Contexts of Reuse and Regeneration. Defense Sites and Disused Infrastructure in Coastal Areas

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Abstract. Urban regeneration must solve the problems of physical and social degradation by regenerating areas in decline according to some indications aimed at making the interventions sustainable and at the same time the territory resilient. This strategy must provide, in the medium and long term, the prerequisites for sustainable and lasting development by improving economic, physical and social aspects. The cases analyzed, which are based on experiences of effective intervention in decommissioned military areas, located in the coastal cities of Reggio Calabria in Italy and Palma de Mallorca in Spain, represent examples of good practices that can be replicated in other contexts precisely because they respect some of the conditions mentioned above. The reorganization and recovery or reconstruction of these particular areas, especially those located within or close to the existing city, can become an opportunity to involve communities in participatory practices aimed at intercepting local demand. This research work focuses on a preliminary step of analysis of the literature which allows us to highlight the optimal conditions and solutions for achieving the objectives of resilience, territorial and social inclusion, and ecological transition in light of the dynamics of the dimensions involved and the current planning guidelines.

Keywords: Social and territorial inclusion · urban regeneration · reuse of brownfield · infrastructure planning

1 Introduction: Urban Regeneration and Reuse of Brownfield

Urban regeneration, in the light of current guidelines, urgings from European Union and United Nations guidelines, is a mode in which a type of public policy is expressed, which must be comprehensive and integrated by seeking to solve problems related to the physical and social degradation of "critical urban pockets" and to redevelop areas in decline (1). This strategy, which operates at multiple levels and through the contamination of sectors, must provide, in the medium and long term, the prerequisites for

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O. Gervasi et al. (Eds.): ICCSA 2024 Workshops, LNCS 14820, pp. 141–152, 2024.
https://doi.org/10.1007/978-3-031-65285-1_10

sustainable spatial development by improving economic, physical and social aspects (2). The analyzed cases that are based on experiences of effective intervention in disused military areas, one Spanish and the other Italian, represent two good practices that can be replicated in other contexts, for the following reasons.

Abandoned military, industrial, or infrastructure areas, while not an easy problem to solve due to the significant costs required for recovery, decontamination, and re-functionalization, represent a priority for the safety and health of exposed communities. Not only that, the reorganization and rehabilitation or reconstruction of these particular areas, especially those located in or near areas within the existing city, can become opportunities to engage communities in participatory practices aimed at intercepting local demand. Such areas, especially if they are well connected in terms of infrastructure with the main connecting road system or with areas of strategic interest, such as port, airport and railway infrastructures, productive activities and services of extra-urban relevance, can represent an opportunity for the economic and social revitalization of the context and territory.

Today, in the literature on development planning, improving the quality of life of citizens and achieving performance standards related to the city's ability to deliver services, high digital specialization while ensuring ecological transition and social and territorial inclusion, requires at least three enabling factors: 1) meeting the demand for space through smart solutions to make optimal use of new "reuse places"; 2) innovation to create development opportunities and competitive environments; and 3) configuring a highly specialized environment to attract creative ideas and investment opportunities.

There is a common characteristic in the cases under study, which is that they are located near coastal areas and port systems. As is well known, the reorganization of new public spaces through the reuse of the existing can be successful if the functional redevelopment takes into account the supply of sustainable mobility and an efficient transportation system in line with current and future demand, also because of the effects produced by regenerative processes, such as increased flows of users, goods and people (11). Urban regeneration means new developments and improvements in the condition of dilapidated urban areas the birth of a new spirit (3).

There is a "complex" relationship between urban settlements, ports, production facilities and defensive systems. Port cities (whether city/port or city with port) have different characteristics from port areas, as known for the obvious dilation of the space-function relationship. The thickening of functions in port cities/towns makes it difficult -and at the same time necessary- to find a planning response that translates into a tool for effective land regeneration. In fact, the issues highlighted become "problems" that are not easy to solve when we talk about port areas (such as the one concerning the cities of Trieste, Taranto, and Cagliari in which the city and the port interact without welding and promiscuity of functions), but they become a priority, imposing an effective response, when city and port are integrated – for example realities such as La Spezia, Savona, Naples or Ancona – and the existing interrelationships influence both port and urban planning and regeneration.

