Master Plans: an integrated approach to sustainability

Greg Havens
Principal
Sasaki Associates, Inc
Master Plans and Sustainability

- Master plans provide a framework for integrated sustainability strategies, IF considered from the outset
- Master plans can assist in coordinating sustainability investments
- Sustainable master plans require a metric based approach
## Funding Mechanisms for Campus Sustainability

- Administrative allocation
- Alumni sustainability fund
- Charge backs
- Class gifts
- Endowments
- Fee for service
- Government incentives
- Fee Assessment ("tax")
- Parking fees
- Payroll deduction
- Performance contracting
- Foundations
- Revolving loan funds
- Savings from sustainability measures (Life Cycle)
- Student fees (dedicated or every budget cycle)
University of Maine Master Plan
SUSTAINABILITY METRICS

Outcomes:
- Reforestation Corridor
- Wetland restoration
- Riverfront restoration (removal of parking)
- 800 acres of forest preserved

Habitat Values
Demerritt Forest:
- Spruce 29%
- White Pine 27%
- Red Maple 18%
- Balsam Fir 14%
- Hemlock 10%

Preserve

Growth boundary

Reforestation / Wetland Restoration

Riverfront restoration (removal of parking)

Goals:
- Increase connectivity
- Preserve woods and farm land

Strategies:
- Growth Boundary
- Reforestation
- Riverfront restoration
- Wetland restoration
- Windbreaks
Water Resources :: proposed

- **Goals:**
  - Comprehensive stormwater management plan
  - Reduce impervious area
  - Increase water retention time
  - Decrease potable water use

- **Strategies:**
  - Re-establish wetlands
  - Restore riverfront floodplain
  - Create detention areas

**Outcomes:**
- decreased impervious area
- decreased run-off volume (cubic feet)
- decreased run-off rates (cubic feet / second)
Access / Mobility: proposed

- **Goals:**
  - Improve the pedestrian experience
  - Plan for transportation options / reduce parking demand
  - Connectivity: Interior / Exterior Circulation / Community Network

- **Strategies:**
  - Establish pedestrian priority zone
  - Park once and walk policy
  - Relocate parking to the periphery
  - Create campus shuttle / transit service
  - Connectivity to community paths

**Outcomes:**
- Pedestrianized core
- Improved transit access / modal split
- Increase in resident population
Energy & Emissions :: proposed

- **Goals:**
  - Presidents’ Climate Commitment (climate neutrality)
  - Reduce CO₂ emissions
  - Reduce energy costs

- **Strategies:**
  - Cogeneration
  - Transition fuel sources
  - Create working landscapes
  - Future building performance guidelines
  - Solar adaptability
  - Emissions reduction targets

**Outcomes:**
- 1.7 million additional SF
- Potential eCO₂ increase – 25,800 MTeCO₂ (assuming current fuel mix / power sources)

**SUSTAINABILITY METRICS**
- Existing Emissions
  - 70,000 MTeCO₂ annually
  - 0.015 MTeCO₂ / sf (37lbs / sf)
  - 6.1 MTeCO₂ per capita
Land Use Framework & Policy
Demeritt Forest
830 acres

GROWTH BOUNDARY

10 min., 5 min. walk
Mobility Funding Strategies

- Assess charges for parking displaced by construction (*replacement costs in the range of $30,000 for garage parking*)
- Assess charges for parking demand created by a new project
- Transportation fees to support a wider range of services
Mobility: integrated pedestrian, bicycle, transit and parking investments
Landscape Funding Strategies

- **Grounds Improvement Fund**
  - Assessment fee on capital projects (1.5%)
  - Maximum contribution per project: $500,000, collected at the time of contract award
  - $1 Million per year is available in an expendable account for the support of projects

- Types of projects considered include:
  - pedestrian and bicycle facilities,
  - lighting, site furnishing, plantings & public art
LANDSCAPE FRAMEWORK

- Reforestation
- Forest Preserve
- Windbreaks
- SOUTH MALL
- Colvin
- Deering
- Estabrooke
- Kennebec
- York
A Working Landscape: wind protection / stormwater management
A Working Landscape: open spaces / stormwater management
A Working Landscape: investment in the pedestrian network
Energy & Emissions Funding Strategies

- Savings from sustainable efficiency measures (lifecycle)
- Revolving loan funds
- Performance contracts
- Fees (student tax)
- Endowment investment
2008 Totals:
713,000 MMBTU’s
$11,531,717
Climate / Population / Consumption

JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC

- MODERATELY COLD, SHORT WINTER
- HOT & HUMID, LONG SUMMER
- MODERATELY COLD, SHORT WINTER

SPRING

POPULATION

SUMMER

FALL

ELECTRICITY CONSUMPTION

GAS CONSUMPTION

WATER CONSUMPTION

Patterns of a university in the southern US
Operational Considerations

per capita costs:

- electricity: $18 per month to $132 per month
- natural gas: $14 per month to $71 per month

Patterns of a university in the southern US
Emissions Reduction Targets

1990: 48,000 MTeCO₂

2050 Target Emissions: 14,000 MTeCO₂

Emissions Reduction Targets

- Transportation: 54%
- Heating: 25%
- Electricity: 21%

Emissions: 81,000 MTeCO₂
Existing Building Efficiency

Existing Buildings: 4.3 million square feet
Focus on utilization, efficiency and metering
Potential additional emissions: 25,800 MTeCO₂ / Passive Design Strategies: orientation / adaptability
Focus on Energy Use Intensity / passive strategies
Thank you

Greg Havens
Principal

Sasaki Associates, Inc.
64 Pleasant Street
Watertown, MA 02472
617 923 5337
ghavens@sasaki.com