
# Cost & Benefit Estimates for Green Infrastructure

A Guide to Lifecycle Analysis, Stormwater Valuation, and Strategic Estimating



NotebookLM

# THE TOTAL VALUE EQUATION


NotebookLM

# Establishing the Cost Baseline

## Unit Cost Approach


Detailed, line-item estimating using industry-standard data. Essential for specific 'Site Work & Landscape Costs' and creating precise construction budgets.

## Lump Sum Approach


Aggregate estimates typically found in planning tools like the 'Green Values™ Calculator'. Useful for early-stage feasibility but lacks granular detail.

**Key Insight:** Accurate estimation requires understanding the scope. RSMeans provides the granular data necessary for complex builds, while calculators provide broader planning figures.

NotebookLM

# The Long View: Lifecycle and Design Life


## O&M Cost

Operation and Maintenance expenses that accrue annually over the asset's design life.

## Net Present Value (NPV)

A financial method used to determine the current value of future costs and benefits, adjusting for inflation and time.

## Life Cycle Cost (LCC)

The total cost of ownership, mathematically combining upfront Capital Costs with long-term O&M costs.

## Standard Design Life Horizons

NotebookLM

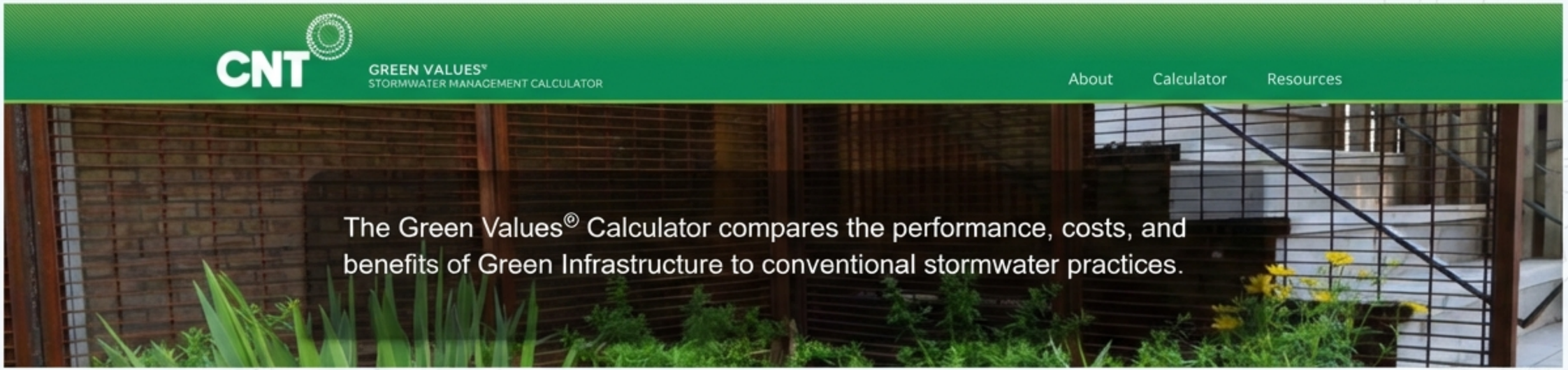
# Tool Profile: RSMeans Data


## Site Work & Landscape Costs

- **Purpose:** Designed for estimating infrastructure improvements, environment-oriented construction, and utilities.
- **Scope:** Comprehensive coverage including exterior improvements, pavement tasks, building utilities, and ADA-mandated access.
- **Depth of Data:** Contains more than 19,800 unit costs and 4,000 assemblies for efficient estimating.
- **Supplemental Info:** Includes Location Factors, Historical Cost Indexes, Crews, and Equipment Rentals.

NotebookLM

# Tool Profile: Green Values™ Calculator




## Core Function

Compares the performance, costs, and benefits of Green Infrastructure (GI) against conventional stormwater practices.

## Target Audience

Planners, landscape architects, municipal staff, and homeowners.

## Strategic Goal

To plan solutions that prevent flooding and determine the value of GI at the neighborhood or community scale.

NotebookLM

# Modeling Diverse Site Scenarios

Scenario Cards — Technical Slate Blue

## Urban Home

Small lot 6,075 ft²

Includes small house, garage, sidewalk, yard.

Scenario Cards — Technical Slate Blue

## Apartment

Medium lot 8,400 ft²

Includes building, sidewalk, patio, small yard.

Scenario Cards — Technical Slate Blue

## Suburban

Large lot 24,000 ft²

Includes large house, garage, driveway, yard.

Scenario Cards — Technical Slate Blue

## Commercial

Large lot 50,000 ft²

Includes building, parking lot, driveway, limited landscaping.

Scenario Cards — Technical Slate Blue

## Urban Park Area

6.8 Acres

Includes 3 acre park, streets, residential buildings, lawns.

