



A Brief Guide on Public Space Planning, Design, and Maintenance for Small Jordanian Municipalities

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GENERAL INTRODUCTION

This guide is based on the guide that CSBE was commissioned to develop by VNG International as part of GIZ's (Deutsche Gesellschaft für Internationale Zusammenarbeit) 'Improvement of public spaces and Green Infrastructure in Mafrq municipalities' project. The project is part of a broader GIZ programme entitled 'Improvement of Green Infrastructure in Jordan through labour intensive measures' and is commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ). The manual is intended for use by the aforementioned municipalities, but should also be of value to other municipalities in the kingdom.

The guide contains guidance on the design and maintenance of public open space. It also contains an introduction to the concept and benefits of Green Infrastructure. It focuses on the micro-scale (i.e., the design of parks and public gardens, plazas, and streetscapes), rather than the macro-scale (i.e., planning spaces at the level of districts or cities).

The guide draws upon the local expertise of the authors in the design of public spaces, and also draws upon observations of common design and maintenance practices implemented by various municipalities in Jordan as observed over the years by the authors.

Due to the short length of the document, the focus of the discussion is on simple, easily implementable design and maintenance solutions that are within the reach of the budgetary and technical resources of small and medium-

sized municipalities. It addresses what municipalities are currently doing (quantitatively and qualitatively) in terms of the design of public spaces, and how such current practices may be improved using realizable and realistic inputs. This guide document aims to provide such guidance in a succinct and easy to use format.

Many of the examples cited in this document are found in the capital Amman. These examples of public spaces are implemented by the largest municipality in the kingdom, the Greater Amman Municipality, and its work is a good reference for both good and poor practices.

DEFINING PUBLIC SPACE AND ITS CATEGORIES

For the purpose of this guide, we define public space as any outdoor space that is open to the public and either owned (or partially owned) by a municipality and / or managed (or partially managed) by a municipality.

A public space comes in many forms and scales, and may be categorized into the following:

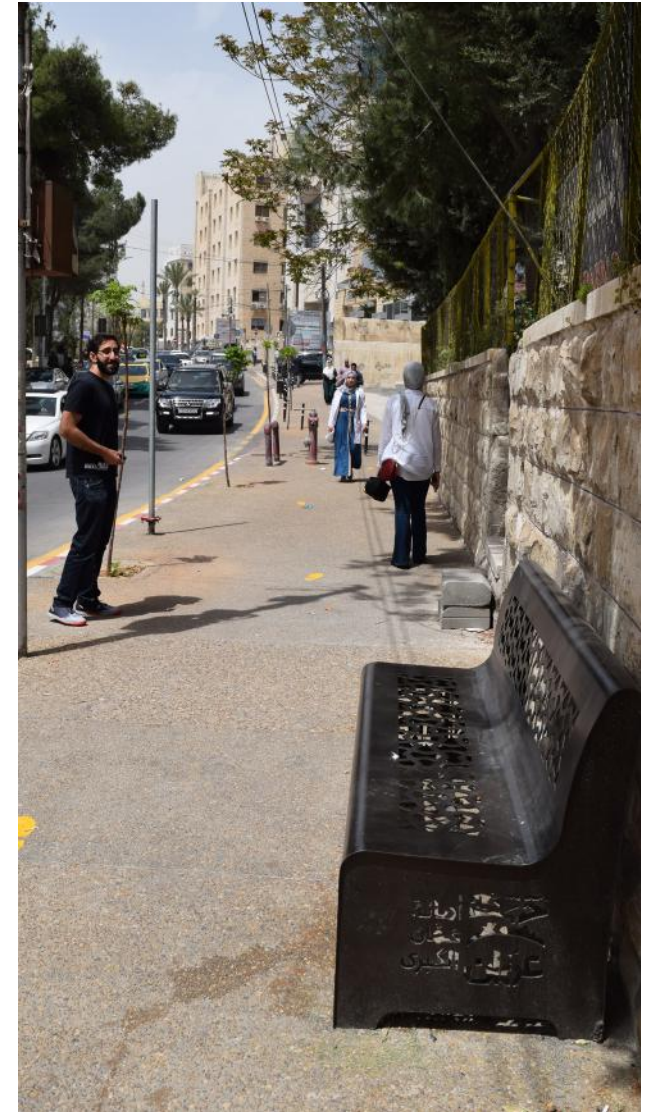
- Streets, stairs, sidewalks, medians, roundabouts
- Plazas, urban pockets (left-over urban spaces reclaimed for public use)
- Pocket parks, neighborhood parks, district parks, regional parks, national parks

Below are photographic examples of the different categories of public spaces.

A. STREETSCAPES



A large landscaped central median in Amman's Jabal al Hussein district.



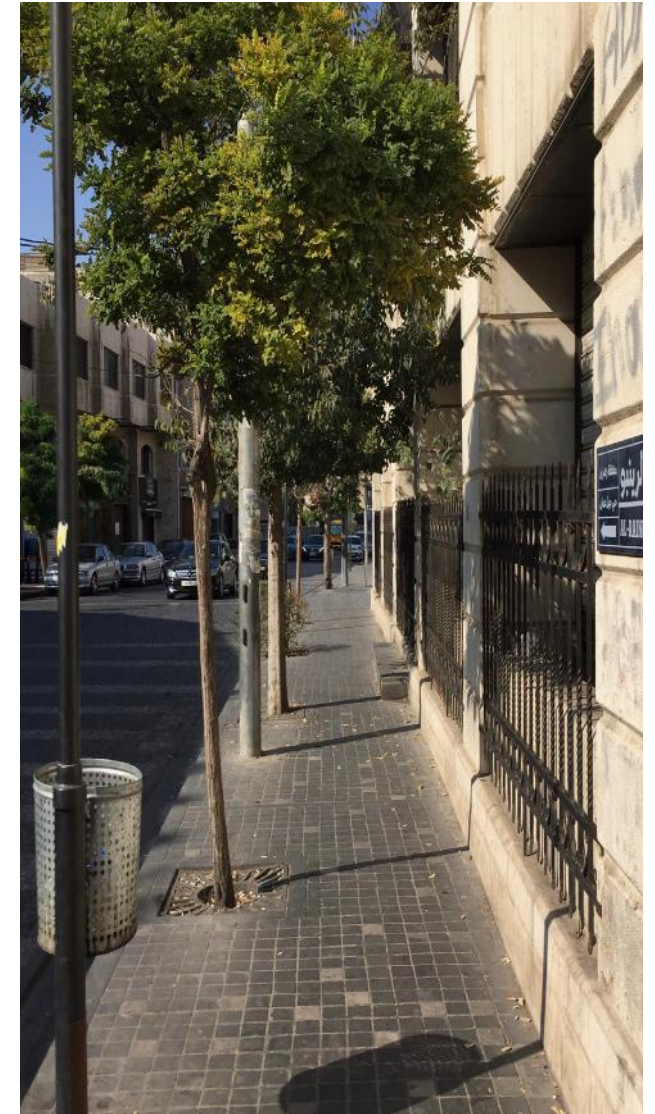
A wide (more than two-meters) sidewalk in al-Khalidi Hospital area in Amman's Jabal Amman district.



An urban stair in Amman's Jabal Amman district.



A narrow (one meter) sidewalk in Amman's Jabal Amman district.



A two-meter sidewalk with successful tree planting along Rainbow Street in Amman's Jabal Amman district.



A traffic circle that takes on the role of a public space in Amman's Jabal Amman district.



Spaces underneath traffic overpasses (in this case, al-'Abdali project intersection in Amman) can also be part of an open space network.



A traffic circle that also takes on the role of an urban plaza in Amman's Abdun district.



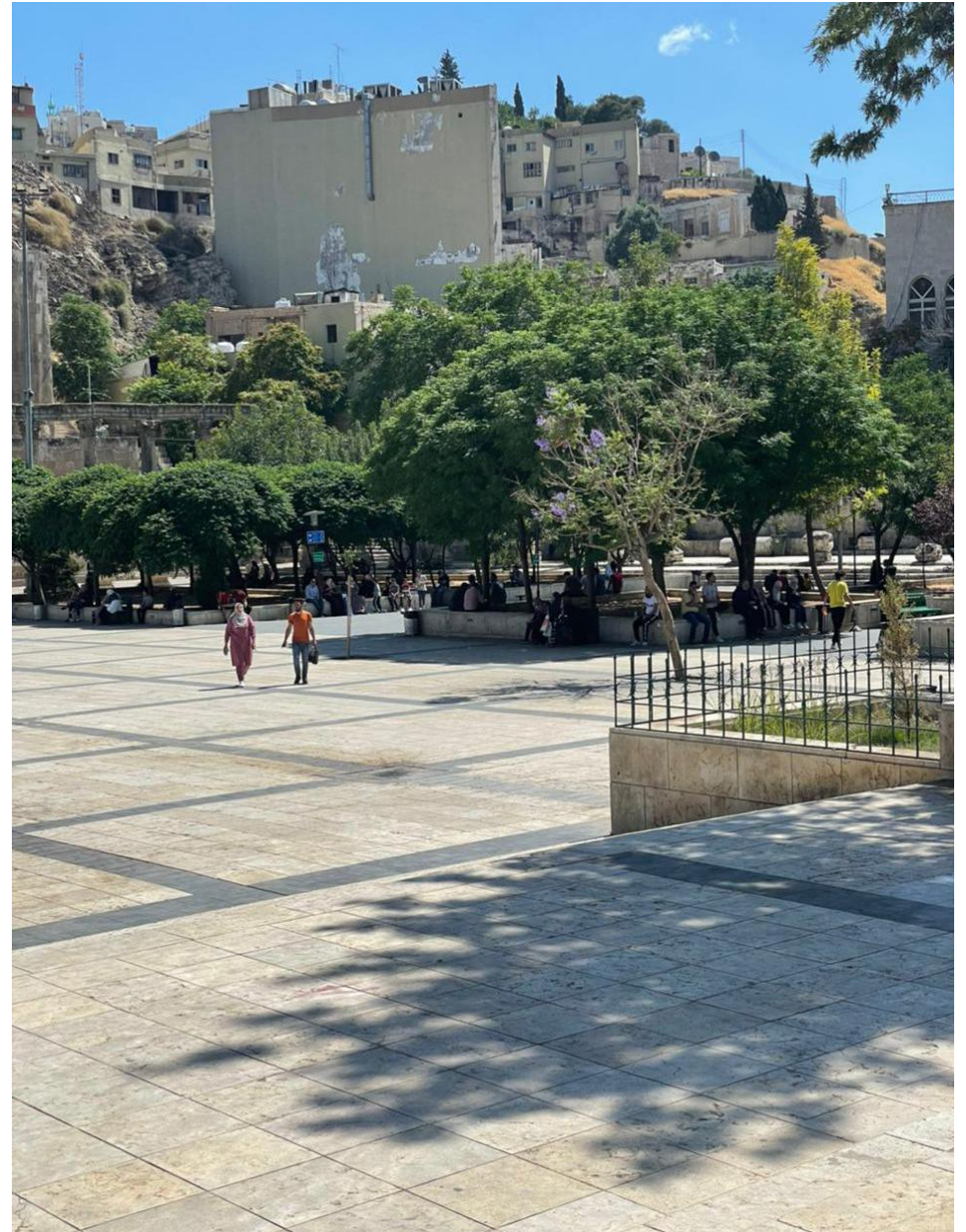
A traffic circle with green cover in Amman's Abdun district.

B. PLAZAS AND URBAN SPACES





The Hashimiyah Plaza in downtown Amman is an example of a large urban plaza.





An urban pocket along Rainbow Street in Amman's Jabal Amman district.





A small urban plaza along Rainbow Street in Amman's Jabal Amman district.

