Ta' Qali Commercial Area
Group 1

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1. Introduction

In 2006, the Ta'Qali Commercial Area was designated as a recreational area for the general public and tourists in the Ta' Qali Action Plan. However, to date, this redevelopment has been under consultation, and progress has been limited.

The Ta'Qali Commercial Area is located in the central region of Malta, in the municipality of Attard, belonging to the western district. The intervention area is adjacent to the southern side of the Ta'Qali National Park (65 ha), a designated national recreation area that includes large green public spaces and gardens, the national football stadium, a crafts village, and a vegetable market. The park is surrounded chiefly by agricultural land. Along with the fortified medieval city of Mdina, one of the major tourist hotspots in Malta, is recognized as a high-value landscape. The selected intervention area (3.7 ha) contains a mix of land uses, such as retail warehouses, industrial plants, open storage and services, logistics, and parking areas.

Based on the local authorities' planning documents complemented by open-source information, this document proposes an integrated design for the site incorporating a set of Nature-based Solutions (NbS) to redevelop a smaller area within the Ta'Qali Commercial Area (figure 1). The proposed design is consistent with planning requirements and critical policy objectives set out in the earlier mentioned policy documents. Key stakeholder groups required planning activities and potential policy instruments to realize the implementation of the selected NbS are considered. The specific site area is identified below in Figure 1.

Figure 1 The study area within the Ta'Qali Recreational Park (within the red square)

2. Key policy goals and general strategy

The Ta'Qali Commercial Area is designated as a recreational area and should combine a range of formal and informal activities for the general public and tourists. According to the Ta' Qali Action Plan, land uses in the area must shift or be retrofitted to provide new and existing recreational and sports uses. New as well as existing buildings must minimize negative aesthetic impacts on the surrounding cultural heritage landscape (i.e., Mdina hilltop, agricultural land) by following maximum height and façade design regulations (e.g., green roofs and walls, vegetated buffers).

Land uses in the area should favour socio-economic and touristic development through environmentally friendly and sustainable. The interventions aim to protect and improve open public spaces, contain low-impact uses (e.g., food and drinks, supermarkets, clinics), and remove incompatible ones (e.g., industry, large storage facilities). The intervention is in line with key policy objectives of providing recreational opportunities, open public spaces, and local facilities. Moreover, the proposed interventions in this plan include an integrated design with nature-based solutions; these contribute to environmental conservation objectives and provide the general public with quality green space for recreation. This public space will accommodate commercial opportunities for local small businesses and entrepreneurs. The proposed interventions for the redevelopment of this area are sustainable and consider Malta's climate and water availability issues (both in terms of flooding and droughts).

3. Proposed interventions

Proposed interventions can be broken down into two main groups. The first group relates to water management and green surface creation, and the second those on the nexus of urban expansion, agriculture, and nutrition. As for the first group on water management and green surface creation, Malta suffers from heavy storms caused by uncontrolled street surface runoff and flash floods. The first group of intervention below contains several permeable green features. These features help direct water into the soil rather than across non-permeable (concrete) surfaces. These include the green car park, bioswale, green street, rain garden, green roof, and central park elements of the below diagram (Figure 2). More specifically, the rain garden located in the southernmost corner of the site will allow partial treatment of runoff before being discharged into a nearby stream running to the south. This rain garden is composed of a core area vegetated with flood-resistant species. Water is retained and partially treated and then surrounded by native shrubs and trees to improve biodiversity and aesthetics. The rain garden could be additionally used as a water reservoir to be used for supplementary irrigation during dry periods. Each of the other green permeable surfaces mentioned above contributes to similarly reducing flooding impacts, with the additional benefit that the water can be stored both to irrigate the surrounding area and be also used in times of drought. Ta'Qali Commercial Area is located at a certain distance from the city center and the residential area, so public transportation and parking areas are needed, to make it more approachable to visitors. Parking lots often mean large concrete spaces which contribute to increase of temperatures making it less comfortable for visitors. Therefore, we proposed parking lots and pedestrian corridors which include previous surfaces (combination of low grassy vegetation) and trees (e.g. Laurel or Holm oak) which provide shade and contribute to microclimate and human thermal comfort regulation. For achieving energy efficiency, we also proposed usage of bio-solar roofs, which include low vegetation (contributing to biodiversity) and solar panels (contributing to the usage of renewable energy). For public transportation, we also suggest usage of green-roofed bus stations which can also provide mini habitat and contributes to temperature regulation, as well as green-roofed vehicles (buses), which can contribute to thermal comfort by reducing the indoor and outdoor temperature.