Scenario Cards — Technical Slate Blue

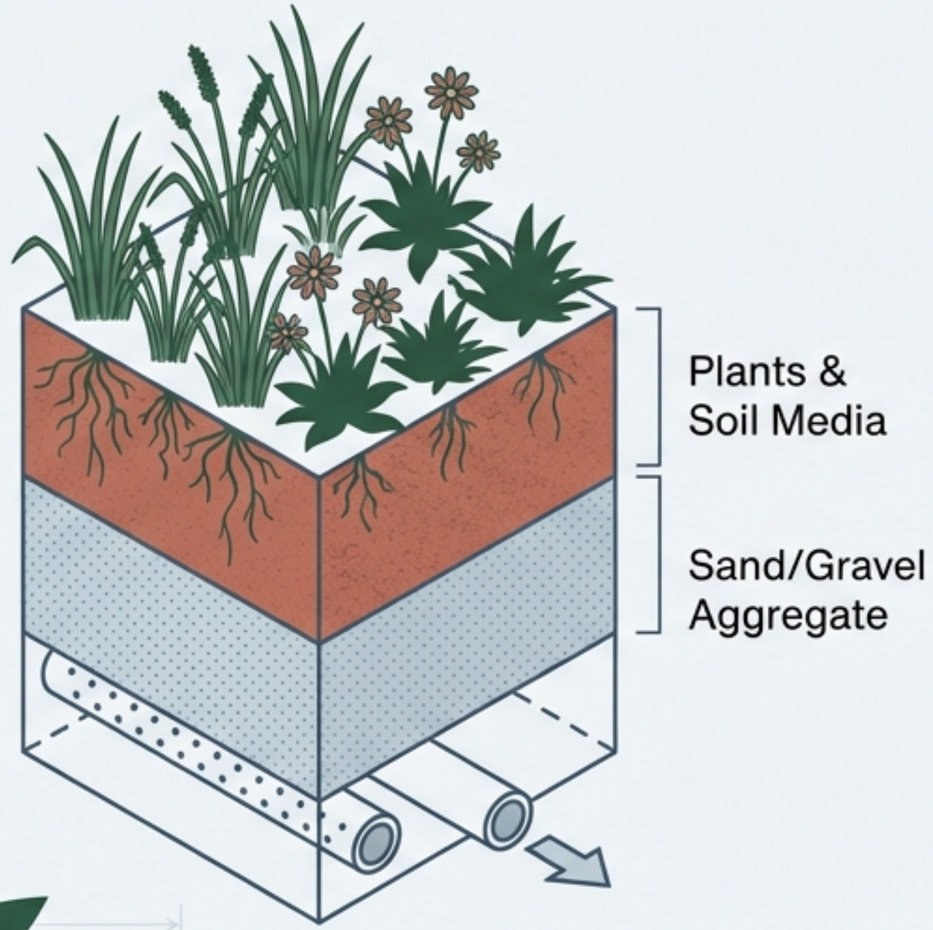
## Community Garden


Small lot 6,075 ft²

Includes raised beds, staging area, lawn walkways.

NotebookLM

# Cost Case Study: The Rain Garden




| Rain Garden Specification Costs | | |
|---|---|---|
| 1 | Construction Cost (Capital) | $6.07 / Ft² |
| 2 | Maintenance Cost (O&M) | $0.41 / Ft² |

Source: Green Values™ Calculator Initial Default Values

While upfront capital is higher, maintenance is a fraction of the cost—critical for Long Term Lifecycle analysis.

NotebookLM

# The Physics of Capture: Volume Calculation

Amended Soil Depth: 8 Inches

Aggregate Depth: 2 Inches

Aggregate Porosity: 0.25

$$VC_{RG} = (SD_{RG} * SP_{RG} + AD_{RG} * AP_{RG} + PD_{RG} * 0.667) * A_{RG}$$

Amended Soil Porosity: 0.35

Ponding Depth: 8 Inches. (Scaled back by 2/3rds to account for sloping sides)

Area of Rain Garden

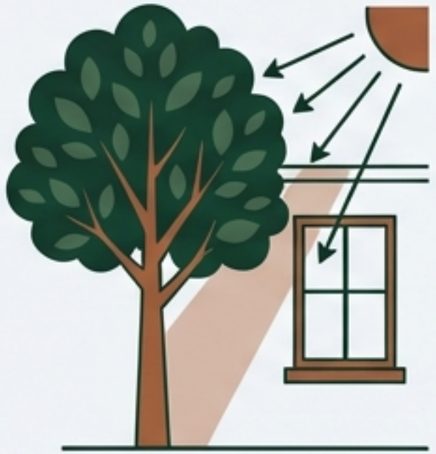
Typical Useful Life: 22.5 Years

Source: Rain Garden Volume Calculation Data

NotebookLM

# Quantifying Owner Benefits: Energy Efficiency

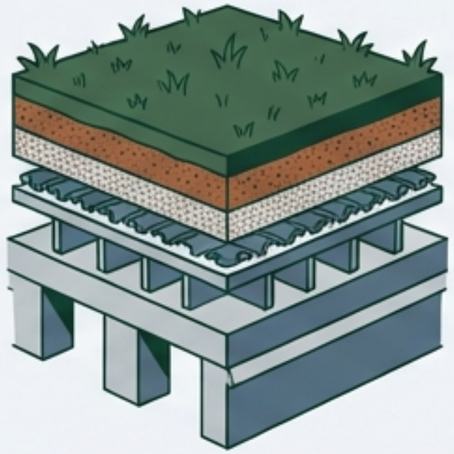
## Reduced Energy Use from Trees



**$36 / Per Tree**

Trees save energy for nearby buildings by providing shade and windbreaks.