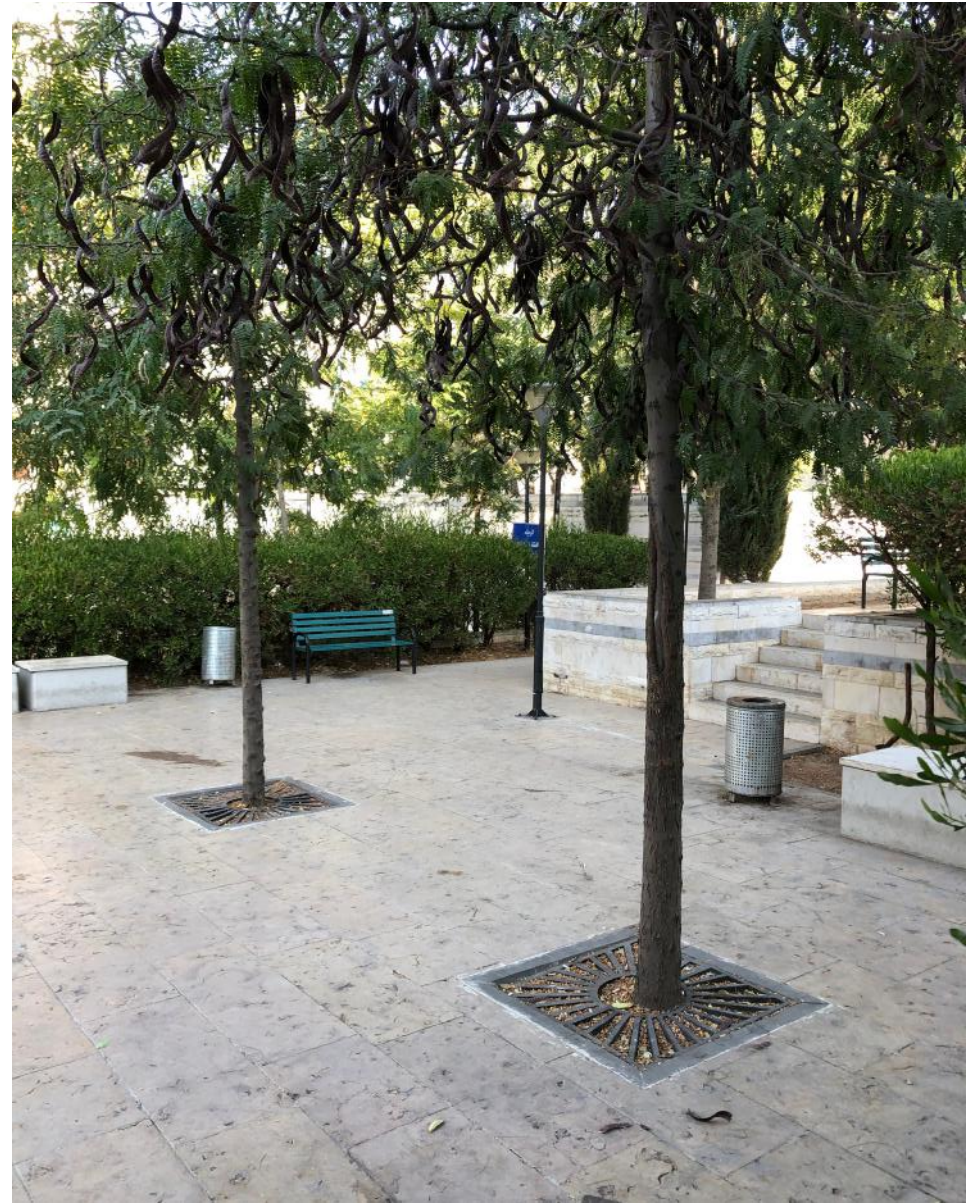


C. PARKS





A pocket park along Rainbow Street in Amman's Jabal Amman District.



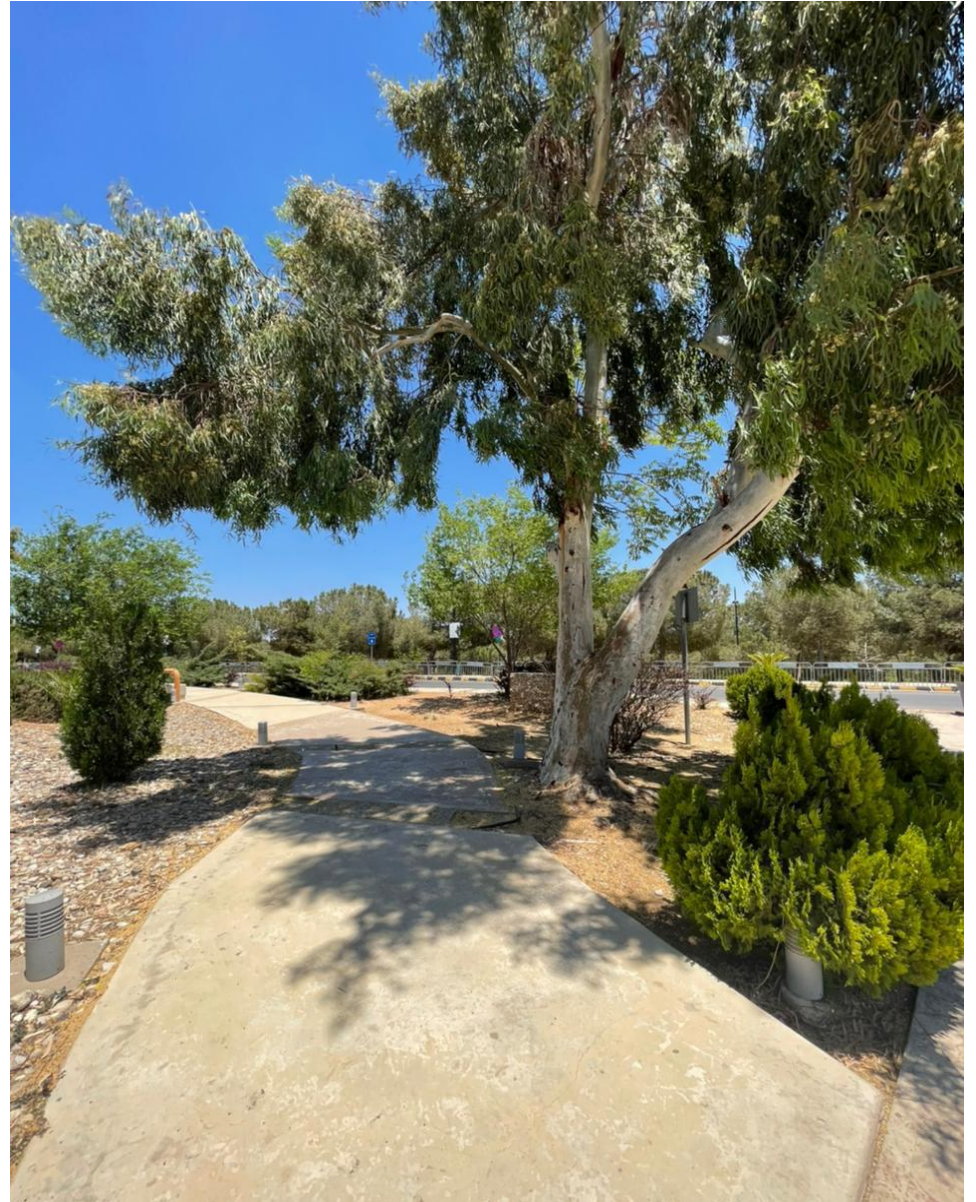


Princess Rahmah Park, a neighborhood park in Amman's Khalda district.





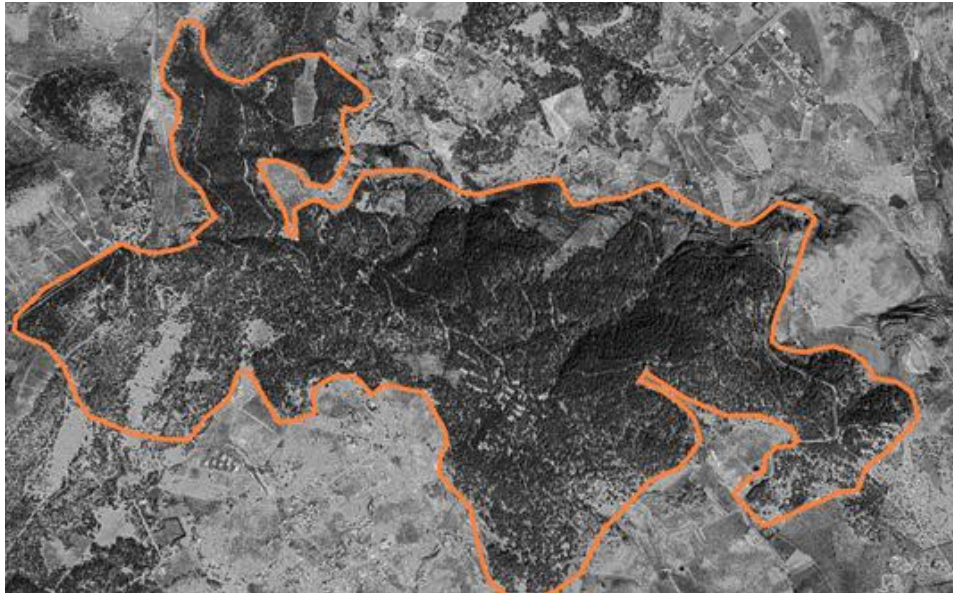
King Hussein Park: A district park in Amman.





Amman National Park: A regional park in Amman.





Dibbeen Forest Reserve: One of Jordan's most visited national parks.





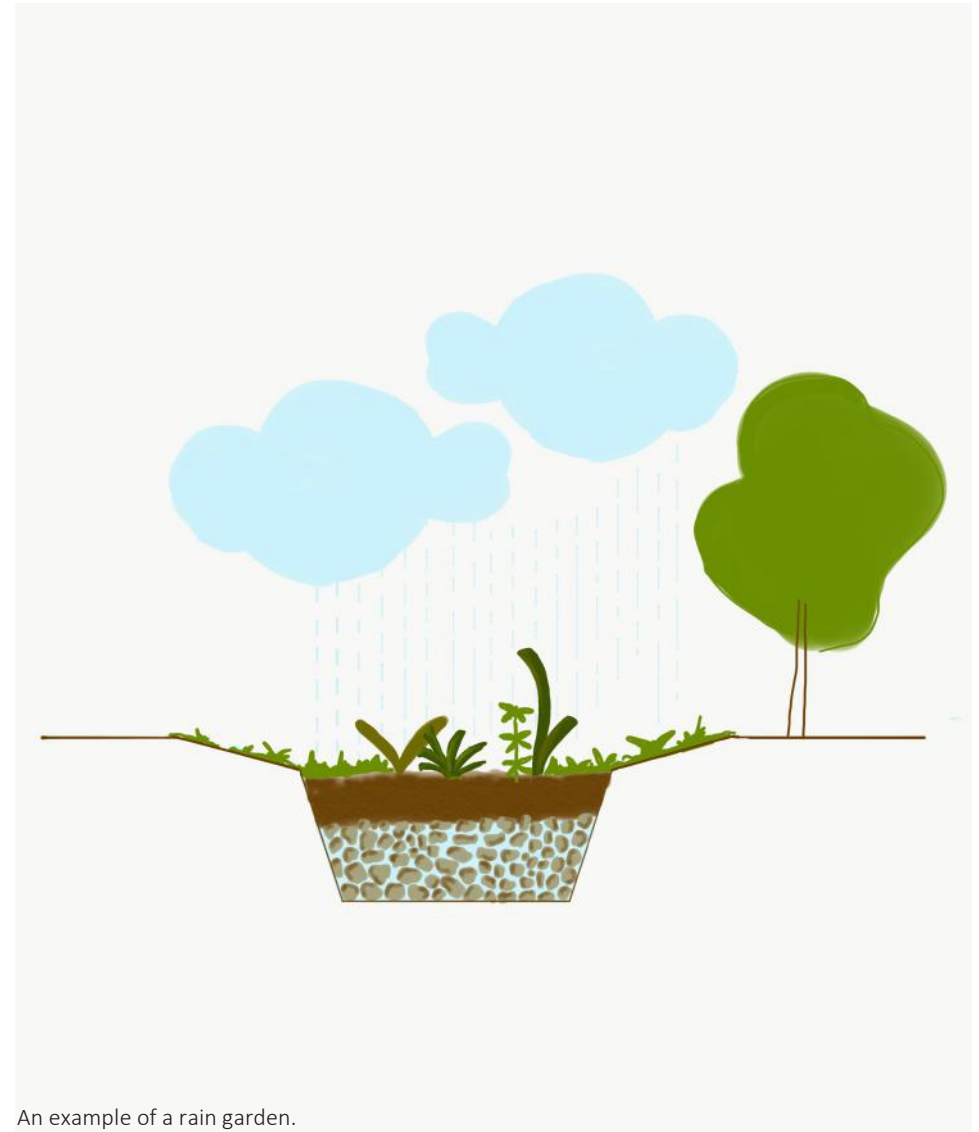
AN INTRODUCTION TO GREEN INFRASTRUCTURE

Public space is a significant part of a municipality's Green Infrastructure (GI) network. GI networks are vital to cities and are defined as follows:

Green Infrastructure can be broadly defined as a strategically planned network of high quality natural and semi-natural areas with other environmental features, which is designed and managed to deliver a wide range of ecosystem services and protect biodiversity in both rural and urban settings. More specifically GI, being a spatial structure providing benefits from nature to people, aims to enhance nature's ability to deliver multiple valuable ecosystem goods and services, such as clean air or water. (European Commission, Building a Green Infrastructure for Europe, Brussels: European Union, 2013, p. 7. Available at https://ec.europa.eu/environment/nature/ecosystems/docs/green_infrastructure_broc.pdf.)

