

## PENERAPAN KONSEP ARSITEKTUR KONSERVASI PADA KAWASAN PUERTO MADERO, ARGENTINA

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### ABSTRAK

Revitalisasi Puerto Madero di Argentina merupakan proyek konservasi waterfront skala metropolitan yang berhasil mengubah citra pelabuhan industri terbengkalai menjadi simbol modernitas kosmopolitan melalui strategi pemanfaatan adaptif (*adaptive reuse*) yang masif. Kawasan ini mengintegrasikan struktur warisan sejarah, seperti gudang bata merah dan derek pelabuhan tua, dengan intervensi arsitektur kontemporer yang ikonik seperti jembatan Puente de la Mujer, serta menerapkan kebijakan ketinggian bangunan "amfiteater urban" untuk menjaga dominasi visual sejarah di tepi air. Meskipun sukses menciptakan ruang publik yang dinamis dan berkelanjutan secara ekonomi dengan membagi zona komersial di sisi barat dan cagar ekologis di sisi timur, transformasi ini juga menghadapi tantangan terkait eksklusivitas sosial akibat tingginya nilai properti dan orientasi investasi yang mewah.

**Kata Kunci:** Arsitektur Konservasi, Waterfront, Regenerasi Skala Kota, Adaptive Reuse, Puerto Madero.

### ABSTRACT

*The revitalization of Puerto Madero in Argentina is a metropolitan-scale waterfront conservation project that successfully transformed the image of an abandoned industrial port into a symbol of cosmopolitan modernity through a massive adaptive reuse strategy. This area integrates historical heritage structures, such as red brick warehouses and old port cranes, with iconic contemporary architectural interventions like the Puente de la Mujer bridge, and implements an "urban amphitheater" building height policy to preserve the visual dominance of the waterfront's history. Although it has succeeded in creating a dynamic and economically sustainable public space by dividing commercial zones on the west side and ecological reserves on the east side, this transformation also faces challenges related to social exclusivity due to high property values and luxury-oriented investments.*

**Keywords:** Conservation Architecture, Waterfront, City-Scale Regeneration, Adaptive Reuse, Puerto Madero.

### INTRODUCTION

Waterfront areas play a strategic role in shaping the structure and identity of global cities. Historically, these areas developed as hubs for maritime logistics and trade; however, changes in global transportation systems often left behind derelict and degraded port infrastructures. Puerto Madero in Buenos Aires, Argentina, has emerged as one of the world's most significant precedents for the regeneration of industrial port areas through a large-scale architectural conservation approach. Once a central hub for cargo handling in the 19th century, Puerto Madero experienced a period of functional vacancy before eventually being transformed into a dynamic and cosmopolitan new urban center.

Architectural conservation in the context of Puerto Madero is not merely understood as an effort to preserve the physical state of old buildings, but rather as a dynamic strategy to revitalize the area through adaptive reuse. The success of this district lies in its ability to integrate industrial heritage structures, such as red-brick warehouses and port cranes, with contemporary modern architectural interventions. This approach allows the preservation of maritime historical values to run in harmony with the economic and social demands of a modern city, creating a balance between the memories of the past and a

vision for the future.

This research focuses on examining the application of architectural conservation concepts in Puerto Madero through an analysis of five main principles of waterfront design. The scope of the study includes how the area manages pedestrian accessibility through the iconic Puente de la Mujer bridge, maintains visual orientation toward the water through "urban amphitheater" building height regulations, and creates a diversity of functions that transformed logistics warehouses into metropolitan-scale mixed-use spaces. Through this case study, it is expected to reveal how architectural conservation serves as a strategic instrument in creating sustainable, vibrant waterfront areas with a strong sense of identity.

## RESEARCH METHODS

This research employs a descriptive-qualitative method with an in-depth single case study approach focusing on the Puerto Madero area in Buenos Aires, Argentina. Puerto Madero was selected as the object of study due to its characteristics as a large-scale waterfront regeneration project that successfully integrates industrial conservation with modern urban development.

