AGENDA 4:30 P.M.

CITY COUNCIL MEETING WEDNESDAY, JUNE 10, 2026

NOTES:

- Meeting room is wheelchair accessible. American Disabilities Act (ADA) accommodations and translation services are available upon request. Please phone 928-282-3113 at least two (2) business days in advance.
- City Council Meeting Agenda Packets are available on the City's website at:

  www.SedonaAZ.gov

THE MEETING CAN BE VIEWED LIVE ON THE CITY'S WEBSITE AT WWW.SEDONAAZ.GOV OR ON CABLE CHANNEL 4.

GUIDELINES FOR PUBLIC COMMENT

PURPOSE:

- To allow the public to provide input to the City Council on a particular subject scheduled on the agenda.
- This is not a question/answer session.
- No disruptive behavior or profane language will be allowed.

PROCEDURES:

- Fill out a "Comment Card" and deliver it to the City Clerk.
- When recognized, use the podium/microphone.
- State your:
  1. Name and
  2. City of Residence
- Limit comments to **3 MINUTES.**
- Submit written comments to the City Clerk.

1. CALL TO ORDER/PLEDGE OF ALLEGIANCE/MOMENT OF SILENCE

2. ROLL CALL

3. SPECIAL BUSINESS

LINK TO DOCUMENT =

a. AB 3336 **Discussion/possible direction** on sustainability code recommendations for energy, mobility, waste, water, and climate resiliency.
b. **Discussion/possible action** regarding ideas for future meetings/agenda items.

4. EXECUTIVE SESSION

Upon a public majority vote of the members constituting a quorum, the Council may hold an Executive Session that is not open to the public for the following purposes:

a. To consult with legal counsel for advice regarding matters listed on this agenda per A.R.S. § 38-431.03(A)(3).
b. Return to open session. **Discussion/possible action** regarding executive session items.

5. ADJOURNMENT

Posted: 06/04/2026 _____

By: DJ JoAnne Cook, CMC, City Clerk

Note: Pursuant to A.R.S. § 38-431.02(B) notice is hereby given to the members of the City Council and to the general public that the Council will hold the above open meeting. Members of the City Council will attend either in person or by telephone, video, or internet communications. The Council may vote to go into executive session on any agenda item, pursuant to A.R.S. § 38-431.03(A)(3) and (4) for discussion and consultation for legal advice with the City Attorney. Because various other commissions, committees and/or boards may speak at Council meetings, notice is also given that a quorum of members of these other City commissions, boards, or committees may be in attendance.

A copy of the packet with material relating to the agenda items is typically available for review by the public in the Clerk's office after 1:00 p.m. the Thursday prior to the Council meeting and on the City's website at www.SedonaAZ.gov. The Council Chambers is accessible to people with disabilities, in compliance with the Federal 504 and ADA laws. Those with needs for special typeface print, may request these at the Clerk's Office. All requests should be made **forty-eight hours** prior to the meeting.

NOTICE TO PARENTS AND LEGAL GUARDIANS: Parents and legal guardians have the right to consent before the City of Sedona makes a video or voice recording of a minor child, pursuant to A.R.S. § 1-602(A)(9). The Sedona City Council meetings are recorded and may be viewed on the City of Sedona website. If you permit your child to attend/participate in a televised City Council meeting, a recording will be made. You may exercise your right not to consent by not allowing your child to attend/participate in the meeting.

CITY COUNCIL CHAMBERS
102 ROADRUNNER DRIVE, SEDONA, AZ

The mission of the City of Sedona government is to provide exemplary municipal services that are consistent with our values, history, culture and unique beauty.

CITY COUNCIL AGENDA BILL

AB 3336
June 10, 2026
Special Business

Agenda Item: 3a
Proposed Action & Subject: Discussion/possible direction regarding sustainability code recommendations for energy, mobility, waste, water, and climate resiliency.

Department	Sustainability Department, Bryce Beck
Time to Present	60 min
Total Time for Item	120 min
Other Council Meetings	N/A
Exhibits	A. Sustainability Code Recommendations and Evaluation

Finance Approval	Reviewed 5/27/26 BGW
City Attorney Approval	Reviewed 5/29/26 MKC
City Manager's Recommendation	Provide feedback to staff for items to include in future LDC and building code revisions. ABS 6/1/26

Expenditure Required
$ N/A
Amount Budgeted
$ N/A
Account No. (Description)

SUMMARY STATEMENT

Overview

Sustainability staff develop programs and initiatives in five main areas derived from the Climate Action Plan (CAP): Buildings and Energy, Transportation and Land Use, Materials and Consumption, Water and Natural Systems, and Climate Resilience. For this agenda discussion, staff will present code recommendations developed in collaboration with the Community Development Department for review and direction.

Code Recommendations Background

As the City continues to pursue and implement a variety of environmental conservation, climate mitigation and adaptation, and resiliency projects across the organization, Sustainability and Community Development staff wanted to evaluate options to further align municipal building code and land development codes with the goals and values from the 2024 Sedona Community Plan and 2021 Sedona Climate Action Plan, and the 2024 Heat Mitigation and Adaptation Guidebook. In the Summer of 2025, staff partnered with the Sustainable Investment Group (SIG) who specializes in sustainability consulting and engineering with extensive experience in energy modeling, LEED benchmarking, ASHRAE energy audits, and sustainability policy to facilitate the project.

The project included a comprehensive evaluation of Sedona's existing codes, benchmarking against peer municipalities, and the development of draft language for recommended updates. SIG facilitated stakeholder engagement where needed, provided both quantitative and qualitative analysis of the proposed measures, and assessed cost impacts to ensure recommendations were realistic, replicable, and financially feasible. The outcome was a set of sustainability-focused code amendments and implementation strategies designed to help Sedona achieve its climate and community goals while enhancing long-term resilience and livability.

The report is broken out into five core sections, each dedicated to a distinct focus area: energy, mobility, waste, water, and climate resilience. Within each section, the report outlines the recommendation, suggested code language to implement the recommendation, and an impact assessment matrix. The impact assessment matrix offers an approachable and consistent presentation of the impact, costs, and benefits of the recommendation to the public, property owners, and developers. Additional details on the calculations and methodology behind each impact assessment are found in the corresponding endnote in the Appendix.

The recommendations and suggested code language developed in the report are intended to serve as a baseline for discussions and direction. The recommendations are not all encompassing, finalized, or required to be implemented. Any recommendations that receives direction from Council to move forward would have additional refinement and incorporation into existing code processes before possible implementation. A summary table of the recommendations for each focus area is below:

Energy Category	Recommendation
Energy 1	Phase-out of fossil fuel-powered domestic hot water
Energy 2	Battery-ready new construction
Energy 3	Solar PV, green or reflective roofs for new commercial construction
Mobility Category	**Recommendation**
Mobility 1	Bicycle parking substitution for vehicle parking
Mobility 2	Parking reduction for sidewalk and bike lane improvements
Mobility 3	Shade requirements for pedestrian gathering areas
Mobility 4	Mid-block pedestrian access in long blocks or dead ends
Mobility 5	Tree canopy requirements for new developments
Mobility 6	New construction to install cool roofing or paving on hardscapes
Mobility 7	Transit stops to have weather shelters
Mobility 8	Surface lots to have shading and pedestrian pathways and/or walkable medians with crosswalks
Mobility 9	New multifamily to have level 2 EV chargers installed
Mobility 10	New EV charging stations on commercial properties be at least level 2
Mobility 11	Public hydrations stations, waste/recycling receptacles, and shaded seating at public/civic spaces and trailheads
Waste Category	**Recommendation**
Waste 1	New construction of 1,000 square feet to provide a construction and waste demolition plan
Waste 2	Require commercial properties to recycling bins and large commercial to have a recycling plan
Water Category	**Recommendation**
Water 1	Require an average efficiency of 1.8 gpm across all fixtures in new construction

Water 2	Require rainwater harvesting for irrigation and landscaping on commercial sites larger than 5,000 sq. feet
Water 3	Require greywater reuse in new commercial buildings over 5,000 sq. feet
Water 4	Require greywater readiness in new construction
Water 5	Permeable paving, bioswales, and/or bioretention basins in hardscapes greater than 5,000 sq. feet
Water 6	Resilience and sustainability checklist at design review
Resilience Category	**Recommendation**
Resilience 1	Require minimum tree canopy for new construction (20% residential and 10% for commercial)
Resilience 2	Require trees, plants and bushes to be replaced with native adapted species.
Resilience 3	Require shade trees per parking spaces on commercial properties
Resilience 4	Cultural/visual impact states for projects greater than 50,000 sq. feet
Resilience 5	Wildland-urban interface developments must include defensible space, emergency access, and fire-resilient materials
Resilience 6	Require bioswales with native vegetation around new, modified, or repaired storm drains.
Resilience 7	Require short term rentals to maintain an evacuation plan and fire prevention and mitigation plan.
Resilience 8	Require owners of vacant lots maintain the lot for fire mitigation and invasive species management
Resilience 9	Require new commercial developments greater than 1,000 sq. feet to have publicly accessible restroom
Resilience 10	Require at time of sale utility and consumption records for the last 12 months and EV, PV, and battery readiness of a property

Future Program Considerations:

Future Program Considerations	
Program #1	Clean energy equipment conversion incentive
Program #2	Resilient buildings bonus for demand response programs
Program #3	High-performance building recognition and incentives
Program #4	Solar parking canopy bonus program
Program #5	Low-carbon & recycled materials rebate program
Program #6	Waste diversion innovation grants
Program #7	Blue-green infrastructure zones
Program #8	Net-zero water density bonus
Program #9	Cultural & visual impact statement

Summary

A variety of code recommendations and programs can be pursued to help align and advance goals in the city's master plans. Feedback from this session will facilitate further refinement and possible direction for incorporation of sustainability code recommendations into future building and land development code updates. The Sustainability Code Recommendations and Evaluation Report serves as a reference point on implementable options that can enhance the city's efforts in energy, mobility, water, waste, and climate resilience.

This project builds upon past city code efforts that emphasized environmental stewardship such as dark sky compliant lighting, solar-ready roofs, EV-ready parking spaces, native plant species

lists, stormwater ordinances that strive to foster high-quality, attractive, and sustainable development.

Climate Action Plan/Sustainability Consistent: ☒**Yes -** ☐**No -** ☐**Not Applicable**

Board/Commission Recommendation: ☐**Applicable -** ☒**Not Applicable**

Alternative(s): N/A

MOTION

I move to: For information, discussion, and possible direction only.

Sustainability Code Recommendations and Evaluation

Sedona, AZ

Prepared for the City of Sedona, AZ
Submitted by Sustainable Investment Group (SIG)

November 2025

SIG

A company of TÜV SÜD

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INTRODUCTION & EXECUTIVE SUMMARY

Sustainable Investment Group, LLC (SIG) partnered with the City of Sedona, Arizona, to review and strengthen the City's municipal and land development codes in alignment with the Sedona Community Plan, the 2021 Climate Action Plan, and the Heat Mitigation and Adaptation Guidebook. Drawing on SIG's expertise in ESG, sustainability strategy, and public policy, the project delivered actionable code recommendations that advance the City's priorities around energy efficiency, electric vehicle infrastructure, heat mitigation and adaptation, multi-modal transportation, and nature-based solutions.

The project included a comprehensive evaluation of Sedona's existing codes, benchmarking against peer municipalities, and the development of draft language for recommended updates. SIG facilitated stakeholder engagement where needed, provided both quantitative and qualitative analysis of the proposed measures, and assessed cost impacts to ensure recommendations were realistic, replicable, and financially feasible. The outcome was a set of sustainability-focused code amendments and implementation strategies designed to help Sedona achieve its climate and community goals while enhancing long-term resilience and livability.

The report is broken out into five core sections, each dedicated to a distinct focus area: energy, mobility, waste, water, and climate resilience. Within each section, the report outlines the recommendation, suggested code language to implement the recommendation, and an impact assessment matrix. The impact assessment matrix offers an approachable and consistent presentation of the impact, costs, and benefits of the recommendation to the public, property owners, and developers. For more details on the calculations and methodology behind each impact assessment, please visit the corresponding endnote in the Appendix.

SIG commends the City of Sedona for its past and future sustainability initiatives and progress, and thanks the City for the opportunity to deliver this report and be a part of its continued sustainability journey.

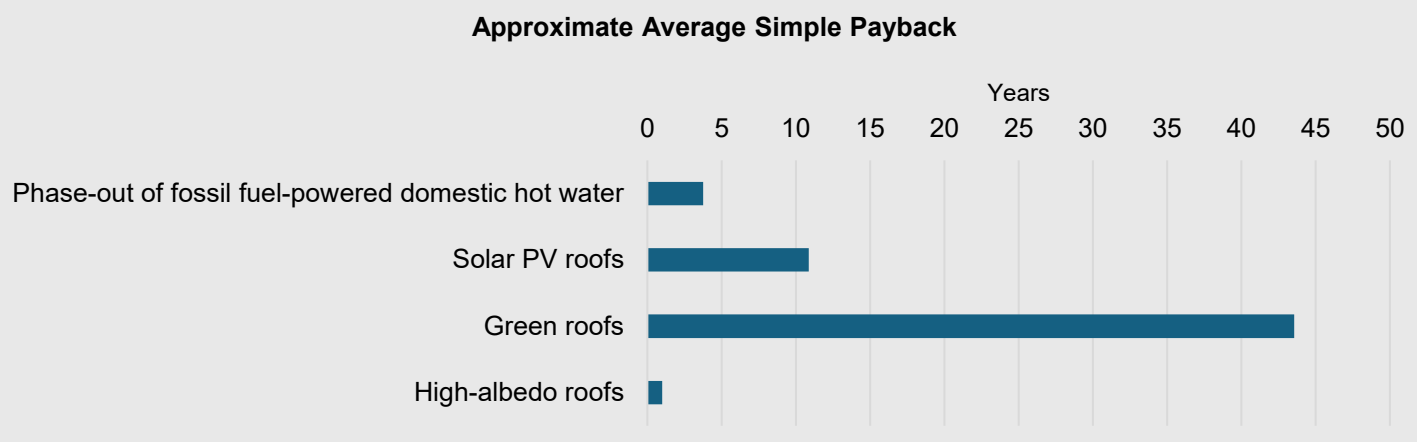
ENERGY

Guiding Goals for Energy

1. Ensure long-term access to clean energy while reducing the fiscal and environmental impacts of consumption
2. Reduce energy use and increase energy efficiency at commercial, residential, and public facilities
3. Reduce buildings' contribution to the urban heat island effect
4. Utilize energy efficiency as a tool for equity and opportunity for co-benefits
5. Ensure access to cooling

Summary: Energy

	Approximate Average Simple Payback
1. Phase-out of fossil fuel-powered domestic hot water	4 years
2. Battery-ready new construction	Intangible savings
3a. Solar PV roofs	11 years
3b. Green roofs	44 years
3c. High-albedo roofs	<1 year



Energy 1: Phase-out of fossil fuel-powered domestic hot water

Recommendation

Prohibit the installation in new construction of new domestic hot water systems that are powered by fossil fuel after 2029 and provide a financial incentive for domestic hot water systems installed in new construction that have an efficiency greater than 100%.