Green Infrastructure categories

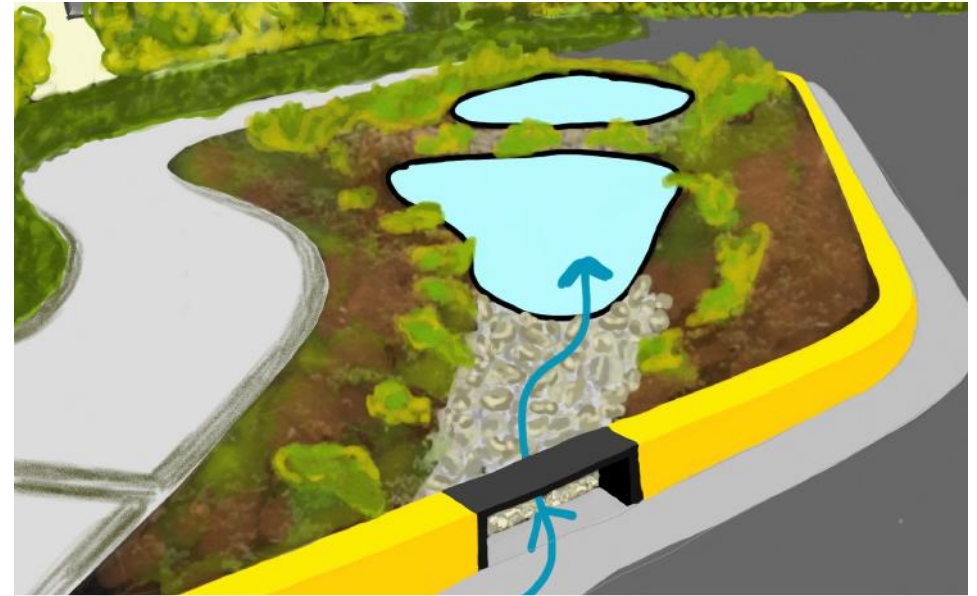
- Protected areas, wildlife reserves (i.e., Dana Biosphere Reserve, Shawmari Wildlife Reserve).
- Urban forests (i.e., King of Bahrain Park).
- Undeveloped natural areas (i.e., scrubland, grassland, dunes).
- Flood plains and wetlands (i.e., Jordan and Yarmouk rivers basins, Wadi al-Mujib)
- Vegetation corridors (vegetation-filled areas connecting large parks and / or reserves that otherwise would be disconnected by roads, cultivated land, or urbanized areas. These are vital for connecting wildlife populations).
- Open green space (includes streetscapes and street trees).
- Private gardens.
- Green roofs.
- Bioswales and rain gardens (bioswales are planted depressions that convey water to a collection site as an alternative to traditional storm water systems; rain gardens are bioretention facilities that treat polluted storm water. Both help with groundwater recharge.)
- Water bodies (blue infrastructure).



An example of a rain garden.



An illustration of a wildlife corridor straddling a highway.



An example of a bioswale.

Although vegetation corridors, green roofs, and bioswales are not commonly implemented in Jordan, they are currently being used in a few pilot projects. There is a great deal of overlap between public space and GI. As deduced from the categories above, many GI areas are open to the public and qualify as public space. Private gardens, green roofs on private buildings, and certain wildlife reserves on the other hand, are considered part of GI, but are not open to the public.

Functions and benefits of Green Infrastructure

The conception of green space as merely beautification is prevalent in the context of Jordan. Green is indeed beautiful, especially in arid regions, but Green Infrastructure provides much more than pleasant scenery, and should not be reduced to that. Some of the primary functions and benefits of Green Infrastructure are as follows:

- Ground water re-charge
- Reduction of surface water run-off
- Erosion control
- Increasing soil fertility
- Habitat creation and encouraging species diversity
- Temperature control
- Improvement of air quality

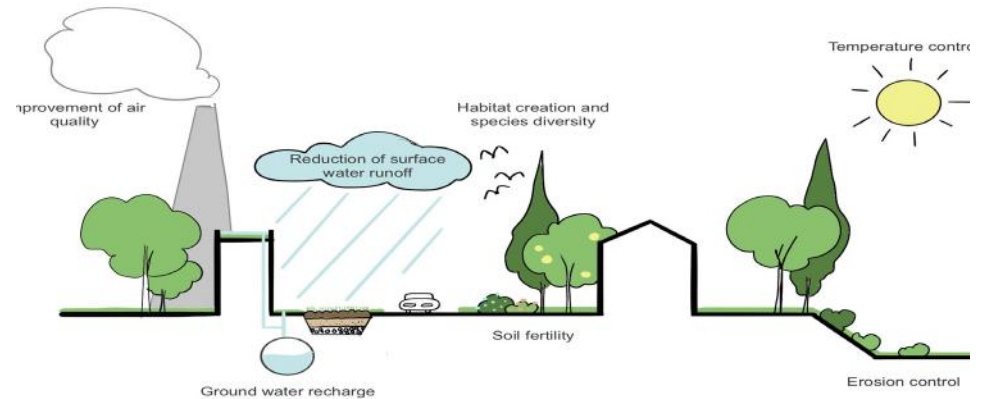
Maintaining, improving, and densifying Green Infrastructure is extremely important and should be a priority for municipalities due to the benefits mentioned above, and also for addressing larger environmental issues such as climate change.

It is recommended that municipalities conduct an inventory of their GI network. The inventory may include the following:

- The area of each space.
- The ownership of each space (public or private). Documenting small private spaces can be an overwhelming task. It is therefore up to each municipality to decide how much documentation of private space is possible.
- The current function of each space (categories may include the following: unused, developed as visual markers, used as a park or garden, used for functions other than those usually connected to public open green spaces ...).
- The current condition of each space (categories may include the following: needs total reconfiguration in terms of function and design; needs complete refurbishment; needs considerable refurbishment; needs some refurbishment; need very little intervention; does not need any intervention).
- Potential functions for each space.

These spaces also should be indicated on a map of the city or through GIS software if available.

It is also recommended to conduct GI inventories before the development and / or rehabilitation of new public spaces.



An illustrated summary of the benefits of green infrastructure.

General principles to consider in the design / rehabilitation of site-specific public space ('public space charter')

The goal of municipalities in providing open space is to develop well-designed and well-maintained public spaces that meet the needs of their users. Successful design and maintenance practices encompass environmentally friendly, sustainable, and inclusive approaches.

A successful public space should:

- Meet the needs of its users in providing recreation, relaxation, and contact with nature.
- Meet the needs of a variety of users in terms of gender and age group.
- Be accessible to all, including people with disabilities.
- Be environmentally friendly in terms of the use of resources (water, energy, upkeep ...).

Planning public spaces

Begin by answering the following questions:

- What public spaces does the municipality own (a Green Infrastructure inventory): Parks, gardens, plazas, wide sidewalks and medians, roundabouts, public stairs, urban pockets, unused plots ...
- Where are these spaces located in the city?
- What is the square area of each of them?
(incorporate the information gathered from answering these first three questions into a map)
- What functions and activities do these spaces provide?

Answering the questions above and incorporating their results into a map will help municipalities identify existing public spaces, the areas in the city that lack public spaces, as well as the functions and activities afforded by these spaces.

It is recommended to ensure that a large number of people are able to access the space on foot rather than through the use of a private vehicle. Check how many people live within a one-kilometer radius around the space (i.e., within walking distance to it). Ideally, municipalities in Jordan should aim at providing each of its residents with about 10 square meters of open space. The current number for Amman, 2.5 square meters per resident, is still considerably below that. (see, UN-Habitat Jordan, Workshop: Localizing the Public Space Toolkit for the Arab States, 15th – 16th July 2020, p. 4).

A common practice adopted by all municipalities in Jordan is to use land already owned by those municipalities to develop public spaces. This land may not be ideally located. Municipalities therefore should also consider land swaps, leasing, and donations so that space can be equitably and conveniently distributed throughout the city. During the planning process, answer the following questions:

- Considering your tight budget, would your priority be to create new public spaces or rehabilitate existing ones?
- What budget do you have for public spaces for the coming year, both in terms of capital expenditures and running costs?
- How many staff members do you have available for caring for public spaces?
- What are their qualifications? What are their tasks (design, maintenance, gardening, cleaning, ...)? As a rule of thumb, for example, every 1,000 square meters of public space area would need four hours a week for gardening, and another four for cleaning. This does not include maintenance work.

Answering these questions will help municipalities identify the financial and human resources that are available and that are needed for developing and maintaining public spaces. Accordingly, priorities can be set and further funding potential can be explored.

One of the biggest limitations for municipalities is the lack of financial resources that may be allocated for public space (both capital expenditures and running costs). In many cities, hybrid funding models are being adopted to sustain public spaces. These include a mix of public funds, public-private partnerships, philanthropy, and earned income through leasing parts of public spaces. Consider and explore possibilities for hybrid funding.

Designing public spaces

Begin by answering the following questions:

- What capacities relating to public spaces do you have inhouse, and what capacities need to be outsourced (design, construction, maintenance, gardening, cleaning, ...)?
- What water irrigation resources do you have available for your public spaces (piped water or water trucks; is the supply reliable? ...)
- What other resources are available to you (equipment, materials, labor)?

Answering these questions will assist municipalities in identifying the human and material resources available to them. Gaps in these resources need to be addressed by outsourcing or by purchasing materials and services.

- To what degree are local communities consulted or involved in the making as well as the upkeep of public gardens (through community meetings, surveys, activity programs, sponsorship programs, ...)? Are they also being consulted regarding their needs?

Community engagement is essential in the design of public spaces in order to meet the needs and desires of their users. Consulting the community in the design and planning of public spaces fosters feelings of empowerment and ownership, and positively contributes to the long-term maintenance and sustainability of these spaces. Fostering relationships with communities and carrying out participatory approaches to design are highly recommended activities for municipalities to undertake.



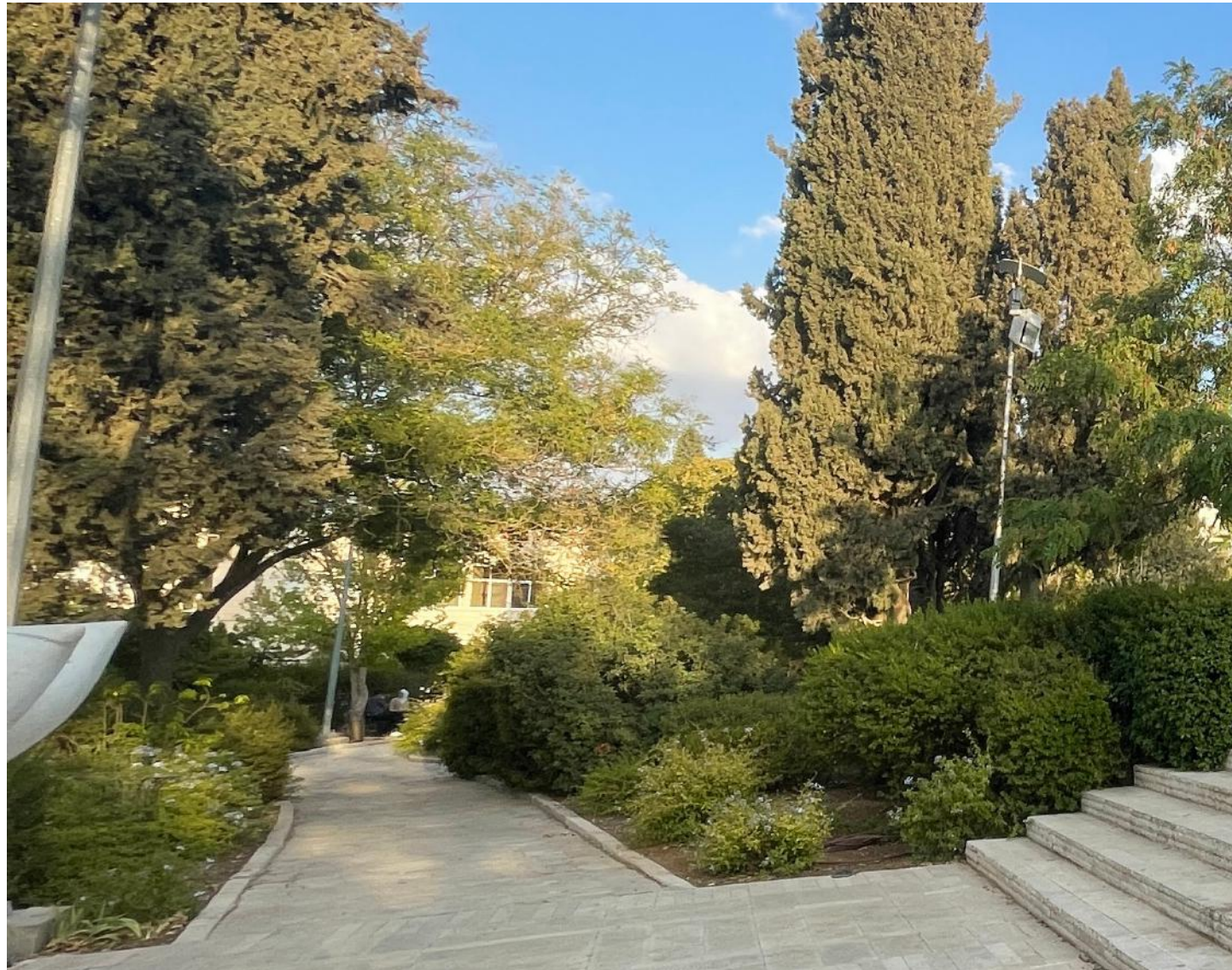
An urban pocket along Rainbow Street in Amman's Jabal Amman district.

