Funded by the European Union

Mitigation Enabling Energy Transition in the MEDiterranean region

GREEN PARKING STRUCTURE – GS5

Presented by Sabine SAAD, ALMEE

Training on GRASS*Med* – meetMED II

WP3_A3.1.6

February 27, 2024

OUTLINE

- ✓What is a Green Parking Structure?
- ✓How to Design a Green Parking ?
- ✓What are the Benefits of Green Parking Lots ?
- ✓What are the Requirements of Green Parking Site?
- ✓How to Comply with GRASS*Med*?

What is a Green Parking Structure?

Parking conception, like many others, can be designed environmentally sustainable

Parking, and structured parking in particular, means finding ways to build and operate facilities in ways that won't negatively impact living conditions.

What is a Green Parking Structure?

Green parking lot design can be good for the environment and for budgets

While parking structures are typically not considered indoor environments, there are measures that should be taken to ensure that they are not contributing to health-related problems:

- ✓ Maintaining proper openness for natural ventilation
- ✓ Selecting waterproofing systems and coatings with low VOCs, etc.

- ✓ More efficient materials, technologies, and strategies for managing vehicles can reduce labor, energy, and building costs.
- ✓ Introducing permeable or semipermeable materials like grass, natural stone pavers, or even previous concrete can create more efficient surfaces for stormwater collection and purification.
- ✓ Further, technology solutions can create more sustainable practices both within the parking asset and in the larger community.

How to Design a Green Parking ?

There are different ways to make a parking lot more environmentally friendly to benefit the users/owners in the long-term

a. SUSTAINABLE SITE

The process begins with selecting a site. The chosen site shouldn't replace a greenfield with a parking garage.

Parking must not be build on parks, farmland, wetlands, or areas with endangered flora and fauna, etc.

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b. PERMEABLE PAVERS

Permeable paving systems are porous, so they allow water to infiltrate the pavement and drain into the ground or sub-base rock underneath.

These paving systems are just as strong and durable as traditional paving materials such as concrete, asphalt, or compacted gravel.

They can be ideal for decorative barriers, entryways, ancillary parking areas, and exterior landscaping.

Reinforced grass-block system

It is important to consider that permeable pavers may not be durable enough to withstand the demands of high-traffic areas.

They also may not be suitable for areas that need to be handicap-accessible.

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c. USE PREVIOUS CONCRETE FOR PARKING SPACES

In high-traffic parts of a parking asset, pervious concrete can be a great green option.

- It improves the absorption of water back into the ground.

- It can also absorb more sunlight and heat, reducing the heat island effect.
- Concrete is produced from abundant natural resources, reduces toxic run-off and can be easily recycled.

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d. GRASS PARKING LOTS AND PLANTATION

To transform a car park into an ecological site:

- New Building: it can be converted at the design phase into autonomous green spaces
- Existing Building: recycling the asphalt areas into natural terrains that reintroduce biodiversity

Plantation benefits :

- Provide shades for cars as well. Especially in making green renovations to an existing structure, adding plants can be a smart and eco-friendly addition to any parking operation.
- Reduce the heat island effect.
- Absorb CO_2 emissions,
- Prevent erosion and runoff,
- Add a welcoming green appearance to the parking asset .

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e. STORMWATER MANAGEMENT

Consider water detention strategies, bioswales /rain gardens in the design to:

- Collect stormwater
- Reduce flooding

Rainwater harvesting, where permitted, captures rainwater, and uses it for irrigation of plantings.

It's best to use water efficient landscaping that doesn't require a lot of water.

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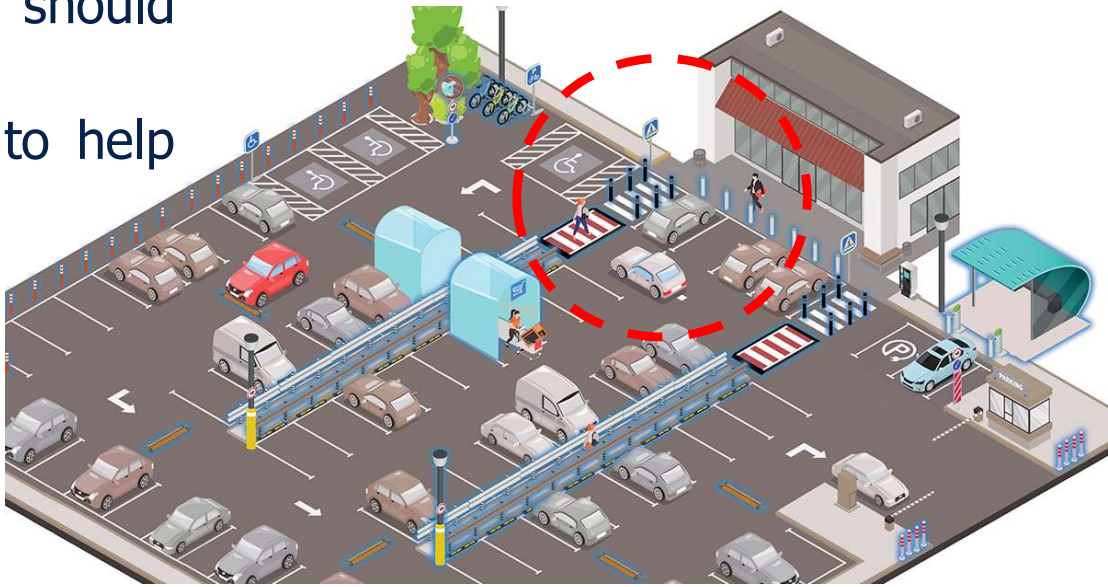
f. SAFE PEDESTRIAN AND VEHICULAR CIRCULATION

