EmiratesGBC Technical Workshops

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Adaptive Reuse: Shaping the Future of Sustainable Urban Development

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WHAT IS ADAPTIVE REUSE

WHAT IS ADAPTIVE REUSE

The process of maintenance, renovation or restoration of existing buildings for an alternate use (RIBA).

Adaptive reuse frequently encompasses:

- Structural Integrity and Load Assessments
- MEP and Energy Retrofits
- Fire & Code compliance
- Accessibility compliance
- Zoning and Regulatory compliance
- Material selection & Technology for future use

Beit Beirut, Lebanon
Photo credit: Architectural Review

WHAT IS ADAPTIVE REUSE

Good building candidates often have open or **flexible floor plans**, are **structurally sound**, and are built with **durable materials**.

Examples:

Beit Beirut, Lebanon
Photo credit: Architectural Review

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Examples:

- Decommissioned structures

New Bahru, Singapore
Photo credit: Dezeen

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Examples:

- Decommissioned structures
- Abandoned structures

The Highline, New York
Photo credit: The High Line

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Examples:

- Decommissioned structures
- Abandoned structures
- Heritage or cultural sites

Al Fahidi, Dubai
Photo credit: Conde Naste

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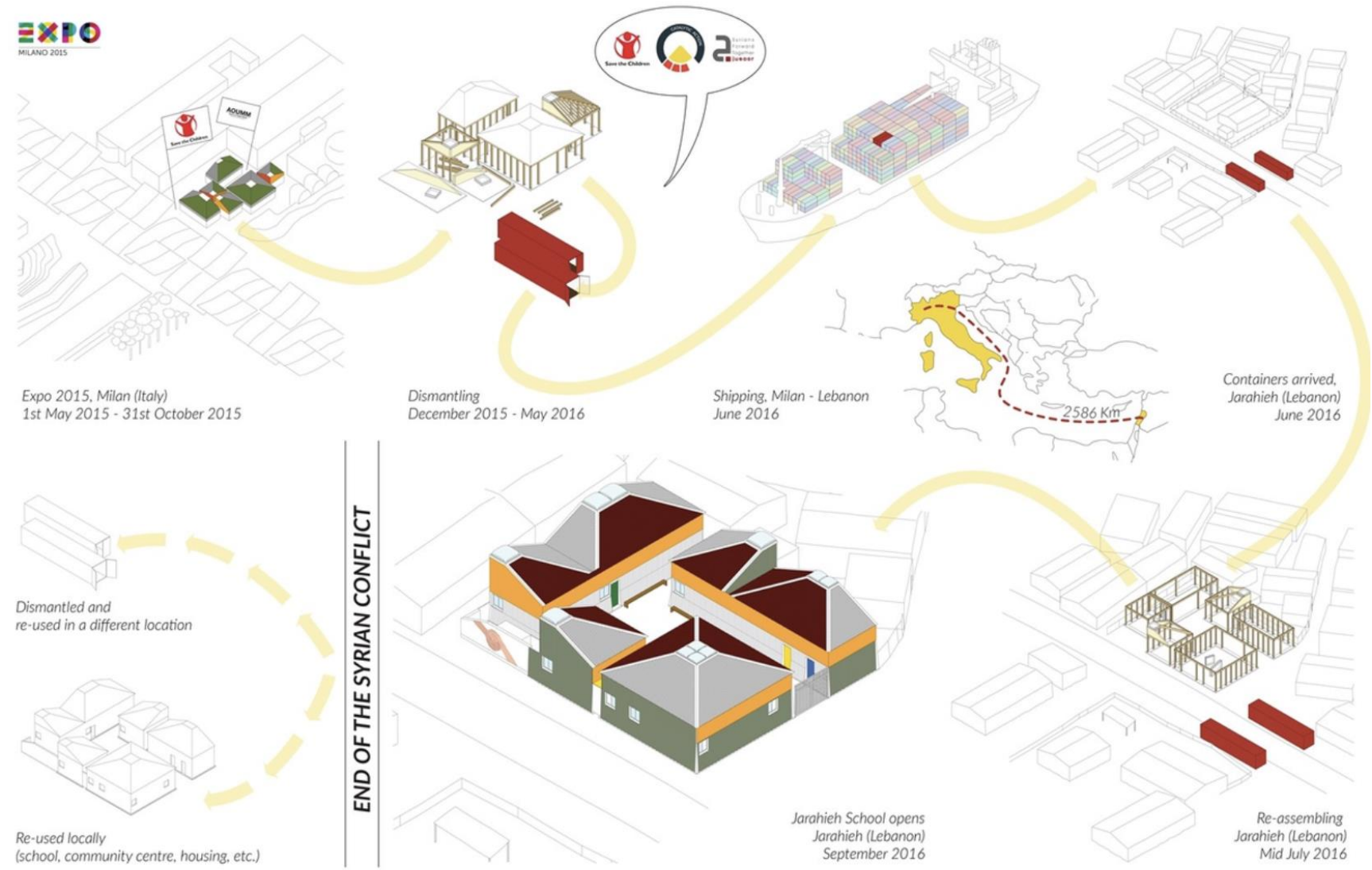
Good building candidates often have open or **flexible floor plans**, are **structurally sound**, and are built with **durable materials**.

Examples:

- Decommissioned structures
- Abandoned structures
- Heritage or cultural sites
- Structures built for temporary use

School for Refugees, Lebanon
Photo credit: holcim foundation

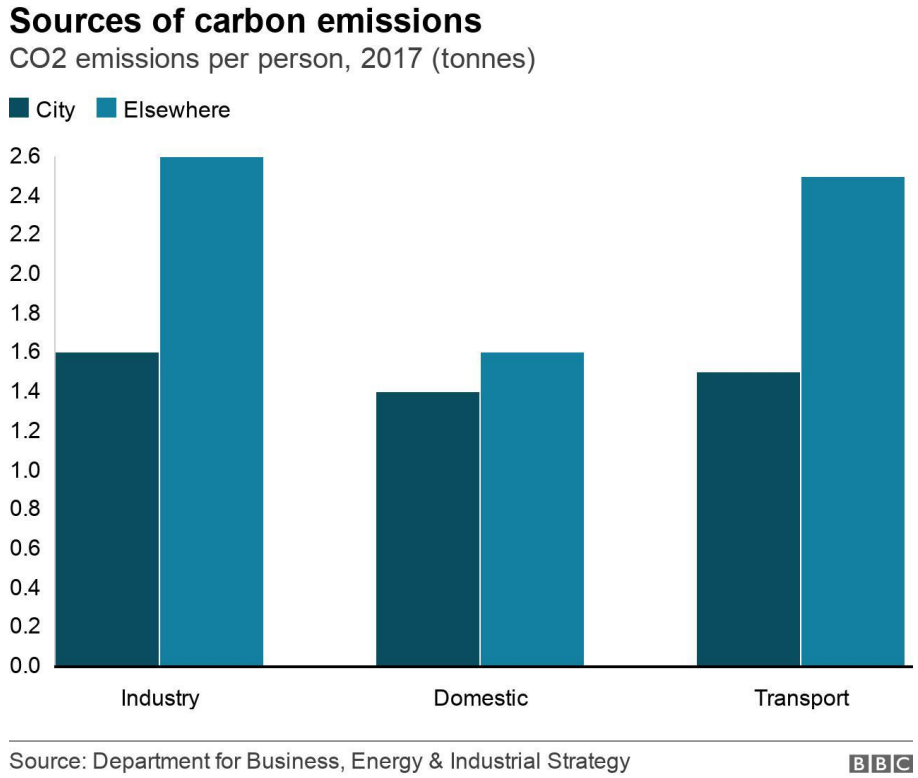
WHAT IS ADAPTIVE REUSE



WHAT IS ADAPTIVE REUSE

The Sustainability Perspective

- **Reduced Carbon emissions** – through material conservation.
- **Climate resilience** – 80% of the buildings that will exist in 2050 are already built today.
- **Land-use conservation** – helps establish creative solutions for densification within existing urban areas.
- **Waste reduction** – or in some cases complete avoidance of.
- **Financial sustainability** – reduced construction costs.



