CASCADE GARDENS CASE STUDY

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Designed by Design Workshop Inc.

At a Glance

DESIGNER
Design Workshop, Inc.

PROJECT TYPE
Single-family residence

FORMER LAND USE
Residential

LOCATION
Undisclosed
Aspen, Colorado
Map it

CLIMATE ZONE
Humid continental

SIZE
2.49 acres

BUDGET
Undisclosed

COMPLETION DATE
2009

OVERVIEW

- ➔ Tranquil High altitude residential property
- ➔ Designed to preserve the area's natural setting and ecosystem while providing outdoor amenities
- ➔ Dismantling existing house- building a new home integrated into landscape with minimal site disturbance
- ➔ Improve the existing pond in order to support fish life

The design creates a serene environment that compliments its surroundings and provides the relaxing outdoor spaces the homeowners wanted

SUSTAINABLE FEATURES

- Healthy Aquatic ecosystem
  - Complete with a pond and cascade creek
- Preserved native flora
- Deepened pond to support aquatic life
- Added riparian vegetation to improve water quality
- Used Native Materials to build outdoor space
- Minimized site disturbance
- Eliminated need for connection to municipal stormwater system
- Implemented renewable energy sources

CHALLENGES & GOALS

- ➔ Creation of viable habitat
  - ◆ Reconciled with fishing and boating requests
- ➔ Responsible disposal of the previous property materials
- ➔ Stormwater harvesting and reuse
- ➔ Aesthetic for a limited native plant palette

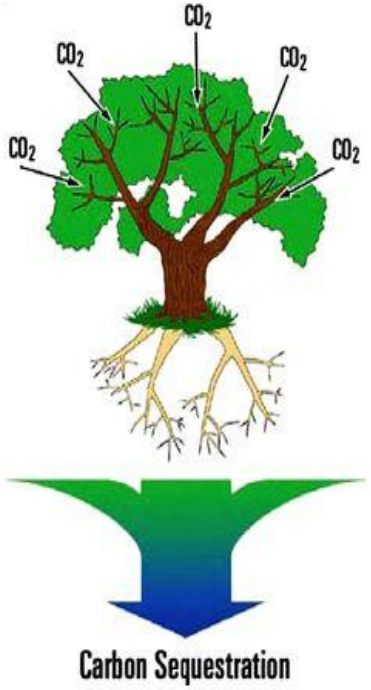
SOLUTIONS

- ➔ Donated all old materials and appliances from home to local charities
- ➔ Mature trees preserved the steep slopes adjacent to the home
- ➔ Swales collect stormwater and snowmelt
  - ◆ Repurposed for landscape irrigation

LANDSCAPE PERFORMANCE BENEFITS

- ➔ Blocks approximately 97.8% of unwanted views
- ➔ Sequesters 31,200 lbs of carbon annually
- ➔ Reduced the projects landfill burden by over 3,700 cubic feet
- ➔ Reduced irrigation/fertilizer needs by 60%
  - ◆ Saves 75,000 gallons of water a

METHODOLOGY (CARBON)



➔ Entered data for 44 mature Globe Willow trees and 18 Colorado Blue Spruce trees into tree value calculator to determine carbon sequestration

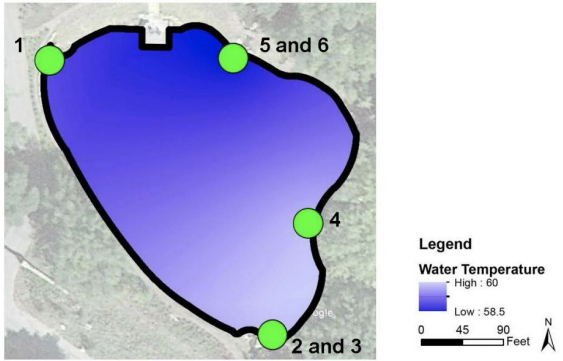
METHODOLOGY (HABITAT)

- Worked with aquatic consultants to improve existing pond
  - Performed on-site analysis of water temp., alkalinity, pH, hardness, oxygen levels
- Pond deepened to 14 feet and lined
- Added oxygenators
- Added vegetation cover, dead tree trunks and other structures for trout habitat

DATA COLLECTION

OBJECTID	on-site pH	Depth	Temperature	Time	Alkalinity	TSS (mg SS/)L	Hardness
2882| 1	7.5	3 inches	59	1:35	130	32	124.20
2883| 2	7.5	3 inches	60	1:50	150	18	118.01
2884| 3	7.5	18 inches	NA	1:50	NA	22	125.28
2885| 4	7.8	3 inches	60	1:53	175	18	136.05
2886| 5	7.5	3 inches	58.5	2:00	120	14	118.62
2887| 6	NA	18 inches	NA	2:00	NA	33	117.61