**The research procedure was carried out through the following stages:**

1. **Data Collection:** Data were gathered through a comprehensive secondary literature study, including urban planning documents, scientific journals related to the revitalization of Puerto Madero, and analysis of historical and contemporary maps. Visual observations were conducted on architectural elements and public spaces using spatial data and architectural documentation.
2. **Identification of Conservation Elements:** Identifying the physical objects that are the focus of conservation, such as red-brick dock warehouses, port infrastructure (cranes), and water elements (docks/basins).
3. **Analytical Framework:** The collected data were analyzed using the five main principles of waterfront design to evaluate the effectiveness of the conservation:
  - **Accessibility:** Analyzing the integration of pedestrian bridges and the separation of vehicular traffic.
  - **Orientation to the Water:** Examining the massing and height regulations of buildings (urban amphitheater).
  - **Diversity of Functions:** Evaluating adaptive reuse strategies for the warehouse buildings.
  - **District Identity:** Analyzing the blend of historical industrial elements with modern architecture.
  - **Quality of Public Space:** Reviewing the provision of green open spaces and connectivity to the Costanera Sur Ecological Reserve.

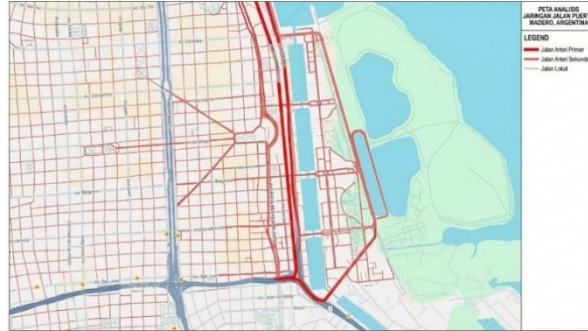
**Synthesis of Results:** Drawing conclusions on how architectural conservation principles (preservation, restoration, reconstruction, and rehabilitation) contribute to the sustainability and image of Puerto Madero as a world-class waterfront.

## RESULT AND DISCUSSION

### Case Study Data Puerto Madero, Argentina

**General Overview & Zoning:** Puerto Madero is a revitalization project transforming an old port into a dynamic urban center. The area is divided into two distinct characters: the West Side (dense Commercial & Entertainment Zone) and the East Side (Tourism, Culture, & Ecology Zone). The water basins (diques) serve as the primary axis and a visual buffer between the city's hustle and the Costanera Sur Ecological Reserve.

**Circulation & Road Network:** The circulation system employs a strict hierarchy to prioritize pedestrians. Main arterial roads are positioned on the outer perimeter (east and west) as a "protective belt" to manage heavy traffic loads. In the core area, integrated pedestrian and bicycle circuits are established, with the iconic Puente de la Mujer bridge serving as a vital link that slows the pace of movement, allowing users to appreciate the district's aesthetics.



**Gambar 1.** Area Road Network Puerto Madero, Argentina  
(Arsip Pribadi, 2025)

**Landmarks:** The area's identity is forged through a dialogue between historical elements (red-brick warehouses, port cranes, and the Fragata Sarmiento museum ship) and modern interventions (YPF Tower and contemporary bridges). The industrial heritage is not removed but is instead utilized as the "soul" of the district.



**Gambar 2.** Building Height Puerto Madero, Argentina  
(Arsip Pribadi, 2025)

**Building Height:** The project implements an "Urban Amphitheater" concept. Waterfront buildings are restricted to low-rise (<50m) to maintain a human scale and the visibility of historical warehouses. Meanwhile, skyscrapers ( $\geq 100\text{m}$ ) are pushed to the back rows to prevent a "concrete wall" effect along the docks.



**Gambar 3.** Area Puerto Madero, Argentina  
(Arsip Pribadi, 2025)

### Non-Physical Review: Puerto Madero, Argentina

**Social Aspect:** The area functions as a planned modern urban space with stable activity patterns. While it serves as a public space for sports and recreation, the interaction patterns tend to be exclusive, primarily catering to the professional community, luxury apartment residents, and international tourists within a comfortable and organized atmosphere.