Regeneration is sometimes, in rare cases, not complex when the re-functionalization confirms the previous so-use. This is the case, for example, of the new forestry barracks and carabinieri station in Verghereto, which provided for the demolition of the existing

structure the construction of a new barracks with improvements and additional provisions, including the use of a load-bearing structure consistent with the indications of the State Property Agency, built for the first two floors in reinforced concrete, including the basement, while the top level with X-lam partitions. The wooden construction elements that improve the landscaping and are completely prefabricated: dry assembly use guarantees advantages in terms of quality and sustainability of materials (4). The relationship of non-randomness of urban, port and defensive settlements is different for small and medium-sized ports and towns, where some defense installations or small defensive garrisons have sprung up along the coast to ensure military control by sea: ports that retain a tourist vocation and small towns composed of two distinct and different parts, unified functionally, since time immemorial, but only in the last century really welded together (12). Part of the urban core is arranged on the promontory and often arises from the joining of waterways to the sea, in the coastal area, on the other hand, the coastal core is characterized by activities and services related to fishing or maritime activities in general. The two centers are usually-a few hundred meters apart as the crow flies-experiencing a certain economic complementarity: sailors, fishermen and artisans in the sector settled on the marina, while farmers preferred the high zone near the arteries connecting with the interior of the territory. Defensive works and military installations were located in control positions and close to land and sea transportation infrastructure.

2 Case Studies

By looking at two sites i.e., Son Busquets and DIA of Reggio Calabri, we attempt to unearth the unique opportunities that they offer for urban renewal and community engagement. Son Busquets stands poised to play a pivotal role in the rejuvenation of its neighborhood, with plans for a new civic and pedestrian axis set to link it with the historic center, breathing new life into the area. Once home to barracks, its well-preserved buildings and lush surroundings offer immense potential for creating green spaces and vibrant public areas. On the other hand, the DIA of Reggio Calabria holds a rich history, having served as a fuel depot during World War II. Going through patch of transformation, remnants of its past remain now that includes a tunnel and the Manganelli multipurpose facility. Located in Santa Caterina, near the port and major highways, this site holds promise for future development while honoring its military heritage.

Son Busquets

Son Busquets could assume an important aggregative role in the planning process of the new civic and pedestrian axis – Cotlliure – that would serve to regenerate the neighbourhood and effectively connect it with the historic centre. In the Camp Redó neighbourhood, the Son Busquets site is also emerging as a valuable solution to the need for new green areas and quality public open spaces. The barracks were closed in 2000, leaving a complex of buildings consisting of 16 ground-floor hangars with an east-west orientation and another 18 smaller hangars with a north-south orientation. These and other artefacts are in a relatively good state of preservation, having been built according to the tradition of the time, with marés load-bearing walls and pitched roofs made of Arabian tiles of historical and cultural value. It is set in a context of interesting vegetation, with productive potential (Table 1 and Fig. 1).

Table 1. Barracks - headquarters of the 91st Mixed Artillery Regiment (RAMIX 91)