WHAT IS ADAPTIVE REUSE

The Socio-cultural Perspective

- **Preservation of architectural heritage** – through conservation of local architectural language over time.
- **Placemaking**– strengthening community identity and sense of belonging.
- **Cultural continuity** – balancing old and new.
- **Supporting creative industries** – maintaining authenticity, boosting tourism while generating economic opportunities.
- **Community revitalization** – transforming neglected structures into vibrant spaces.

Source: National Design Guide, Ministry of Housing, Communities & Local Government, UK.

GENTRIFICATION: A REAL RISK

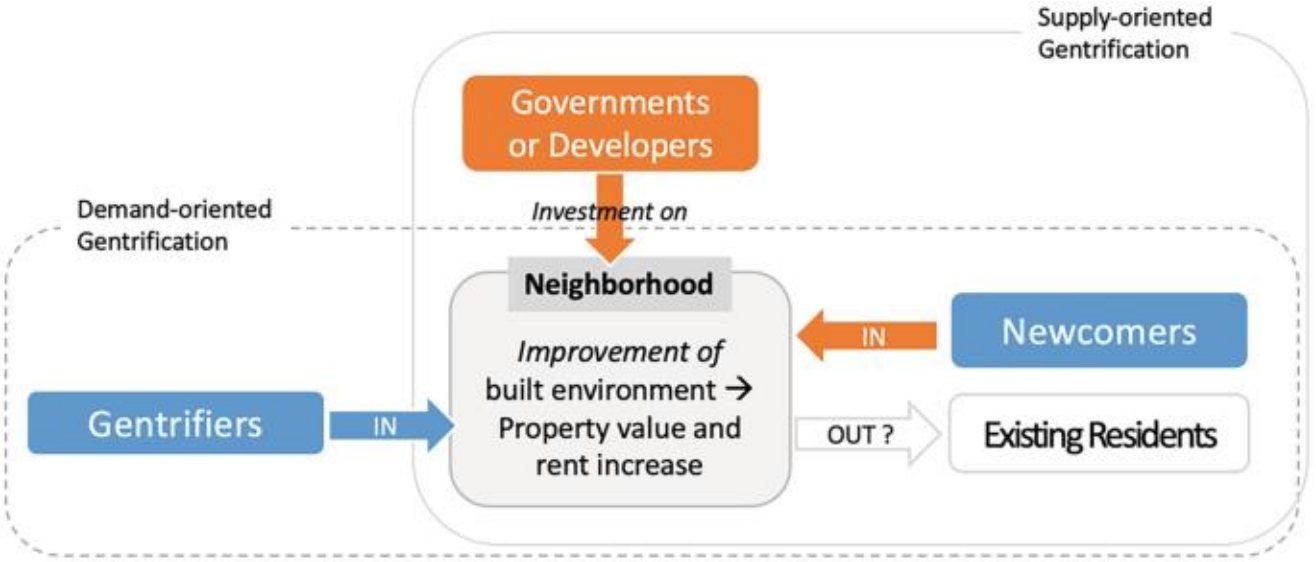
GENTRIFICATION: A REAL RISK

What is Gentrification?

gentrification /ˌdʒɛntrɪfɪˈkeɪʃn/

is the transformation of a neighborhood from low value to high value. It is viewed as a process of urban development in which a neighborhood or portion of a city develops rapidly in a short period of time, often as a result of urban renewal programs, including real estate investment. This process is often marked by inflated home prices that bring in higher-income residents and displace a neighborhood's previous residents.

Source: Investopedia



Source: Green Gentrification and environmental Injustice – A Complexity Approach to Policy.
Author: Campbell, H. et al.

GENTRIFICATION: A REAL RISK

Gentrification through Forced Displacement

Maspero Triangle, Cairo

Al Warraq Island, Cairo

Gentrification through Revitalization

Al Batroun, Lebanon

TECHNICAL CONSIDERATIONS

Structural Integrity and Load Capacity

Common Issues	*Possible Solutions*
Deteriorated Foundations, cracked, or corroded elements.	Structural underpinning, micropiles, or reinforcing concrete slabs.

Underpinning

Concrete reinforcing

Structural Integrity and Load Capacity

Common Issues	*Possible Solutions*
Corroding or aging structural material	Anti corrosion treatments

Protective coatings

Sealers

Structural Integrity and Load Capacity

Common Issues	*Possible Solutions*
Not suitable for new seismic activity / codes.	Undergo seismic retrofit through bracing or base isolators.

Seismic bracing

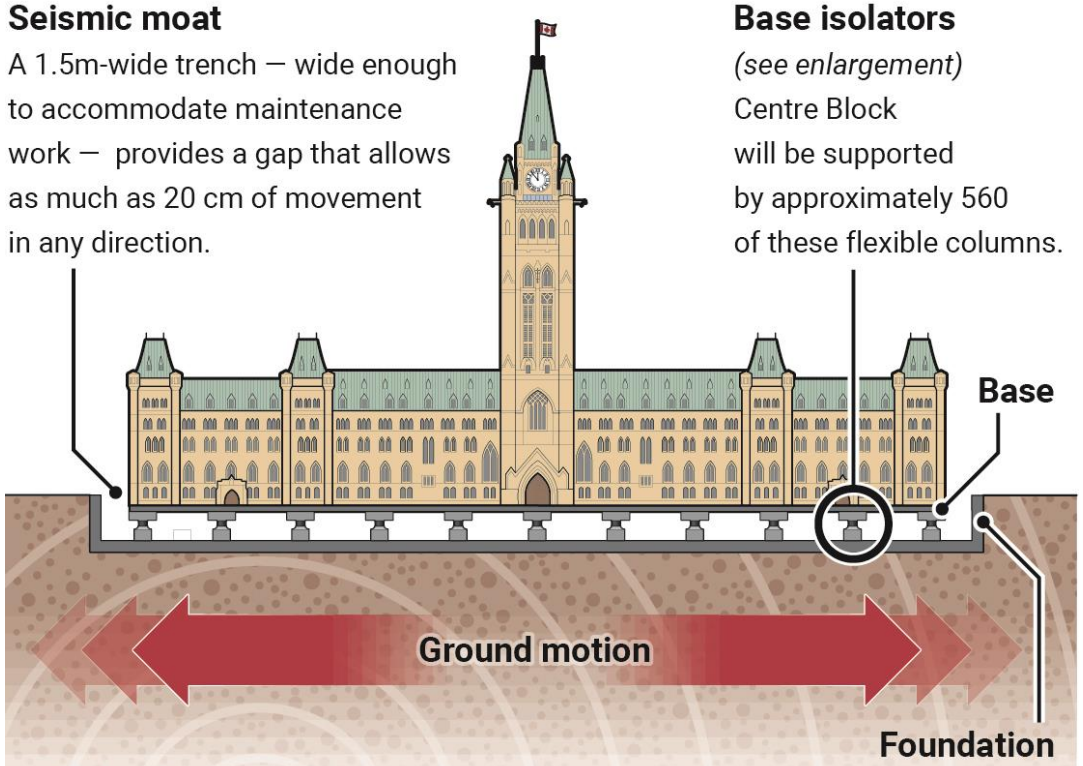
Base Isolators

HOW BASE ISOLATION WORKS

Centre Block

Seismic moat
A 1.5m-wide trench — wide enough to accommodate maintenance work — provides a gap that allows as much as 20 cm of movement in any direction.