Site specific design recommendations

General design guidelines

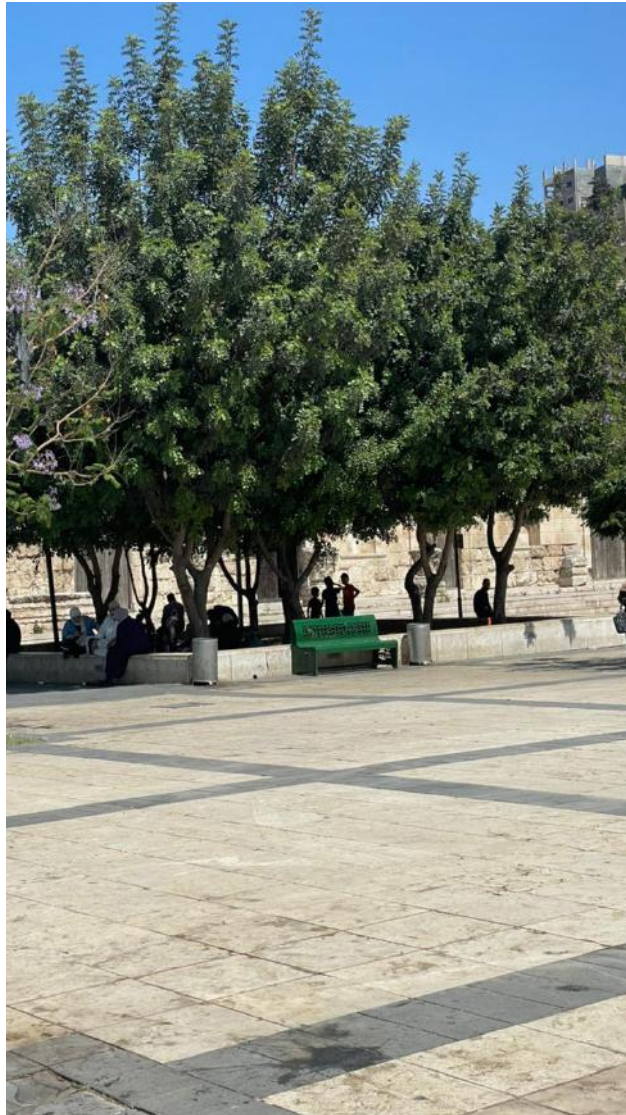
Keep the design of the space as simple as possible. Concentrate on providing areas (mainly paved) where people can comfortably sit and walk, and where small children can play. Include generous amounts of greenery to balance and soften paved surfaces. Use trees to provide shade (especially around seating areas), and shrubs to provide green cover, color, and seasonal interest.

Overly programed spaces can be limiting. Given the scarce amount of available public space and that which may feasibly be provided in the future, it is better to keep spaces as multi-functional as possible. For example, an open paved area with ample shade and seating may be used for both relaxation and planned seasonal activities such as holding markets.



The National Gallery Park in Amman's Jabal al Luweideh district.

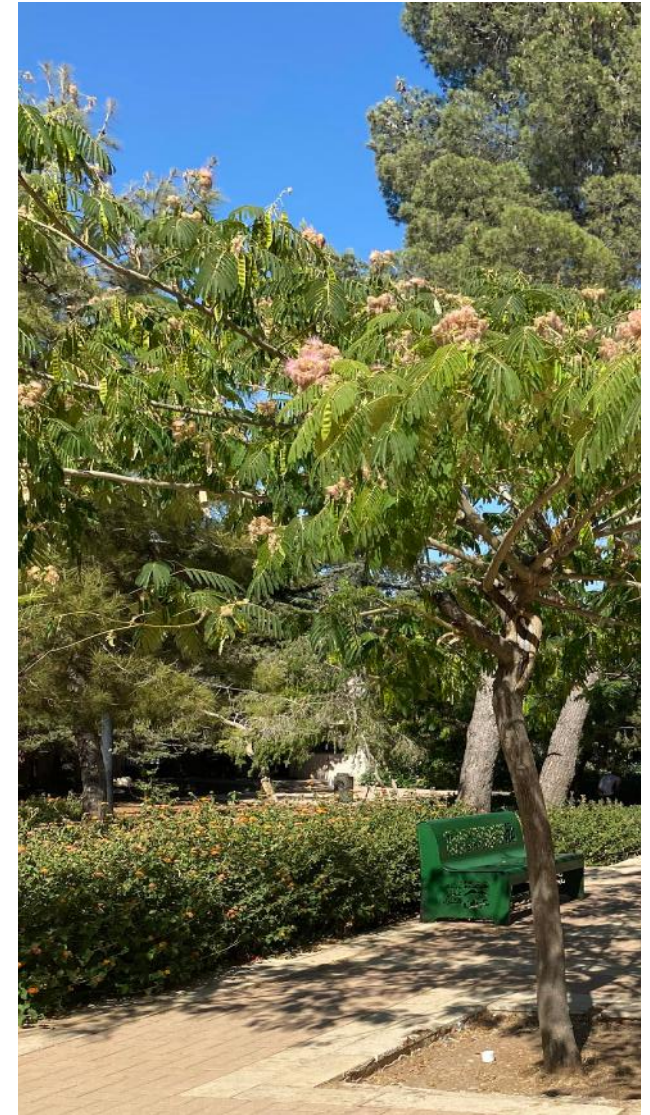




Seating areas shaded by canopy trees in the Hashimiyesh Plaza in Amman.



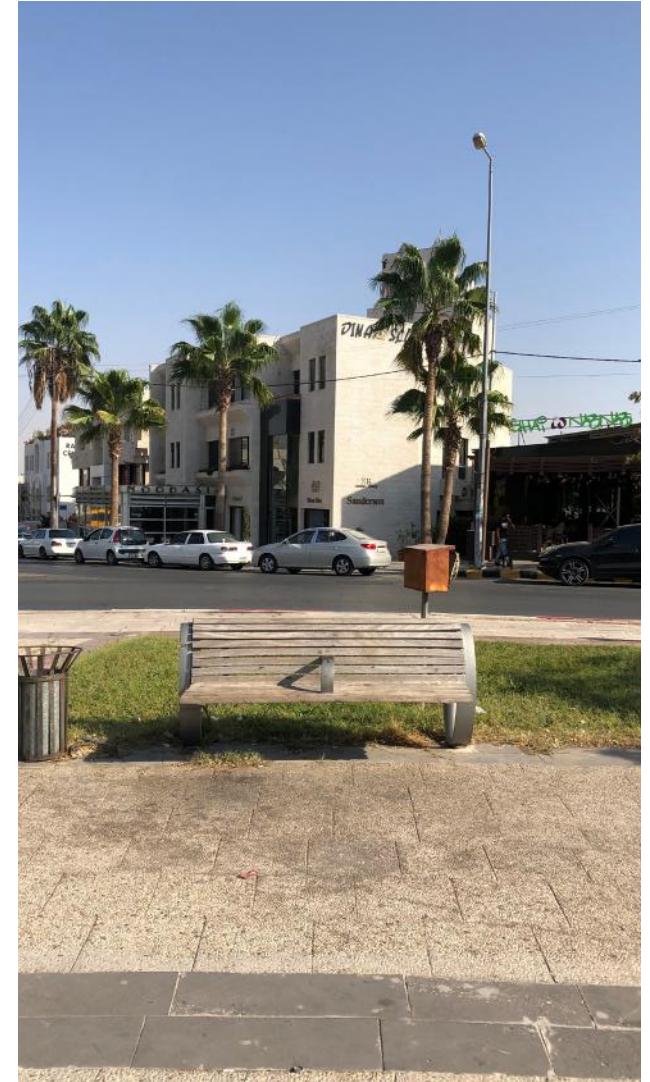
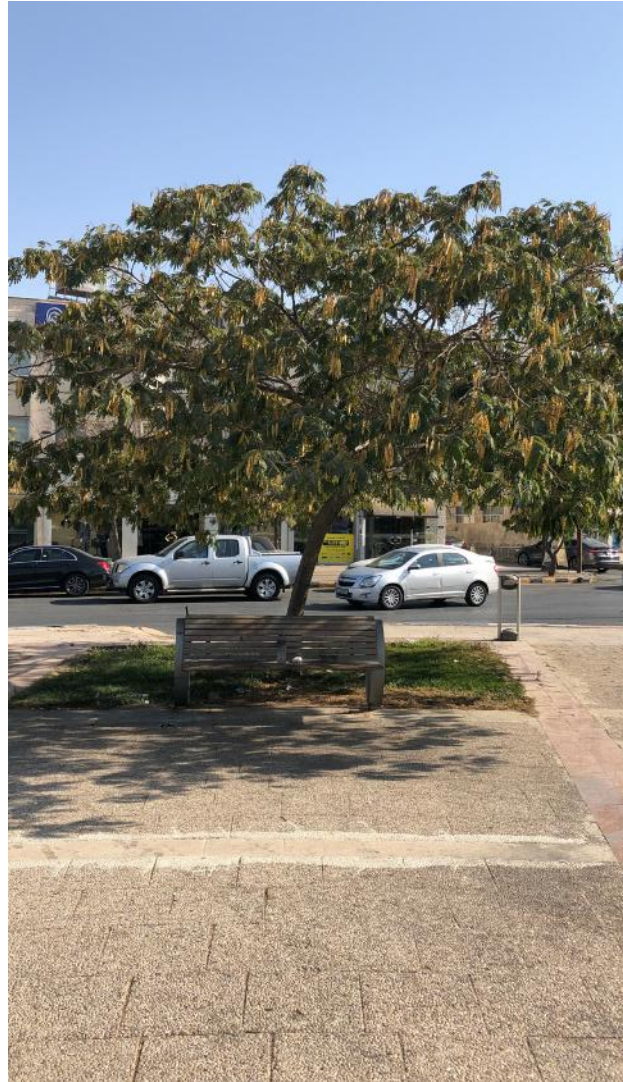
The Second Circle in Amman's Jabal Amman district features canopy trees that shade the main gathering space and also is characterized by a successful ratio of paved to green zones.



A paved area is softened by surrounding it with flowering shrubs and canopy trees at the Zahran Park in Amman's Jabal Amman District.



Albizia julibrissin, which is used here to provide shade in a theater-style seating area in 'Abdun Circle in Amman, is a good choice for a shade / canopy tree. It is drought-tolerant and also has attractive flowers.



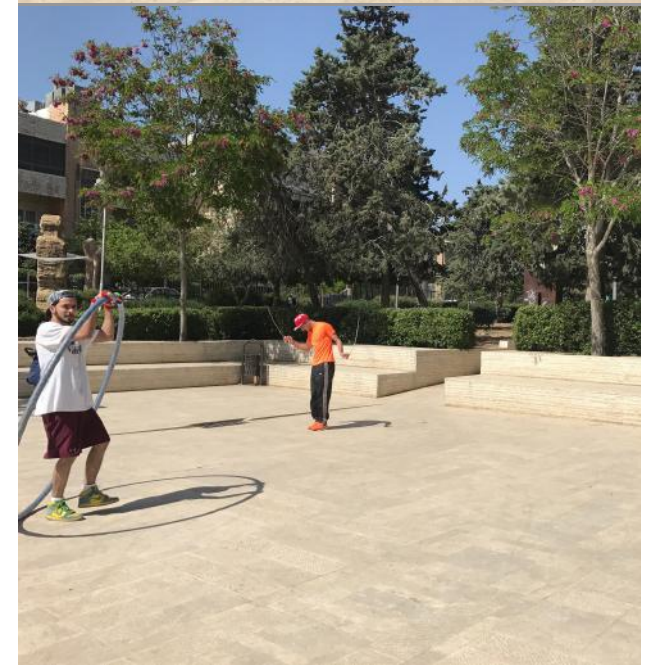
Locating canopy trees near seating areas makes a big difference regarding the comfort level of users. The microclimate around the bench on the left is cooler and more comfortable than the microclimate around the bench on the right. Location: 'Abdun Circle.