Figure 2 Proposed interventions within the Ta'Qali Recreational Park

As aforementioned, water is an important and scarce resource due to the arid Mediterranean climate. Therefore, proposed vegetation should be the one that is native to the island, as well as aesthetically pleasing while allowing for the provision of all ecosystem services. As the most significant proposed nature-based solution, Central park is planned and designed with Mediterranean vegetation adapted to local climate. It is composed of trees such as carob tree (*Ceratonia siliqua*), olive tree (*Olea europaea*), holm oak (*Quercus ilex*), and aleppo pine (*Pinus halepensis*). Shrubs are represented with sandarac tree (*Tetraclinis articulata*) being Malta's national tree, laurel (*Laurus nobilis*), and scented species such as lavender (*Lavandula angustifolia*) and rosemary (*Rosmarinus officinalis*). The ground layer of the proposed solution predicts native and endemic grasses and flowers. All of the proposed vegetation simultaneously allows for learning about native island's vegetation for residents and tourists alongside microclimate regulation. Concerning ecosystem services, the proposed vegetation is multifunctional i.e., vegetation with edible fruits provides provisioning ecosystem services, regulating services are expressed with the carbon cycle, microclimate regulation, and water cycle, supporting ecosystem services with photosynthesis and cultural ecosystem services with their aesthetics, recreational, and learning possibilities. The central park area is directly linked to the proposed local market by providing local fruits from trees and shrubs with edible parts making it a sustainable solution with bioeconomic principles.

The succession buffer around the area of interest is a dynamic green buffer and space for the natural regrowth of natural vegetation. While it encircles a commercial area and separates it from surrounding space simultaneously, this is a dynamic and ever-changing green area. Proposed succession buffer is a

long-term solution because succession is a long-term process. Nevertheless, it allows for residents and tourists to enjoy an everlasting and ever-changing environment. Pioneering species are proposed for initial planting into green buffer areas, and from that point, the process is left to nature. Another important implication of this nature-based solution is enhancing biodiversity in the area and learning possibilities for residents and tourists.

The remaining interventions identified above in Figure 2 belonging to the second group of interventions on the nexus between urban expansion, agriculture, and nutrition are the local market and allotments/cafes to be placed on the north end of the site. Urban expansion in Malta, as with the rest of the world, has placed increasing pressure on agricultural and ecological systems. In the 1950s, the world's total population was approximately 800 million in urban centres, with most of the global population occupying rural settlements. By 2050 however, the expected global figure for urban dwellings is expected to reach 6.3 billion. This shift from rural to urban dwelling is of concern and places greater demands on natural resources. Urban agriculture increases the self-sufficiency and resiliency of cities and can deliver positive social and environmental benefits.

The commercial area of Ta' Qali has the opportunity to positively impact the highly urbanised country of Malta using innovative technologies addressing issues of urban expansion, need for agricultural land, and improved nutrition simultaneously. Firstly, Malta has, along with many parts of the Mediterranean, water shortage issues. The Maltese water shortage is an area that constantly needs management, particularly with food production and agriculture. The Ta' Qali commercial centre with proposed roof gardens will address some of this need with hydroponically grown foods that require less water and no soil. With a focus on city environment and food security for urban population expansion, the Ta' Qali commercial centre can benefit from using Urban Hydroponics to improve the Ta' Qali area and Malta. Urban Hydroponics are designed for physical and psychological indoor and outdoor activities. They give the potential to create a supply of diversified healthy fruits and vegetables without transportation.

In addition, Malta has currently seen a dramatic shift in the counties diet over the last two decades. The nation has moved from a traditional diet to a 'western' diet and has seen a significant rise in obesity, type two diabetes, chronic respiratory disease, and cardiovascular disease, with an increased risk of mortality from non-communicable disease. Nutrition is central to health, and an improvement in diet would reduce many of these dietary-related issues. The proposed development in Ta' Quli of food grown by technology would give a yearly supply of healthier foods. In conjunction with policymakers, this would offer a solution to aid in tackling dietary conditions.