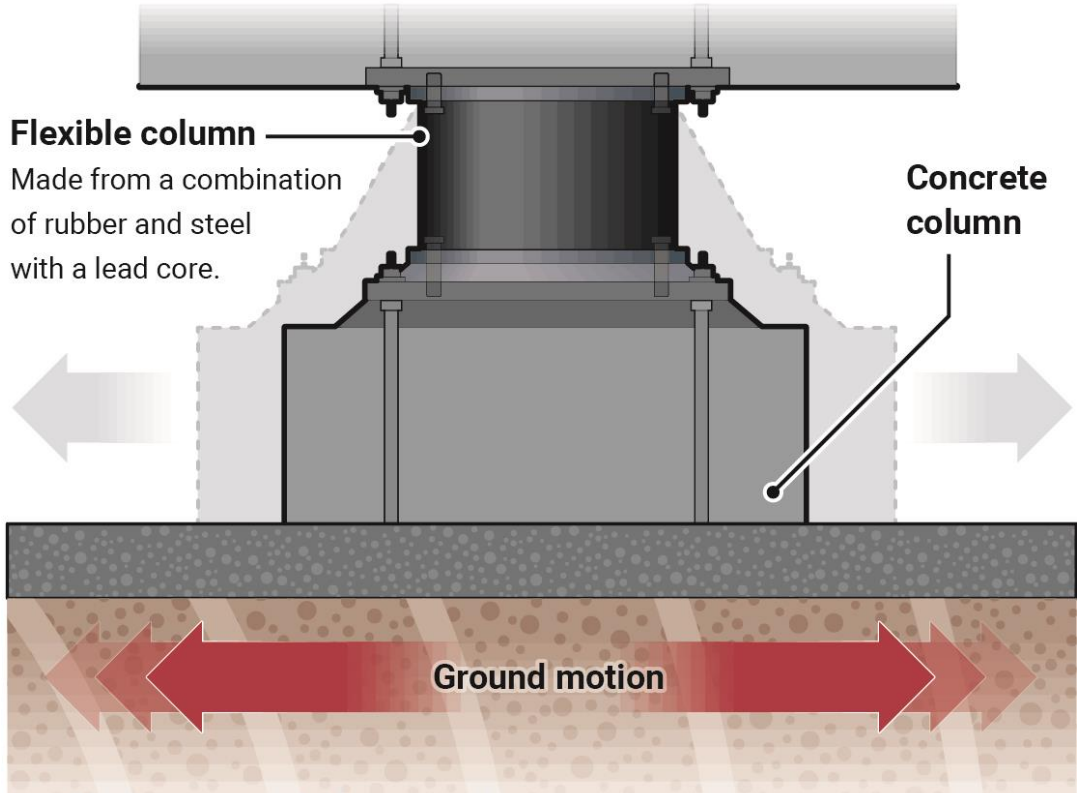
Base isolators
(see enlargement)
Centre Block will be supported by approximately 560 of these flexible columns.



Seismic suspension system
Centre Block will sit on a strong base of steel and reinforced concrete supported, in turn, by base isolators anchored to the building's foundation.

Base isolator

Flexible column
Made from a combination of rubber and steel with a lead core.



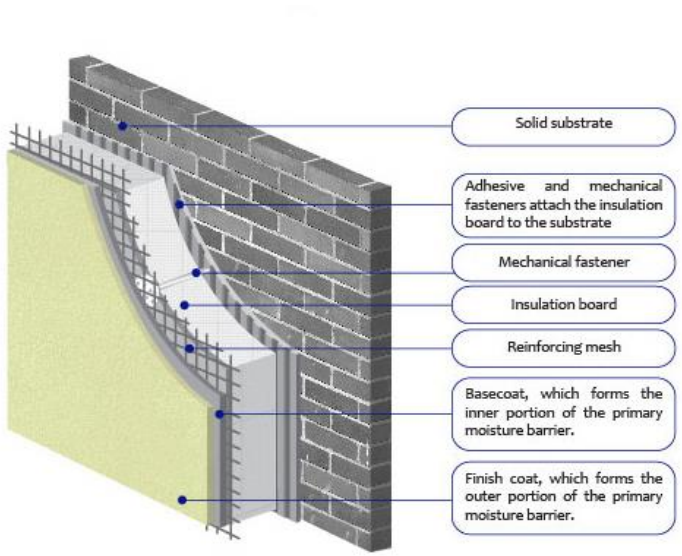
No longer on shaky ground
Each isolator can bend and flex, absorbing the energy generated by an earthquake while the building above remains relatively motionless.

SOURCES: *Public Services and Procurement Canada, Teratec Inc.*

TECHNICAL CONSIDERATIONS

Envelope

Common Issues	*Possible Solutions*
Thermal insulation inefficiency	Interior or exterior insulation, depending on type of building and whether exterior changes are acceptable



Exterior Insulation and Finish Systems (EIFS)

Spray foam insulation

Aerogel

TECHNICAL CONSIDERATIONS

Envelope

Common Issues	*Possible Solutions*
Air and Moisture infiltration leading to mold and/or structural damage.	Weather resistant barriers, airstripping, caulking and sealants, etc.

Weather resistant barriers

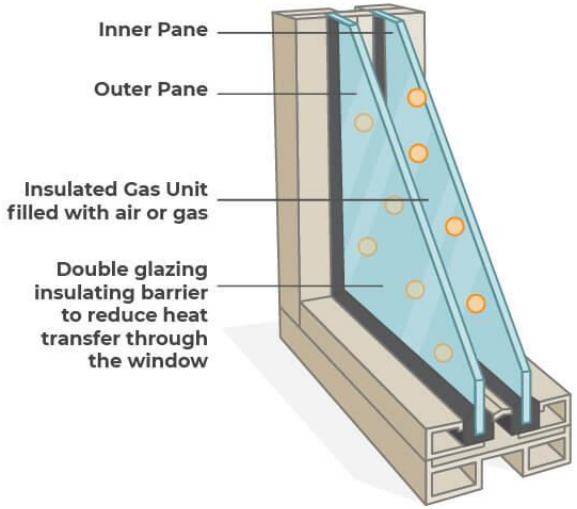
Air stripping and caulking

TECHNICAL CONSIDERATIONS

Envelope

Common Issues	*Possible Solutions*
Reduced thermal performance of glazing.	Use secondary glazing systems, or replace with double glazing systems, or solar film.