Suggested Code Language

> (a) Effective January 1, 2030, the installation of domestic hot water systems powered by fossil fuels shall be prohibited in all new construction.
> (b) All domestic hot water systems installed in new construction shall utilize electric or renewable energy technologies.
> (c) A financial incentive shall be provided for domestic hot water systems installed in new construction that demonstrate a rated efficiency greater than one hundred percent (100%), as determined under applicable federal test procedures.
> (d) Eligible systems shall include, but not be limited to, heat pump water heaters and other technologies certified by the Building Official as exceeding one hundred percent (100%) efficiency.
> (e) Incentive amounts, eligibility requirements, and application procedures shall be established by administrative rule, provided that the incentive shall not be less than ten percent (10%) of the documented incremental cost between baseline systems and qualifying systems.

Impact Assessment[i]

	Low	Medium	High	Not Applicable
Policy Impact			X	
Benefit to Public		X		
Benefit to Property Owner			X	
Benefit to Developer	X			
Cost to Public	X			
Cost to Property Owner	X			
Cost to Developer		X		

The installation of a high efficiency electric or solar thermal hot water system has an upfront installation cost ranging from **$1,000 to $1,500** for Single Family Residential buildings, **$10,000 to $12,000** for mixed office and retail, and **$15,000 to $25,000** for multifamily residential buildings. The incentive for > 100% efficient systems, along with rebates from utility providers can potentially offset some of the upfront costs and reduce operating costs.

- **Economic Benefits (2-4 years)**: Electric heat pump systems use up to **75%** less energy than fossil fueled heat systems. This provides a reduction in monthly utility bills for property owners and/or tenants.
- **Public Health Benefits (3-6 years):** The elimination of on-site fossil fuel combustion can improve indoor air quality.
- **Environmental Benefits (10+ years):** The prohibition of fossil fueled systems and prioritization of electric/solar systems will provide a significant reduction in GHG emissions. Water heating can account for up to **18%** of household energy consumption. This prohibition and transition can eliminate thousands of metric tons of CO2 from Sedona's building stock.

Estimated Cost Recovery Period:

- **2–4 years**: Economic and incentive-based payback
- **10+ years**: Cumulative environmental and climate impact

Energy 2: Battery-ready new construction

Recommendation

Require that all new construction is battery-ready in addition to being solar-ready and EV-ready; adopt NFPA 855 and UL 9540 for battery storage requirements.

Suggested Code Language

> (a) All new construction shall be designed and constructed to be battery-ready, solar-ready, and electric vehicle (EV)-ready.
> (b) Battery-ready construction shall include dedicated space for future battery energy storage system installation, provision of electrical panel capacity, and installation of conduit and raceways necessary to accommodate future system interconnection.
> (c) All battery energy storage systems installed shall comply with NFPA 855 and UL 9540, as amended from time to time.
> (d) Solar-ready construction shall comply with the requirements of Section [X.X – Solar-Ready Construction].
> (e) EV-ready construction shall comply with the requirements of Section [X.X – Electric Vehicle Infrastructure].
> (f) The Building Official shall adopt administrative rules establishing standards for battery-ready space allocation, conduit sizing, electrical capacity requirements, and submittal documentation.

Impact Assessment[ii]

	Low	Medium	High	Not Applicable
Policy Impact		X		
Benefit to Public		X		
Benefit to Property Owner	X			
Benefit to Developer	X			
Cost to Public	X			
Cost to Property Owner	X			
Cost to Developer	X			

This policy encourages future participation in demand-response programs, time-of-use rate optimization, and reduces peak demand for utilities. Battery-readiness includes electrical panel space, conduit placement, load-management systems, wall clearances, and predesign for battery weight/support. Compliance with **NFPA 855** (standard for installation of stationary energy storage) and **UL 9540** (battery system safety testing) adds minimal cost when designed upfront.

- **Economic Benefits (3–5 years):** Battery-ready buildings reduce potential future retrofit costs for post-construction installations, and increase property values.
- **Public Health Benefits (4–7 years):** Battery-readiness supports power availability during grid outages caused by extreme weather or wildfires. Public and private buildings with battery backup can reduce vulnerability for residents and emergency responders.
- **Environmental Benefits (10+ years):** Battery storage encourages the increased use of solar by shifting energy use during non-peak hours, grid stability, and long-term decarbonization.

Estimated Cost Recovery Period:

- **3–5 years**: Financial resilience and avoided retrofit cost
- **10+ years**: Grid integration and environmental value

Energy 3: Solar PV, green, or reflective roofs

Recommendation

All new commercial construction must have a roof that is or includes either (1) solar PV, (2) a green roof, or (3) a high albedo roof, or some combination thereof.

Suggested Code Language

(a) All new commercial buildings shall be constructed with a roof that incorporates one or more of the following:
(1) Solar photovoltaic (PV) systems covering not less than fifty percent (50%) of the roof area;
(2) A green roof system designed and installed in accordance with standards adopted by the Building Official; or
(3) A high-albedo (cool) roof meeting a maximum solar reflectance index (SRI) of 65 for low-sloped roofs and 39 for steep-sloped roofs, as tested under ASTM standards.
(b) A combination of the measures in subsection (a) may be used, provided that the combined coverage equals at least one hundred percent (100%) of the roof area.
(c) The applicant shall submit construction documents demonstrating compliance, including roof plans, specifications, and certifications from qualified professionals.
(d) Exemptions may be granted by the Building Official for roof areas occupied by mechanical equipment, skylights, or other features that preclude installation of the required systems, provided that the remaining available roof area complies with subsection (a).

Impact Assessment[iii]

	Low	Medium	High	Not Applicable
Policy Impact			X	
Benefit to Public			X	
Benefit to Property Owner			X	
Benefit to Developer	X			
Cost to Public	X			
Cost to Property Owner	X			
Cost to Developer		X		

This policy mandates that at least one high-performance roofing strategy be implemented. Cost estimates include: **Solar PV: $50,000** for single-family residential, $**400**,**000** for multifamily residential, **$675,000** for mixed office/retail; **Green Roof: $8,000** for single-family residential, **$60,000** for multifamily residential, **$100,000** for mixed office/retail; **Cool Roof (High-Albedo):** $0 cost difference over conventional roofs.

- **Economic Benefits (3–6 years):** Solar PV systems, Green roofs, and Cool Roofs can offset electricity usage and reduce stormwater runoff fees, reduce maintenance and operating costs. For Solar/PV roofs, costs savings can range from **$5,000 to $70,000** annually, depending on building size, utility rates and net metering policies.

- **Public Health Benefits (5–8 years):** Green and reflective roofs reduce surface temperatures, improve worker comfort, reduce heat-related illnesses, and enhance livability in urban heat zones. Green roofs also improve air quality and provide limited carbon sequestration and habitat value.

- **Environmental Benefits (10+ years):** Cool and Green roofs reduce stormwater runoff and reduce the urban heat island effect.

Estimated Cost Recovery Period:

- **3–6 years**: Operational and energy savings payback

- **10+ years**: Environmental, public health, and infrastructure resilience returns

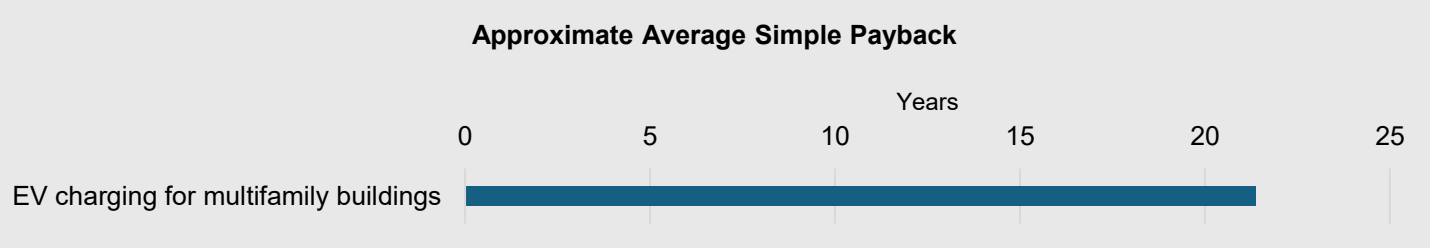
MOBILITY

Guiding Goals for Mobility

1. Reduce transportation emissions and enhance community mobility
2. Sedona's unique sense of place and stewardship of the natural environment is reflected in the design and development of the built environment
3. Build a complete and connected circulation network that is safe, convenient, and efficient for all users and all modes of travel
4. Prioritize public and alternative transportation

Summary: Mobility

	Approximate Average Simple Payback
1. Bicycle parking substitution for vehicle parking	Intangible savings
2. Parking reduction for sidewalk and bike lane improvements	Intangible savings
3. Shade requirements for pedestrian gathering areas	Intangible savings
4. Mid-block pedestrian access	Intangible savings
5. Tree canopy requirements for new development	Intangible savings
6. Cool roofing & paving	Intangible savings
7. Transit shelters	Intangible savings
8. Surface lot shading & pedestrian crossings	Intangible savings
9. EV charging for multifamily buildings	21 years
10. Minimum EV charging capacity for commercial properties	Intangible savings
11. Public rest & hydration stations	Intangible savings



Mobility 1: Bicycle parking substitution for vehicle parking

Recommendation

For the purposes of meeting parking space requirements, one parking space can be substituted by a minimum of three bicycle parking spaces up to a maximum of 10.

Suggested Code Language

> (a) For the purpose of satisfying off-street parking requirements under this Code, one (1) required automobile parking space may be substituted by not fewer than three (3) bicycle parking spaces.
> (b) The total number of automobile parking spaces substituted under this section shall not exceed ten (10) spaces for any development.
> (c) Bicycle parking spaces provided under this section shall comply with design, security, and accessibility standards adopted by the Building Official.
> (d) Substituted bicycle parking spaces shall be located on the same site as the development they serve and shall be available to occupants and visitors during all hours of building operation.

Impact Assessment[iv]

	Low	Medium	High	Not Applicable
Policy Impact	X			
Benefit to Public		X		
Benefit to Property Owner	X			
Benefit to Developer	X			
Cost to Public	X			
Cost to Property Owner	X			
Cost to Developer	X			

Replacing vehicle parking spaces with bicycle racks requires low upfront costs. The costs for developers and property owners include the installation of anchored, ADA-compliant bike racks, and permit costs. The estimated cost per bike rack (supporting 2 bikes) averages **$660** to substitute a single parking space with 3 bike spots.

- **Economic Benefits (1-3 years):** Developers can save significantly on reduced parking construction costs. The replacement provides an increase in accessibility.

- **Public Health Benefits (3-5 years):** Increased accessibility for bikers can lower obesity rates, improve air quality, and reduce vehicle emissions, which can contribute to reduced healthcare costs.

- **Environmental Benefits (10+ years):** The shift from car to bike travel reduces greenhouse gas emissions and supports long-term climate mitigation efforts.

Estimated Cost Recovery Period:

- **1–3 years** for economic and health-related benefits
- **10+ years** for broader environmental outcomes

Mobility 2: Parking reduction for sidewalk and bike lane improvements

Recommendation

Reduce parking space requirements for new developments that implement a continuous sidewalk and/or protected bike lane of at least 10' in width.

Suggested Code Language

> (a) New developments that construct and maintain a continuous sidewalk of not less than ten (10) feet in width along the property frontage, or that construct and maintain a protected bicycle lane of not less than ten (10) feet in width adjacent to the property, shall be eligible for a reduction in the minimum off-street parking requirements established by this Code.
> (b) The parking reduction authorized by this section shall not exceed twenty percent (20%) of the minimum number of off-street parking spaces otherwise required.
> (c) To qualify, the sidewalk or bicycle lane shall connect to existing or planned pedestrian or bicycle facilities as designated in the City's transportation or mobility plan.
> (d) All improvements constructed under this section shall comply with applicable accessibility, safety, and design standards adopted by the City.
> (e) The applicant shall provide construction drawings and as-built documentation demonstrating compliance and shall maintain the improvements for the duration of the development's use.

Impact Assessment[v]

	Low	Medium	High	Not Applicable
Policy Impact	X			
Benefit to Public		X		
Benefit to Property Owner		X		
Benefit to Developer	X			
Cost to Public	X			
Cost to Property Owner	X			
Cost to Developer		X		

The construction of 10 ft. sidewalks or protected bike lanes averages **$8,170** for raised crosswalks and an estimated **$1,000 to $5,000** for protected bike lanes. These improvements provide a trade-off up to 20% reduction in required parking construction and maintenance savings.

- **Economic Benefits (2-4 years**): Developers benefit from reduced parking construction requirements, while adjacent properties may see increased foot traffic and land value appreciation.
- **Public Health Benefits (3-6 years):** Safer walking and biking environments encourage physical activity, reducing long-term healthcare costs.
- **Environmental Benefits (10+ years):** Improvements to modal transpiration infrastructure will encourage a shift from single occupancy vehicles, resulting in lower emissions and roadway congestion.

Estimated Cost Recovery Period:

- 2-4 years for economic and health-related benefits
- 10+ years for environmental outcomes

Mobility 3: Shade requirements for pedestrian gathering areas

Recommendation

Require minimum shade coverage of at least 50% for pedestrian gathering points, including outdoor dining areas, waiting areas, transit stops, trailheads, and bike parking.

