CASCADE GARDENS
CASE STUDY
KENNA, TIA, & KAITLIN
Designed by Design Workshop Inc.
<table>
<thead>
<tr>
<th>At a Glance</th>
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</thead>
<tbody>
<tr>
<td>DESIGNER</td>
<td>Design Workshop, Inc.</td>
<td></td>
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<tr>
<td>PROJECT TYPE</td>
<td>Single-family residence</td>
<td></td>
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<tr>
<td>FORMER LAND USE</td>
<td>Residential</td>
<td></td>
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</tr>
<tr>
<td>LOCATION</td>
<td>Undisclosed</td>
<td>Aspen, Colorado</td>
<td></td>
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<tr>
<td>CLIMATE ZONE</td>
<td>Humid continental</td>
<td></td>
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</tr>
<tr>
<td>SIZE</td>
<td>2.49 acres</td>
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<td></td>
</tr>
<tr>
<td>BUDGET</td>
<td>Undisclosed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMPLETION DATE</td>
<td>2009</td>
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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 annually
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

<table>
<thead>
<tr>
<th>OBJECTID</th>
<th>on-site pH</th>
<th>Depth</th>
<th>Temperature</th>
<th>Time</th>
<th>Alkalinity</th>
<th>TSS (mg SS/L)</th>
<th>Hardness</th>
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<tbody>
<tr>
<td>2882</td>
<td>7.5</td>
<td>3 inches</td>
<td>59</td>
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<td>130</td>
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<table>
<thead>
<tr>
<th>Parameter</th>
<th>Level</th>
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<tbody>
<tr>
<td>pH</td>
<td>6.5-8.5</td>
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<tr>
<td>Alkalinity</td>
<td>10-400 ppm</td>
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<tr>
<td>Hardness</td>
<td>&gt;20 ppm</td>
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<tr>
<td>Dissolved Oxygen</td>
<td>5-12 ppm</td>
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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
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
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**