Secondary glazing



Double glazing system, solar film

Envelope

Common Issues	*Possible Solutions*
Cladding deterioration	Repair and maintenance, overcladding, replacement.

Overcladding

Façade Replacement

Envelope

Common Issues	*Possible Solutions*
Roof slab requires insulation	Reflective roof coatings, roof re-insulation, green roofing if load allows

Reflective roof coating

Façade Green roofing

Indoor Air Quality

Common Issues	*Possible Solutions*
Asbestos	Encapsulation, abatement, replacement of elements containing asbestos.

Encapsulation

Abatement

Indoor Air Quality

Common Issues	*Possible Solutions*
Mold	Eliminate moisture sources and leaks, install dehumidifiers, ensure proper ventilation through HVAC retrofits.

Liquid applied waterproofing membranes

HVAC Retrofit

Fire and Life Safety

Common Issues	*Possible Solutions*
Lack of fire suppression systems	Installation of water mist system, sprinkler system and smoke detectors

Water mist system

Sprinkler system

Fire and Life Safety

Common Issues	*Possible Solutions*
Inadequate fire compartmentalization or open plans	Introduction of fire rated partitions and doors, use of intumescent coatings

Fire rated partitions

Intumescent Steel Coating

Fire and Life Safety

Common Issues	*Possible Solutions*
Inadequate egress routes and emergency accessibility.	Creation of additional egress routes where possible (sometimes external), refuge areas. Addition of wayfinding signage.

Fire external stair

Wayfinding

Fire and Life Safety

Common Issues	*Possible Solutions*
The use of flammable material.	Replace materials where possible with fire rated materials, treat with fire retardant solutions, upgrade wiring conduits to standard.

Conduit sleeves

Fire retardant paint

Accessibility

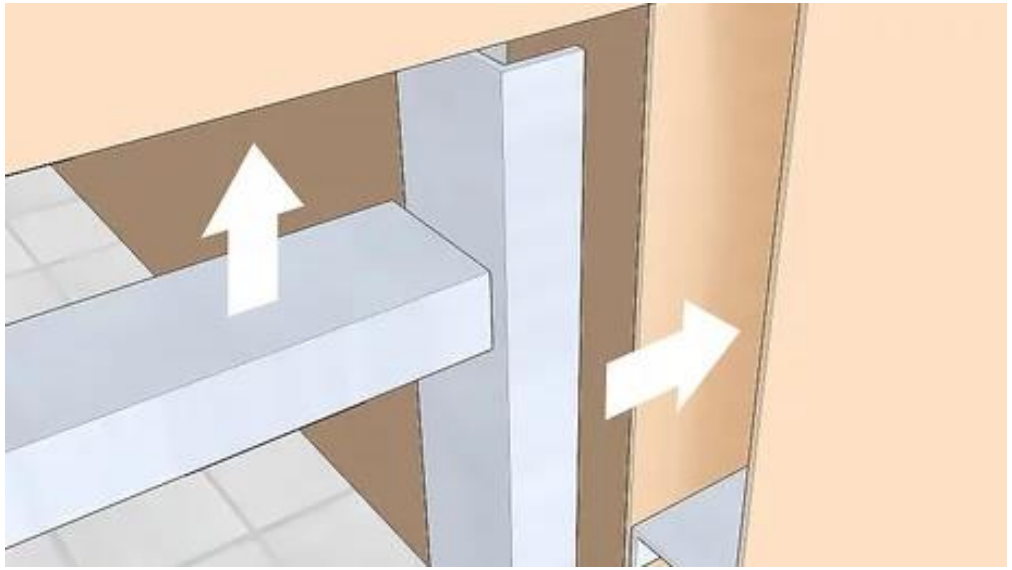
Common Issues	*Possible Solutions*
Limited use of elevators	Use hydraulic elevators where possible, stairlifts to improve access

Hydraulic elevators

Platform stair lift

Accessibility

Common Issues	*Possible Solutions*
Narrow doors or hallways	Widen doors where possible, redesign circulation paths.



Door widening

Accessible circulation paths

Accessibility

Common Issues	*Possible Solutions*
Uneven flooring	Ramps, self-leveling, anti slip elements

Ramps

Anti slip elements

Accessibility

Common Issues	*Possible Solutions*
Lack of accessible restrooms	Retrofit to create accessible bathrooms, add accessories, handrails, grab bars, etc.

Accessible toilet

Grab bars

Materials

Common Issues	*Possible Solutions*
Deteriorating materials	Repair, replace, overlay or creatively contrast with existing materials juxtaposing old and new

Rotermann’s flour storage

Step house, London

Zoning & Regulatory Compliance

Common Issues	*Possible Solutions*
New use does not match current zoning regulation.	Seek special approvals, early authority involvement.
Compliance with new building codes for fire, accessibility and energy.	Undergo retrofits for fire and life safety, MEP as outlined above. Often creative solutions are necessary.
Heritage preservation or landmark restrictions.	Work with specialized agencies and firms, seek appropriate permits, opt for non-permanent changes, or concealed upgrades where necessary.
Parking requirements	Shared parking agreements, creative solutions to integrate with public transport or cycling routes where applicable.

TECHNICAL CONSIDERATIONS

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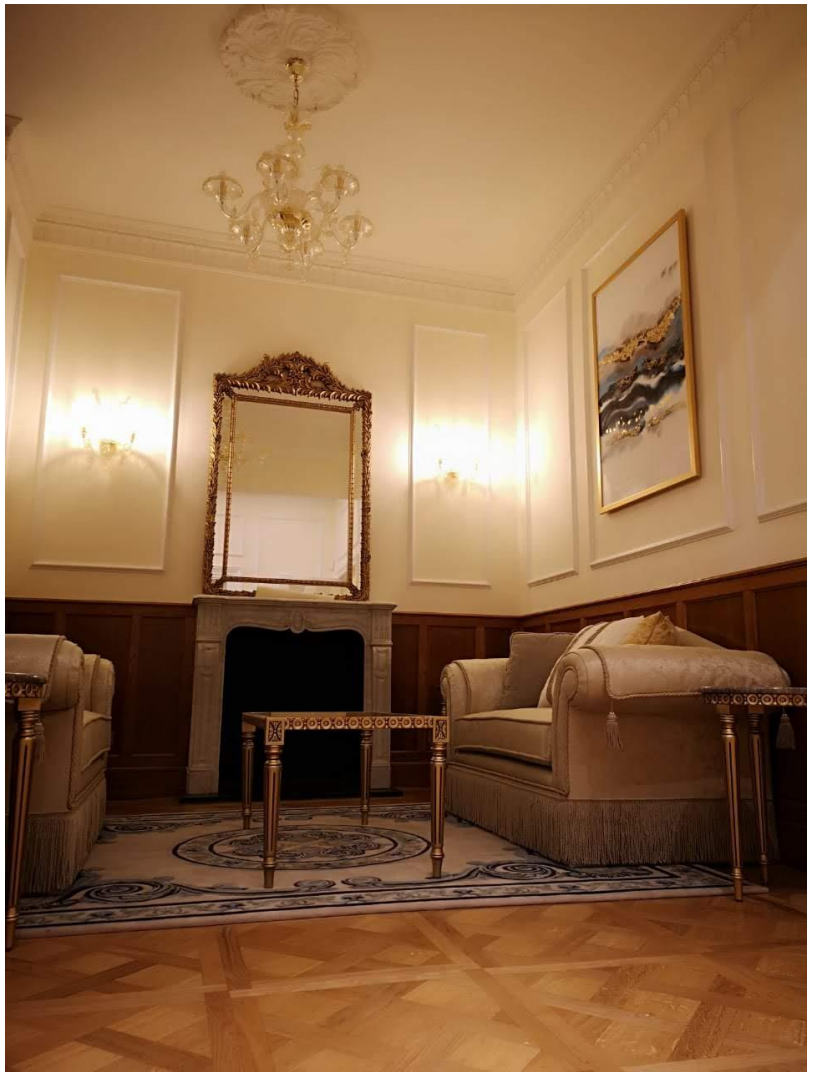