**Cultural Aspect:** There has been a transformation of identity from an industrial port into a cosmopolitan symbol. The local culture is now representative, expressed through spatial experiences, modern architecture, and the naming of infrastructure (such as streets and bridges after prominent women) that reflects the progressive social values of Buenos Aires.

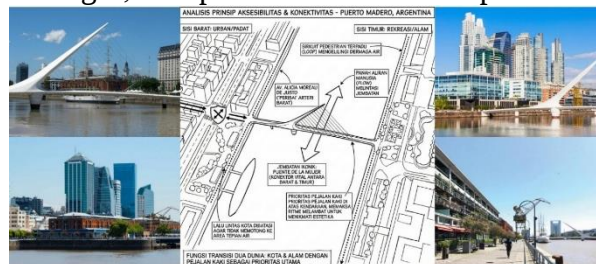
**Economic Aspect:** The district's economy is dominated by high-value service sectors, premium real estate, and international tourism. The revitalization has successfully generated employment and significantly increased land values, although the economic structure remains elite-oriented and provides limited accommodation for the lower-income grassroots economy.

### Conservation Analysis Based on Waterfront Principles Puerto Madero, Argentina

A. Preservation Principle Analysis Preservation in Puerto Madero focuses on macro-industrial elements that define the port's character.

**Iconic Bridge: Puente de la Mujer:** Accessibility in this area is not only functional but also symbolic through the presence of Puente de la Mujer (Woman's Bridge). This pedestrian bridge spans the basins (diques) and serves as a vital link between the West Side (city) and the East Side (recreation/nature). Its modern design reinforces pedestrian priority over vehicles, forcing a slower pace of movement to appreciate the district's aesthetics.

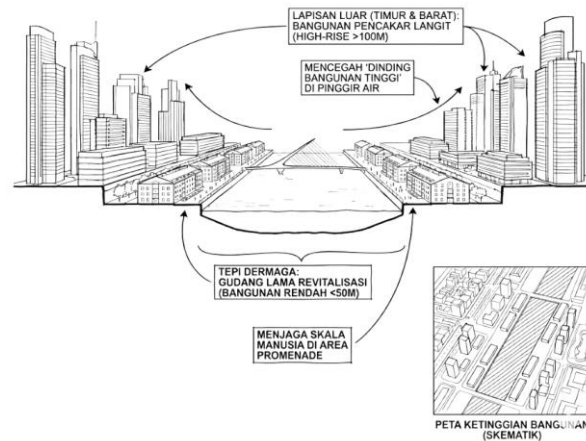
**Integrated Pedestrian Circuit:** Circulation paths form a closed loop surrounding the historic water docks. Motor vehicles are restricted to the western arterial road (Av. Alicia Moreau de Justo), which acts as a "shield" preventing city traffic from cutting directly into the waterfront. The linear circulation pattern along the docks is preserved following its original footprint. The water element (canal) is kept intact as the primary void, ensuring that despite functional changes, the spatial structure of the port remains preserved.



**Gambar 4.** Circulation route of the Puente de la Mujer bridge  
(Arsip Pribadi, 2025)

B. Restoration Principle Analysis Restoration in Puerto Madero is applied to the visual integrity of the district's skyline.

**"Bowl" Concept (Urban Amphitheater):** Building height analysis indicates the implementation of a city-scale amphitheater concept. The waterfront edge is reserved for low-rise buildings (<50m), consisting of revitalized historic warehouses. Skyscrapers (high-rise >100m) are pushed to the outermost layers in the east and west. This prevents the formation of a "concrete wall" directly at the water's edge, maintaining a human scale at the promenade. This height strategy restores the visual dominance of the port warehouses, ensuring the old port's visual scale is not "drowned out" by new skyscrapers.