Malta has also seen a shift in food production, which has moved from traditional goat breeding towards industrial dairy production through the massive utilisation of imported animal feeds. By growing foods with high protein, Malta would also have the opportunity to explore the large volume of animal feed imports and mitigate this through projects such as that suggested in the Ta' Qali commercial centre. Urban agriculture should be a key consideration for the Ta' Qali redevelopment.

Food provision	Shade	Aesthetic appreciation	Freshwater provision and purification	Flood management	Habitat creation	Climate control	Recreation

Selected NBS	Description	Ecosystem Services delivered
Green roofs	Grow different plant species on top of selected buildings.	
Succession buffer	Vegetated margin consisting of native shrubs and trees.	
Raingarden	Vegetated area in which water is temporarily retained, partially treated and slowly released.	
Bioswale	Vegetated channel where runoff is conveyed and partially infiltrated / treated.	
Green car parking	Permeable surfaces and trees providing shade.	
Central park	Multi-purpose green space.	
Renatured channel	Vegetated ephemeral channel conveying runoff to nearby stream.	

Figure 3 Summary of ecosystem services provided by each proposed NBS element of the site

On the level of ecosystem services, each proposed NBS element may provide several. Potential ecosystem services include food provision, shade, aesthetic appreciation, freshwater provision and purification, flood management, habitat creation, climate control and recreation. These are summarised per element in the above Figure 3.

4. Planning instruments and stakeholder analysis

In order to implement the proposed NBS on the site, several different planning instruments should be used depending on the type of NBS. In order to make the public able to co-create and accept any actions taken, these should be informed by stakeholder input. Regarding planning instruments to be used, many of the interventions in the first round of proposed NBS on water and green space management could be done through imposing quantitative standards and standards for the development of the site. In addition to these, performance-based zoning rules, technological and design-based site specifications, could also be used. Specifically, these could, for example, require that a certain percentage of the surface area of the site be dedicated green space (quantitative standards) or that certain ecosystem services be maintained and protected in some regions of the site (performance-based zoning). Further, developers could be required to use green permeable design elements or place a certain amount of trees in the case of the car parking area, an example of technological design requirements, or that each identified green

feature be designed such to enhance habitat interconnectivity on the site as design-based site specifications.

As for the remaining second group of proposed NBS on the site, these could mainly be achieved through subsidies and specification of guidelines or criteria for the sites design. Regarding subsidies, given that these interventions primarily relate to businesses (cafes, markets), subsidies for certain kinds of (green) businesses could be offered to attract suitable commercial partners to the site to operate their businesses. Tax advantages or similar could be offered for installing and maintaining certain green features of these commercial sites, for example, the green roofs and agricultural areas. The specific content of these actions are provided for by guidelines by developers and further encouraged through subsidies.

The exact content of these planning instruments ought to be informed by robust stakeholder participation and co-creation to ensure that the public are informed of the proposed interventions and provide their input into the design and implementation of these solutions. As preliminary steps to this stakeholder consultation process, stakeholders should first be identified, and their relative interest and level of influence on outcomes should be analysed. This is done to identify whose interests are at stake, who has the power to affect these interests, and where power imbalances may arise. For this suite of interventions, several main stakeholders are identified: politicians, businesses, planners and practitioners, environmental NGOs, public and civil society, and tourists. In below Figure 4, these are placed in a matrix of their respective levels of interest in the development (low to high) and level of influence in decision-making (low to high).

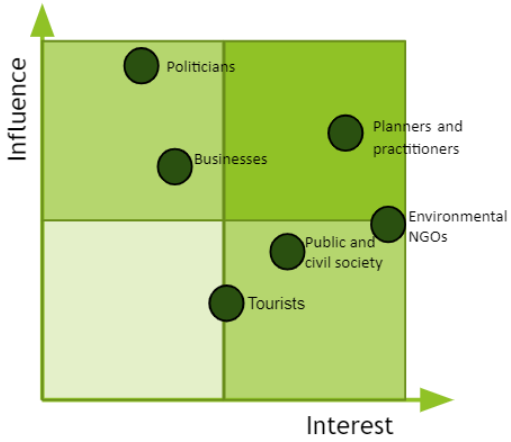

Figure 4 Influence and interest matrix of identified stakeholders

As can be seen, several potential imbalances appear; for example, that politicians are identified as having a high level of influence but relatively low interest in the matter, while the public have a high interest yet lower levels of influence. This power asymmetry highlights the need for meaningful stakeholder input at each level of the project, from design to implementation.