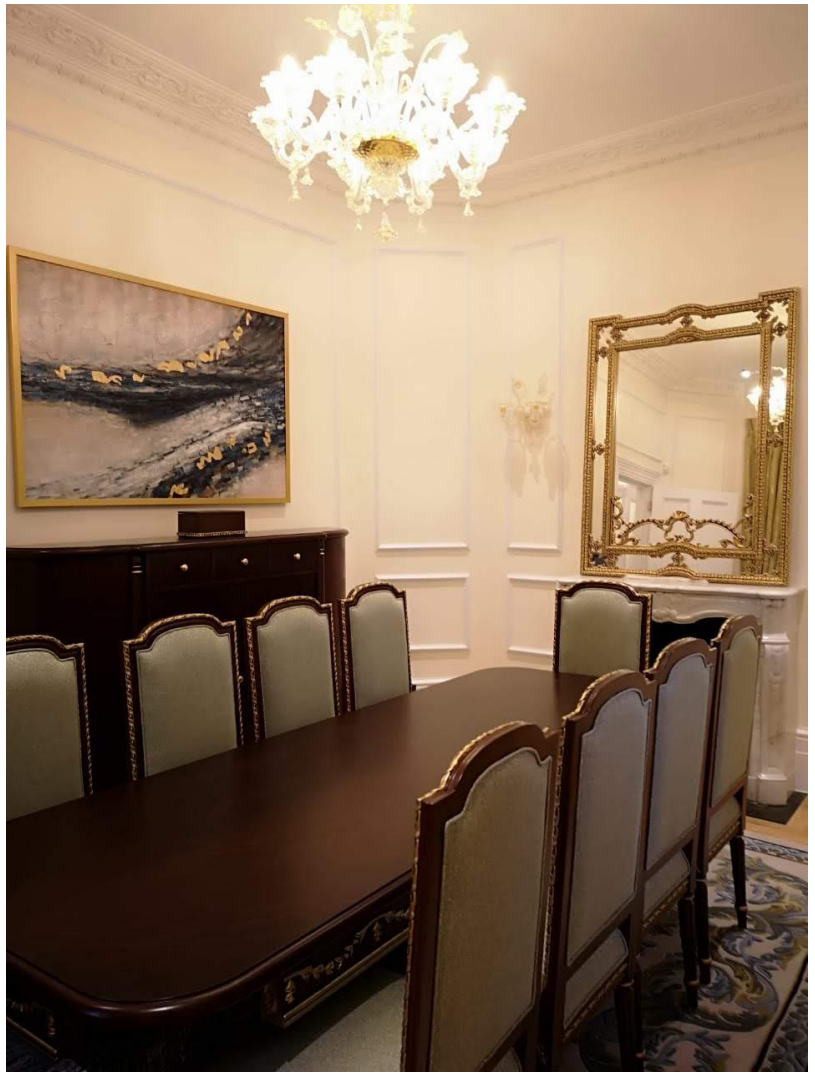

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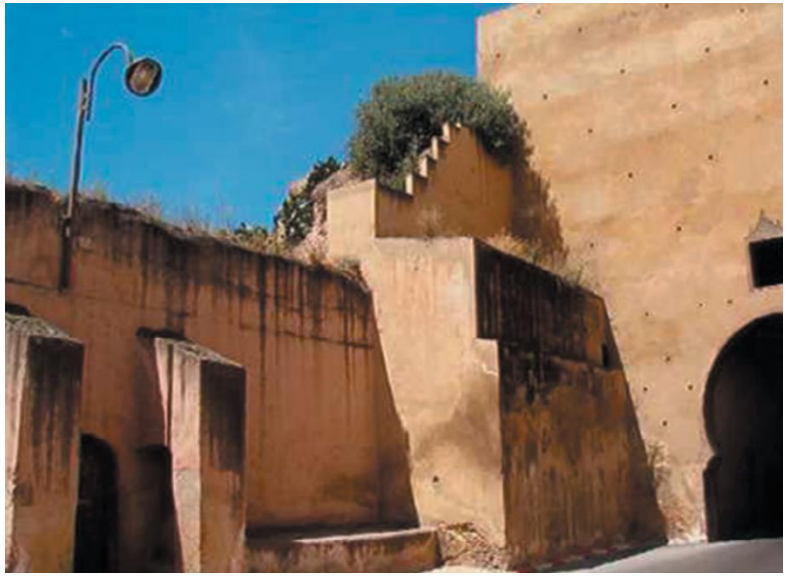
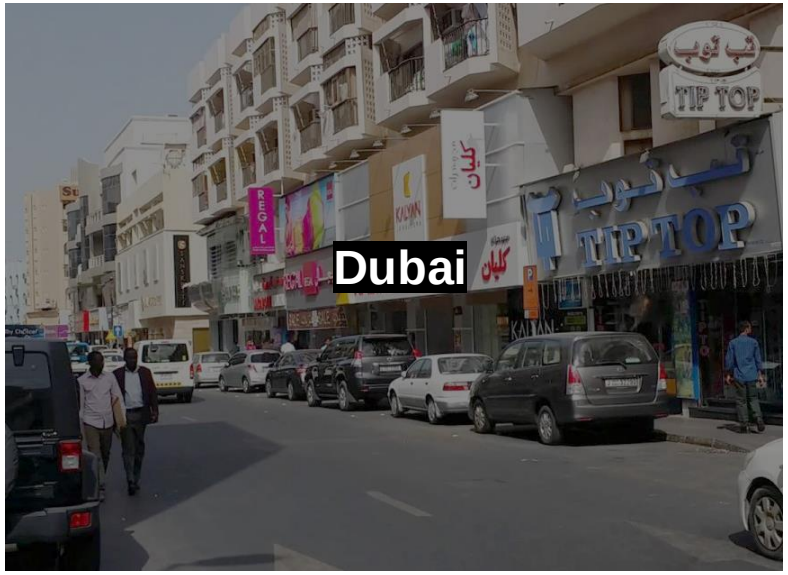


Buttress walls, Istanbul, Turkey and Meknes, Morocco

Passive cooling, Dubai, UAE and Cairo, Egypt.