A safe and functional parking lot should have:

- Clear signage and visual cues to help navigation
- Designated pedestrian routes
- Limited vehicle speed



- Traffic-Calming features
- Good visibility

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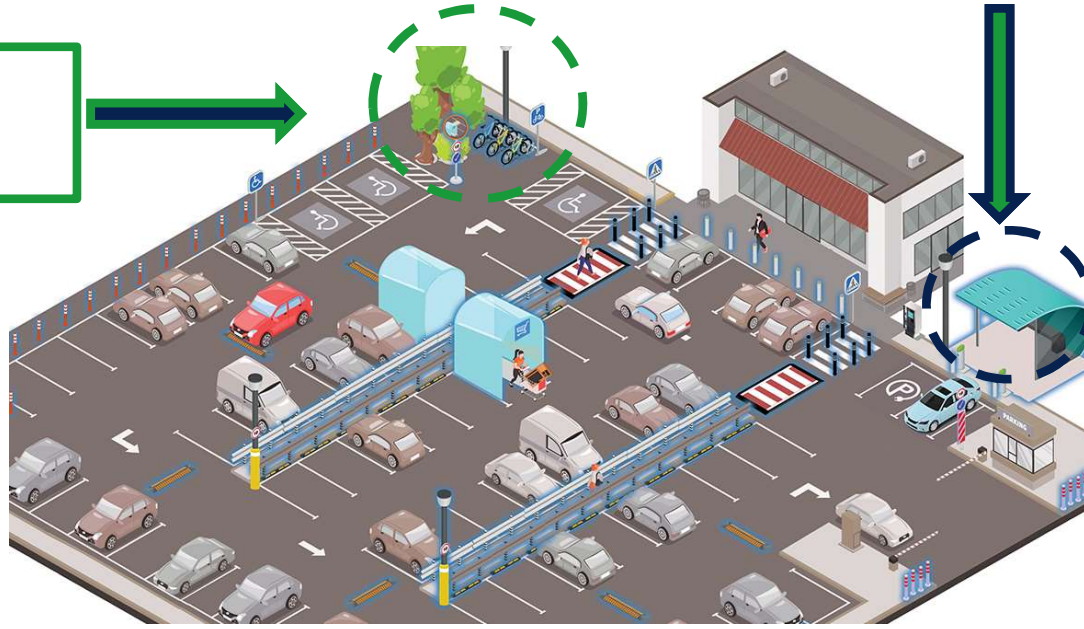
g. TRANSPOSRTATION DEMAND MANAGEMENT

Incentivize other modes of transportation like bikes, scooters, walking, public transportation.

Parking can include:

- Facilities for public transit, such as bus stops,

- Bike lockers to promote bicycle commuting, etc.



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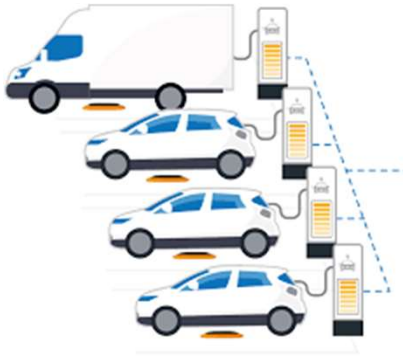
h. GREEN VEHICLES

Add an Electric Vehical (EV) Charging Parking Solution.



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i. SUSTAINABLE LIGHTING

Parking lots require lighting to provide safety and security for pedestrians and motorists as well as adjacent facilities.

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i. SUSTAINABLE LIGHTING

Design

Location: is determined by analyzing lighting patterns to achieve effective illumination at different areas on the parking lot surface. Location of trees and other obstacles needs to be considered in determining the placement of light structures.

Height: of the structure is important in providing effective lighting without creating off-site impacts.

- Small parking lots, the height of luminaires should be limited to 6 m or less.
- Large parking lots, higher structures may be appropriate.

Fixtures should direct light onto the surface and be designed as full cutoff fixtures, where no light is emitted at or above a horizontal plane at the bottom of the fixture.

Additional shielding can be provided with perimeter fixtures to block light from shining on adjoining properties. Ideally, perimeter fixtures should also be oriented perpendicular to the property line.