Suggested Code Language

> (a) All new developments shall provide a minimum of fifty percent (50%) shade coverage for designated pedestrian gathering points, including but not limited to outdoor dining areas, building entrances, waiting areas, transit stops, trailheads, and bicycle parking areas.
> (b) Shade coverage may be achieved through tree canopy, shade structures, building overhangs, photovoltaic canopies, or other permanent features approved by the Building Official.
> (c) Shade coverage shall be calculated at solar noon on June 21, based on the mature size of plantings or the constructed dimensions of shade structures.
> (d) Plantings used to meet the requirements of this section shall be species appropriate to the local climate, drought-tolerant, and maintained in healthy condition for the life of the development.
> (e) Compliance shall be demonstrated through site plans, shading diagrams, and landscape plans submitted as part of the development review application.

Impact Assessment[vi]

	Low	Medium	High	Not Applicable
Policy Impact	X			
Benefit to Public		X		
Benefit to Property Owner	X			
Benefit to Developer	X			
Cost to Public	X			
Cost to Property Owner		X		
Cost to Developer		X		

Modifications to pedestrian/public gathering spaces require moderate upfront costs from property owners and developers. Tree installation and maintenance average to **$120/tree and $100 - $500/year**. The installation of shade structures or building overhangs ranges from **$20,000 to $70,000** depending on materials, labor costs, and size. These improvements can increase utilization of public spaces, economic vitality for local and small businesses, and increase public health.

- **Public Health Benefits (3–5 years):** Enhanced usability, reduced heat stress.
- **Economic Benefits (5–10 years):** Increases foot traffic for nearby retailers.

Estimated Cost Recovery Period:

- 3-5 years for shade-related thermal and comfort benefits.
- 8-10 years for enhanced property values and placemaking.

Mobility 4: Mid-block pedestrian access

Recommendation

Mandate mid-block pedestrian access in long blocks or dead ends.

Suggested Code Language

> (a) All new subdivisions and site developments located on blocks exceeding [Sedona-specific measurement] feet in length shall provide a publicly accessible mid-block pedestrian access connecting parallel rights-of-way.
> (b) All new subdivisions and site developments located on dead-end streets or cul-de-sacs exceeding [Sedona-specific measurement] feet in length shall provide a publicly accessible pedestrian access connecting the dead-end to an adjacent street, trail, or pathway network, where feasible.
> (c) Mid-block pedestrian accessways shall be not less than six (6) feet in clear width, designed to comply with ADA accessibility standards, and illuminated in accordance with City lighting requirements.
> (d) Accessways shall be constructed of durable, all-weather surfacing materials and shall be maintained in good condition for the life of the development.
> (e) The Planning Director may approve alternative alignments where topography, natural features, or existing development preclude a straight connection, provided that pedestrian connectivity is substantially preserved.

Impact Assessment[vii]

	Low	Medium	High	Not Applicable
Policy Impact	X			
Benefit to Public			X	
Benefit to Property Owner				X
Benefit to Developer	X			
Cost to Public	X			
Cost to Property Owner				X
Cost to Developer			X	

Implementing mid-block pedestrian accessways require high upfront cost for easement acquisition, grading, surfacing, ADA-compliant design, and lighting installation. Based on comparable projects in peer cities and estimates from Federal Highway Administration, the initial costs start at **$22,250** per accessway, depending on existing site conditions, and materials.

- **Economic Benefits (3-5 years)**: Enhanced walkability improves property values and reduces long-term municipal infrastructure costs.
- **Public Health Benefits (3-7 years)**: Increased walking reduces public dependency on vehicles, lowering healthcare costs tied to air pollution and sedentary lifestyles.
- **Environmental Benefits (10+ years)**: Improved pedestrian networks reduce greenhouse gas emissions, decrease usage of single occupancy vehicles for travel less than 5 miles, single occupancy vehicles, resulting in lower emissions and roadway congestion.

Estimated Cost Recovery Period:

- **3-5 years** for economic and health-related benefits
- **10+ years** for broader environmental and livability outcomes

Mobility 5. Tree canopy requirements for new development

Recommendation

In new developments, require a plan for there to be at least 30% tree canopy on-site within 10 years.

Suggested Code Language

> (a) All new developments shall provide a tree planting and landscaping plan that demonstrates achievement of a minimum of thirty percent (30%) tree canopy coverage on-site at maturity.
> (b) Tree canopy coverage shall be calculated based on the projected mature canopy spread of proposed tree species, as published by recognized horticultural or arboricultural references approved by the City.
> (c) Tree species selected shall be drought-tolerant, non-invasive, and appropriate to the Sedona climate and soils, and shall be maintained in healthy condition for the life of the development.
> (d) Areas counted toward tree canopy coverage shall include parking lots, pedestrian pathways, gathering areas, and other open space areas within the development site.
> (e) Compliance shall be demonstrated through a landscape plan prepared by a qualified professional and submitted with the development application.
> (f) Failure to maintain required tree canopy coverage shall constitute a violation of this Code and may be subject to enforcement action.

Impact Assessment[viii]

	Low	Medium	High	Not Applicable
Policy Impact	X			
Benefit to Public		X		
Benefit to Property Owner		X		
Benefit to Developer	X			
Cost to Public	X			
Cost to Property Owner	X			
Cost to Developer		X		

Requiring development plans to include a 30% tree canopy bear moderate upfront costs for developers. The average installation costs is **$750 per tree** and an estimated annual maintenance of **$200-$600**. The estimated development cost of a 10-year shading plan is **$30,000.**

- **Economic Benefits (3-6 years):** Increased property value. Long-term savings available from reduced cooling, stormwater fees, and grey infrastructure upgrades.
- **Public Health Benefits (4-7 years):** Tree shade reduces heat-related illnesses and improves mental health through exposure to greenery.
- **Environmental Benefits (10+ years):** Reduced stormwater runoff, improved air quality, and carbon capture, contributing to long-term climate mitigation and wildlife habitat restoration.

Estimated Cost Recovery Period:

- 3-6 years for economic and health-related benefits
- 10+ years for public health, environmental and climate resilience outcomes

Mobility 6. Cool roofing & paving

Recommendation

Require that new construction install cool roofing/paving for at least 50% of hardscapes.

Suggested Code Language

> (a) All new construction shall provide cool roofing and/or cool paving materials for not less than fifty percent (50%) of the total hardscape area on the site, including roofs, surface parking areas, walkways, plazas, and other impervious surfaces.
> (b) Cool roofing materials shall have a minimum initial solar reflectance index (SRI) of 82 for low-sloped roofs and 39 for steep-sloped roofs, as tested in accordance with ASTM standards.
> (c) Cool paving materials shall demonstrate a minimum initial solar reflectance of 0.29 or an equivalent thermal performance standard approved by the Building Official.
> (d) Compliance shall be demonstrated through material specifications and manufacturer certifications submitted with the building permit application.
> (e) Exemptions may be granted by the Building Official for areas occupied by mechanical equipment, utilities, or other features that preclude installation of cool materials, provided that the fifty percent (50%) coverage requirement is met on the remaining eligible hardscape areas.

Impact Assessment[ix]

	Low	Medium	High	Not Applicable
Policy Impact		X		
Benefit to Public		X		
Benefit to Property Owner		X		
Benefit to Developer		X		
Cost to Public	X			
Cost to Property Owner		X		
Cost to Developer		X		

The construction of cool roofing/paving systems will require a moderate upfront cost from property owners and developers. The estimated cost for a cool roof for a 3,000 residential home ranges from $47,086-$70,630. The estimated cost for cool paving installation based on the model of a 30 ft driveway is $5,700, depending on labor costs and materials.

- **Economic Benefits (3-5 years):** Lower HVAC demand, cool roofing/paving materials have a longer lifespan than conventional material resulting in a reduction in maintenance costs.
- **Public Health Savings (5-8 years):** Reduced urban heat exposure mitigates the risk of heat related illness and injuries.
- **Environmental Benefits (10+ years):** Cool paving/roofing with solar reflectance results in a reduction in heat island effect and reduce peak energy demand.

Estimated Cost Recovery Period:

- 3-5 years for energy and maintenance savings
- 10+ years for public health, environmental and climate resilience outcomes

Mobility 7. Transit shelters

Recommendation

Require transit stops to have shelters.

Suggested Code Language

> (a) All new transit stops established after the effective date of this section shall include a shelter providing overhead and lateral protection from sun, wind, and precipitation.
> (b) Shelters shall be designed to accommodate a minimum of four (4) seated passengers and additional standing space, and shall comply with all applicable accessibility requirements under the Americans with Disabilities Act (ADA).
> (c) Shelter design shall incorporate durable, weather-resistant materials appropriate to the Sedona climate and may include integrated seating, lighting, and signage.
> (d) Shelters shall be located to ensure safe ingress and egress from transit vehicles and shall not obstruct pedestrian circulation or accessibility.
> (e) Maintenance of shelters shall be the responsibility of the property owner, transit agency, or other party designated by agreement with the City.

Impact Assessment[x]

	Low	Medium	High	Not Applicable
Policy Impact	X			
Benefit to Public			X	
Benefit to Property Owner	X			
Benefit to Developer	X			
Cost to Public		X		
Cost to Property Owner	X			
Cost to Developer		X		

Transit shelters average in cost between **$10,000-$15,000** per shelter depending on amenities (solar lighting, signage, seating, labor costs, and materials. Cost returns are achieved through increased ridership.

- **Economic Benefits (3-6 years):** Increased ridership leads to more transit revenue and increased foot traffic for nearby commercial and public areas. Reduced maintenance and repair costs for roadways.

- **Public Health Benefits (3-7 years):** Improved transit accessibility encourages the modal shift from passenger vehicles resulting in a reduction in emissions and the promotion of multimodal transportation.

- **Environmental Benefits (10+ years):** Increased transit accessibility and utilization, reduces GHG emissions, and improves air quality.

Estimated Cost Recovery Period:

- 3-6 years for transit, access, and economic benefits
- 10+ years for emissions reductions and system-wide environmental benefits

Mobility 8. Surface lot shading & pedestrian crossings

Recommendation

Require surface lots greater than 10,000 ft^2 to include 30% shading (trees or structures) and pedestrian pathways and/or walkable medians with crosswalks.

Suggested Code Language

> (a) All new surface parking lots exceeding ten thousand (10,000) square feet in area shall provide shade coverage for not less than thirty percent (30%) of the total lot area.
> (b) Shade coverage may be achieved through tree canopy at maturity, shade structures, photovoltaic canopies, or other permanent features approved by the Building Official.
> (c) Parking lot design shall include clearly defined pedestrian pathways and/or walkable medians that connect parking areas to building entrances, adjacent sidewalks, and public rights-of-way.
> (d) Pedestrian pathways shall be distinguished from driving aisles through grade separation, striping, surface treatment, or other design measures ensuring pedestrian safety.
> (e) Crosswalks shall be provided at all major pedestrian crossings within the lot and shall be marked in accordance with City standards.
> (f) Compliance shall be demonstrated through site plans and landscape plans submitted with the development application.

Impact Assessment[xi]

	Low	Medium	High	Not Applicable
Policy Impact	X			
Benefit to Public			X	
Benefit to Property Owner	X			
Benefit to Developer	X			
Cost to Public	X			
Cost to Property Owner		X		
Cost to Developer			X	

Requiring a 30% shading of surface lots and pedestrian pathways requires a **moderate** upfront cost to property owners and a **high** upfront cost to developers. The estimated average cost for a raised crosswalk and painted crossing is **$8.500.** The estimated average cost for tree installation is **$750** per tree with an estimated annual maintenance cost of **$500**. The average cost of installation for shade shelters ranges from **$3,000 to $30,000** depending on size and additional features such as solar lighting.

- **Economic Benefits (3-5 years):** Increased pedestrian access and shaded areas enhance retail experience and reduce pavement degradation from sun exposure.
- **Public Health Benefits (3-6 years):** Safer and cooler walking environments reduce accidents and heat-related illnesses.
- **Environmental Benefits (10+ years):** Shade elements, such as trees, can reduce stormwater runoff, cool pavement temperatures, and support native plant and wildlife habitats.

Estimated Cost Recovery Period:

- 3-5 years for economic and public safety benefits
- 10+ years for environmental improvements and climate adaptation

Mobility 9. EV charging for multifamily buildings

Recommendation

Require new multifamily construction to have Level 2 EV chargers installed at a rate of at least one charger per three units.

Suggested Code Language

(a) All new electric vehicle charging stations installed on multifamily properties, with a ratio of at least one charger per three units, after the effective date of this section shall provide charging capacity of Level 2 or higher, as defined by the National Electrical Code (NEC) and applicable industry standards.
(b) Level 1 chargers shall not be permitted to satisfy any requirement of this Code for electric vehicle infrastructure on commercial properties.
(c) Chargers shall be certified under UL 2594 or an equivalent standard approved by the Building Official and shall comply with all applicable electrical and safety codes.
(d) Installation shall include adequate electrical capacity, conduit, and overcurrent protection sized to accommodate the installed chargers, subject to inspection and approval by the Building Official.
(e) Signage, accessibility, and installation location shall conform to standards adopted by the City and consistent with the Americans with Disabilities Act (ADA).

Impact Assessment[xii]

	Low	Medium	High	Not Applicable
Policy Impact		X		
Benefit to Public			X	
Benefit to Property Owner			X	
Benefit to Developer	X			
Cost to Public		X		
Cost to Property Owner		X		
Cost to Developer			X	

Based on the model of a 30-unit building, the estimated installation costs of Level 2 chargers range from (10 chargers) total **$20,000 - $75,000.** Incentives and tax credits can offset the **high** upfront cost for developers. Benefits emerge through utility savings, resident satisfaction, and alignment with statewide EV mandates.

- **Economic Benefits (4-6 years):** Property owners can recover costs through EV charging fees and rent premiums.
- **Public Health Benefits (5-8 years):** Reduced emissions in heavy populated areas, improved local air quality, and reduced the risk of respiratory illnesses.
- **Environmental Benefits (10+ years):** EV adoption reduces GHG emissions and aligns with Sedona's Climate Action Plan.

Estimated Cost Recovery Period:

- 4–6 years for operational and maintenance returns
- 10+ years for emissions and air quality improvement

Mobility 10. Minimum EV charging capacity for commercial properties

Recommendation

Require that new EV chargers on commercial properties be at least Level 2.

Suggested Code Language

> (a) All new electric vehicle charging stations installed on commercial properties after the effective date of this section shall provide charging capacity of Level 2 or higher, as defined by the National Electrical Code (NEC) and applicable industry standards.
> (b) Level 1 chargers shall not be permitted to satisfy any requirement of this Code for electric vehicle infrastructure on commercial properties.
> (c) Chargers shall be certified under UL 2594 or an equivalent standard approved by the Building Official and shall comply with all applicable electrical and safety codes.
> (d) Installation shall include adequate electrical capacity, conduit, and overcurrent protection sized to accommodate the installed chargers, subject to inspection and approval by the Building Official.
> (e) Signage, accessibility, and installation location shall conform to standards adopted by the City and consistent with the Americans with Disabilities Act (ADA).