Jeddah, KSA & Sanaa, Yemen Old Towns

Mid century “non-iconic” buildings across the Middle East



Mid century “non-iconic” buildings across the Middle East

Identification of Cultural Heritage in the UAE for Preservation and Adaptive Reuse – Challenges and Opportunities:

Listen here:

https://www.youtube.com/watch?v=rAfi469Uh3s&t=5s

KEY PROJECT CONSIDERATIONS

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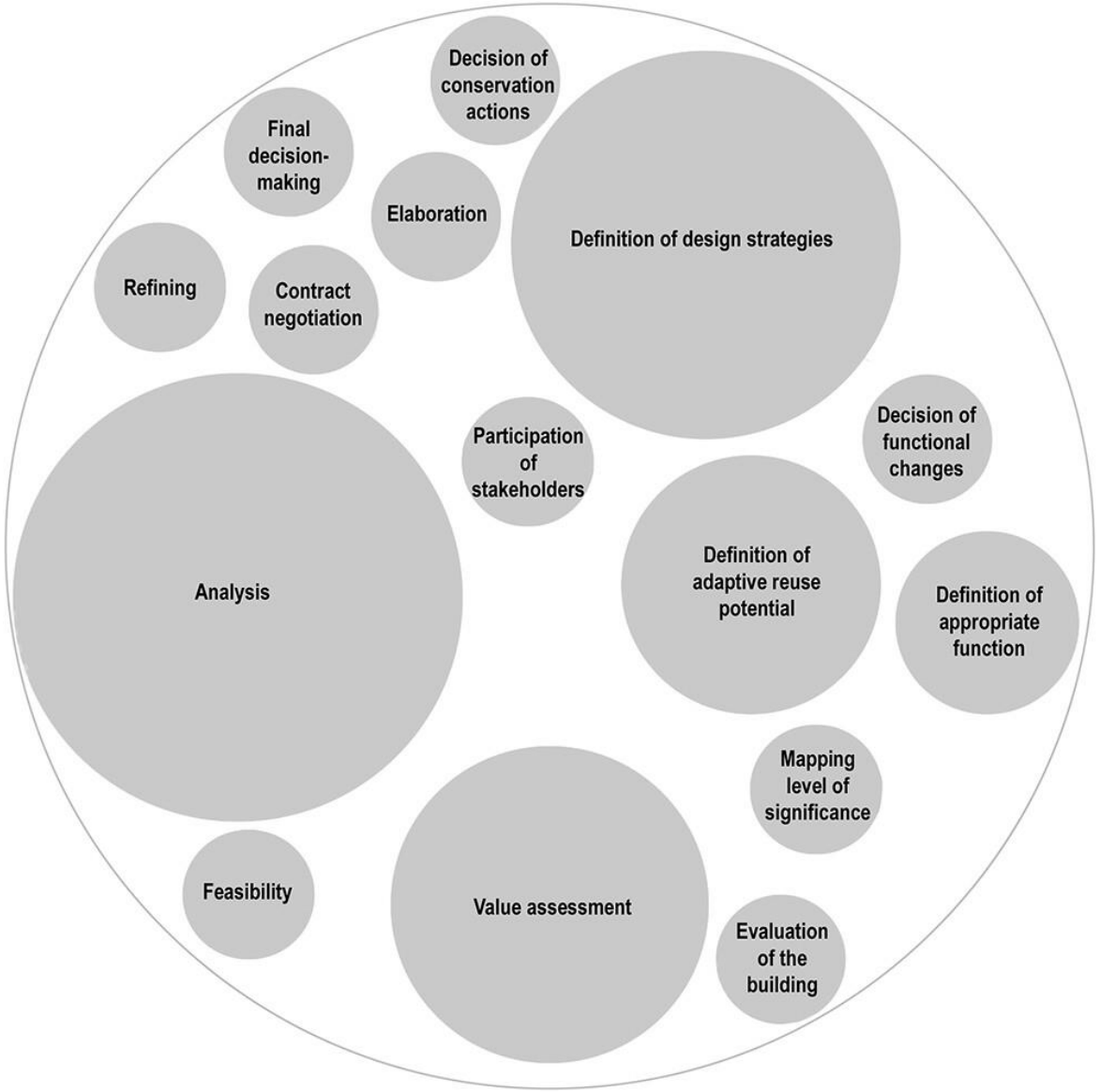

Source: Adaptive Reuse of Heritage Buildings: From a Literature Review to a Model of Practice
Author: Arfa, F. et al.

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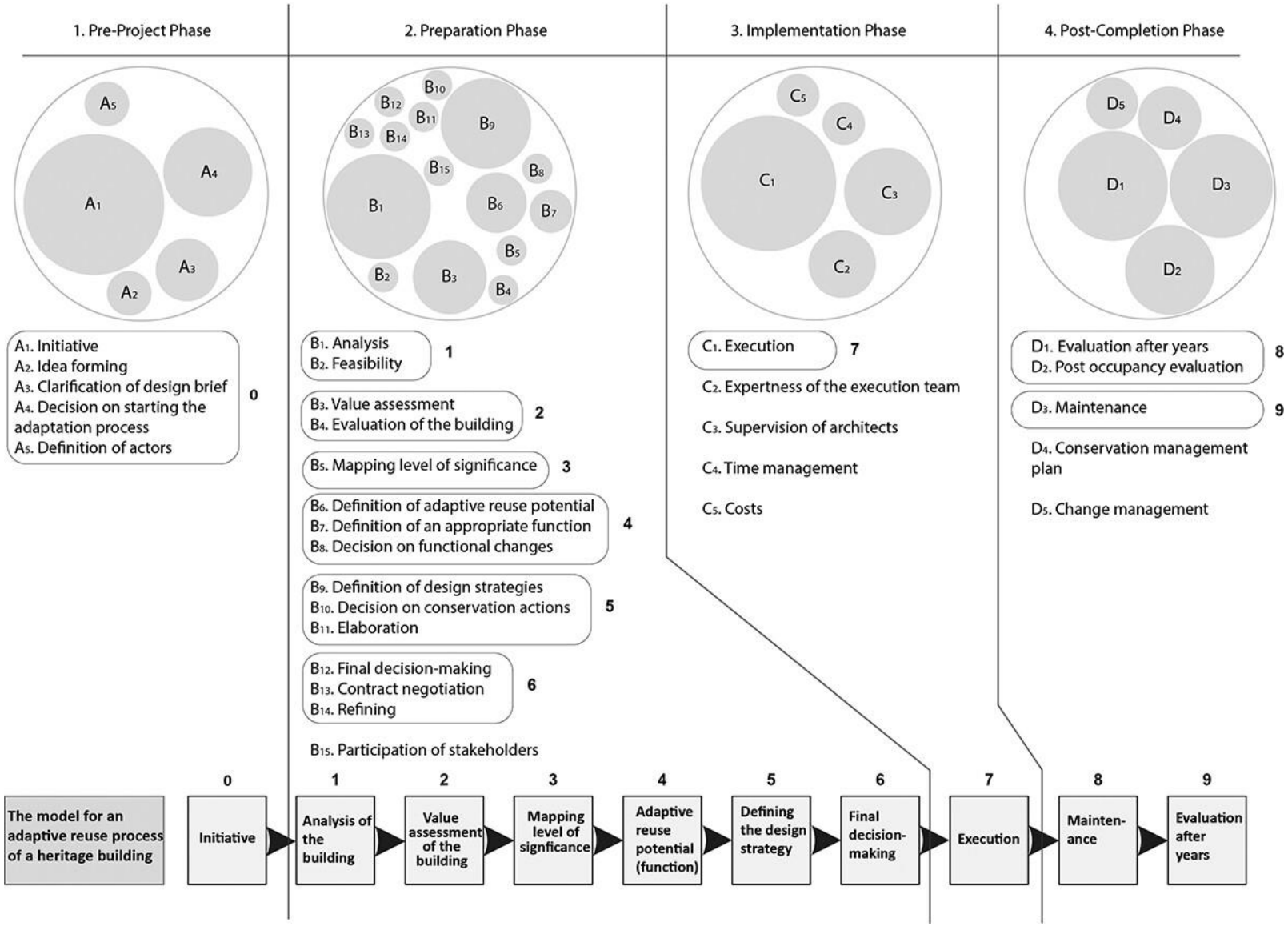