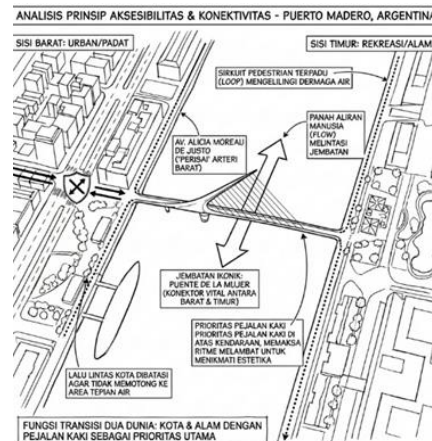


**Gambar 5. Building height**  
(Arsip Pribadi, 2025)

C. Reconstruction Principle Analysis Reconstruction is carried out on pavement elements and pedestrian paths.

**Industrial Memory Integration:** The district's identity does not erase its industrial past. Red-brick warehouses, old port cranes, and museum ships like the *Fragata Sarmiento* are maintained as sculptural elements along the promenade.

**Architectural Dialogue:** These historical elements engage in a dialogue with ultra-modern architecture, such as glass skyscrapers and the *Puente de la Mujer*. This creates a cosmopolitan image that remains rooted in maritime history. The wide pedestrian paths along the docks are the result of reconstructing old railway tracks and cargo loading lines, rebuilt with modern materials while maintaining the width and alignment of the original logistics routes.



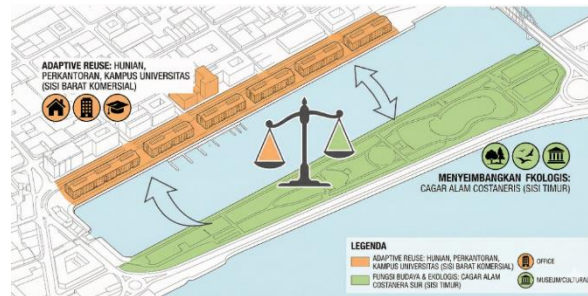
**Gambar 6. Circulation Path**  
(Arsip Pribadi, 2025)

D. Rehabilitation Principle Analysis Infrastructure rehabilitation is conducted to reconnect isolated areas.

**Transformational Conservation:** The old port warehouses are not only preserved in façade but undergo a transformation of function (adaptive reuse) into housing, offices, and university campuses. The East Side is dedicated to cultural and ecological functions (Costanera Sur Ecological Reserve), balancing the highly commercial West Side. The construction of the iconic pedestrian bridge is an act of accessibility rehabilitation, reconnecting the old city center and the new port that were previously severed by the water basins.

E. Adaptive Reuse Principle Analysis Puerto Madero is an example of the largest district-scale adaptive reuse.

**Metropolitan Promenade Scale:** Unlike the intimate scale of Malacca, Puerto Madero features very wide promenades. This scale supports mass recreational activities like jogging and cycling; however, according to Sassen's analysis (2021), this grand and luxurious scale also risks creating social exclusivity. The total transformation of the area's function saw long red-brick warehouses—formerly cargo storage—adapted into mixed-use functions. The original column grids and structures of the warehouses are utilized for modern loft apartments and offices.



**Gambar 7. Mixed-Use Activity**  
(Arsip Pribadi, 2025).

## CONCLUSION

The application of architectural conservation concepts in the Puerto Madero waterfront area, Argentina, demonstrates that large-scale revitalization can succeed by integrating industrial heritage as the district's primary identity. Through the "Urban Amphitheater" strategy, Puerto Madero has successfully restored the visual quality of the waterfront by maintaining low-rise historic warehouse buildings in the foreground and positioning skyscrapers in the background, ensuring the human scale remains preserved.

Furthermore, the adaptive reuse of red-brick warehouses into mixed-use spaces has proven effective in reviving the economic vitality of a once-dormant area. The presence of the Puente de la Mujer bridge and the integrated pedestrian circuit highlight that prioritizing pedestrian accessibility is the key to rehabilitating the connection between the city center and the waterfront. Although this development tends to create social exclusivity, from a technical architectural perspective, Puerto Madero serves as an ideal model of transformational conservation, successfully balancing the preservation of industrial memory with the functional demands of a modern global city.

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