OLD MILITARY QUARTER OF SON BUSQUETS	**REGION:**	**Spain**
	CITY:	Palma (Majorca)
	NAME:	
	INITIAL DESTINATION: *Military barracks* *Airport, military infrastructure* *Military base/shooting range, exercises* *Other*	Barracks - headquarters of the 91st Mixed Artillery Regiment (RAMIX 91).
PHYSICAL AND DIMENSIONAL CHARACTERISTICS	AGE OF CONSTRUCTION:	1949 (presumed era)
	PROPERTY:	Public
	SIZE (RANGE): <1000 SQM >1001 E <10.000 >10,001 SQM	110.000 m2 Total built space is 27,743 m2
	RELATIONSHIP TO THE URBANISED CONTEXT *Interior* *External in continuity* *External in suburban areas*	***Interior***
	STATE OF DISUSE: *Abandoned* *Underused*	Abandoned The buildings are in a relatively good state of preservation and are considered to have a certain charm because they were built in the tradition of the time.
REGENERATION STRATEGIES	CONVERSION IMPLEMENTED OR IN PROGRESS:	Abandoned since 2000, it is regarded as Palma's last great urban void and is still awaiting architectural and urban renewal to respond to the demand for urban transformation of the surrounding neighbourhoods
	MIXED WITH PREVALENCE OF: *Services and urban amenities of a social and aggregative nature* *Business/office centre*	There are currently abandoned artefacts and potentially productive greenery. A project is hoped for to create urban services and amenities of a social and aggregative nature
COMPLEXITY FACTORS	CONTAMINATED SITE:	-
	WIDESPREAD URBAN DECAY:	Camp Redó, is a very dense peripheral neighbourhood that suffers from serious problems of physical and social degradation, with severe urban discontinuity and poor connection to the historic city centre
	LACK OF SERVICES AND SOCIAL DISCOMFORT:	The General Urban Development Plan of Palma of 1973, the current plan of 1998 and its imminent successor, contemplate for the urban expansion of Palma the reinforcement of six civic axes (west or east Fàbrica, Ocells, Blanquerna-Cotlliure, Arxiduc, Nuredduna and Foners). Since 1973, only 14% of the 7,110 planned 'civic' metres have been implemented.
	MANAGEMENT COMPLEXITY:	The regeneration of the Old Military Quarter of Son Busquets could become an opportunity for the urban planning and development of the Camp Redó district, a densely built-up area with problems of physical and social decay.

Note: Elaborated by Celestina Fazia



Fig. 1. Old Military Quarter of Son Busquets, Source: Gallery of Mallorca's Abandoned Buildings - 9 (archdaily.com)

Construction of the Son Busquets barracks (within the city walls that were built in 1575), began in 1949 and was completed in 1952. Regarding the regeneration of the now decommissioned area, an agreement was signed between the Ministries of Defense and Transportation, Mobility, and Urban Agenda; following this agreement, the structure was handed over to the Entedad Pública Empresarial de Suelo (SEPES) for the construction of social housing on 50% of the available land. The remaining 50% will be set aside for public use and the creation of green areas. According to the Special Interior Reform Plan (PERI), defined through a participatory process, the housing will be public and will be rented at reduced prices, accessible to people with different incomes. There will be 20,000 square meters of tertiary space for small businesses and workshops for job creation (5).

DIA of Reggio Calabria

The site originally was a fuel depot for military use. Used during World War II, it housed three tanks; of these, one was demolished to make way for the construction of the Manganelli multipurpose facility (6). Within the area was a building of about 80 square meters in use by the firefighting squad and which had been disused for several years. Within the project area with access from the elevation of Enotria Street, there was a tunnel used during World War II characterized by a low arch section with dimensions 2.00 m × 2.50 m.

The area is located in the northern area of the city of Reggio Calabria in the locality of Santa Caterina, near the port and the mouth of the Salerno-Reggio Calabria Highway.

The 'area of intervention, placed on Enotria Street, is located in front of the Multipurpose Center Manganelli opened in 2014 that houses the offices of the police headquarters of Reggio Calabria.

The parcel subject to intervention is indicated in the tables of the P.R.G. in zone F called “Areas for military headquarters and equipment,” these are areas subject to military jurisdiction (Figs. 2 and 3).