Impact Assessment[xiii]

	Low	Medium	High	Not Applicable
Policy Impact		X		
Benefit to Public			X	
Benefit to Property Owner			X	
Benefit to Developer	X			
Cost to Public		X		
Cost to Property Owner		X		
Cost to Developer			X	

The installation of Level 2 EV chargers on commercial properties presents a high upfront cost to developers and a moderate upfront cost to property owners. The estimated installation costs of Level 2 chargers range from $2,000-$7,000 per charger with $100-$500 in annual maintenance costs. Incentives and tax credits can offset the high upfront cost for developers.

- **Economic Benefits (3–6 years):** Property owners may charge usage fees, increase lease renewals, increase occupancy rates, and commercial property value.
- **Public Health Savings (5–8 years):** Reduced emissions around commercial zones resulting in improved air quality.
- **Environmental Benefits (10+ years):** Electrification of transportation reduces greenhouse gas emissions and reduces dependency on fossil fuels.

Estimated Cost Recovery Period:

- 3–6 years for financial return
- 10+ years for environmental and air quality improvements

Mobility 11. Public rest & hydration stations

Recommendation

Require public hydration stations for people and pets, waste and recycling receptacles, and shaded seating at public/civic spaces and trailheads.

Suggested Code Language

(a) All new public and civic spaces, including plazas, parks, community facilities, and trailheads, shall provide the following amenities:
(1) At least one publicly accessible hydration station for people and one for pets;
(2) Waste receptacles and recycling receptacles located in visible and convenient locations; and
(3) Shaded seating sufficient to accommodate anticipated users of the space, designed to provide at least fifty percent (50%) shade coverage at solar noon on June 21.
(b) Hydration stations shall be connected to the municipal water system or other approved potable water source and shall be constructed of durable, weather-resistant, and vandal-resistant materials.
(c) Shaded seating may be provided by tree canopy at maturity, built structures, or other permanent shading devices approved by the Building Official.
(d) All required amenities shall be shown on site plans and construction documents submitted with the development application, and shall be maintained in good condition for the life of the development.

Impact Assessment[xiv]

	Low	Medium	High	Not Applicable
Policy Impact		X		
Benefit to Public			X	
Benefit to Property Owner		X		
Benefit to Developer	X			
Cost to Public	X			
Cost to Property Owner		X		
Cost to Developer			X	

The installation of hydration stations, waste and recycling receptacles, and shaded seating in public spaces present a **high** upfront cost to developers. The average cost for these public space amenities ranges from **$9,000 to $20,000,** depending on labor costs and materials.

- **Economic Benefits (3–5 years):** Public space and trails with amenities attract more visitors, increasing ecotourism and local business revenue. Rest stops extend trail use hours and increase community engagement with public spaces.
- **Public Health Savings (3–6 years):** Access to hydration and shaded rest reduces the risk of dehydration and heat related illness.
- **Environmental Benefits (10+ years):** Encourages walking and active/multimodal transportation, which reduces emissions use and supports climate mitigation goals.

Estimated Cost Recovery Period:

- 3–5 years for tourism and local business returns
- 10+ years for public health and environmental impact.

WASTE

Guiding Goals for Waste

1. Increase the diversion of waste from the landfill and reduce GHG emissions associated with the consumption of goods and services
2. Ecosystem health
3. The transport, treatment, and reuse of wastewater is an important component to ensuring a sustainable water supply and healthy ecosystem

Summary: Waste

	Approximate Average Simple Payback
1. Construction & demolition waste management plan	Intangible savings
2. Recycling bins for commercial properties	Intangible savings

Waste 1. Construction & demolition waste management plan

Recommendation

Require that new construction greater than 1,000 ft^2 provide a construction and demolition waste management plan to be filed.

Suggested Code Language

> (a) All new construction projects exceeding one thousand (1,000) square feet of gross floor area shall prepare and submit a Construction and Demolition Waste Management Plan as part of the building permit application.
> (b) The plan shall identify the types and estimated quantities of construction and demolition waste to be generated, and shall describe measures for reuse, recycling, and proper disposal.
> (c) The plan shall include the name and location of facilities or services to be used for the collection, processing, recycling, or disposal of construction and demolition materials.
> (d) A final report documenting implementation of the plan, including actual quantities of materials reused, recycled, and disposed, shall be submitted prior to issuance of a certificate of occupancy.
> (e) The Building Official may adopt administrative rules establishing plan format, reporting requirements, and minimum diversion thresholds.

Impact Assessment[xv]

	Low	Medium	High	Not Applicable
Policy Impact	X			
Benefit to Public		X		
Benefit to Property Owner	X			
Benefit to Developer	X			
Cost to Public	X			
Cost to Property Owner	X			
Cost to Developer	X			

Waste management plans outline how debris will be diverted from landfill via recycling, salvage, or reuse. Based on regional construction data, the cost of preparing a waste management plan is estimated at **$2000** per project, depending on project complexity. Additional costs may be incurred from on-site labor or disposal fees from recycling centers.

- **Economic Benefits (1–2 years):** The diversion of recyclable materials such as concrete, wood, drywall, and metals, can significantly reduce hauling and landfill disposal costs. For large construction projects generating hundreds of tons of debris, diversion can yield **$ 70 - $80** per cubic yard in avoided fees.

- **Public Health and Safety Benefits (2–4 years):** The recycling and reuse of construction materials reduces illegal dumping. Proper Waste management plans can improve worker safety and reduce particulate matter in surrounding neighborhoods.

- **Environmental Benefits (5–10 years):** Landfill diversion reduces methane emissions from organic construction debris. Material reuse also decreases the carbon footprint of buildings and supports Sedona's zero-waste goals.

Estimated Cost Recovery Period:

- **1–2 years**: Direct savings from landfill diversion

- **5–10 years**: Environmental and public safety outcomes

Waste 2. Recycling bins for commercial properties

Recommendation

Require all commercial properties to have recycling bins available, and all commercial properties greater than 10,000 ft^2 to have a recycling plan in place. (Policy to be adopted in a phased approach with the largest buildings first being subject to the regulation).

Suggested Code Language

> (a) All commercial properties shall provide clearly labeled and accessible recycling bins for use by occupants, employees, and visitors.
> (b) All commercial properties with a gross floor area greater than ten thousand (10,000) square feet shall prepare, implement, and maintain a Recycling Plan approved by the City. The plan shall identify the materials to be collected, the collection methods, and the facilities or services to be used for processing and recycling.
> (c) The requirements of subsection (b) shall be implemented in phases, beginning with commercial properties having a gross floor area greater than fifty thousand (50,000) square feet, followed by properties greater than twenty-five thousand (25,000) square feet, and finally properties greater than ten thousand (10,000) square feet. The City Council shall establish compliance deadlines for each phase by resolution.
> (d) Recycling Plans shall be submitted to the City as part of the business license application or renewal process and shall be updated no less frequently than once every five (5) years.
> (e) Failure to provide recycling bins or maintain an approved Recycling Plan, as required by this section, shall constitute a violation of this Code and may be subject to enforcement action.

Impact Assessment[xvi]

	Low	Medium	High	Not Applicable
Policy Impact		X		
Benefit to Public		X		
Benefit to Property Owner	X			
Benefit to Developer				X
Cost to Public	X			
Cost to Property Owner	X			
Cost to Developer	X			

The costs of recycling bins may vary by size and number of bins required. The average cost is **$73 - $126** per container service for roll-off dumpsters or toters.

- **Economic Benefits (2–4 years):** Buildings with a structured recycling plan can reduce trash volume and lower waste collection costs. Potential recycling rebates and avoided landfill charges can also contribute to long-term cost savings.
- **Public Health Benefits (3–6 years):** Labeled and accessible recycling bins will reduce contamination and clutter, improve cleanliness, and reduce pest issues in common areas. Recycling education and engagement could boost tenant satisfaction and alignment with ESG or LEED goals.
- **Environmental Benefits (5–10 years):** Increased waste diversion supports Sedona sustainability targets. Recycling reduces greenhouse gas emissions, especially within high single-use waste sectors such as hospitality and tourism.

Estimated Cost Recovery Period:

- **2–4 years**: Waste management savings and efficiency gains

- **5–10 years**: Environmental and community-wide behavioral benefits

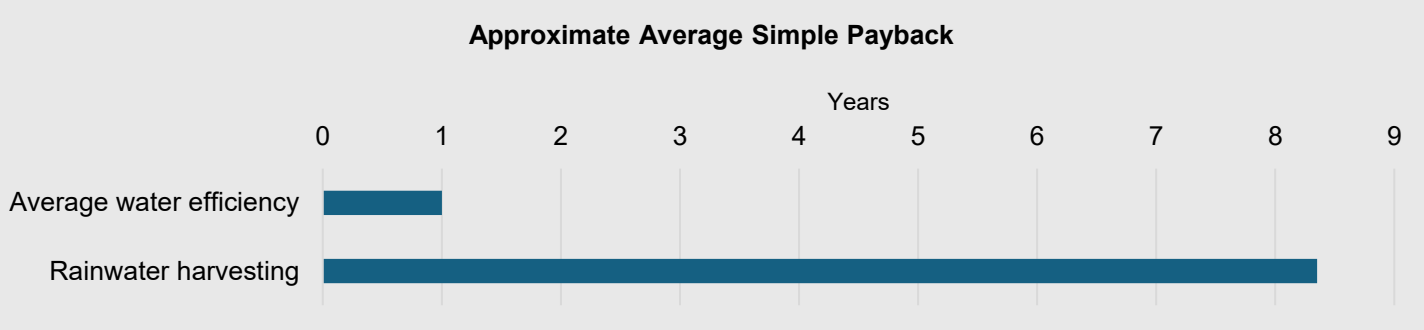
WATER

Guiding Goals for Water

1. Conserve community water resources by maximizing water efficiency technologies while ensuring a secure and sustainable water supply in the face of climate change impacts
2. Manage, restore, and foster resilient ecosystems, landscapes, and resources
3. As responsible stewards of the natural environment, Sedona maintains a lasting water supply, healthy ecosystems, and the ability to adapt to changing conditions
4. Utilize green infrastructure and blue-green infrastructure to reduce heat island effects

Summary: Water

	Approximate Average Simple Payback
1. Minimum water efficiency in new construction	<1 year
2. Rainwater harvesting on commercial sites	8 years
3. Greywater reuse in new commercial buildings	Negligible cost & savings
4. Greywater readiness in new construction	Negligible cost & intangible savings
5. Stormwater runoff on hardscapes	Intangible savings
6. Sustainability checklist at design review	Negligible cost & intangible savings



Water 1. Minimum water efficiency in new construction

Recommendation

Require an average water efficiency of 1.8 gpm across all fixtures in new construction.

Suggested Code Language

> (a) All new construction shall be designed and constructed to achieve an average maximum water use of one and eight-tenths (1.8) gallons per minute (gpm) across all installed water closets, urinals, and other fixtures.
> (b) The average shall be calculated based on the rated flush volume of each installed fixture, as certified by the manufacturer, divided by the total number of such fixtures within the building.
> (c) Dual-flush fixtures shall be evaluated using the average of the full-flush and reduced-flush volumes.
> (d) The applicant shall submit manufacturer specifications and a compliance calculation worksheet as part of the plumbing plan review.
> (e) Fixtures installed to satisfy this section shall be WaterSense certified or shall otherwise be approved by the Building Official as meeting the required efficiency.

Impact Assessment[xvii]

	Low	Medium	High	Not Applicable
Policy Impact		X		
Benefit to Public		X		
Benefit to Property Owner		X		
Benefit to Developer		X		
Cost to Public	X			
Cost to Property Owner	X			
Cost to Developer	X			

The cost of complying with a 1.8 gallons-per-minute (GPM) efficiency standard is low and often negligible, especially when incorporated into new construction. Installation and maintenance procedures are identical to standard fixtures, making the integration seamless for developers and contractors.

- **Economic Benefits (1–2 years):**
  Water-efficient fixtures can reduce indoor water use by **15–30%**, saving **$100–$500 annually per unit**, depending on local water rates and occupancy. In commercial buildings, savings can exceed **$1,000 annually** with high usage.

- **Public Health Benefits (3–5 years):**
  Lower indoor water use reduces stress on aging water infrastructure, mitigating potential disruptions or service failures. In drought-prone regions, conserving potable water supports broader community health and resilience.

- **Environmental Benefits (5–10 years):**
  Water conservation reduces energy used in pumping, heating, and treating water—decreasing both greenhouse gas emissions and demand on freshwater sources. It also aligns with Arizona's long-term drought response and water allocation goals.

Estimated Cost Recovery Period:

- **1–2 years**: Utility cost savings from reduced water and energy use

- **5–10 years**: Environmental conservation and infrastructure resilience

Water 2. Rainwater harvesting on commercial sites

Recommendation

Require rainwater harvesting for irrigation water on commercial sites greater than 5,000 ft^2.

Suggested Code Language

> (a) All new commercial developments with a site area greater than five thousand (5,000) square feet shall install and maintain a rainwater harvesting system designed to supply irrigation water for on-site landscaping.
> (b) The system shall include collection from roof or other impervious surfaces, conveyance, storage, and distribution infrastructure sized to meet not less than fifty percent (50%) of the site's estimated annual irrigation demand, as calculated using methods approved by the City.
> (c) Storage tanks, cisterns, or other facilities shall be designed to prevent mosquito breeding, algae growth, and other public health nuisances, and shall be constructed of durable, weather-resistant materials.
> (d) Irrigation systems supplied by harvested rainwater shall be equipped with backflow prevention devices where connected to potable water systems.
> (e) A rainwater harvesting plan, including calculations, system specifications, and maintenance provisions, shall be submitted with the development application and approved by the Building Official prior to permit issuance.

Impact Assessment[xviii]

	Low	Medium	High	Not Applicable
Policy Impact	X			
Benefit to Public		X		
Benefit to Property Owner		X		
Benefit to Developer	X			
Cost to Public	X			
Cost to Property Owner	X			
Cost to Developer	X			

This recommendation requires commercial properties over 5,000 ft^2 to install rainwater harvesting systems for landscaping. Costs for rainwater harvesting systems may vary depending on scale and tank type, but a standard cistern with basic filtration costs approximately **$4000.** A 5,000-gallon system may cost **$20,000,** not including installation, plumbing, and filtration.