Another way of digging deeper into these issues is to conduct a multi-criteria decision analysis (MCDA). This requires that each stakeholder is assigned a quantified level of interest in a given criteria relating to a particular aspect of the intervention in terms of the utility it provides them (0-100), which is tempered by the level of importance it has to them (between 0 and 1.0). Each of these aspects relates to social, environmental, and economic criteria to evaluate the given intervention. A final value is then produced by the multiplication of the relative level of utility provided by each of these criteria and the level of importance they attach to it. This allows for the quantification and deeper analysis of which aspects of the intervention each stakeholder finds the most critical and structure further stakeholder inclusion.

Below, Figure 5 shows the results of a hypothetical MCDA conducted for the proposed interventions, including the stakeholders mentioned above. The social, environmental, and economic criteria used as a unit for analysis were connecting with nature & people (social), micro-climate management (environmental), and commercial facilities / opportunities (economic). From the figure, the relative distribution of interest in these criteria is visualised for each stakeholder. For example, it can be seen that politicians have the overall lowest interest in the project; however, their economic interest in the project is the highest among all stakeholders. The public and civil society, by comparison, have a higher level of interest in each of the criteria. Adding to the above interest/influence diagram, we can obtain a more detailed picture of the precise levels of interest in different specific aspects of the proposed interventions. The levels of utility and weights for this were assigned based on assumptions, however, real surveys or focus groups would need to be done to calculate these values in reality.

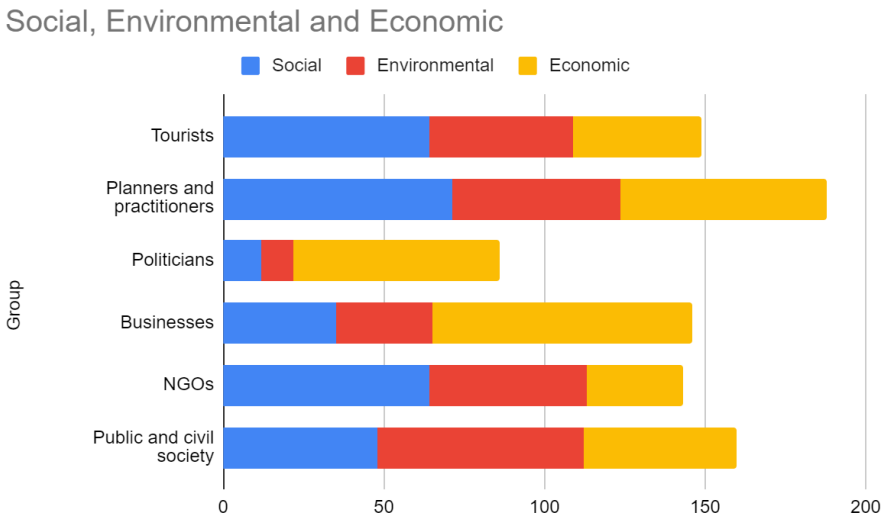

Figure 5 Results of hypothetical MCDA across social, environmental and economic criteria for each stakeholder identified

5. Conclusions

The Ta' Qali commercial area can be rejuvenated to benefit Malta, offering a unique design that respects the Maltese and Mediterranean traditions. While aesthetically appropriate bringing nature to an urban

setting, the design will also address critical issues facing Malta: water shortage, green spaces availability, and health. The rain garden, which is specifically designed to collect water, will complement the roof gardens, which have a low water impact. The creation of bright green spaces will suggest an open opportunity to local and visiting people alike. The harmony of nature and social settings such as coffee shops and markets should give a significant rise to trade and tourism in this area. Spending time in nature will benefit those working in Ta' Qali and those who visit, but the addition of food and plants grown on the roofs of the centre will offer additional benefits. With both industry and education central to the site, the potential for the long-term development of cooperative projects is significant and may have far-reaching positive significance for the Ta' Qali centre and the community.