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i. SUSTAINABLE LIGHTING

Lamps

The **type of lamp** used in lighting can **increase efficiency**, resulting in increased sustainability and **cost savings**.

- LED (Light Emitting Diode) lighting is a great choice for use in green parking lots,
- Other energy-efficient lamp options including: sodium vapor, metal halide, T fluorescent, and compact fluorescent.

In addition to energy costs, maintenance costs can be significantly reduced through the use of energy-efficient lighting, since the lamps last 2 to 5 times longer than conventional lighting.

Operation

Energy efficiency can be achieved **in the operation** of parking lot lighting as well.

The use of intelligent lighting systems to dim and shut off parking lot lights when no longer needed reduces electric use and minimizes impact on the surrounding neighborhood.

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j. ENERGY GENERATION

There are several potential on-site energy generation options. Particularly, Solar Powered Parking Lots.

- Solar energy technologies offer an efficient means of providing lighting without needing utility lines.
- The solar cell is sized according to the energy need and the number of hours of operation required.

- Solar panels can also be mounted on a frame canopy above the parking area, providing the additional benefit of shade.

What are the Benefits of Green Parking Lots ?

Green parking lots have a host of benefits

- Improve air quality
- Improve water quality
- Increase groundwater supply
- Reduce the urban heat island effect
- Less heat generated

- Re-absorption of water into the ground for recharge
- Remove sediments and other pollutants
- Provide effective storm-water management

What are the Requirements of Green Parking Site?

Building green parking lots require soil types which are suitable for easy construction and porosity to allow adequate infiltration.

- Porous pavements can be used in both low- and high-traffic areas.
- Warmer climates are better suited to concrete than porous asphalt.
- Colder climates should be designed with a stone sub-base.
- Permeable pavers are not accessible by disabled people and are not suitable for high-traffic areas.
- Green parking lots also need special treatment during snow removal, plow blades could damage the surface.
- Sand and other abrasive materials could clog the system.
- Moreover, such lots should not be built in areas with contaminated runoff as this can pollute groundwater.
- Maintenance:

  - Permeable pavements in green parking lots have a lifespan comparable to that of conventional asphalt but need regular maintenance to avoid clogging.
  - Clogging is often a risk in areas with sediments and dust, frequent maintenance is required for smooth installation.

How To Comply With GRASS*Med*?

Two options are considered in earning credits for Green Parking Structures.

Option 1: Percentage of Underground Parking (PUGP)

- Place at least 50% parking lots underground (the more underground area provided, the more scoring points are achieved).
- Establish a minimum interior greening requirement.

Option 2: External Parking

- Provide environmentally friendly external parking that has low negative impacts on the environment.

  It must satisfy the following: Permeable Pavement System, Bioretention and On-Site Storm Water Management, Landscaping, Maximize Shading and Greening, Provide Undercover Parking Lots and Roofs of Undercover Parking Spaces, and Photovoltaic Roofing.
- Energy Efficiency in Lighting (Lighting Fixture Design, Illumination Levels, Control of Nuisance Glare and Energy Conservation)
- Pedestrian Friendly Design (Walk Ways, Pedestrian Circulation, Pedestrian Connection to Entrances, Disabilities Act Compliance)
- Bicycle Parking

How To Comply With GRASS*Med* ?

Maximum Scoring for Commercial Buildings	24
COMMERCIAL BUILDING	Scoring Points
Option 1: Percent of Underground Parking (PUGP)	
50%-60%	4
60.1%-70%	7
70.1%-80%	10
80.1%-99%	13
100%	24
Option 2: External Parking	
Permeable pavers	1
Use Pervious concrete for Parking Spaces	1
Grass Parking lots and Plantation	1
Stormwater Management	1
Green Vehicles	1
Transportation Demand Management	1
Undercover Spaces Percent UCSP	
10%-30%	1
31%-50%	2
≥ 50.1%	3
Roofs of Undercover Spaces	
Renewable Energy Roofing	1
Eco-roofs	1

How To Comply With GRASS*Med* ?

Maximum Scoring for Residential Buildings	23
RESIDENTIAL BUILDING	Scoring Points
Option 1: Percent of Underground Parking (PUGP)	
50%-60%	4
60.1%-70%	6
70.1%-80%	8
80.1%-99%	12
100%	23
Option 2: External Parking	
Permeable pavers	1
Use Pervious concrete for Parking Spaces	1
Grass Parking lots and Plantation	1
Stormwater Management	1
Green Vehicles	1
Transportation Demand Management	1
Undercover Spaces Percent UCSP	
10%-30%	1
31%-50%	2
≥ 50.1%	3
Roofs of Undercover Spaces	
Renewable Energy Roofing	1
Eco-roofs	1

Contact us!

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Mitigation Enabling Energy Transition in the MEDiterranean region
Together We Switch to Clean Energy

For any inquires or comments,
please don't hesitate to contact us

www.meetmed.org
meetMED Project
@meetmed1

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This project is funded by the European Union