- **Economic Benefits (4–6 years):** Substituting municipal irrigation water with harvested rainwater can save **up to 40% on utility costs per year**, depending on landscaping needs and local water rates. These systems can reduce landscaping maintenance costs. Additional savings can be found by installing drought-tolerant plants.

- **Public Health Benefits (5–8 years):** Improved water self-sufficiency reduces demand on municipal water supply during drought periods.

- **Environmental Benefits (10+ years):** Rainwater harvesting reduces stormwater runoff and reduces pollutants. This supports erosion control, groundwater health, and the sustainability of local watersheds.

Estimated Cost Recovery Period:

- **4–6 years**: Irrigation cost savings and water offset

- **10+ years**: Ecosystem and stormwater benefits

Water 3. Greywater reuse in new commercial buildings

Recommendation

Require greywater reuse in newly constructed commercial buildings greater than 5,000 ft^2.

Suggested Code Language

(a) All new commercial buildings with a gross floor area greater than five thousand (5,000) square feet shall be designed and constructed to capture, treat, and reuse greywater for non-potable applications, including but not limited to landscape irrigation, cooling, and toilet flushing.
(b) Greywater systems shall be designed in accordance with Arizona Department of Environmental Quality (ADEQ) regulations, the Arizona Plumbing Code, and all other applicable state and local requirements.
(c) Systems shall include clearly identified greywater piping, filtration, disinfection (where required), storage, and distribution infrastructure sized to meet anticipated non-potable demand.
(d) A greywater reuse plan, including design drawings, calculations, and maintenance provisions, shall be submitted as part of the building permit application and approved by the Building Official prior to permit issuance.
(e) Greywater systems shall be maintained in good working order for the life of the building. Failure to operate and maintain the system as approved shall constitute a violation of this Code.

Impact Assessment[xix]

	Low	Medium	High	Not Applicable
Policy Impact		X		
Benefit to Public		X		
Benefit to Property Owner	X			
Benefit to Developer	X			
Cost to Public	X			
Cost to Property Owner	X			
Cost to Developer	X			

Installation costs for commercial greywater systems range from **$16,316,** depending on building size, plumbing complexity, and treatment level required.

- **Economic Benefits (5–7 years):** Greywater systems can offset non-potable water use, providing savings from utility costs. Additional savings may be available through rebates or tax credits.
- **Public Health Benefits (5–8 years):** Reusing greywater for non-potable applications reduces demand on potable water systems and helps maintain landscaping during periods of drought, and reduces heat related illnesses.
- **Environmental Benefits (10+ years):** Greywater reuse reduces wastewater volumes, reduces the burdens and demands on treatment facilities.

Estimated Cost Recovery Period:

- **5–7 years**: Water bill savings and operational efficiency
- **10+ years**: Environmental and infrastructure benefits

Water 4. Greywater readiness in new construction

Recommendation

Require greywater readiness in new construction.

Suggested Code Language

(a) All new buildings shall be designed and constructed to be greywater-ready, providing the necessary plumbing infrastructure to enable future installation of a greywater reuse system.
(b) Greywater-ready construction shall include:
(1) Separate drainage piping for showers, bathtubs, clothes washers, and other approved greywater sources;
(2) Installation of a diverter valve or stub-out connection accessible for future system connection; and
(3) Adequate space allocation for future filtration, storage, and distribution equipment.
(c) Greywater-ready systems shall be designed in accordance with the Arizona Plumbing Code, Arizona Department of Environmental Quality (ADEQ) regulations, and all other applicable state and local requirements.
(d) Construction documents shall include plumbing layouts and specifications demonstrating compliance with this section and shall be reviewed and approved by the Building Official prior to permit issuance.

Impact Assessmentxx

	Low	Medium	High	Not Applicable
Policy Impact	X			
Benefit to Public	X			
Benefit to Property Owner	X			
Benefit to Developer	X			
Cost to Public	X			
Cost to Property Owner	X			
Cost to Developer	X			

The upfront costs of greywater readiness in new construction are significantly lower than later retrofits, depending on design and labor costs.

- **Economic Benefits (3–5 years):** Avoiding costly retrofits which makes this a low-cost, high-benefit strategy. Readiness allows owners to install greywater systems in the future when cost or policy pressures rise.
- **Public Health Benefits (4–6 years):** Greywater readiness improves community resilience during droughts and supports long-term water independence and grid flexibility.
- **Environmental Benefits (10+ years):** Supports groundwater recharge and reduces stormwater runoff.

Estimated Cost Recovery Period:

- **3–5 years**: Avoided retrofit costs and installation flexibility
- **10+ years**: Environmental infrastructure benefits

Water 5. Stormwater runoffs on hardscapes

Recommendation

Mandate 50% coverage of permeable paving, bioswales, and/or bioretention islands in hardscapes greater than 5,000 ft^2.

Suggested Code Language

(a) All new developments with hardscape areas greater than five thousand (5,000) square feet shall provide permeable paving, bioswales, and/or bioretention islands covering not less than fifty percent (50%) of the total hardscape area.
(b) Permeable paving shall consist of materials such as pervious concrete, porous asphalt, permeable pavers, or other surfaces approved by the Building Official that allow for water infiltration.
(c) Bioswales and bioretention islands shall be designed and constructed in accordance with City stormwater management standards and shall include appropriate vegetation, soil media, and drainage infrastructure.
(d) Areas occupied by required fire lanes, loading zones, or other features where permeable surfaces are demonstrably infeasible may be exempted by the Building Official, provided that the fifty percent (50%) coverage requirement is achieved across the remaining eligible hardscape.
(e) Compliance shall be demonstrated through site plans, grading and drainage plans, and landscape plans submitted with the development application.

Impact Assessment[xxi]

	Low	Medium	High	Not Applicable
Policy Impact		X		
Benefit to Public			X	
Benefit to Property Owner	X			
Benefit to Developer	X			
Cost to Public	X			
Cost to Property Owner	X			
Cost to Developer		X		

Green infrastructure elements such as permeable pavers, bioswales, and bioretention islands generally cost more than conventional paving. The average installation cost range from **$16,000 to $125,000**, depending on size and labor costs. Maintenance costs are ongoing but moderate.

- **Economic Benefits (3–6 years):** Green infrastructure can reduce stormwater utility fees, and potential credits may be available. These developments can extend the lifespan of surrounding road and walkway pavement. It also reduces costs and risks related to flood damage or drainage retrofits.

- **Public Health Benefits (4–7 years):** Green infrastructure improves air quality, reduces urban heat, and creates safer walkable environments for residents and pedestrians.

- **Environmental Benefits (10+ years):**
  Enhanced stormwater infiltration improves aquifer recharge and reduces erosion and pollutant runoff into creeks and washes—particularly critical in Sedona's sensitive red rock watershed areas.

Estimated Cost Recovery Period:

- **3–6 years**: Drainage and utility cost savings

- **10+ years**: Ecological and livability improvements

Water 6. Sustainability checklist at design review

Recommendation

Require resilience and sustainability checklist at design review.

Suggested Code Language

> (a) All new development and substantial redevelopment projects subject to design review shall submit a completed Resilience and Sustainability Checklist with the design review application.
> (b) The checklist shall address, at a minimum, energy efficiency, renewable energy readiness, water conservation, waste reduction, transportation access, climate resilience, and ecological impacts.
> (c) The checklist shall be prepared on a form provided by the City and shall be reviewed by staff as part of the design review process.
> (d) Completion of the checklist is required for application completeness; however, individual measures identified in the checklist shall not be mandatory unless separately required under this Code.
> (e) The Planning Director may adopt administrative rules to establish the content, format, and scoring methodology of the checklist and may update the checklist from time to time to reflect best practices and community priorities.

Impact Assessment[xxii]

	Low	Medium	High	Not Applicable
Policy Impact	X			
Benefit to Public	X			
Benefit to Property Owner	X			
Benefit to Developer	X			
Cost to Public	X			
Cost to Property Owner	X			
Cost to Developer	X			

This policy requires developers to complete a standardized checklist covering energy, water, health, and climate resilience criteria during design review. Development of the checklist and training staff may incur a one-time cost depending on labor cost. Developer costs are negligible considering the contractual/professional time to complete forms.

- **Economic Benefits (1–2 years):** Guides developers in identifying long-term cost-saving measures during pre-construction, avoiding missed opportunities and credits for green infrastructure and sustainable development.

- **Public Health and Resilience Benefits (2–5 years):** Encourages incorporation of passive cooling, green space, air filtration, and heat adaptation features that improve occupant health, reduce energy bills, and buffer against extreme weather.

- **Environmental Benefits (5–10 years):**
  Improves consistency of sustainable design across projects, contributing to cumulative emissions reductions, water conservation, and biodiversity enhancement.

Estimated Cost Recovery Period:

- **1–2 years**: Operational efficiencies and planning benefits

- **5–10 years**: Regional sustainability and resilience outcomes

CLIMATE RESILIENCE

Guiding Goals for Climate Resilience

1. Ensure Sedona and its residents, businesses, visitors, facilities, and services are prepared for climate impacts, especially those at the highest risk
2. Sedona's unique sense of place and stewardship of the natural environment is reflected in the design and development of the built environment
3. Ensure heat mitigation and adaptation measures are incorporated as part of climate resilience planning

Summary: Climate Resilience

	Approximate Average Simple Payback
1. Tree canopy for new construction	Intangible savings
2. Promote native vegetation	Intangible savings
3. Shade trees for commercial properties	Intangible savings
4. Cultural impact statements	Negligible cost & intangible savings
5. Fire-resilient materials and infrastructure	Intangible savings
6. Require native vegetation near storm drains	Intangible savings
7. Fire-preparedness for short-term rentals	Negligible cost & intangible savings
8. Fire mitigation for vacant lots	Intangible savings
9. Accessible restrooms	Intangible savings
10. Property efficiency information	Negligible cost & intangible savings

Climate Resilience 1. Tree canopy for new construction

Recommendation

Require a minimum tree canopy for new construction of at least 20% for residential and 10% for commercial.

Suggested Code Language

(a) All new residential construction shall provide tree canopy coverage equal to not less than twenty percent (20%) of the lot area at maturity.
(b) All new commercial construction shall provide tree canopy coverage equal to not less than ten percent (10%) of the lot area at maturity.
(c) In all open areas of the lot located a minimum of [X] feet from any building structure, a minimum of [X]% of the area shall include tree plantings.
(d) At least one (1) tree shall be planted for every [X] linear feet of lot frontage, with a concentrated emphasis on the southern perimeter of the lot to maximize environmental and shading benefits.
(e) Trees may be native or non-native species, subject to approval by the City, and shall be drought-tolerant, climate-appropriate, and maintained in healthy condition for the life of the development.
(f) Compliance shall be demonstrated through a landscape plan prepared by a qualified professional and submitted with the development application.

Impact Assessment[xxiii]

	Low	Medium	High	Not Applicable
Policy Impact			X	
Benefit to Public			X	
Benefit to Property Owner		X		
Benefit to Developer	X			
Cost to Public	X			
Cost to Property Owner	X			
Cost to Developer		X		

Establishing a 10% - 20% canopy for new residential and commercial developments may require a combination of tree plantings, preserving existing trees, and site design modifications. The cost of tree installation, including planting, irrigation, and initial maintenance, ranges from **$250 per tree**, depending on the size and type of tree.

- **Economic Benefits (5–7 years):** Larger tree canopies can increase property values by **3–15%** and reduce HVAC costs, resulting in $300 - $1200 in annual energy savings. Tree canopies also reduce stormwater costs.
- **Public Health Benefits (4–6 years):** Increased tree coverage mitigates extreme heat, lowers surface temperatures, and improves air quality. This reduces public health risks such as heat-related illness, cardiovascular disease, and respiratory conditions.
- **Environmental Benefits (10–20 years):** Trees reduce GHG emissions, enhance plant and wildlife habitation, and reduce erosion. An average tree can absorb 22 pounds of CO_2 per year in the first 20 years.

Estimated Cost Recovery Period:

- **5–7 years**: Energy savings and increased property values
- **10–20 years**: Environmental protection, carbon sequestration, and wildlife habitation

Climate Resilience 2. Promote native vegetation

Recommendation

Require that every tree, bush, or plant removed be replaced by three of a native variety on commercial properties and by two of a native variety on residential properties.

Suggested Code Language

> (a) On all commercial properties, the removal of any tree, bush, or plant shall require replacement with three (3) plantings of a native species approved by the City.
> (b) On all residential properties, the removal of any tree, bush, or plant shall require replacement with two (2) plantings of a native species approved by the City.
> (c) Replacement plantings shall be of a size, species, and condition sufficient to ensure reasonable survivability and shall be maintained in healthy condition for the life of the property use.
> (d) The Building Official or designee may require documentation of removal and replacement through site plans, landscape plans, or photographic evidence.
> (e) Failure to provide required replacement plantings under this section shall constitute a violation of this Code and may be subject to enforcement action.

Impact Assessment[xxiv]

		Low	Medium	High	Not Applicable
Policy Impact				X	
Benefit to Public				X	
Benefit to Property Owner		X			
Benefit to Developer		x			
Cost to Public		X			
Cost to Property Owner			X		
Cost to Developer			X		

This policy requires developers and property owners to replace any removed vegetation with native species at a **3:1** ratio for commercial and **2:1** for residential properties. Native plantings, including trees, shrubs, and groundcovers, typically cost **$10–$150 per plant**, depending on size and species. The total cost to a property owner for replacing one removed tree could range from **$60–$450**. Generally, native plants require less water and maintenance, which can result in long-term cost savings.

- **Economic Benefits (3–5 years):** Native vegetation reduces long-term landscaping costs by **30–60%** due to reduced irrigation and maintenance. Also, mature native landscaping can increase property values and reduce stormwater fees.
- **Public Health Benefits (3–6 years):** Native vegetation reduces allergens and minimizes wildfire risk.
- **Environmental Benefits (5–10 years):** Native plants increase ecosystem biodiversity and resilience, increase pollinators and wildlife habitation, reduce the spread of invasive species, and contribute to water conservation.

Estimated Cost Recovery Period:

- **3–5 years**: Maintenance savings and landscape value
- **5–10 years**: Ecosystem and biodiversity benefits

Climate Resilience 3. Shade trees for commercial properties

Recommendation

Require one shade tree per eight parking spaces on commercial properties.