Benches in need of shading (and maintenance) at the Princess Rahmah Park in Amman's Khalda district. Canopy trees would be an ideal addition here.



A successful gathering and seating area in Zahran Park in Amman's Jabal Amman district. The harshness of paved surfaces is softened by the use of overhead shading / canopy trees and surrounding green areas. The paving expanse is also mitigated by the use of two paving materials.



A paved open space with canopy trees and different levels of seating in the National Gallery Park in Amman's Jabal al-Luweibdeh district. The space is flexible enough for different types of activities as well as occasional festivals and other functions.

Organizing functions

Make sure to avoid conflicting functions. A highly active group function, such as playing soccer, should not be placed next to an area where people come to sit and relax. In this context, arrangements may be made with schools, for example, to have their grounds open to sports activities outside of teaching hours.

Surfaces

Supply adequate paved areas where people can sit and walk, and where very young children can play. Interlocking paving units are a good option as they do not need a reinforced concrete base, and individual paving units may be easily replaced if broken or otherwise rendered unusable. Use widely-available paving units that may be easily procured from the marketplace if additional or replacement units are needed. Note, however, that materials such as stamped concrete appear to last longer and require less maintenance than interlocking pavements as the surfacing does not contain movable parts. If any excavation or renovation is to be carried out, however, new additions will appear patchy.

Other common available paving materials in the local market include stone, cast-in-place concrete, concrete paving, ceramic/porcelain, and asphalt.

Avoid lawn areas at all costs since they need considerable amounts of water and require considerable maintenance. In areas where only a green cover is required (i.e., not an area needed for foot-traffic) use deep rooting shrubs and ground covers (see next section).

Also, loose stone coverings (gravel or tuf stone) are inexpensive and effective in terms of providing surfaces that do not need irrigation and that can accommodate walking and sitting on benches. They do, however, need to be constantly cleaned and replenished, more so in areas of heavy use.



The upper photo shows loose tuf covering when it was first installed at a private residence in Amman, and the lower photo shows the same area a year after installation.



A pathway paved with exposed aggregate concrete tiles in the Princess Rahmah Park in Amman's Khalda district.



Exposed aggregate concrete tiles, basalt stone, and granite paving materials. Combining stone elements with concrete tiles adds visual interest and is more economical than exclusively using stone paving. The photo is of the paving in 'Abdun Circle in Amman.



A stamped concrete pathway at Zahran Park in Amman's Jabal Amman district.



Exposed aggregate concrete tiles and plain concrete tiles on a side walk along Arar Street in Amman.

Vegetation

Use water conserving plants (trees and shrubs) that need little maintenance. Ideally, use plants that can establish their root systems within three years, and accordingly can survive without irrigation after that. When available, use native plants as many will not need supplemental irrigation after establishment and will also provide habitat for local fauna.

Use tough, low-water-consuming shrubs / ornamentals (include ones with colorful flowers) that easily and quickly spread horizontally in areas where people are not to walk or sit

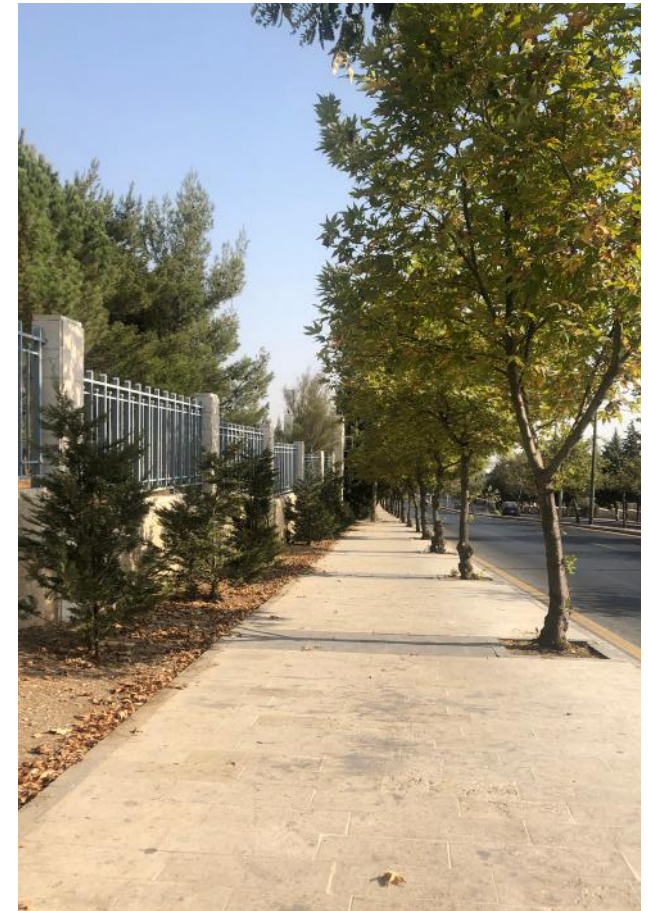
Use drought-tolerant trees with wide canopies to provide large amounts of shade (aim at covering a minimum of 50% of the area of the space). These trees are also suitable for use on sidewalks (see, <https://www.csbe.org/water-conserving-trees-for-sidewalks>).

Use vertically-oriented trees such as *Cupressus sempervirens*, *Pinus halepensis*, and *Casuarina equisetifolia* at the borders of spaces if you wish to create a 'green fence' around the space or to provide visual privacy or a windbreak.

Invest in large fast or moderate growing trees (most municipalities plant small trees that need years to grow and can be easily damaged during that time). Investing and properly maintaining large trees can make a significant difference in a short time span. For streetscapes, shaded areas, and areas where pedestrian circulation is to take place, purchase trees with a trunk height of 2 meters and a trunk circumference of 14 - 16 centimeters. These are ideal in size and relatively economical. Make sure to adequately irrigate trees until they are established.

Trees need supplemental irrigation to get established, especially if planted after the rainy season. During the first year, a tree needs to be irrigated with 25 – 30 liters of water two times a week. During its second year, it needs to be irrigated with 40 liters once a week. Beginning with the third year, when trees usually get established, some trees, such as pomegranates, require 50 – 60 liters of water once a month while others need no supplemental irrigation, such as Cypresses. Native trees such as the Carob usually do not need supplemental irrigation once established. Trees with flowers or crops need supplemental irrigation after their establishment to achieve optimal results.

Refer to appendix 1 for a list of recommended plants.



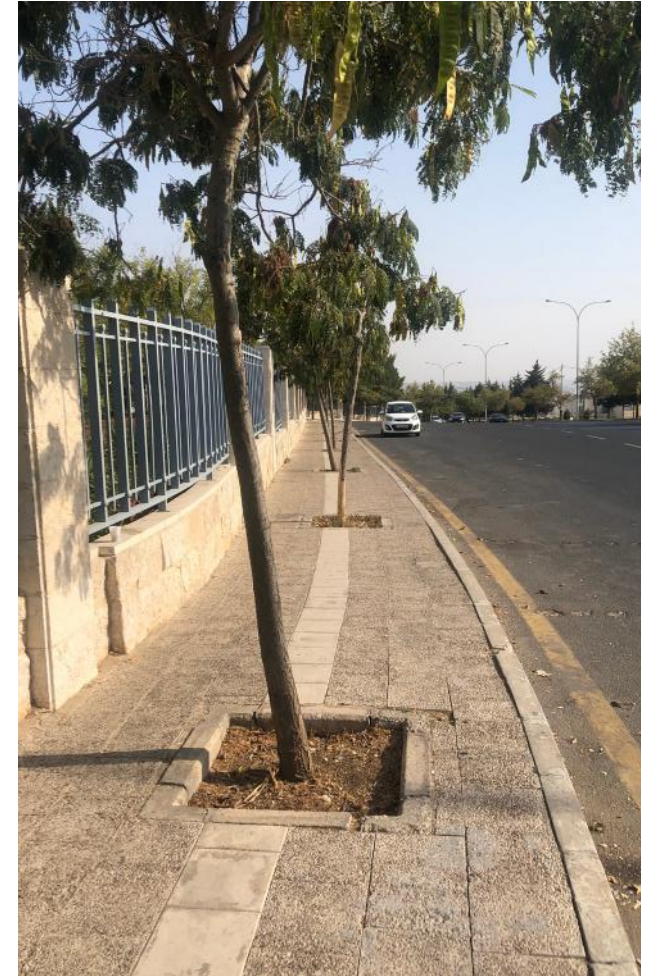
Placing canopy trees at the edge of the sidewalk is good practice and does not obstruct movement. It is important for trees to have a trunk of at least 2 meters in height to allow pedestrians to walk underneath. Note that the planting of *Cupressus leylandii* on the left-hand side of the sidewalk will cause maintenance difficulties in the future. The trees will become too large for the space in terms of width, and will consequently begin to encroach on the sidewalk space. Constant pruning and trimming will be needed, which is not always sustainable in the public sphere. This photo was taken in Amman's Dabuq district.



Canopy trees provide a good amount of shade and are useful in both parks and streetscapes. This photo is of shade trees in the Princess Rahmah Park in Amman's Khalda district.



Canopy trees such as *Melia azadirachta* 'Umbraculifera' are ideal for sidewalk planting. They have a tall trunk that allows pedestrians to walk freely under its canopy; they provide dense shade in the summer; and they allow the winter sun to warm the spaces below. Trees should be placed at the edge of the sidewalk so as not to obstruct circulation. This photo was taken in Amman's Dabuq district.



Placing trees in the middle of the sidewalk obstructs pedestrian movement on them. This photo was taken in Amman's Dabuq district.



Columnar trees (those that have branches starting at the bottom of the trunk) should not be planted on sidewalks as they are a major obstruction to pedestrian movement. This photo was taken in Amman's Jabal Amman district.



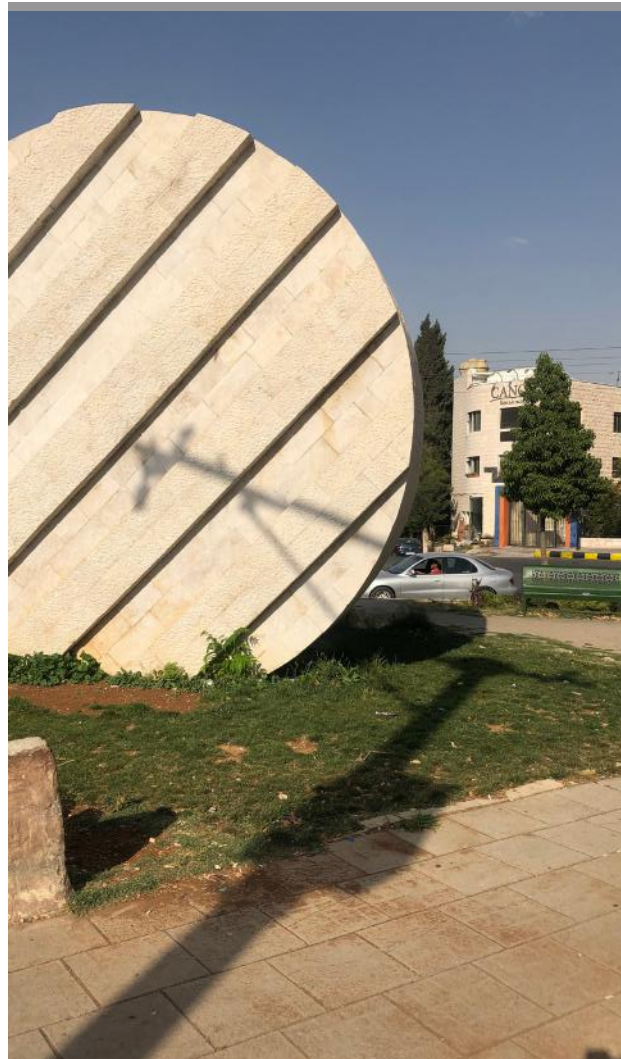
Although potentially attractive in appearance, this type of landscaping is both high in maintenance and water requirements. Grass and shallow rooting shrubs and flowers are difficult to sustain without constant irrigation. Clipped hedges also require increased amounts of water and considerable maintenance. This photo was taken in Amman's Dabuq district.