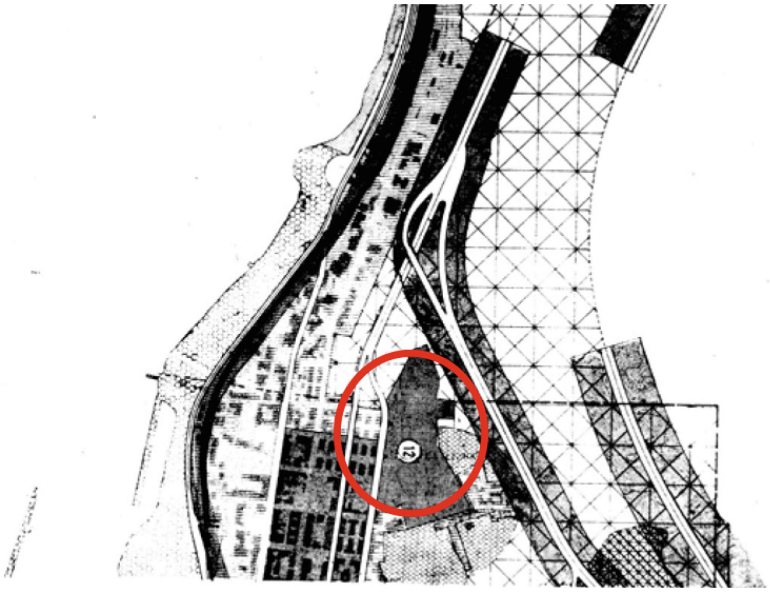

Fig. 2. General Regulatory Plan, PRG, of Reggio Calabria, approved in 1970, Source: Piano regolatore generale comunale - Comune di Reggio Calabria - Trasparenza

According to the PSC, the ‘area falls within the UTA, Unified Territorial Area, II.1 of the consolidated or forming urban fabric, oriented mainly to the consolidation of the recent city. For the project of the new headquarters DIA, Anti-Mafia Investigative Directorate, several specialized investigations and analyses were carried out: analysis of interference with the overhead and underground networks of services and design resolution (water network, black water and storm water disposal networks, power supply network, gas and telecommunications),

As a result of Law No. 177/2012, on the subject of remnants of war, which amends and supplements the T.U.S. 81/2008 on occupational safety, the possible definition of a level of risk of non-acceptability implies the need to take the necessary preventive and protective measures suitable to eliminate or at least significantly reduce the probability of occurrence of the potentially harmful event. In this second case, one has the power to provide for subsequent conventional safety measures, defined as “ordnance clearance,” to be activated in the case requested under the aegis and binding opinion of the competent Ministry of Defense pursuant to Art. 22 of Legislative Decree 66/2010 (New Military Code). So, the area affected by the implementation of the DIA, was subject to specific checks, analyzed in relation to geological characteristics, the presence of possible inhibitory and protective constraints. The presence of possible archaeological finds, seismic risk.

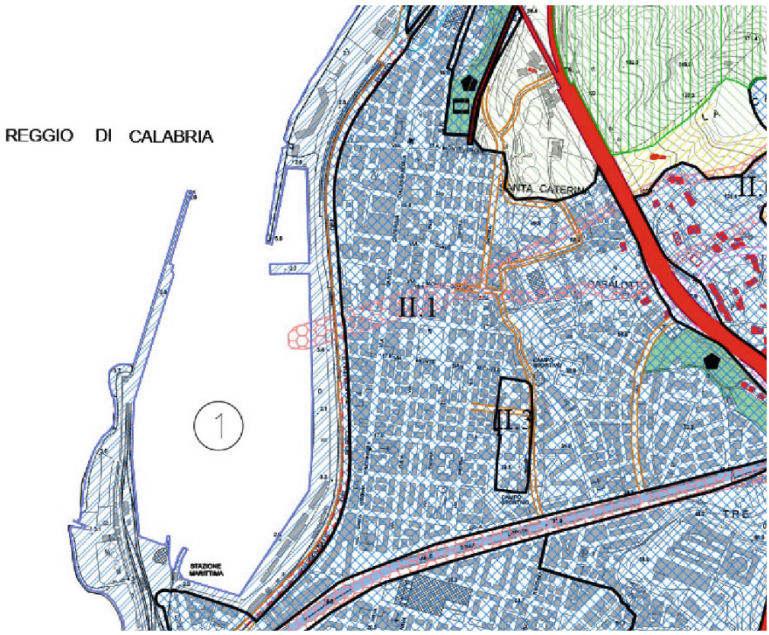

Fig. 3. Excerpt from the Municipal Structural Plan, PSC, of Reggio Calabria, adopted in 2019, Source: Comune di Reggio Calabria - Notizie - PSC - REU