Suggested Code Language

> (a) All new commercial developments shall provide a minimum of one (1) shade tree for every eight (8) off-street parking spaces.
> (b) Required shade trees shall be distributed throughout the parking area to maximize shade coverage, with priority given to interior rows and pedestrian pathways.
> (c) Shade trees shall be selected from species approved by the City as drought-tolerant and climate-appropriate, and shall be maintained in healthy condition for the life of the development.
> (d) Compliance shall be demonstrated through site and landscape plans submitted with the development application, showing tree placement relative to parking spaces.
> (e) Failure to plant or maintain the required number of shade trees shall constitute a violation of this Code and may be subject to enforcement action.

Impact Assessment[xxv]

	Low	Medium	High	Not Applicable
Policy Impact			X	
Benefit to Public			X	
Benefit to Property Owner		X		
Benefit to Developer	X			
Cost to Public	X			
Cost to Property Owner	X			
Cost to Developer		X		

This requirement would mandate shade tree installation proportional to parking lot size. For a lot with 80 spaces, this equates to **10 trees**. At an average installed cost of **$300 per tree**, the total upfront cost is **$3,000**, including planting, irrigation, and initial maintenance.

- **Economic Benefits (4–6 years):** Shaded parking lots reduce asphalt heat damage and surface wear, extending pavement lifespan. Businesses benefit from improved aesthetics, which can increase customer satisfaction.
- **Public Health Benefits (4–6 years):** Shade trees lower surface temperatures, reduce heat exposure, improve air quality, and increase the well-being for employees, shoppers, and pedestrians.
- **Environmental Benefits (10–20 years):** Shade trees reduce heat island effects, reduce GHG emissions, and improve stormwater capture.

Estimated Cost Recovery Period:

- **4–6 years**: Reduced paving maintenance and energy savings
- **10–20 years**: Environmental and climate resilience benefits

Climate Resilience 4. Cultural impact statements

Recommendation

Cultural/visual impact statements required for projects greater than 50,000 ft^2.

Suggested Code Language

(a) All new development projects with a gross floor area greater than fifty thousand (50,000) square feet shall prepare and submit a Cultural and Visual Impact Statement as part of the development application.
(b) The statement shall evaluate the project's potential impacts on cultural resources, community character, scenic views, and visual compatibility with the surrounding built and natural environment.
(c) The statement shall include, at a minimum:
(1) An inventory of nearby cultural, historic, or archaeological resources;
(2) An analysis of the project's scale, massing, and design relative to existing community character;
(3) An assessment of potential impacts on designated scenic view corridors or visually sensitive areas; and
(4) Recommended design or mitigation measures to minimize adverse impacts.
(d) The statement shall be prepared by a qualified professional approved by the City and shall be subject to review and approval by the Planning Director.
(e) Compliance with this section shall be a condition of development approval.

Impact Assessment[xxvi]

	Low	Medium	High	Not Applicable
Policy Impact		X		
Benefit to Public		X		
Benefit to Property Owner	X			
Benefit to Developer	X			
Cost to Public	X			
Cost to Property Owner	X			
Cost to Developer	X			

This policy requires developers of large-scale projects to submit a cultural or visual impact statement. Preparation costs can vary depending on the site's cultural sensitivity, view corridors, and community context. No significant implementation costs accrue to the City beyond review and administrative processing.

- **Economic Benefits (2–4 years):** Incorporating cultural and visual context enhances architectural quality, boosts tourism appeal, and reduces costly redesigns due to community opposition or legal challenges.
- **Public Health Benefits (3–5 years):** This process promotes inclusion, transparency, and respect for indigenous and historical sites, and strengthens community identity.
- **Environmental Benefits (5–10 years):** Culturally relevant development may avoid disruption to heritage landscapes, native habitats, or sacred sites, and further encourage sustainable land use.

Estimated Cost Recovery Period:

- **2–4 years**: Avoided delays and higher community support
- **5–10 years**: Preservation and place-making outcomes

Climate Resilience 5. Fire-resilient materials and infrastructure

Recommendation

Wildland-urban interface developments must include defensible space, emergency access, fire-resilient materials.

Suggested Code Language

(a) All new developments located within designated wildland-urban interface (WUI) areas shall incorporate defensible space, emergency access, and fire-resilient construction materials as required by this section.
(b) Defensible Space. A minimum defensible space of thirty (30) feet shall be maintained around all structures, consisting of cleared, irrigated, or fire-resistant landscaping, in accordance with standards adopted by the Fire Marshal.
(c) Emergency Access. Developments shall provide emergency vehicle access routes with a minimum unobstructed width of twenty (20) feet, vertical clearance of thirteen feet six inches (13'6"), and all-weather surfacing capable of supporting fire apparatus.
(d) Fire-Resilient Materials. All structures shall utilize non-combustible or ignition-resistant materials for roofing, siding, decks, and other exterior elements, consistent with the International Wildland-Urban Interface Code (IWUIC) as adopted by the City.
(e) Landscape plantings within the defensible space shall be limited to drought-tolerant, fire-resistant species approved by the Fire Marshal.
(f) Compliance shall be demonstrated through site plans, construction documents, and material specifications submitted with the development application, and shall be verified prior to issuance of a certificate of occupancy.

Impact Assessment[xxvii]

	Low	Medium	High	Not Applicable
Policy Impact			X	
Benefit to Public			X	
Benefit to Property Owner			X	
Benefit to Developer		X		
Cost to Public		X		
Cost to Property Owner	X			
Cost to Developer	X			

This policy introduces wildfire mitigation requirements, depending on site conditions and building type, these measures are increasingly becoming standard in regions with higher risk of wildfires.The **incremental cost is considered negligible**, when weighed against avoided losses and insurance savings. **Economic Benefits (3–6 years):** Potential reduction in insurance premiums for properties meeting WUI codes. Wildfire-resistant buildings experience less damage, resulting in fewer reconstruction costs after events.

- **Public Health Benefits (Immediate–5 years):** Improved access, reduced evacuation times, firefighter risk, and structure losses during wildfires.

- **Environmental Benefits (10+ years):** Defensible space and resilient design limit ecosystem destruction and air quality degradation during wildfire and preserve surrounding wildlife habitats.

Estimated Cost Recovery Period:

- **3–6 years**: Insurance savings and reduced post-disaster recovery

- **10+ years**: Environmental protection and climate resilience

Climate Resilience 6. Require native vegetation near storm drains

Recommendation

Require bioswales with native, drought-resistant vegetation around new, modified, or repaired storm drains.

Suggested Code Language

> (a) All new, modified, or repaired storm drains shall be constructed with bioswales designed to capture, convey, and treat stormwater runoff.
> (b) Bioswales required under this section shall incorporate native, drought-resistant vegetation approved by the City to promote infiltration, pollutant removal, and habitat value.
> (c) Bioswales shall be sized and designed in accordance with the City's stormwater management standards and best management practices to accommodate anticipated runoff volumes.
> (d) Construction documents for storm drain installations subject to this section shall include bioswale design, planting specifications, and maintenance provisions, and shall be reviewed and approved by the City Engineer prior to permit issuance.
> (e) Bioswales shall be maintained in good working order for the life of the development. Failure to maintain required bioswales shall constitute a violation of this Code and may be subject to enforcement action.

Impact Assessment[xxviii]

	Low	Medium	High	Not Applicable
Policy Impact		X		
Benefit to Public		X		
Benefit to Property Owner		X		
Benefit to Developer	X			
Cost to Public	X			
Cost to Property Owner	X			
Cost to Developer	X			

Installing bioswales around storm drains costs approximately **$5–$25 per square foot**, with native planting costs included. A standard installation around a drain may vary between **$2,000–$10,000**, depending on site grading, soil type, and drainage flow.

- **Economic Benefits (4–6 years):** Bioswales reduce the need for expensive underground piping and water treatment, reduce stormwater utility fees, and reduce erosion repair costs.
- **Public Health Benefits (5–7 years):** Green infrastructure improves air quality, reduce water pollution, and reduces urban heat effect.
- **Environmental Benefits (10+ years):** Vegetated bioswales can filter sediment, other pollutants from stormwater runoff resulting in an improved downstream water quality, and provides a diverse habitat for native pollinators and wildlife.

Estimated Cost Recovery Period:

- **4–6 years**: Infrastructure cost offsets
- **10+ years**: Watershed health and climate adaptation

Climate Resilience 7. Fire-preparedness for short-term rentals

Recommendation

Require short-term rentals to maintain an evacuation plan and fire prevention and mitigation plan.

Suggested Code Language

> (a) All short-term rental properties shall maintain an approved evacuation plan and a fire prevention and mitigation plan.
> (b) The evacuation plan shall identify exit routes, assembly points, and emergency contact information, and shall be posted conspicuously within the dwelling unit.
> (c) The fire prevention and mitigation plan shall include defensible space maintenance, use of fire-resistant landscaping where applicable, safe storage of flammable materials, and procedures for notifying guests of fire danger conditions.
> (d) Plans required under this section shall be submitted to the City Fire Marshal or designee for review and approval at the time of business license application or renewal.
> (e) Property owners shall ensure that guests are provided with information on evacuation procedures and fire prevention measures at the commencement of each rental stay.
> (f) Failure to prepare, maintain, or implement the required plans shall constitute a violation of this Code and may be grounds for suspension or revocation of the short-term rental license.

Impact Assessment

	Low	Medium	High	Not Applicable
Policy Impact	X			
Benefit to Public		X		
Benefit to Property Owner		X		
Benefit to Developer		X		
Cost to Public	X			
Cost to Property Owner	X			
Cost to Developer	X			

This policy will require property owners to submit and maintain evacuation and fire prevention plans, Preparation costs are minimal and varies **depending on contractual/professional services**. Enforcement may require minimal City oversight.

- **Economic Benefits (2–3 years):** Prevention measures reduce liability risks and potential costs from fire damage.
- **Public Health Benefits (Immediate–2 years):** Improves public safety during wildfires, power outages, or natural disasters.
- **Environmental Benefits (5+ years):** Reduces preventable fire ignition sources and promotes defensible space practices among short-term rentals in WUI zones.

Estimated Cost Recovery Period:

- **2–3 years**: Risk reduction and host preparedness
- **5+ years**: Lower fire spread potential and community resilience

Climate Resilience 8. Fire mitigation for vacant lots

Recommendation

Require that owners of a vacant lot maintain the lot to mitigate fire risk and spread of invasive species.

Suggested Code Language

> (a) Owners of vacant lots shall maintain their property to reduce fire risk and prevent the spread of invasive plant species.
> (b) Required maintenance shall include removal of dead vegetation, maintenance of defensible space consistent with fire safety standards adopted by the City, and control of invasive or noxious plants identified by the City or state agencies.
> (c) Lots shall be maintained in a condition that does not create a public nuisance, fire hazard, or threat to adjacent properties.
> (d) The Fire Marshal or designee may inspect vacant lots periodically or upon complaint to verify compliance with this section.
> (e) Failure to maintain a vacant lot in accordance with this section shall constitute a violation of this Code and may be subject to enforcement actions, including fines and abatement by the City with costs assessed to the property owner.

Impact Assessment

	Low	Medium	High	Not Applicable
Policy Impact		X		
Benefit to Public			X	
Benefit to Property Owner		X		
Benefit to Developer		X		
Cost to Public	X			
Cost to Property Owner		X		
Cost to Developer		X		

The overall cost to the City is negligible, as enforcement can be incorporated into existing code compliance programs. However, the policy may result in a moderate cost impact for property owners and developers, especially for larger or overgrown parcels. Maintenance costs vary depending on lot size and vegetation density, but typical maintenance includes seasonal mowing, weed abatement, and trash and debris removal.

- **Economic Benefits (3–4 years):** Preventative maintenance reduces costs and risks of fire damage to neighboring properties, invasive species management, and stormwater drainage repairs. Maintained vacant lots can increase property values.

- **Public Health Benefits (Immediate–3 years):** Lower fuel loads reduce wildfire risk to surrounding homes and public lands. It also reduces illegal dumping and pest infestations.

- **Environmental Benefits (5–10 years):** Managed vegetative lots can reduce the spread of invasive species, improve soil health, prevent erosion, and further support native ecosystems.

Estimated Cost Recovery Period:

- **3–4 years**: Avoided mitigation costs and neighborhood protection

- **5–10 years**: Ecological restoration and fire adaptation

Climate Resilience 9. Accessible restrooms

Recommendation

Require that new commercial developments of 1,000 ft^2 or more have a publicly accessible restroom.

Suggested Code Language

> (a) All new commercial developments with a gross floor area of one thousand (1,000) square feet or more shall provide at least one (1) publicly accessible restroom.
> (b) Public restrooms required under this section shall be clearly signed, located in an accessible area, and made available during all hours of business operation.
> (c) Restrooms shall comply with all applicable provisions of the Americans with Disabilities Act (ADA), the Arizona Plumbing Code, and other relevant state and local health and safety regulations.
> (d) Maintenance of public restrooms shall be the responsibility of the property owner or operator and shall be carried out in a manner that ensures cleanliness, safety, and continuous operability.
> (e) Failure to provide or maintain a required public restroom shall constitute a violation of this Code and may be subject to enforcement action.

Impact Assessment

	Low	Medium	High	Not Applicable
Policy Impact		X		
Benefit to Public			X	
Benefit to Property Owner	X			
Benefit to Developer	X			
Cost to Public	X			
Cost to Property Owner		X		
Cost to Developer	X			

Incorporating public restrooms into commercial designs adds **$5,000–$20,000** in construction costs, including plumbing, ventilation, ADA compliance, and signage.

- **Economic Benefits (4–6 years):** Attracts more foot traffic to commercial areas, supporting tourism and local businesses. It can also increase new tenants and tenant retention.
- **Public Health Benefits (Immediate–3 years):** Improves sanitation access and provides equitable access for vulnerable populations and outdoor workers.
- **Environmental Benefits (5+ years):** Reduces pollution and health risks associated with lack of access to sanitation in urban areas.

Estimated Cost Recovery Period:

- **4–6 years**: Business growth and tourism access
- **5+ years**: Public sanitation and urban health

Climate Resilience 10. Property efficiency information

Recommendation

Require that the following be disclosed to a new property owner at the time of sale: (1) utility and water consumption records for the prior 12 months; and (2) the EV, PV, and battery readiness features of the property.