Deep-rooting drought tolerant shrubs such as Junipers are a good choice for greening street medians and traffic circles. They also only require little maintenance. This photo was taken in Amman's Dabuq district.



It is not recommended to use grass as a visual green cover. This small strip of grass will most likely not be used for seating. It therefore would be better to instead plant drought tolerant deep-rooting groundcovers in this area. This photo was taken in Amman's 'Abdun district.

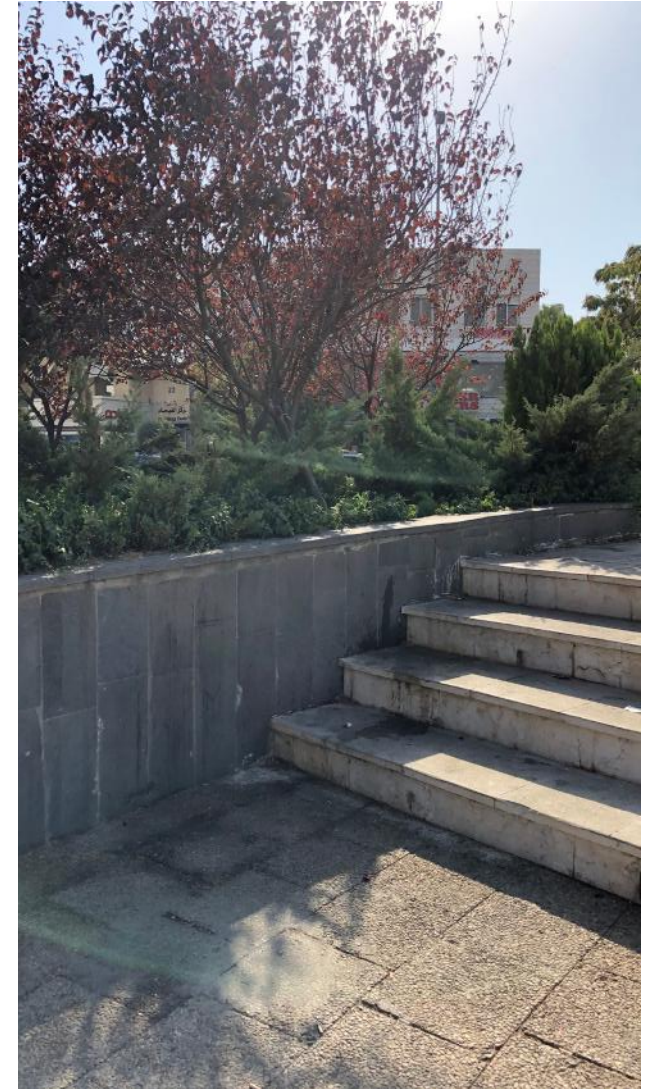


Reduce or avoid using grass. It consumes a lot of water and requires continuous maintenance (cutting, fertilizing, and pest management). This photo was taken in the Second Circle in Amman's Jabal Amman district.





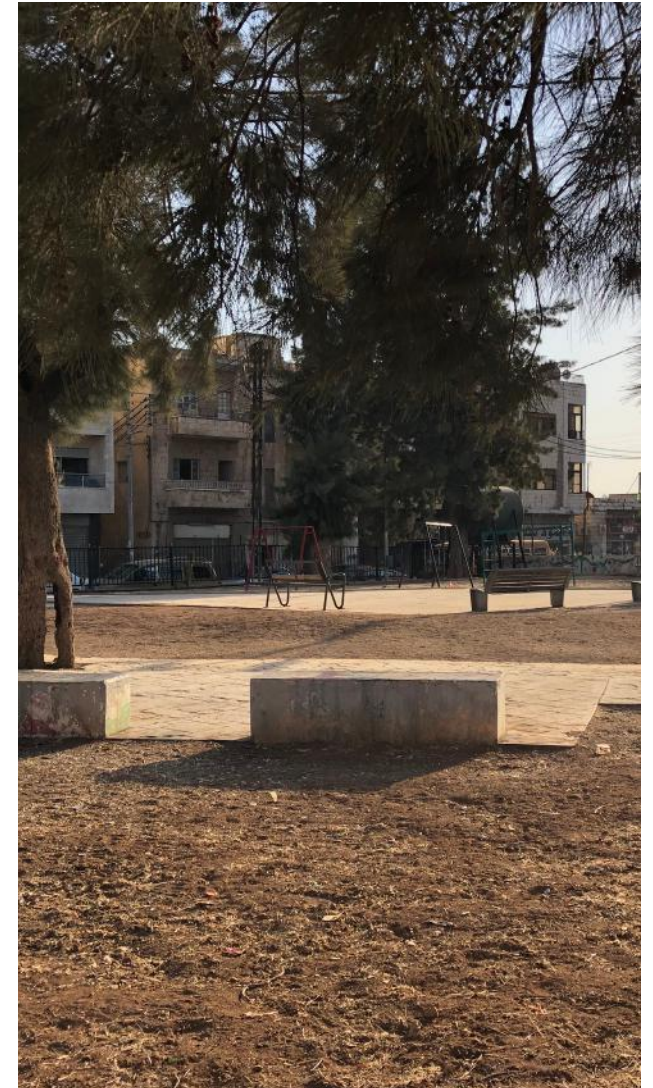
A photo of a lawn area at the National Gallery Park in Amman's Jabal al-Luweibdeh district when it was first installed in 2005 and a photo of the same area in 2020. The grass was difficult to maintain and therefore died a few years after installation.



Drought tolerant plants such as *Juniperus horizontalis* are an appropriate low-maintenance ground cover for public spaces. The variety pictured here has a blue-tone leaf color and creates a nice contrast with the purple leaf of the *Prunus cerasifera* tree. This photo was taken in 'Abdun Circle in Amman.



Although lush green spaces are attractive, maintaining grass on traffic circles is difficult due to their high water demand, cutting / mowing needs, and the pest management required to keep it healthy. This photo was taken in Amman's 'Abdun district.



Investment in trees (both in terms of capital expenditures and running costs) is paramount in public spaces. The area of the old water tower (al-Hawuz) in Amman's Jabal Amman district shown above has been re-planted at least three times in recent memory. Only the trees have survived these replanting efforts.



A successful planting of understory plants that are deep rooting and drought tolerant (*Juniperus horizontalis* and *Plumbago capensis*) at Zahran Park in Amman's Jabal Amman district.



A view of various drought tolerant shrubs and ground covers planted at the National Gallery Park in Amman's Jabal al-Luweibdeh district when it was renovated in 2005. Only a few very tough shrubs have survived over the years. None of the groundcovers have survived.



Drought tolerant trees and shrubs at the National Gallery Park. These large deep rooting shrubs (*Myrtus communis* and *Pittosporum heterophyllum*) have withstood considerable neglect and also mistreatment from users.

Irrigation

Include a drip irrigation system for the plants. This will need some maintenance. It is particularly important that the system is fully functional for the first three years of the life of the plants as this is when they need to be irrigated to establish their root systems.



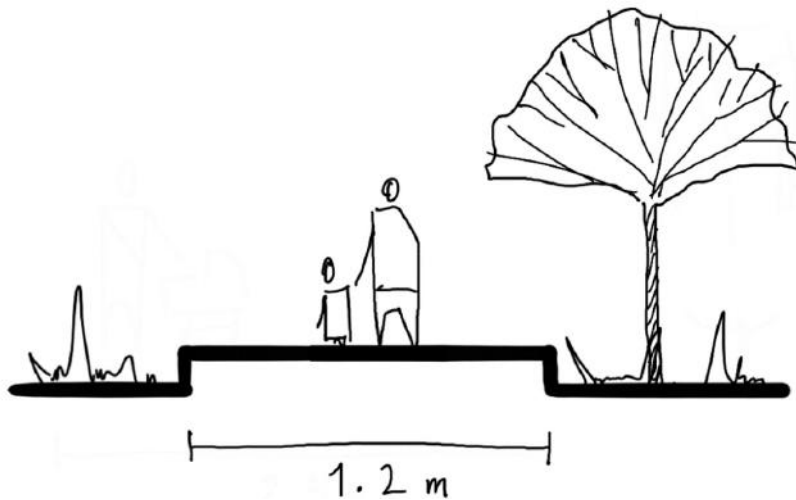
Successful groundcover and shrub planting at Zahran Park in Amman's Jabal Amman district. Installing an irrigation system (even a temporary one) will greatly advance the health and success of planting. Drip irrigation provides water to the root zone in a slow and consistent manner, and also saves water.



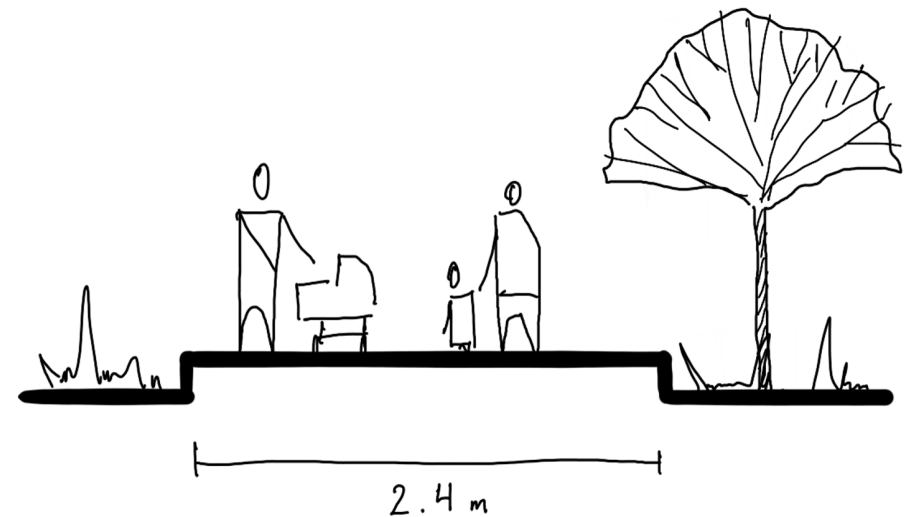
Circulation and accessibility

Accessibility for people of all age groups and for people with disabilities is key in fulfilling the needs of all users. Moreover, all spaces should be accessible to wheelchair users or to people pushing children's strollers. Ramps should have a 1 to 12 or 7 - 8% slope (i.e., a 1-meter rise to a 12-meter run).

It is recommended that pathways be at least 1.2 meters wide and to be as level as possible. To accommodate baby strollers, pathways should be at least 2.4 meters wide.



A sketch showing the recommended minimum width for a pathway

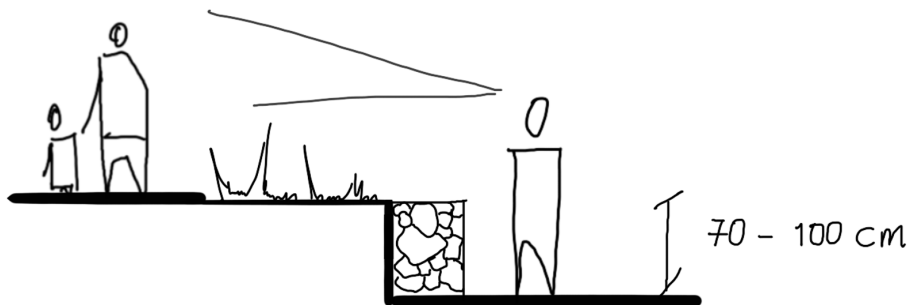


A sketch showing the recommended minimum width of a pathway that accommodates baby strollers.

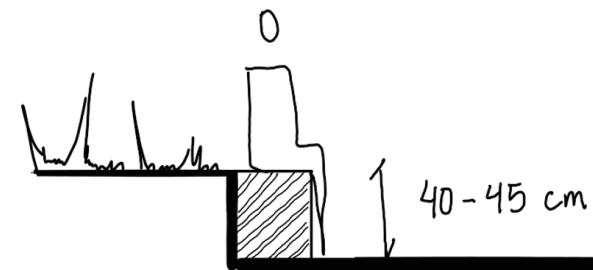
Dealing with level changes and slopes

If your space includes a wide paved area with a significant slope, use retaining walls or drystone walls to separate that area into more than one level.

Keep retaining walls as low as possible. When connecting two spaces located at different levels, the level difference should not exceed 0.70 - 1 meter, which also allows for a strong visual connection between the spaces. Keep in mind that a 45 to 50-centimeter-high retaining wall is visually unobtrusive and can also be used for seating.