## Reduced Energy Use from Green Roofs



**$18 / Per 100 ft²**

Green roofs provide insulation, reducing heating and cooling loads.

Source: Green Values™ Calculator Data.

NotebookLM

# Community ROI: Air Quality and Property Value

## Reduced Air Pollutants

**$0.18 / Per Tree**

Trees absorb and redirect particulate matter and air pollution.


## Carbon Sequestration

**$0.12 / Per Tree**

Trees actively take in CO2, contributing to climate goals.

## Compensatory Value

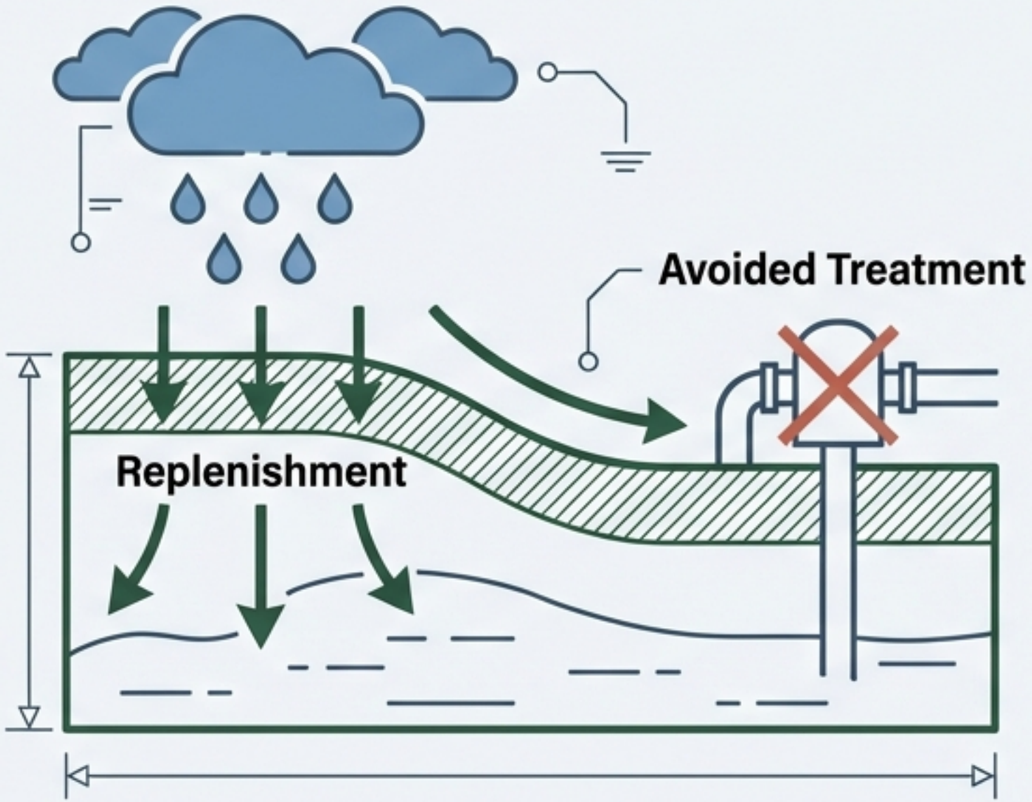
**$275 / Per Tree**

Trees add direct value to the property and the surrounding neighborhood aesthetic.

Source: Community Benefits Calculator Data.

NotebookLM

# Community ROI: Water Systems Savings




## Water Treatment Cost Reduction

**$29.94 / per acre-foot**

Savings derived from NOT treating the volume of water absorbed by BMPs.

## Groundwater Replenishment

**$86.42 / per acre-foot**

The economic value of recharging the local groundwater supply through reduced runoff.

Source: Green Values™ Calculator Data.

NotebookLM

# Synthesizing Cost and Value

## 1. Analyze Costs

Utilize **Unit Cost data (RSMeans)** for precision and **Life Cycle Cost (LCC)** for long-term accuracy.

## 2. Verify Performance

Use **scenario modeling (Green Values)** to ensure volume capture targets are met.

## 3. Calculate Returns

Factor in **energy savings**, **property value** increases, and **avoided water treatment costs.**

Effective Green Infrastructure planning requires balancing the **Capital & O&M Ledger** against **Owner & Community Benefits.**

Source: Comprehensive Cost-Benefit Analysis Data.

NotebookLM