Source: Adaptive Reuse of Heritage Buildings: From a Literature Review to a Model of Practice
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KEY PROJECT CONSIDERATIONS

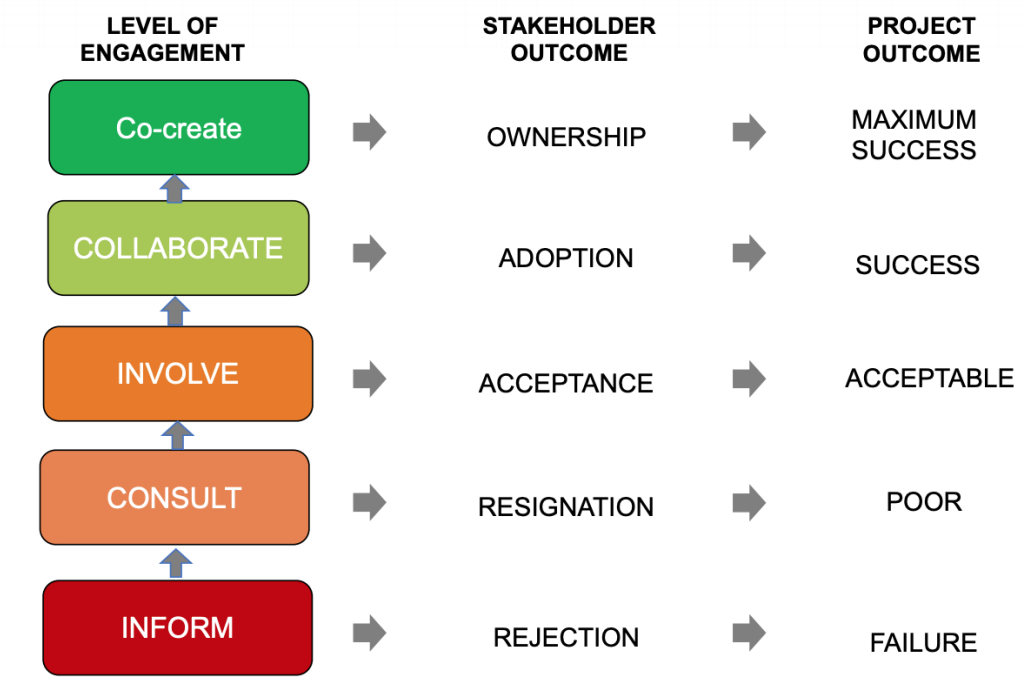
Feasibilities:

- Structural feasibilities to determine suitability for reuse functions.
- Code compliance and regulatory assessments
- Environmental assessments – especially in mid century buildings.
- Financial assessments – not all adaptive reuse projects are feasible. Cost analysis against demolition and reconstruction. Identification of potential hidden costs.
    - *In the case of historical or heritage buildings, this is weighed against cultural significance.*

KEY PROJECT CONSIDERATIONS

Stakeholder involvement:

- Conservation is not objective; it is biased by the values and perspectives of various individuals and interest groups.
- Identification of **stakeholders** and their involvement early in the design process.
- Combination of academic inquiry, research, policy making, planning, technical expertise, and user insight.
- Surveys on urban enhancement and civic projects, to arrive at consensus, and avoid public resistance.



Source: Seminar, Co-creation and Stakeholders by Anna Bullen, Centre for Alternative Technology (2020)

KEY PROJECT CONSIDERATIONS

Cultural sensitivity:

- Achieve preservation of architectural identity and integrity.
  - Retain facades and important elements
  - Complement rather than overshadow
- Attempt the use of local materials and techniques to balance modernity with authenticity.
- Retaining historical memory and storytelling elements.
  - Highlight elements that tell the story of the building
  - Right of public access rather than privatization

Cinema Radio, Cairo
Photo credit: Al Ismaelia

KEY PROJECT CONSIDERATIONS

Urban Integration and Equalities:

- Integration with public transport
- Regeneration functions suitable for all social groups: affordability and inclusion policies
- Target job creation and revitalization, prioritizing hiring local work force
- Support small business and enterprises

La Laguna, Mexico
Photo credit: Productora

THE MIDDLE EAST: A RICH CANVAS

THE MIDDLE EAST: A RICH CANVAS

Regional Nuances and Policy

- Due to rapid development, preference remains directed toward big and new urban developments.
- Limited policy and regulation around adaptive reuse projects as well as heritage preservation regulation and guidelines.
- Preference remains towards high end and luxury finishes, something not always possible with adaptive reuse projects.
- Mid-century buildings and ones that followed constitute the majority of the building stock, and were often experimental, non standardized and require a lot of upkeep to retrofit, especially in hot climates of the middle east.