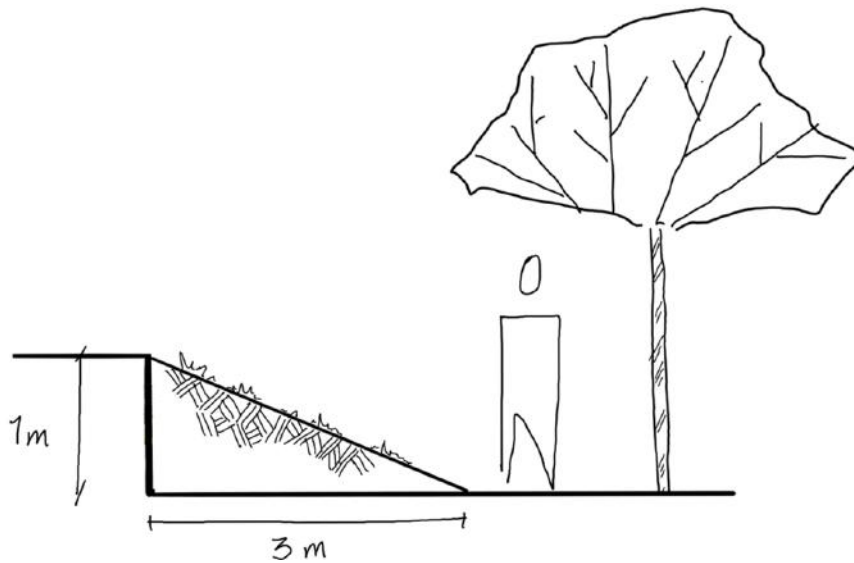
The maximum recommended level change (height of a retaining wall) that allows for maintaining a visual connection between the two levels.



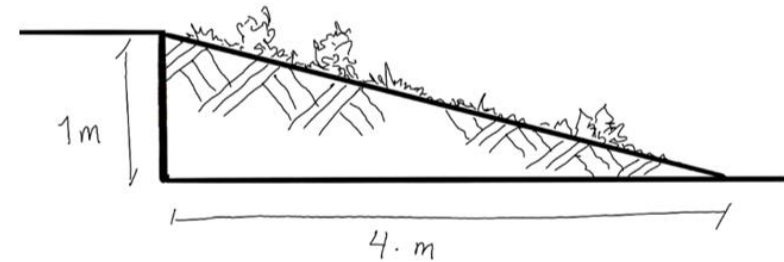
Using a level change (height of a retaining wall) of 40 - 45 centimeters will also allow for the accommodation of seating arrangements.

The separated areas should be linked by stairs and ramps (use a 1 to 12 slope for ramps). Also use rails between these areas for safety.

Level changes can also be achieved using planted slopes. A self-retaining soil slope usually has a maximum ratio of 1 to 3 (or 33.3%, i.e., a 1-meter rise to a 3-meter run). This ranges depending on the type of soil. If the slope is steeper, the soil will be subject to erosion, and a stabilizing element such as geo-grid or steel mesh would be needed to keep the soil in place.



33% is usually the maximum recommended slope for a self-retaining slope.



Planted slopes should preferably not exceed 25%. A 1 to 3 slope is the maximum to be used, but a shallower slope is preferable.

Seating

Provide an ample supply of benches. As a rule of thumb, provide around 1 linear meter of seating for every 8 square meters of area. These should be highly durable and well fastened to the ground. Stone or metal benches are good options. Ensure that they are shaded by trees. Also provide a variety of seating for individuals, couples, and groups.



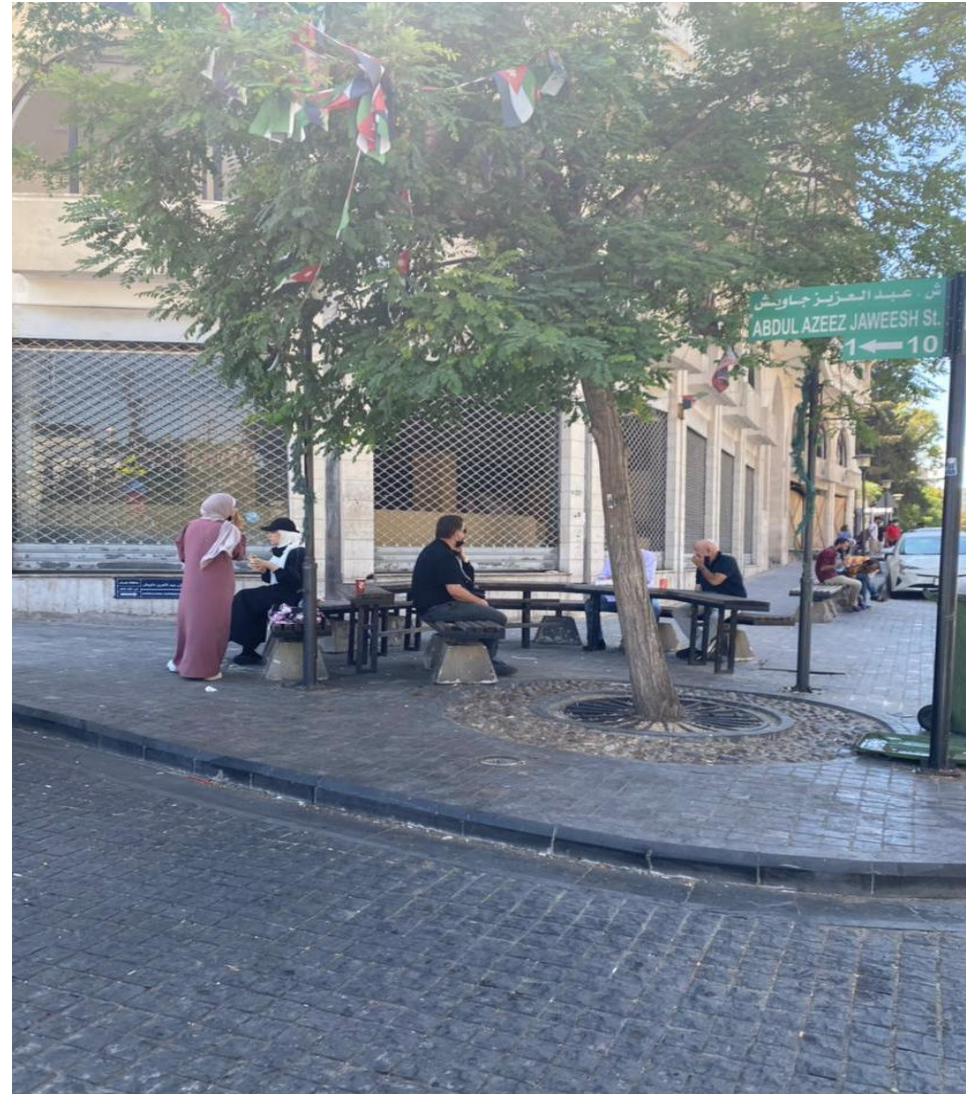
Metal benches fastened to the ground and shaded by trees at the National Gallery Park in Amman's Jabal al-Luwiebedeh district.



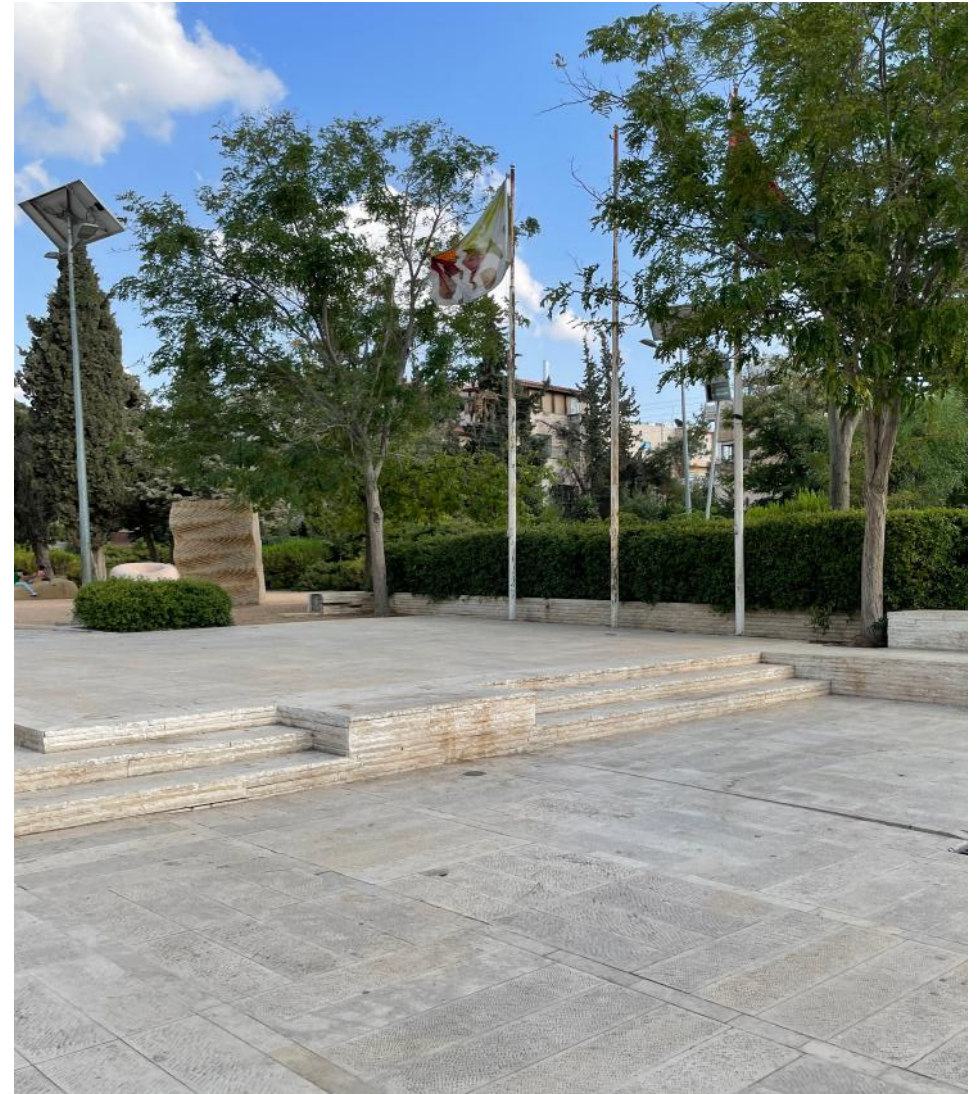
Traditional seats (benches) and low wall provide a variety of seating for all age groups. Photo was taken in Zahran Park in Amman's Jabal Amman district.



Traditional seats (benches) and low seating planters at Zahran Park provide a variety of seating for small and large groups.



Communal seating arrangement along Rainbow Street in Amman's Jabal Amman district.



Different levels of stairs and platforms (that allow for group seating) at the National Gallery Park in Amman's Jabal al-Luweideh district.

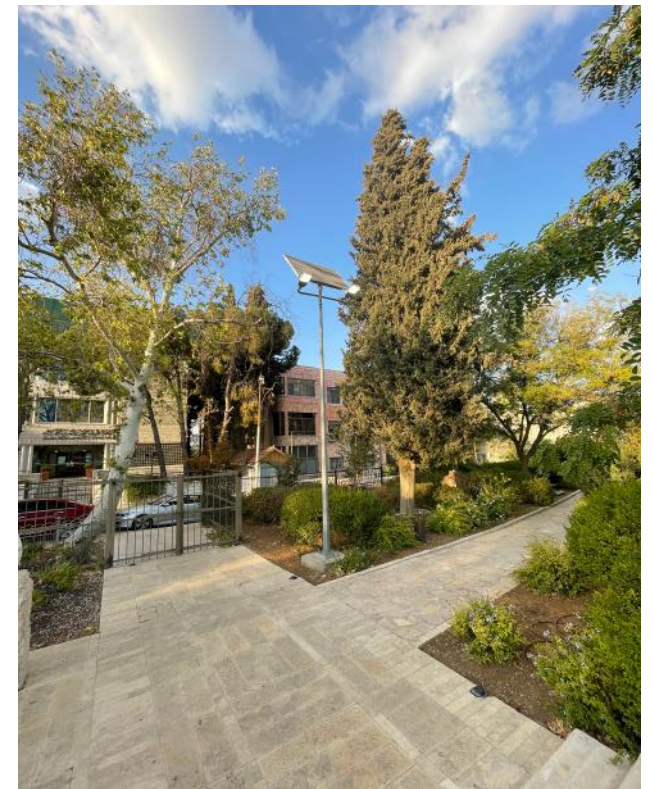
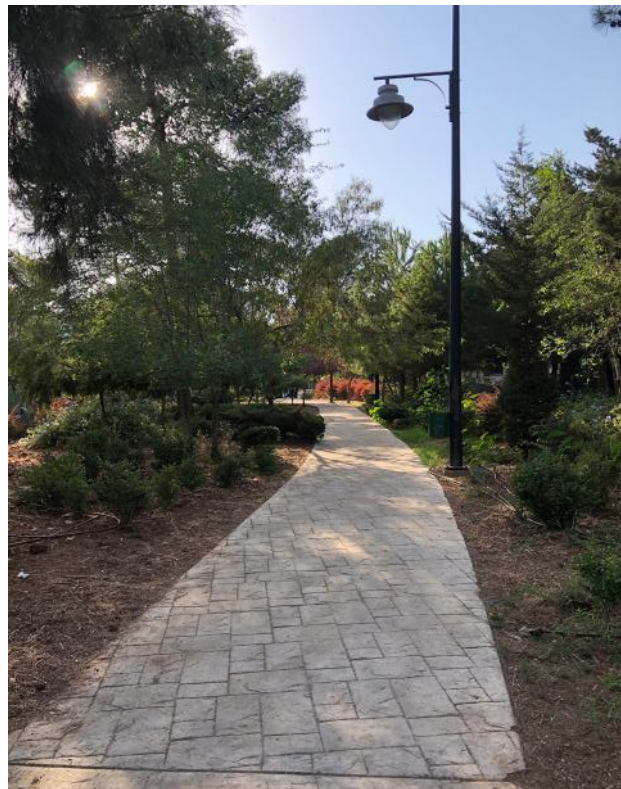
Lighting

Lighting is necessary to include for both function and safety reasons as many public parks are used at night (especially in the summer). Lighting placed at a height not reachable by hand is less likely to be damaged or vandalized, but lighting placed closer to the ground level creates softer and more intimate effects.