Suggested Code Language

(a) At the time of sale of any property, the seller shall provide to the purchaser the following disclosures:
(1) Utility and water consumption records for the property for the prior twelve (12) consecutive months, or for the full duration of ownership if less than twelve (12) months; and
(2) A statement identifying the electric vehicle (EV) readiness, photovoltaic (PV) readiness, and battery readiness features of the property, including the presence of installed infrastructure or capacity for future installation.
(b) Disclosures required under this section shall be provided in writing and acknowledged by the purchaser prior to the closing of the sale.
(c) The seller shall obtain utility and water consumption records directly from the service providers or through bills or official statements, and shall certify their accuracy to the best of the seller's knowledge.
(d) Failure to provide the required disclosures shall constitute a violation of this Code and may be grounds for enforcement action or remedies available to the purchaser under state law.

Impact Assessment

	Low	Medium	High	Not Applicable
Policy Impact	X			
Benefit to Public	X			
Benefit to Property Owner		X		
Benefit to Developer		X		
Cost to Public	X			
Cost to Property Owner	X			
Cost to Developer	X			

This policy will require sellers or agents to provide documentation of the past 12 months' utility consumption and renewable-readiness features. Administrative costs are negligible. City oversight may be integrated into permitting or real estate disclosures.

- **Economic Benefits (Immediate–2 years):** Buyers make better-informed investments, leading to reduced utility costs and increased interest in energy-efficient properties. EV and Battery readiness features can improve market competitiveness and property valuation.

- **Public Health Benefits (2–4 years):** Improves buyer education and transparency while supporting energy literacy and clean tech adoption in Sedona.

- **Environmental Benefits (5–10 years):** Encourages long-term adoption of EVs, solar panels, and batteries, later reducing carbon emissions and grid load.

Estimated Cost Recovery Period:

- **Immediate–2 years**: Improved consumer decision-making

- **5–10 years**: Clean energy infrastructure acceleration

FOR FUTURE CONSIDERATION AS A CITY PROGRAM

Based on feedback from City staff, some initial recommendations could be better suited as a program rather than a code amendment.

Program Consideration 1. Clean equipment conversion incentive

Overview

Provide rebates for replacing fossil fuel- or electric resistance-based HVAC/water heating/appliances with high-efficiency electric equipment (e.g., heat pumps) that deliver >100% efficiency (Coefficient of Performance >1).

Objectives

- Lower building-sector greenhouse gas emissions and on-site combustion.
- Reduce energy bills for residents and small businesses through efficient electrification.
- Grow local contractor capacity in heat pump and high-efficiency installations.

Anticipated Outcomes

- 50–150 upgrades completed within pilot window.
- Annual reduction in GHG emissions and energy savings documented via standardized M&V.
- Creation of a local 'Approved Installer' list and training cohort (10–25 contractors).

Timeline (18 months)

- Months 0–3: Program design, rebate schedule, partner MOUs, installer onboarding.
- Months 4–6: Outreach launch; first projects approved; begin data collection.
- Months 7–15: Full deployment; quarterly enrollment windows; contractor clinics.
- Months 16–18: Close-out, evaluation, Year-2 scale recommendation.

Stakeholders & Partners

- City Sustainability & Building Safety
- Electric utility
- Local HVAC/plumbing contractors
- Community-based organizations & housing providers

Budget & Funding Considerations

- Incentive pool (possible average rebate: $1,500–$3,500 per installation).
- Administration, M&V, and data management
- Outreach & contractor training/QA

Program Consideration 2. Resilient buildings bonus (demand response)

Overview

Offer height allowances under Sedona's Alternative Framework to owners who enroll in the utility's demand response (DR) program with a minimum multi-year commitment, supported by automated controls and DR-ready equipment.

Objectives

- Improve grid flexibility and reduce peak demand in extreme heat events.
- Encourage DR-ready designs and controls in new and existing buildings.
- Demonstrate policy-based incentives (zoning bonuses) that drive grid participation.

Outcomes

- 5–10 enrolled projects with measurable kW load reduction during DR events.
- Documented peak kW shed and event participation rate (>80%).
- Template zoning language and DR participation agreement for permanent adoption.

Timeline (18 months)

- Months 0–3: Define eligibility, height allowance matrix, DR enrollment terms.
- Months 4–6: Recruit early adopters; execute participation agreements.
- Months 7–15: DR seasons with active events; quarterly reporting.
- Months 16–18: Impact assessment; refine for code integration.

Stakeholders & Partners

- Planning & Zoning
- Electric utility (DR program leads)
- Developers/owners and controls vendors

Budget & Funding Considerations

- Program administration & legal/zoning support
- Enablement stipends for controls/meters
- Measurement & verification (M&V)

Program Consideration 3. High-performance building recognition & incentive

Overview

Establish public recognition program to recognize projects meet a stretch code or green building certification standard (e.g., LEED Gold, Living Building Challenge, Zero Energy Ready).

Objectives

- Accelerate uptake of high-performance building standards.
- Signal market demands healthy, efficient, low-carbon buildings.
- Showcase Sedona leadership with a recognition platform and case studies.

Anticipated Outcomes

- 6–12 certified projects across residential and commercial sectors.
- Tracking of permit timelines and lessons-learned published in an annual report.
- Public recognition campaign

Timeline (12-24 months)

- Months 0–2: Define eligible standards; create recognition toolkit.
- Months 3–6: Launch; publish design guides; begin awards/press.
- Months 7–15: Rolling applications; mid-year recognition event.
- Months 16–18: Evaluation; set permanent policy or sunset.

Stakeholders & Partners

- Planning & Building Safety
- City Communications/Mayor's Office (recognition)
- Design/architecture/engineering firms
- Developers and general contractors

Budget & Funding Considerations

- Administration & verification
- Public recognition & materials

Program Consideration 4. Solar parking canopy bonus program

Overview

Provide height/parking/density bonuses to commercial projects that cover ≥85% of parking with solar canopies or solar trees, reducing heat and generating on-site power.

Objectives

- Expand distributed solar generation and lower peak parking lot temperatures.
- Demonstrate dual use of paved areas and improve visitor comfort.
- Create replicable design standards for solar parking in scenic contexts.

Anticipated Outcomes

- 2–5 canopy pilot sites
- Measured surface temperature reductions and shaded space counts.
- Design handbook and a standardized permit checklist.

Timeline (18 months)

- Months 0–4: Bonus criteria, design guidelines, visual impact screening.
- Months 5–8: RFP or developer recruitment; permitting assistance.
- Months 9–16: Construction and commissioning.
- Months 17–18: Post-construction evaluation and guidance update.

Stakeholders & Partners

- Planning & Zoning; Building Safety
- Electric utility; solar EPC firms
- Chamber of Commerce; commercial owners
- Tourism/Transportation for circulation and shading benefits

Budget & Funding Considerations

- Administration
- Optional incentive pool

Program Consideration 5. Low-carbon & recycled materials rebate

Overview

Offer rebates for verified low-embodied-carbon materials (e.g., low-carbon concrete, recycled steel, salvaged wood) with documentation such as EPDs and procurement checklists.

Objectives

- Reduce life-cycle emissions from construction.
- Stimulate local supply of low-carbon materials and reuse markets.
- Build city staff capacity in embodied carbon review.

Anticipated Outcomes

- 10–20 projects receive material rebates.
- Estimated embodied carbon reductions reported per project.
- Creation of an approved product list and EPD guidance sheet.

Timeline (18 months)

- Months 0–3: Rebate schedule ($/ton CO_2e or $/unit), verification rules.
- Months 4–6: Supplier engagement and training; open applications.
- Months 7–15: Rolling awards; spot audits and site visits.
- Months 16–18: Publish impacts and lessons; consider scale-up.

Stakeholders & Partners

- Building Safety; Procurement
- Contractors and material suppliers
- Recycling/reuse organizations

Budget & Funding Considerations

- Rebate pool
- Program admin

Program Consideration 6. Waste diversion innovation grants

Overview

Provide microgrants and technical assistance to businesses and multifamily properties to expand recycling, composting, reuse, and vendor take-back programs in alignment with best practices and haulers' capacities.

Objectives

- Increase organics and recyclables diversion; reduce landfill tonnage.
- Pilot innovative approaches (smart bins, reuse hubs, back-of-house sorting).
- Advance community education and engagement.

Anticipated Outcomes

- 10–25 grantees; diversion increases of 15–40% per site.
- Standardized signage/bin colors adopted across pilots.
- Quarterly tonnage reporting with contamination rate reduction.

Pilot Timeline (18 months)

- Months 0–2: Grant criteria, scoring rubric, outreach kit.
- Months 3–5: First grant round; TA assignments.
- Months 6–15: Implementation and quarterly measurement.
- Months 16–18: Final reporting and citywide playbook.

Stakeholders & Partners

- Solid Waste Services; Sustainability
- Private haulers and composting facilities
- Property managers; business associations
- Nonprofits/educators for outreach

Budget & Funding Considerations

- Technical assistance & training
- Administration & reporting tools

Program Consideration 7. Blue-green infrastructure zones

Overview

Designate demonstration zones with minimum pervious surface requirements and nature-based stormwater features (bioswales, rain gardens, native habitat, shade trees).

Objectives

- Reduce runoff and localized flooding while improving water quality.
- Lower surface temperatures and expand urban habitat.
- Showcase cost-effective nature-based solutions for broader adoption.

Anticipated Outcomes

- 2 pilot zones completed (public or mixed-use).
- Modeled runoff reduction and pollutant load decreases documented.
- Biodiversity indicators (pollinator counts, canopy coverage) tracked.

Timeline (18 months)

- Months 0–4: Site selection, design standards, maintenance plans.
- Months 5–8: Design & permitting; community engagement.
- Months 9–16: Construction/planting; interpretive signage installed.
- Months 17–18: Monitoring plan and O&M handoff.

Stakeholders & Partners

- Public Works; Parks & Recreation; Planning
- Landscape architects/ecologists
- Neighborhood associations and schools
- Water utility and watershed partners

Budget & Funding Considerations

- Design & engineering
- Construction & planting
- Operations & Maintenance

Program Consideration 8. Net-zero water density bonus

Overview

Provide up to 15% density bonus for developments that achieve net-zero water through measures such as rainwater harvesting, graywater reuse, high-efficiency fixtures, and composting toilets where permitted.

Objectives

- Conserve potable water and increase drought resilience.
- Catalyze integrated water management in private development.
- Document performance to inform plumbing/code updates.

Anticipated Outcomes

- 3-6 developments permitted with net-zero water strategies.
- Gallons saved annually tracked; water balance verified.
- Permit pathways and inspection checklists standardized.

Pilot Timeline (18 months)

- Months 0–3: Eligibility criteria; metering/verification protocol.
- Months 4–7: Developer outreach; pre-application clinics.
- Months 8–16: Construction and commissioning of first projects.
- Months 17–18: Evaluation; scale to additional zones.

Stakeholders & Partners

- Planning & Building Safety; Water Utility
- Developers; water engineers; plumbers
- Public health regulators; inspectors
- Community groups for education

Budget & Funding Considerations

- Administration & verification
- Optional rebate pool for systems
- Technical assistance

Program Consideration 9. Cultural & visual impact statement requirement

Overview

Require projects >25,000 ft² to submit a Cultural & Visual Impact Statement addressing viewsheds, local character, cultural landmarks, and indigenous/historic significance, with mitigation as needed.

Objectives

- Protect Sedona's iconic landscapes and cultural heritage.
- Ensure early, meaningful engagement with tribal and local stakeholders.
- Develop consistent visual simulation and mitigation standards.

Anticipated Outcomes

- Clear guidance and templates; 100% compliance among eligible projects.
- Mitigation plans incorporated into approvals where impacts identified.
- Community satisfaction measured via post-approval surveys.

Pilot Timeline (18 months)

- Months 0–3: Draft guidelines; consultation with tribal partners; create templates.
- Months 4–6: Staff training; launch requirement for eligible applications.
- Months 7–15: Ongoing reviews; public reporting dashboard updates.
- Months 16–18: Policy refinement based on feedback and case studies.

Stakeholders & Partners

- Planning & Zoning; Historic Preservation
- Local tribal governments and cultural liaisons
- Design teams (architecture/landscape) and visualization consultants
- Community advisory groups

Budget & Funding Considerations

- Guideline development & tools (e.g., visual simulation standards)
- Staff training & review capacity
- Tribal consultation stipends/community engagement

Notes & Assumptions

- Estimates reflect typical pilot-scale costs in small to mid-sized U.S. cities as of 2025. Refinement is recommended via market soundings with utilities, contractors, suppliers, and eligible grant programs.
- Where 'optional incentive pools' are indicated, programs can operate using only policy bonuses (e.g., height/density) if cash incentives are not available; dedicated funds will accelerate adoption and broaden participation.
- Sedona may phase pilots to match capacity and funding availability, prioritizing greatest impact and feasibility.

Additional Policies Considered But Not Included

The following policies were also initially considered but were not explored further due to City feedback:

- Require annual energy and water consumption reporting for buildings greater than 2,500 ft^2 in gross floor area. Alternatively, require the city to collect city-wide energy and water consumption data from utilities on an annual basis.
- Waive or reduce minimum parking requirements in mixed-use zones or within ½ mile of a transit stop.
- Prohibit the sale of invasive species.