Demolition of Metropolitan hotel. Source: construction week online

THE MIDDLE EAST: A RICH CANVAS

Regional Nuances and Policy

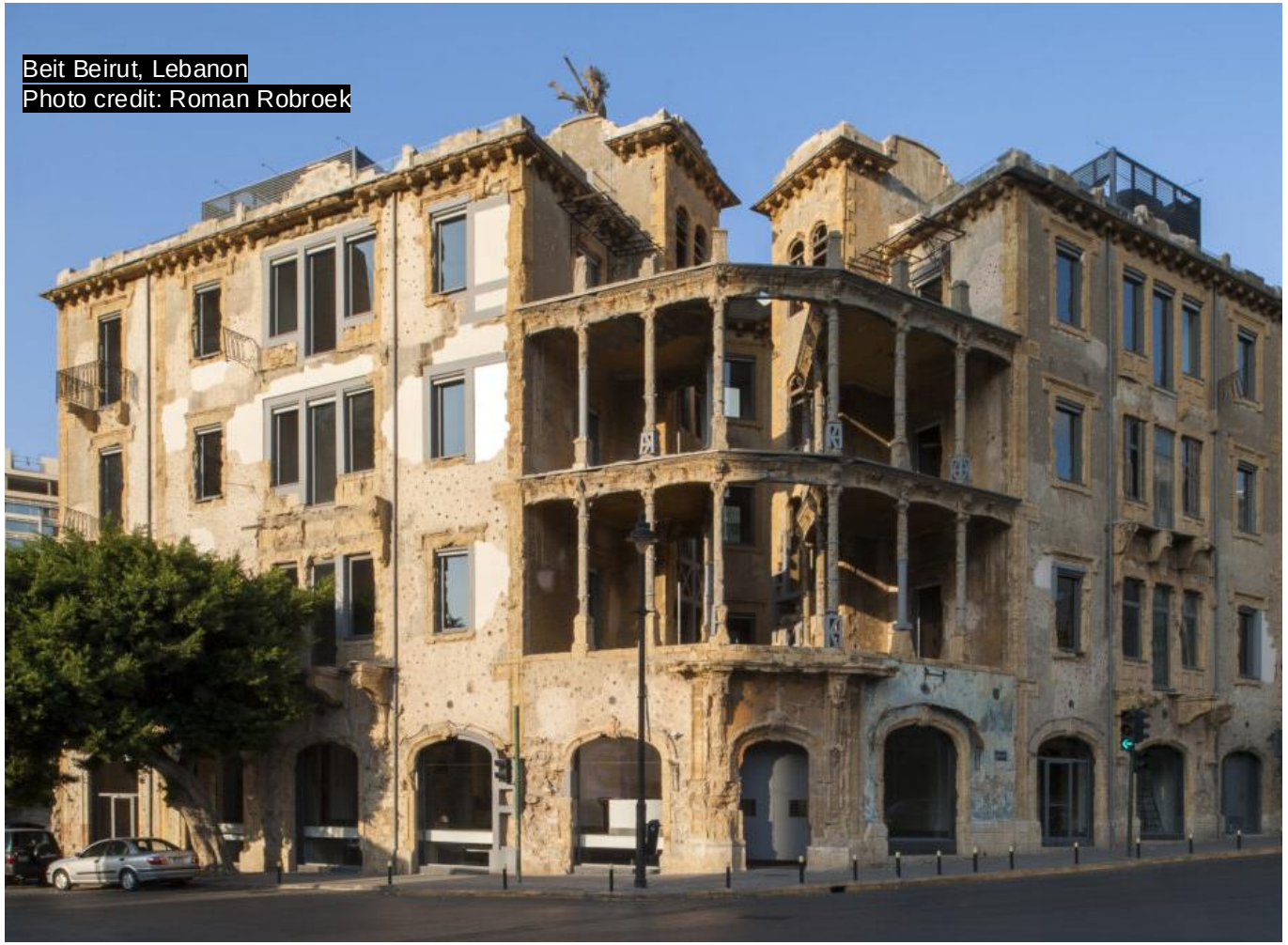
- Previously, buildings did not have to adhere to any **insulation requirements.** In Dubai for example, this was issued via Decree 66 in 2003.
- The existing building stock prior to the implementation of any energy building code in the UAE (2010) is the largest.

Demolition of Metropolitan hotel. Source: construction week online

THE MIDDLE EAST: A RICH CANVAS

Kalba Ice Factory, Sharjah
Photo credit: 51-1 Arquitectos

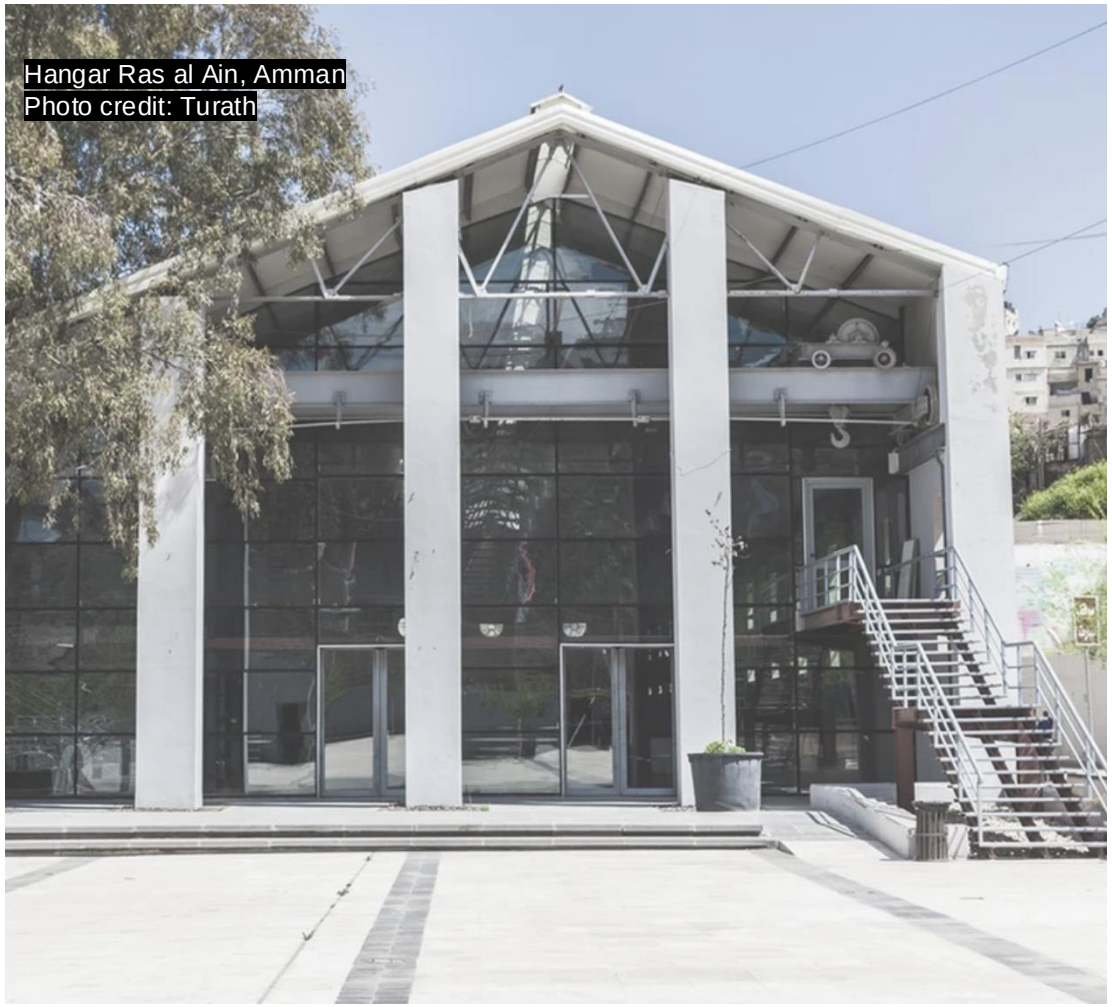
THE MIDDLE EAST: A RICH CANVAS


Beit Beirut, Lebanon
Photo credit: Roman Robroek

THE MIDDLE EAST: A RICH CANVAS

Expo City, Dubai
Photo credit: Construction Week

THE MIDDLE EAST: A RICH CANVAS



Hangar Ras al Ain, Amman
Photo credit: Turath

CONCLUSIONS

- Adaptive reuse is a mindset change that enables the reshaping of cities to be more sustainable, culturally rich and community driven.
- AR projects offer significant opportunities to reduce carbon emissions, save costs, and manage resources more efficiently.
- AR strategies in rapidly developing regions such as the middle east is a crucial step in the direction of sustainable development.
- Technical aspects during retrofit require special considerations.
- Cultural considerations and stakeholder involvement are key in mitigating project failure and public resistance.

Flying Saucer, Sharjah
Photo credit: Dezeen

Q&A

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