Whenever possible, use solar-powered lights.



High pole-mounted lighting fixtures are the most sustainable type of fixture for public spaces. These photos were taken in 'Abdun Circle and Zahran Park in Amman.



A solar-powered light at the National Gallery of Fine Arts Park in Amman's Jabal al-Luweibdeh district.

Water features

Although a crowd pleaser, do not include water features such as fountains or pools as these need considerable maintenance and water that most often are not available.



Water features, such as this pool in a pocket park on Rainbow Street in Amman's Jabal Amman district, often end up as neglected eyesores.

Fencing

Depending on available resources, as well as the nature and area of the space, provide a metal or stone fence around it. This will further define it visually and functionally, as well as help protect it from vandalism.

Children's play settings

Safety and comfort considerations are paramount in children's areas. Make sure to provide ample shade, safety separation barriers, and soft shock absorbing surfaces such as sand or poured rubber. The depth of these surfaces is determined according to the height of a potential fall. Lawn should not be used as a shock absorbing surface. The recommended depth of sand for play equipment ranges from 45 to 90 centimeters.

Moreover, it is recommended that play equipment be separated according to age groups to fulfill different developmental needs. A common recommendation for age groupings is as follows:

- 2 - 5 years
- 5 - 8 years
- 8 - 12 years

Another important consideration in the design of children's play areas is the provision of adequate shade. This could be achieved by using canopy trees or by including shade structures. Shade cloth is usually a good option as it provides large spans of shaded areas without the use of too many columns which may obstruct movement



A children's play area at the Princess Rahmah Park in Amman's Khalda district. A poured rubber surface is used as a safe shock-absorbing material.

Sustainable practice checklist

Below are recommendations for sustainable practices. Many of the recommendations were discussed above, but are included in the checklist nonetheless:

Smart location

Ensure that these spaces are within walking distance and proximity to residences and to public transport.

Adaptive reuse

Developing existing public spaces uses less energy and materials in construction. They also cause less disturbance to new land.

Minimize site disturbance

Preserve natural feature, existing trees, and the natural topography. Cutting and filling should only be used where necessary.

Water conservation

Saving water in Jordan's water scarce environment is paramount. Water saving guidelines known as the 'Seven Principles' include water-wise planning and design, using low-water consuming plants, limiting grass areas, water harvesting, efficient irrigation, the use of mulch, and proper maintenance.

For additional information, check out the following Center for the Study of the Built Environment (CSBE) resources

- <https://www.csbe.org/the-seven-principles-of-xeriscape>
- <https://www.youtube.com/watch?v=Uhtpd-avybg> (video entitled The Principles of Water-Conserving Landscapes)
- <https://static1.squarespace.com/static/5671433fc647ad9f55531f40/t/56c4732527d4bd71b93e925e/1455715158482/landscape-Book-E.pdf>
(publication entitled Landscape Use Water Efficiency Guide)
- <https://www.csbe.org/water-conserving-gardens>

Permeable surfaces / reducing run-off and drainage

Using permeable surfaces such green areas, interlocking tiles, and bioswales are recommended for groundwater recharge and alleviating stress on storm water systems. Harvesting water in storage areas or passively in the ground also accomplishes the same results.

Using local materials

Use them whenever possible; their use most often saves money and energy, and supports local businesses.

Energy efficiency

Use energy efficient and / or solar powered lights where possible. Apply energy efficiency guidelines such as thermal insulation, the use of shading for roofs and for west and south facing facades, and energy-efficient electrical and plumbing fixtures for any buildings in parks.

Preserving and creating wildlife habitats

Preserve and enhance natural areas such as forests, scrublands, dunes, and solitary native trees. Encourage the use of native plants, especially those with wildlife value.

Community outreach and involvement

Make sure to involve the community in the planning, design, and maintenance phases for the public space.

Universal accessibility

Adhere to principles and guidelines regarding access and mobility for all age groups, genders, and physical capability.

Maintaining public spaces

Although these recommendations will help reduce the need for maintenance and upkeep, a degree of maintenance and upkeep still will be needed. As mentioned above, a minimum of eight hours a week will be required for basic gardening and upkeep for every 1,000 square meters of public open space.

A maintenance team accordingly should be put in place for any space. The upkeep person or team would need to cover the following tasks:

- Cleaning up waste: This includes cleaning up waste resulting from littering, emptying waste containers, and disposing the collected waste through an integrated municipal waste management system.
- Pruning.
- Collecting dead plant materials such as leaves, branches, and flowers: These materials may be used for composting or developing organic ground cover mulch, as explained below.
- Planting.
- Irrigating plants.
- Fertilizing and following up on the health of the planting soil.

Weekly schedules may be developed for the person or team following up on each task. Each weekly schedule, for example, would specify the task and mark the day and time during which the task is to be carried out. The relevant staff member would initialize the appropriate box once a task is completed.

Staff member name: Samir Omar														
Week: October 13 - 20, 2019	Sun. AM	Sun. PM	Mon. AM	Mon. PM	Tue. AM	Tue. PM	Wed. AM	Wed. PM	Thu. AM	Thu. PM	Fri. AM	Fri. PM	Sat. AM	Sat. PM
Task:														
Sweeping hardscaped areas		x SA				x SA				x SA		x SA		x SA
Picking up litter		x SA				x SA				x SA		x SA		x SA
Emptying wastebaskets in large container		x SA				x SA				x SA		x SA		x SA

A sample task schedule for cleaning waste

Dead plant material should not be discarded, but used for composting or making organic ground-cover mulch. A mechanical chipper / shredder is needed for making the mulch. The composting and making of mulch may be carried out onsite if enough space is available and if the plants in the site produce enough dead plant material. Otherwise, it is advised that that the relevant municipal authority creates a station (or a number of stations) for this purpose.

In addition to these upkeep tasks, maintenance tasks need to be carried out. As a rule of thumb, it is advisable to set aside each year about 1% of the cost of constructing the space for such tasks. Some spaces of course may need a higher budget and some may need a lower one. A more specific number will emerge with time for each space.

Visual inspection sheets will need to be developed for each of the components below, among others. These components would need to be inspected on a weekly basis. Any issues that need attention would be marked so that appropriate action would be taken. Each sheet should include a map / plan that shows the relevant component being examined. Remarks may be made directly on the map / plan.

- Sidewalk bordering open green space.
- Fences and gates.
- Pavement of hardscaped paths and spaces.
- Retaining walls.
- The site's electrical system components (lighting bulbs, fixtures, wiring, switches ...).
- The site's irrigation system components (pumps, valves, tubes, emitters, end caps ...).
- Plants that need replacement.
- Signage.
- Buildings (facades, floors, ceilings, roofs, windows, doors, bathrooms, kitchens ...).
- Play equipment
- Seating

[Name of Park]
Inspection sheet
Park fences and gates

Week 1: January 1 – 7, 2019

Comments:

- Lock for northern gate is not working properly because of rust.
- Paint is peeling off the fence located in the southwestern segment of the park.

Actions:

- Lubricant applied to lock, and is now working properly.
- Paint ordered for the part of the fence with peeling paint. Expected to be delivered in two weeks.

Week 2: January 8 – 14, 2019

Comments:

Actions:

Sample inspection sheet for fences and gates in a park showing the first two weeks of the year

The list will also function as a record of the maintenance tasks carried out and their costs over time.

Moreover, periodic maintenance of seemingly minor items such as loose screws, parts, and pieces of seating and equipment can go a long way and extend their lifespan.

It is also worth noting that a good deal of damage in public open green spaces takes place not only as a result of neglect and lack of regular maintenance, but also as a result of vandalism. Precautions therefore need to be made to limit the possibilities of its occurrence. These precautions include securing the space through surrounding it with fences and locking its gates during night hours, and installing closed circuit cameras. Also effective is the presence of human protection. A guard may be present at certain times, and regular patrols by security personnel are helpful. Regarding the latter, the establishment of a specialized “environmental police” unit would be of value. These not only would ensure safety and security, but also would be specially trained to appreciate the importance of both environmental issues and the value of soft social skills in law enforcement.

Note: All images featured in this guide, unless otherwise marked, are provided by the authors. Also, all satellite images are taken from Google Earth.

Appendix 1: Plant lists

Water-conserving trees

Acacia cyanophylla
Albizia julibrissin
Arbutus andrachne
Brachychiton populneus
Casuarina equisetifolia
Celtis australis
Ceratonia siliqua
Cercis sillquastrum
Cupressus sempervirens
Elaeagnus angustifolia
Grevillea robusta
Jacaranda mimosifolia
Laurus nobilis
Melia azedarach
Melia azedarach 'Umbraculifera'
Myoporum laetum
Olea Europaea
Pinus halepensis
Pistacia atlantica
Pistacia palaestina
Platanus orientalis
Quercus aegilops
Quercus calliprinos

Robinia pseudoacacia
Schinus mole
Sophora japonica
Tamarix aphylla
Ulmus glabra

Water-conserving shrubs

Atriplex halimus
Carissa macrocarpa
Cistus creticus
Cistus salviifolius
Dodonaea viscosa
Juniperus horizontalis
Lantana camara
Nerium oleander*
Nerium oleander 'Nana'*
Pennisetum setaceum
Pistacia lentiscus
Pittosporum heterophyllum
Pittosporum tobira
Plumbago capensis
Rosmarinus officinalis
Teucrium fruticans
Vitex agnus-castus

Water-conserving ground covers

Bougainvillea sp.
Carissa macrocarpa 'Prostrata'
Cotoneaster horizontalis
Lantana montevidensis
Rosmarinus officinalis 'Prostratus'

Trees for shade

Albizia julibrissin
Ceratonia siliqua
Cercis sillquastrum
Elaeagnus angustifolia
Jacaranda mimosifolia
Melia azedarach
Melia azedarach 'Umbraculifera'
Platanus orientalis
Pistacia atlantica
Pistacia palaestina
Quercus aegilops
Quercus calliprinos
Robinia pseudoacacia
Sophora japonica
Ulmus glabra

Trees for screening

Brachychiton populneus
Casuarina equisetifolia
Cupressus sempervirens
Grevillea robusta
Laurus nobilis
Myoporum laetum
Pinus halepensis

Trees for streets and medians

Albizia julibrissin
Brachychiton populneus
Cercis siliquastrum
Elaeagnus angustifolia
Grevillea robusta
Jacaranda mimosifolia
Melia azedarach
Melia azedarach 'Umbraculifera'
Platanus orientalis
Robinia pseudoacacia
Sophora japonica
Ulmus glabra

Native Trees

Arbutus andrachne
Celtis australis
Ceratonia siliqua
Cercis siliquastrum
Cupressus sempervirens
Olea Europaea
Pinus halepensis
Pistacia atlantica
Pistacia palaestina
Platanus orientalis
Quercus aegilops
Quercus calliprinos
Tamarix aphylla

Native Shrubs

Atriplex halimus
Cistus creticus
Cistus salviifolius
Vitex agnus-castus

* Plant is poisonous and should not be planted near playgrounds. It is however useful as a screen to project areas from grazing.

