.net/

• **Project Drawdown** – Building Retrofitting https://www.drawdown.org/solutions/building-retrofitting/technical-summary

• **Sheet Metal & Air Conditioning Contractors' National Association** (SMACNA) – Papers and Guidelines https://www.smacna.org/about-us/technical/papers-and-guidelines

• **Traditional Building** – Periodical, Past Issues, Manufacturers https://www.traditionalbuilding.com/

• **UNEP Global Alliance for Buildings and Construction** (GlobalABC) https://globalabc.org

• **UNEP 2019 Global Status Report for Buildings and Construction Sector** https://www.unep.org/resources/publication/2019-global-status-report-buildings-and- construction-sector

•**United States Access Board** https://www.access-board.gov/files/ada/guides/alterations.pdf

• **University of Vermont** – Field Guide: Fire & Building Safety Code Compliance for Historic Buildings http://www.uvm.edu/histpres/307/LifeSafetyFieldGuide.pdf

• **Whole Building Design Guide (WBDG)** https://www.wbdg.org/design-objectives/historic-preservation https://www.wbdg.org/design-objectives/historic-preservation/apply-preservation-process- successfully https://www.wbdg.org/design-objectives/historic-preservation/sustainable-historic-preservation https://www.wbdg.org/design-objectives/accessible https://www.wbdg.org/design-objectives/historic-preservation/provide-accessibility-historic-buildings https://www.wbdg.org/design-objectives/historic-preservation/update-building-systems- appropriately https://www.wbdg.org/design-objectives/historic-preservation/accommodate-life-safety-security- needs https://www.wbdg.org/continuing-education/femp-courses/fempfts19 https://www.wbdg.org/continuing-education/wbdg-courses/wbdg13

• **World Green Building Council** (WorldGBC) https://www.worldgbc.org/news-media/starting-renovation-wave

• **WorldGBC Net Zero Carbon Buildings Commitment** https://www.worldgbc.org/sites/default/files/3.%20NZCB%20Commitment%20Detailed%20Guida nce_Final_V1_Jan%202019.pdf

• **World Resources Institute (WRI) Buildings Initiative** https://www.wri.org/our-work/project/buildings-initiative

• **Zero Code** – Renewable Energy Appendix (Added to the 2021 IECC) http://content.aia.org/sites/default/files/2019-08/Guidance_Document_for_Building_Code_Officials_CE264-19.pdf

Example Bibliography

• Adaptive Reuse: Extending the Lives of Buildings Author: Liliane Wong

• (The) Adaptive Reuse Handbook: Procedures to Inventory, Control, Manage and Re-employ Surplus Municipal Properties Editor: David Listokin

• Adaptive Reuse of the Built Heritage – Concepts and Cases of an Emerging Discipline Authors: Bie Plevoets, Koenraad Van Cleempoel

• Accelerating Building Decarbonization: Eight Attainable Policy Pathways to Net Zero Carbon Buildings for All Publisher: WRI (World Resources Institute) Working Paper

• Architectural Details: Classic Pages from Architectural Graphic Standards 1940 – 1980 Authors: Charles George Ramsey, Harold Reeve Sleeper, Donald Watson (Editor)

• Architectural Graphic Standards Version with construction information and illustrations best aligned to the project conditions Publisher: Wiley

• Architectural Regeneration Editors: Aylin Orbasli, Marcel Vellinga

• Barn: Preservation and Adaptation, The Evolution of a Vernacular Icon Authors: Elric Endersby, Alexander Greenwood, David Larkin

• Building Evaluation for Adaptive Reuse and Preservation Authors: J. Stanley Rabun, Richard Miles Kelso

• Building Reuse – Sustainability, Preservation, and the Value of Design Author: Kathryn Rogers Merlino

• Building Surveys and Reports, 3rd Edition Authors: Edward A. Noy, James Douglas (Revised by)

• Building Urban Resilience through Change of Use Editors: Sara J. Wilkinson, Hilde Remøy

• Canadian Building Digests: CBD-1 to CBD-250 https://researchguides.georgebrown.ca/c.php?g=710404&p=5061646

• Conserving Buildings: A Manual of Techniques and Materials, Revised Edition Author: Martin E. Weaver

• COOL IS EVERYWHERE – NEW AND ADAPTIVE DESIGN ACROSS AMERICA Author: Michel Arnaud

• Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming Editor: Paul Hawken / Publisher: Project Drawdown

• Historic Building Façades: The Manual for Maintenance and Rehabilitation Editor: William G. Foulks

• IEBC (International Existing Building Code) Code and Commentary Edition Adopted in the project jurisdiction Publisher: International Code Council

• Keeping Time: The History and Theory of Preservation in America, 3rd Edition Author: William J. Murtagh

• Kidder-Parker Architects' and Builders' Handbook 18th Edition Authors: Frank E. Kidder, Harry Parker

• Lighting for Historic Buildings Author: Roger W. Moss

• Maintaining and Repairing Old and Historic Buildings Author: John J. Cullinane

• Old Buildings, New Designs – Architectural Transformations Author: Charles F. Bloszies

• Old Buildings, New Forms: New Directions in Architectural Transformations Author: Françoise Astorg Bollack

• Preservation of Modern Architecture Author: Theodore H. M. Prudon

• Problem Seeking: An Architectural Programming Primer, 5th Edition Authors: William M. Pena, Steven A. Parshall

• Recording Historic Structures, 2nd Edition Editor: John A. Burns

• Retired, Rehabbed, Reborn: The Adaptive Reuse of America's Derelict Religious Buildings and Schools Authors: Robert Simons, Gary DeWine, Larry Ledebur

• RE–USA: 20 American Stories of Adaptive Reuse: A Toolkit for Post-Industrial Cities Author: Matteo Robiglio

• Structural Analysis of Historic Buildings: Restoration, Preservation, and Adaptive Reuse Applications for Architects and Engineers Author: J. Stanley Rabun

• Structural Condition Assessment Author: Robert T. Ratay

• Traditional Details: For Building Restoration, Renovation, and Rehabilitation Compiled material from the Architectural Graphic Standards published between 1932 and 1951 Authors: Charles George Ramsey, Harold Reeve Sleeper

• UnDoing Buildings: Adaptive Reuse and Cultural Memory Author: Sally Stone

• Waste Matters: Adaptive Reuse for Productive Landscapes Author: Nikole Bouchard

Building Performance

an **AIA** Knowledge Community