The design of the DIA headquarters, it will also host the 12th Mobile Department and the State Police-was drafted to meet the needs of the Administration receiving the property and in compliance with the following criteria

- Flexibility of spaces and solutions to eliminate architectural barriers, including a tactile pre-course with related aids in the area open to the public, services and conference room on the ground floor. The tactile language that will be used is LOGES-VET-EVOLUTION (LVE) and is achieved by inserting special tiles into the flooring, the different types of which can be easily felt underfoot and with a white cane;
- Work environment quality (systems to improve the quality of 'acoustics), indoor air healthiness and respect for the microclimatic conditions of the site
- Energy conservation (photovoltaic system on the roof slab)
- Ease of maintenance and durability of materials.

The sizing of the building was carried out by means of the sq m/addict parameter
Total area of intervention area: 3,675 m^2
Floor area: 1,246 m^2
Covered surface area (SC): 985.20 m^2
Permeable surface area (SP): 1,847.55 m^2
Total surface area (ST): 4,628.92 m

The new building has four above-ground floors and a basement floor for the garage and technical rooms. On the ground floor in addition to the archive and wellness area is the conference room. The first and second floors are devoted to offices and guest quarters. On the other hand, the third floor is dedicated to the apartment for the manager. The building is characterized by a central covered courtyard lit from above with natural light.

The functional arrangements, distributional characters, and orientation of the envelope were designed to improve the building's energy and functional performance by reducing resource consumption and emission of pollutants. Through (i) controlled mechanical ventilation system with heat recovery; and (ii) room primary air diffusion, domestic hot water production systems. Draining outdoor paving plays with the perimeter hedge made of *teucrium fruticans and Phyllirea angustifolia* an important role in surface water management. Irrigation of the hedge and the portion of the lawn that follows the ramp is done with reclaimed meteoric water.

The intervention is an urban redevelopment of a portion of land that is no longer functional for the Navy and involves the construction of a new building that will house the headquarters of the D.I.A. (Direzione Investigativa Antimafia) in the Santa Caterina area of Reggio di Calabria. This new headquarters will be built on a portion of the former Navy fuel depot compendium, which formerly housed three metal tanks connected to the port via underground pipes. To make room for the construction of the new state-owned facility called "Manganelli Multipurpose Facility," one of the three tanks was demolished. Thus, the main objective of the intervention is to build an adequate and functional headquarters for the D.I.A. in this specific area of Reggio di Calabria (Table 2).

The intervention is an innovative building type that follows the most advanced environmental criteria and the best solutions for energy efficiency. This is an excellent approach to ensure sustainable construction and reduce environmental impact in addition to the fact that the intervention will contribute to the creation of a "Security Citadel" within the state-owned complex. The addition of the headquarters of the 12th Mobile Department of the State Police, together with the existing Multipurpose Center, will allow the concentration of several security-related functions in one area. This synergy between different security-related entities can lead to greater collaboration and coordination among various institutions, fostering a safer and more secure environment for the community. Especially because of the Citadel's location, which affects the area north of the city, playing a garrison role in a critical urban context affected by a high number of crimes attributable to organized crime (Fig. 4).

Table 2. D.I.A. (Direzione Investigativa Antimafia) in the Santa Caterina area of Reggio di Calabria.

