Sustainable Planting Design: A New Model for Large-Scale Urban Parks

Presenters
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Learning Objectives
1. How to manage the process of large park planting design from aesthetic, cultural, and environmental perspectives.
2. Understand how Sustainable Landscapes can incorporate both native and non-native plants and multi-zone landscapes.
3. Learn effective design and specification approaches to relocate large trees, establish large-scale Mediterranean meadows, and create multistoried landscape habitats within urban environments.
4. Explore the challenges, changes, and opportunities encountered during construction.

Overview
2. Tongva Park Case Study.
3. Planting Design: Cultural Considerations.
4. Planting Design: Sustainable Landscape Considerations.
5. Specifying and Installing the Canopy Layer.
6. Specifying and Installing the Understory Layer.
7. Synthesis / Conclusions.

Tongva Park Case Study

SANTA MONICA PIER
CITY HALL
KEN GENSER SQUARE – 1 ACRE
TONGVA PARK – 6 ACRES
JAMES CORNER FIELD OPERATIONS
Design Team
James Corner Field Operations, Landscape Architecture
Frederick Fisher & Partners, Architecture for Public Restroom
Buro Happold, Structural + MEP Engineering
Fuscoe Engineering, Civil Engineering
HLB Lighting, Lighting Design
Fluidity Design Consultants, Water Feature Design
Perry & Associates, Horticulture
Greenlee & Associates, Horticulture
d.d. Pagano, Inc., Irrigation
Wallace Labs, Soils

SUSTAINABILITY
• “Sustainability” is defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs. (The Brundtland Commission). Sustainability is about a site’s ecology and is also about creating an environment that supports healthy people and communities.
• Our project aspired to balance goals of ecological restoration with goals of creating a strong new community center for the City of Santa Monica.

ASLA 2014 Annual Meeting and EXPO
1. OBSERVATION HILL
2. GATHERING HILL
3. DISCOVERY HILL
4. GARDEN HILL
5. KEN GENSER SQUARE

TOPOGRAPHY + HYDROLOGY
- maximize the surface area for increased water retention and biomass addition
- soil necessary for perennials comes from a reclaimed, local, sustainable source
- swales and bio retention areas will filter runoff and promote groundwater recharge

PLANTING
- drought tolerant species for western exposed edge condition
- native and locally adapted plants work with hilltopography
- bioswales at hill base
- native wildflowers offer seasonal change and reference to iconic California Landscapes

MEADOW PLANTING
- native and locally adapted plants work with hilltopography
- decomposes at hill base
- native wildflowers offer seasonal change and reference to iconic California Landscapes
GARDEN PLANTING

- Native and locally adapted plants work with the hilltopography for season-long color
- Dramatic seasonal changes
- Bold and unique forms and shapes showcase extraordinary plants

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JAMES CORNER FIELD OPERATIONS
Planting Design: Sustainable Landscape Considerations.

**LIFE SUSTAINING BENEFITS OF PLANTS**


**Ecosystem (Planting) Services:**

- Each pound of biomass contains enough energy to sustain one person for one day.
- 1,910 Calories worth of food energy
- 7,655 Btu’s worth of heat energy
- 2.25 kilowatt hours of electrical energy

Every pound of biomass stores approximately 1/2 pound of Carbon.

Every pound of biomass produced releases approximately 1 pound of oxygen into the atmosphere.

**COSTS ASSOCIATED WITH MAINTAINING LANDSCAPES**

**Landscape (Planting) Costs:**

Embodied Energy to provide water:
- Approximately 3.1 Btu’s of energy are required to import one gallon of water from Southern California.
- Approximately 14 Btu’s of energy are required for one gallon of reclaimed water.

Embodied Energy for fertilizer:
- Approximately 6.8 Btu’s of energy are required to pump one gallon of local ground water.

**Operating Energy for Gasoline/Diesel:**
- 1 gallon of gasoline contains 124,000 Btu’s of energy
- 1 gallon of diesel contains 140,000 Btu’s of energy

1 Gallon of gasoline/week = 32 x 124,000 Btu’s = 4,000,000 Btu’s of energy

**LANDSCAPE BENEFITS: BENEFITS TO COSTS**

**1 Acre of turfgrass Growth:**

- Turf grass biomass value: 10.890# per Acre

- 10.890# x 7,655 Btu’s = 83,362,950 Btu’s

(Turf grass in Santa Monica needs 44 inches of supplemental water per year.

**Energy Costs per Year:**

- Irrigation: 3.5 a.f./year = 10,526,250 Btu’s
- Fertilizer: 2@/year = 3,127,650 Btu’s

- Mowing: 20 @/year = 2,480,000 Btu’s
- Vehicles: 60 @/year = 7,460,000 Btu’s

**23,573,900 Btu’s**

After 3.5 Years of maintenance - costs exceed turfgrass benefits

83,362,950/23,573,900 = 3.5 years

**1 Acre of mixed landscape Growth:**

- Tree: 10,500#
- Shrub/Perennials: 2,890#
- Ground cover: 2,000#
- 13,590#

- 13,590# x 7,655 Btu’s = 104,031,450 Btu’s

**Energy Costs per Year:**

- Irrigation: 1.5 a.f./year = 2,255,650 Btu’s
- Fertilizer: 0@/year = 0 Btu’s
- Mowing: 0@/year = 0 Btu’s
- Vehicles: 25 @/year = 3,100,250 Btu’s

**5,355,625 Btu’s**

After 19.4 Years of maintenance - costs exceed landscape benefits

104,031,450 / 5,355,625 = 19.4 years
Summary Sustainability Recommendations:

Organize plantings into compatible associations, richly diverse in species types, both native and adapted.
Plant for optimum levels of biomass accrual and density.
Design and implement high efficiency irrigation systems managed with soil moisture sensors and climate data.

Specifying and Installing the Canopy Layer.
FOUR (4) FOREST TYPES

- system approach to planting design
  - four native / appropriately adapted plant groups
  - identified to work with existing site micro-climactic conditions, lessening the amount of soil amendment and water resources needed to maintain plantings.

- WRKND SYCAMORE MIX
- MEDITERRANEAN PINE MIX
- FICUS GROVE - REUSE EXISTING TREES
- MEDITERRANEAN OAK MIX

- PINE MIX
- OAK + OLIVE MIX
Specifying and Installing the Understory Layer.