

The background features abstract, overlapping green geometric shapes, primarily triangles and polygons, in various shades of green, creating a modern and dynamic visual effect.

Taking Houston's Landscape in a New Direction

Vertical Gardening

Vertical Gardening Overview

- ▶ The terms living walls, green walls, and vertical gardens can be used interchangeably to describe a green façade
- ▶ Characteristics of systems design are what set each apart
- ▶ Gardens can be placed in interior or exterior settings
- ▶ Houston has an ideal climate for vertical gardens, with very mild winters, where more extreme climates like Los Angeles and Boston are prolific with vertical gardens.
- ▶ Houston's construction boom offers opportunities for new office buildings, high-rises, mixed-use developments, and neighborhoods to utilize this aesthetic
- ▶ A vertical garden is simply a sloped green roof

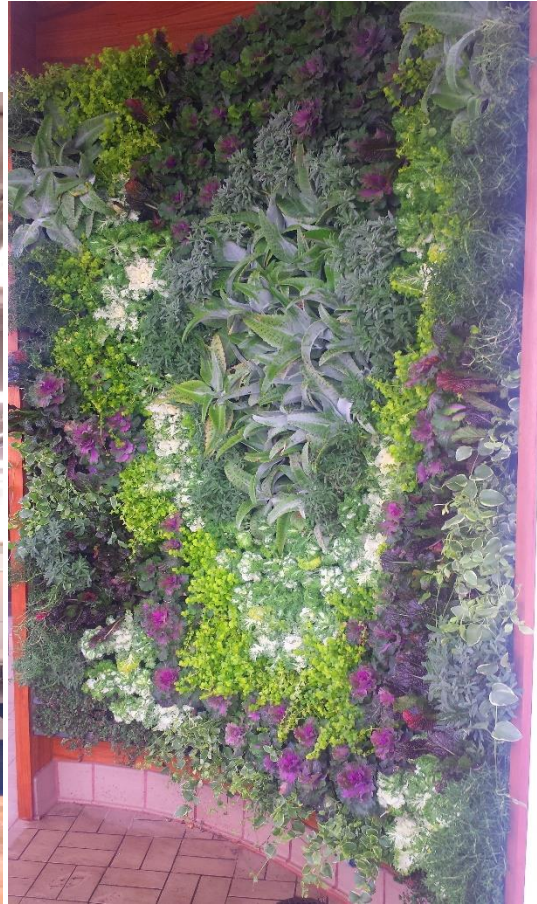
The Benefits of Vertical Gardens & Why They Should Matter in Houston

- ▶ Architectural aesthetic- Incentivizes commercial builders to distinguish their projects and buildings to potential tenants, as a point of differentiation.
- ▶ Social Benefits-Improves work environment by reducing employee tension and stress by providing a green space; mobile applications can be moved from school to school, from department to department, or from hospital wing to pediatric unit
- ▶ Quality of Life-Provides a green canvas reducing carbon dioxide emissions, and a vertical plane, versus a plot, to grow herb and vegetables
- ▶ Community Impact-Reduces signage and billboards as a business logo can be 'planted' onto the side of a building; creates green space for townhome and condo owners, that otherwise have no land/yard.

What else can they do?

- ▶ An aesthetic that saves space
- ▶ An innovation in branding businesses
- ▶ An alternative to commercial planters
- ▶ An advantage in urban agriculture
- ▶ An oasis in mixed use developments

Interiors & Exterior Applications



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The Components

- ▶ Modular panels composed of recycled steel and aluminum
- ▶ Common mounting hardware which takes basic carpentry skills to affix and allows airflow behind the wall
- ▶ A power and water source required for irrigation and valve
- ▶ Drip Irrigation line which runs horizontally across a garden, every few rows; results in zero wastewater
- ▶ Plants, which wick water, resting in their trays, and never come out of their pots-4", 6" and one gallon plant size allowances to accommodate deep root growth

The Components

- ▶ An optional catch basin attached at the base of the wall
- ▶ Specialty trim, which can be selected to reflect design of primary architecture, such as teak or brushed stainless steel
- ▶ Custom dimensions which can be expansive or as minimal as green 'paintings' (with portrait lights attached above as grow lights), scaled columns, or room dividers

Applications~

Green paintings



Columns & Partitions



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Reception Areas



Plant Selection & Other Factors

1. Like plants with like plants-

A vertical garden dedicated exclusively to succulents or herbs. Light exposure is a primary factor.



Factors

2. Maintenance-

Consider that plants are eye level and are seen from every angle. Drip irrigation ensures that plants are watered uniformly



Factors

3. Availability-

With a typical attrition rate between 3-7%,
plant design must include seasonal and
well-stocked elements



Plants that we use



Favorites for growth habit & drought tolerance

- ▶ Ornamental cabbages, mustards, chard, and artichokes
- ▶ Lettuces & strawberries
- ▶ Cuban Oregano, Lavender, Mint, Sage, Chives, Parsley, and Prostrate Rosemary
- ▶ Sweetheart roses, Bacopa, Lysimachia, Ipomoea, Plumosa Fern, Vinca Minor, Ajuga, Sedum, and Kalanchoes (mostly exotic)
- ▶ Texas natives and other perennials including Dichondra, Dwarf Coreopsis, 'Katy' Ruelia, Purslane, Carpet Juniper, Dwarf Pennisetum, and 'New Gold' Lantana

Cleveland's Milestones

- ▶ Our attrition rate in four months went from 20% to just 3% of plant count
- ▶ Our 10'x 10' North facing vertical garden at a Houston high-rise on the 20th floor
- ▶ Securing 100 square feet of freeze cloth in 40 mph winds on the abovementioned 20th floor
- ▶ 66% of our 2014 revenue came from Vertical Garden design, installation, maintenance, and consultation

Our Revenue Streams

- ▶ Design
- ▶ Installation & Maintenance
- ▶ Leasing
- ▶ Special events
- ▶ Consulting

The Future and Looking Ahead

- ▶ Contracting with growers for large scale designs
- ▶ Testing cultivation for more heat tolerant herbs
- ▶ Refining potting mediums to include paper pulp to help retain moisture
- ▶ Studying anti-desiccants for high elevation gardens, and a fertilizer injection system
- ▶ Piloting a herb 'painting' project in school cafeterias, and restaurants
- ▶ Creating a 'Five Senses' vertical garden for a magnate school and other educational venues
- ▶ Commercially developing the concept of brandscapes-signage and landscaping in one application, for Houston area businesses

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