D.I.A. (Direzione Investigativa Antimafia) in the Santa Caterina area of Reggio di Calabria	**Region:**	**Calabria, Italy**
	City:	Reggio Calabria
	Name:	D.I.A. (Direzione Investigativa Antimafia) in the Santa Caterina area of Reggio di Calabria.
	Initial destination: *Military barracks* *Airport, military infrastructure* *Military base/shooting range, exercises* *Other*	State-owned former fuel depot complex of the Navy, which formerly housed three metal tanks connected to the port via underground pipes.
physical and dimensional characteristics	Age of construction:	1943 (presumed era)
	Property:	Public
	Size (range): <1000 sqm >1001 e <10.000 >10,001 sqm	3.675 mq
	Relationship to the urbanised context *Interior* *External in continuity* *External in suburban areas*	Suburban area located in the northern part of the city. It is located in the vicinity of the port of Reggio Calabria and more exactly upstream of Via Enotria, traveling along it in the direction of the Mediterranean highway.
	State of disuse: *Abandoned* *Underused*	Abandoned
regeneration strategies	Conversion implemented or in progress:	Urban redevelopment of a portion of land no longer functional for the Navy, providing for the construction of a new building that will house the headquarters of the D.I.A. in the city of Reggio di Calabria.
	Mixed with prevalence of: *Services and urban amenities of a social and aggregative nature* *Business/office centre*	The presence of the decommissioned military works represent two of the interferences surveyed within the area affected by the works: 1. presence of an old one-story above-ground building of about 80 square meters that housed the firefighting team; 2. presence of the underground tunnel.
complexity factors	Contaminated site:	partially, presence of disused tanks
	Widespread urban decay:	confined to some areas of the St. Catherine neighborhood
	Lack of services and social discomfort:	critical urban context affected by a high number of crimes attributable to organized crime
	Management complexity:	no

Note: Elaborated by Celestina Fazia



Fig. 4. Top left: underground tunnel; Top right: fire team building; Bottom: exterior view of the building-Entrance area. Source: Executive project-interference report (2018)

3 Conclusions

In addition to the social-environmental-economic aspect, there are several factors that do not incentivize the reuse (7) of decommissioned military real estate assets (whether to be reclaimed even partially). In coastal areas and within the port cities, the issue of brownfields takes on a certain significance that stems from the exposure of urbanized areas to environmental and technological risk factors. Such "adverse situations" can be summarized as follows:

- the bargaining power of those who hold the asset (usually it is the Ministry of Defense) with respect to the future use (8) of the areas and the economic role of the state in decision-making over state-owned areas that lose their institutional function;
- the overlapping competencies between subjects and levels and the "paralysis" affected any emerging conflicts; all of which indirectly affect the loss of value (9);
- the high cost required for reuse in addition to the poor level of degradation;
- the constant crisis in the real estate market and the construction industry;

– the continuous adoption of new legislation with the consequent introduction and modification of procedures that are not always well defined and often contradictory to each other, but also the timing of bureaucratic and land-government procedures;
– the predominantly financial approach of alienation procedures and the adoption of sector regulations that should economically incentivize the rationalization of the armed forces, but do not integrate new functions to be attributed to the decommissioned assets into the process;
– a lack of knowledge about the current state of military real estate assets (in use, underutilized, abandoned or to be included in the lists of alienation programs);

These circumstances have strongly contributed to the creation, of military "urban and suburban voids" that threaten to compromise the coastal, rural and mountainous Italian landscape (10). The first area through which the coastal city becomes recognizable is the port area, (the case of Genoa and Naples); within or in close proximity is the "backport strip," which is the intermediate zone between the port that becomes the waterfront and the consolidated urban fabric, sea-inland graft routes, the consolidated city. In it were located many manufacturing or military facilities, now disused. One solution could be to return these facilities to the port infrastructure (e.g., by strengthening the relationship between the energy/transport/infrastructure compartments) or to weld them to the specific urban functions of the city that is set back from the port (mixed cultural/aggregative/receptive, or purely social destinations) (11, 12).

The challenges associated with the reuse of decommissioned military real estate assets, particularly in coastal and port city contexts, are reflective of broader issues of bureaucratic complexity, financial barriers, and institutional inertia. These obstacles, while specific to certain regions, resonate with similar challenges worldwide, especially in areas with high environmental and technological risk factors. The creation of military "urban and suburban voids" is a common concern, threatening landscapes and urban fabric integrity. However, the proposed solutions, such as integrating disused facilities into port infrastructure or repurposing them for urban functions, offer replicable strategies for addressing similar issues globally. By strengthening interdepartmental cooperation, streamlining regulatory processes, and fostering public-private partnerships, communities can transform liabilities into assets, revitalizing landscapes and enhancing urban resilience across diverse contexts.

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