Parameter	Level
pH	6.5-8.5
Alkalinity	10-400 ppm
Hardness	>20 ppm
Dissolved Oxygen	5-12 ppm

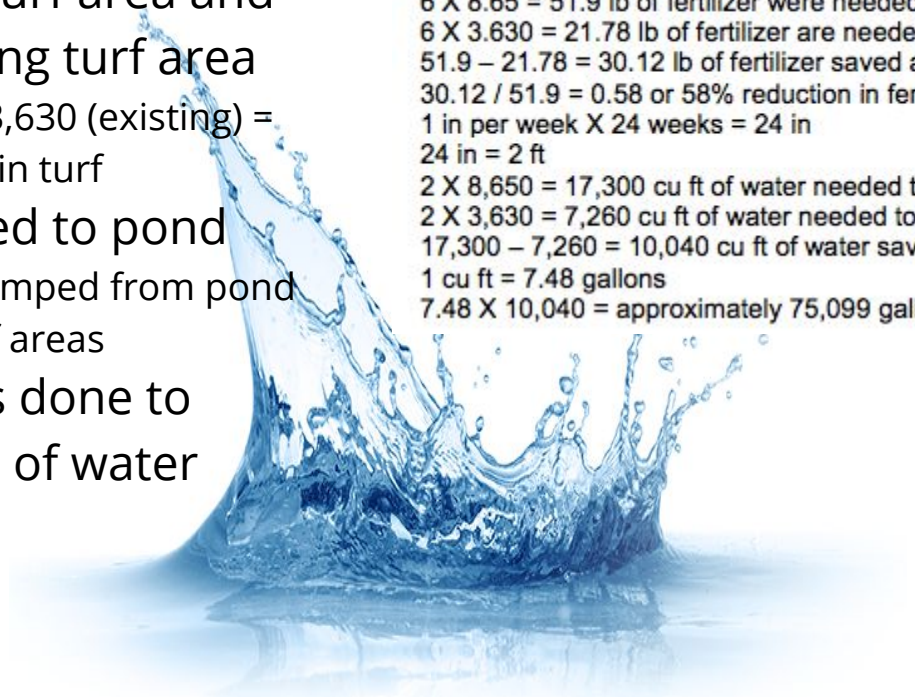


METHODOLOGY (RECYCLING)

- Average weight for Western White Pine timber was obtained from the American Wood Council
  - Weight : 27.2lb/cu ft.
  - Volume: 847.25 cu ft.
  - Total weight: 11.52 tons
- Recycling the 11.52 tons saved 20 metric tons of carbon dioxide

METHODOLOGY (WATER CONSERVATION)

- Mapped previous turf area and compared to existing turf area
  - 8,650 (previous) - 3,630 (existing) = 5,020 sf reduction in turf
- Stormwater directed to pond
  - Irrigation water pumped from pond and applied to turf areas
- Lots of calculations done to determine amount of water saved annually



2 lb / 1,000 sf X 3 times per year = 6 lb / 1,000 sf per year
6 X 8.65 = 51.9 lb of fertilizer were needed in previous condition
6 X 3.630 = 21.78 lb of fertilizer are needed in current condition
51.9 – 21.78 = 30.12 lb of fertilizer saved annually
30.12 / 51.9 = 0.58 or 58% reduction in fertilizer use
1 in per week X 24 weeks = 24 in
24 in = 2 ft
2 X 8,650 = 17,300 cu ft of water needed to irrigate previous condition
2 X 3,630 = 7,260 cu ft of water needed to irrigate current condition
17,300 – 7,260 = 10,040 cu ft of water saved annually
1 cu ft = 7.48 gallons
7.48 X 10,040 = approximately 75,099 gallons of water saved annually

METHODOLOGY (UNWANTED VIEWS)

- ➔ A road circling a large portion of the site created unwanted views of traffic
- ➔ A panoramic photo was taken from the patio as the key point of the property
- ➔ Photoshop was used to show a before and after of implementation of berms, planting, and mature trees to block views

BEFORE

AFTER

METHODOLOGY (ENERGY COST ANALYSIS)

- ➔ Installing a ground source heat pump avoided $97,000 in Pitkin County Renewal Energy Mitigation Program fees
- ➔ Heat pumps by Water Furnace = $28,000 to install
- ➔ Cost of drilling, field pipe, and grout = $55,000
- ➔ Annual Maintenance cost = $1,500 annually
- ➔ Total fees = $97,183.47
- ➔ Total cost to date = $90,5000
- ➔ **Saved roughly $7,000 for a 5 year period**