APPENDIX

i

Recommendation	Prohibit the installation in new construction of new domestic hot water systems that are powered by fossil fuel after 2029, and provide a financial incentive for domestic hot water systems installed in new construction that have an efficiency greater than 100%.
Types of Costs + Savings	Equipment Time + material
Possible Methodology	Compare cost of conventional DHW vs. heat pump DHW for ~3 different property types/sizes
Possible Units for Costs & Savings	% change in construction cost % change in operating cost $/kWh or $/kBtu
Potential Calculators/Tools/Resources	
Cost to City	$0
Cost to Developer	$1,000-$1,500 for single-family residential $10,000-$12,000 for mixed office and retail $15,000-$25,000 for multifamily residential
Cost to Property Owner	$0
Savings to City	$0
Savings to Developer	$0
Savings to Property Owner	$100-$300/year for single-family residential $5,000-$250,000/year for multifamily residential $100-$4,000/year for mixed office and retail
Notes/Description of Methodology & Findings	

	Single-family residential			Multifamily residential			Retail		
	Gas	Electric resistance	Heat pump	Gas	Electric resistance	Heat pump	Gas	Electric resistance	Heat pump
Purchase price ($)	$1,000	$600	$2,000	$35,000	$25,000	$50,000	$10,000	$8,000	$20,000
Water demand (gpd)	46	46	46	1,720	1,720	1,720	223	223	223
Energy cost ($/unit)	$2.29	$0.16	$0.16	$2.29	$0.16	$0.16	$2.29	$0.16	$0.16
Efficiency (%)	80%	100%	300%	80%	100%	300%	80%	100%	300%
Recovery (gph)	75	62	70	300	120	175	300	120	175
Daily Btu output	34,500	34,500	34,500	1,290,000	1,290,000	1,290,000	167,250	167,250	167,250
Daily Btu input	26,450	25,597	7,557	9,245,000	18,490,000	4,226,286	155,403	310,806	71,041
Relevant energy unit per day	0.26	7.50	2.21	92.45	5,419.11	1,238.65	1.55	91.09	20.82
Energy cost per day	$0.61	$1.20	$0.35	$211.71	$867.06	$198.18	$3.56	$14.57	$3.33
Energy cost per year	$221	$438	$129	$77,274	$316,476	$72,337	$1,299	$5,320	$1,216
$/usable Btu	$0.000018	$0.000035	$0.000010	$0.000164	$0.000672	$0.000154	$0.000021	$0.000087	$0.000020
Simple payback of heat pump	11	5		3	0		120	3	
Cost of heat pump to developer ($)	$1,000	$1,400		$15,000	$25,000		$10,000	$12,000	
Cost of heat pump to property owner ($/year)	-$92	-$309		-$4,937	-$244,139		-$83	-$4,104	

ii

Recommendation	Require that all new construction is battery-ready in addition to being solar-ready and EV-ready; adopt NFPA 855 and UL 9540 for battery storage requirements.
Types of Costs + Savings	Material - additional conduit/piping/raceway Time + material Permitting
Possible Methodology	Compare cost of build without battery readiness vs. cost with for ~3 different property types/sizes

Possible Units for Costs & Savings	% change in construction cost
Potential Calculators/Tools/Resources	
Cost to City	$0
Cost to Developer	$5,000 for single-family residential $36,000 for multifamily residential $10,000 for mixed office/retail
Cost to Property Owner	$0
Savings to City	$0
Savings to Developer	$0
Savings to Property Owner	$0
Notes/Description of Methodology & Findings	

			Single-family residential		Multi-family residential		Office/retail	
Conduit & junction box cost ($/ft)	$12	Length (ft)	100	$1,200	1000	$12,000	250	$3,000
Labor cost ($/hr)	$100	Hours	16	$1,600	80	$8,000	40	$4,000
Panel & inteconnection cost				$1,500		$10,000		$2,000
Contingency	20%							
				$5,160		$36,000		$10,800

iii

Recommendation	All new commercial construction must have a roof that is or includes either (1) solar PV, (2) a green roof, or (3) a high albedo roof, or some combination thereof.
Types of Costs + Savings	Time + material Permitting Solar PV production - lower electricity bills Reduced stormwater runoff Reduced cooling load
Possible Methodology	Calculate approximate cost of solar panels, green roof, and high albedo roof for ~3 different property types/sizes, as well as cost savings from solar production, reduced cooling load, and reduced stormwater runoff

Possible Units for Costs & Savings	% change in construction cost % change in operating cost $/kWh or $/kBtu
Potential Calculators/Tools/Resources	PV Watts https://pvwatts.nrel.gov/ CNT https://greenvalues.cnt.org/#calculate
Cost to City	$0
Cost to Developer	*Solar* | $50,000 for single-family residential, $400,000 for multifamily residential, $675,000 for mixed office/retail *Green roof* | $8,000 for single-family residential, $60,000 for multifamily residential, $100,000 for mixed office/retail *High albedo roof* | $0 cost difference
Cost to Property Owner	*Green roof* | $600 for single-family residential, $5,000 for multifamily residential, $8,000 for mixed office/retail
Savings to City	*Green roof* | $2 for single-family residential, $15 for multifamily residential, $25 for mixed office/retail
Savings to Developer	$0
Savings to Property Owner	*Solar* | $5,000 for single-family residential, $40,000 for multifamily residential, $70,000 for mixed office/retail *Green roof* | $200 for single-family residential, $1,500 for multifamily residential, $2,500 for mixed office/retail *High albedo roof* | $40 for single-family residential, $300 for multifamily residential, $500 for mixed office/retail
Notes/Description of Methodology & Findings	

Month	Solar Radiation (kWh / m^2 / day)	AC Energy (kWh)
January	4.46	2,034
February	5.05	2,030
March	6.22	2,682
April	7.26	2,985
May	7.83	3,203
June	8.17	3,137
July	6.99	2,768
August	6.59	2,599
September	6.74	2,611
October	6.14	2,574
November	5.07	2,156
December	4.09	1,877
Annual	6.22	30,656

Location and Station Identification	
Requested Location	45 roundup road sedona az
Weather Data Source	Lat, Lng: 34.89, -111.82 1.7 mi
Latitude	34.89° N
Longitude	111.82° W
PV System Specifications	
DC System Size	19 kW
Module Type	Standard
Array Type	Fixed (roof mount)
System Losses	16%

Month	Solar Radiation (kWh / m^2 / day)	AC Energy (kWh)
January	4.46	16,061
February	5.05	16,028
March	6.22	21,176
April	7.26	23,569
May	7.83	25,285
June	8.17	24,765
July	6.99	21,851
August	6.59	20,521
September	6.74	20,615
October	6.14	20,324
November	5.07	17,024
December	4.09	14,820
Annual	6.22	242,039

Location and Station Identification	
Requested Location	45 roundup road sedona az
Weather Data Source	Lat, Lng: 34.89, -111.82 1.7 mi
Latitude	34.89° N
Longitude	111.82° W
PV System Specifications	
DC System Size	150 kW
Module Type	Standard
Array Type	Fixed (roof mount)
System Losses	16%

Month	Solar Radiation (kWh / m^2 / day)	AC Energy (kWh)
January	4.46	27,839
February	5.05	27,781
March	6.22	36,706
April	7.26	40,853
May	7.83	43,827
June	8.17	42,926
July	6.99	37,875
August	6.59	35,570
September	6.74	35,733
October	6.14	35,229
November	5.07	29,508
December	4.09	25,688
Annual	6.22	419,535

Location and Station Identification	
Requested Location	45 roundup road sedona az
Weather Data Source	Lat, Lng: 34.89, -111.82 1.7 mi
Latitude	34.89° N
Longitude	111.82° W
PV System Specifications	
DC System Size	260 kW
Module Type	Standard
Array Type	Fixed (roof mount)
System Losses	16%

Rainfall data for: Sedona, AZ edit

Avg. Annual Rainfall: **15.10** inches

Volume Capacity Capture Goal edit goal

Increase the capacity of the landscape to capture at least 0.5 inches of water over the impervious areas. For this scenario that is equal to 40 ft^3 or a volume of 299 gallon.

Single Site	Life-cycle Cost	% of Goal

The Green Infrastructure BMPs included below can provide runoff reduction benefits through infiltration, evapotranspiration, and reuse of captured stormwater for irrigation and other non-potable uses. Green infrastructure BMPs provide additional environmental benefits including carbon sequestration, reduced energy use, and groundwater recharge in addition to reduced construction and maintenance costs and extended design life. Experiment with applying different combinations of BMPs then see how you can progress towards meeting the specified runoff reduction goal, reduce total runoff volume from the site (annually and for the average storm), reduce site imperviousness, and affect life-cycle costs and benefits.

Roof Water Capture

☑ **Green Roof**

Total: $25,459
Capital: $11,512.78
Maint.: $720.75

460%
Potential increased capacity:
184.2 ft^3 (1377.8 gal.)

Replaces: Flat Roof ft^2 available

Amount

961 area in ft^2

100.0%
0 Volume Captured 100

Total Cost: **$0**

Results: The green infrastructure applied in this scenario increases the area's potential volume capture capacity by **184.2** ft^3 or **460%** of the desired goal.

Site Overview | Volume | Runoff | Costs | Benefits

Cost Summary

Using a conventional, without BMPs, approach, the costs to develop this site will be $8,462 in net present value.*

Select from the Green Improvements menu to estimate the cost to increase stormwater volume control to site reduce runoff.

Development	Initial Cost	Annual Maintenance Cost	Life Cycle Cost (NPV)
Without BMPs	$3,844	$135	$8,462

VIEW COST DETAILS

* The net present value calculation assumes a **3.1%** discount rate over a **30** year life-cycle - these values can be adjusted in the advanced settings.

Rainfall data for: Sedona, AZ edit

Avg. Annual Rainfall: **15.10** inches

Volume Capacity Capture Goal edit goal

Increase the capacity of the landscape to capture at least 0.5 inches of water over the impervious areas. For this scenario that is equal to 40 ft^3 or a volume of 299 gallon.

Single Site	Life-cycle Cost	% of Goal

The Green Infrastructure BMPs included below can provide runoff reduction benefits through infiltration, evapotranspiration, and reuse of captured stormwater for irrigation and other non-potable uses. Green infrastructure BMPs provide additional environmental benefits including carbon sequestration, reduced energy use, and groundwater recharge in addition to reduced construction and maintenance costs and extended design life. Experiment with applying different combinations of BMPs then see how you can progress towards meeting the specified runoff reduction goal, reduce total runoff volume from the site (annually and for the average storm), reduce site imperviousness, and affect life-cycle costs and benefits.

Roof Water Capture

☑ **Green Roof**

Total: $25,459
Capital: $11,512.78
Maint.: $720.75

460%
Potential increased capacity:
184.2 ft^3 (1377.8 gal.)

Replaces: Flat Roof ft^2 available

Amount

961 area in ft^2

advanced options & cost estimates

100.0%
0 Volume Captured 100

Total Cost: **$0**

Results: The green infrastructure applied in this scenario increases the area's potential volume capture capacity by **184.2** ft^3 or **460%** of the desired goal.

Site Overview | Volume | Runoff | Costs | Benefits

Benefits

Financial Benefit	Annual Benefits	Life Cycle Benefits (NPV)
Owner Total	$172.98	$3520.05
Reduced Energy Use from Green Roof	$172.98	$3520.05
Community Total	$1.78	$36.22
Groundwater Replenishment	$1.32	$26.9
Reduced Treatment benefits	$0.46	$9.32
Total	$174.76	$3556.27

Increased Real Estate Value

Value From	Existence	Area
Total	0%	0%

Additional Benefits

The table above only accounts for the benefits that can be associated with a financial effect. For more on the non-financial benefits from implementing green stormwater control measures see CNT's Green Values Strategy Guide.

View Guide

Rainfall data for: Sedona, AZ edit

Avg. Annual Rainfall: **15.10** inches

Volume Capacity Capture Goal edit goal

Increase the capacity of the landscape to capture at least 0.5 inches of water over the impervious areas. For this scenario that is equal to 315 ft^3 or a volume of 2,356 gallon.

Single Site	Life-cycle Cost	% of Goal

The Green Infrastructure BMPs included below can provide runoff reduction benefits through infiltration, evapotranspiration, and reuse of captured stormwater for irrigation and other non-potable uses. Green infrastructure BMPs provide additional environmental benefits including carbon sequestration, reduced energy use, and groundwater recharge in addition to reduced construction and maintenance costs and extended design life. Experiment with applying different combinations of BMPs then see how you can progress towards meeting the specified runoff reduction goal, reduce total runoff volume from the site (annually and for the average storm), reduce site imperviousness, and affect life-cycle costs and benefits.

Roof Water Capture

☑ **Green Roof**

Total: $198,691
Capital: $89,850
Maint.: $5,625

455.8%
Potential increased capacity:
1437.5 ft^3 (10753.2 gal.)

Replaces: Flat Roof ft^2 available

Amount

7500 area in ft^2

100.0%
0 Volume Captured 100

Total Cost: **$0**

Results: The green infrastructure applied in this scenario increases the area's potential volume capture capacity by **1,437.5** ft^3 or **455.8%** of the desired goal.

Site Overview | Volume | Runoff | **Costs** | Benefits

Cost Summary

Using a conventional, without BMPs, approach, the costs to develop this site will be $66,645 in net present value.*

Select from the Green Improvements menu to estimate the cost to increase stormwater volume control to site reduce runoff.

Development	Initial Cost	Annual Maintenance Cost	Life Cycle Cost (NPV)
Without BMPs	$30,276	$1,060	$66,645

VIEW COST DETAILS

* The net present value calculation assumes a **3.1%** discount rate over a **30** year life-cycle - these values can be adjusted in the advanced settings.

Rainfall data for: Sedona, AZ edit

Avg. Annual Rainfall: **15.10** inches

Volume Capacity Capture Goal edit goal

Increase the capacity of the landscape to capture at least 0.5 inches of water over the impervious areas. For this scenario that is equal to 315 ft^3 or a volume of 2,356 gallon.

Single Site	Life-cycle Cost	% of Goal

The Green Infrastructure BMPs included below can provide runoff reduction benefits through infiltration, evapotranspiration, and reuse of captured stormwater for irrigation and other non-potable uses. Green infrastructure BMPs provide additional environmental benefits including carbon sequestration, reduced energy use, and groundwater recharge in addition to reduced construction and maintenance costs and extended design life. Experiment with applying different combinations of BMPs then see how you can progress towards meeting the specified runoff reduction goal, reduce total runoff volume from the site (annually and for the average storm), reduce site imperviousness, and affect life-cycle costs and benefits.

Roof Water Capture

☑ **Green Roof**

Total: $198,691
Capital: $89,850
Maint.: $5,625

455.8%
Potential increased capacity:
1437.5 ft^3 (10753.2 gal.)

Replaces: Flat Roof ft^2 available

Amount

7500 area in ft^2

100.0%
0 Volume Captured 100

Total Cost: **$0**

Results: The green infrastructure applied in this scenario increases the area's potential volume capture capacity by **1,437.5** ft^3 or **455.8%** of the desired goal.

Site Overview | Volume | Runoff | Costs | **Benefits**

Benefits

Financial Benefit	Annual Benefits	Life Cycle Benefits (NPV)
Owner Total	$1350	$27471.81
Reduced Energy Use from Green Roof	$1350	$27471.81
Community Total	$12.95	$263.5
Groundwater Replenishment	$9.62	$195.7
Reduced Treatment benefits	$3.33	$67.8
Total	$1362.95	$27735.31

Increased Real Estate Value ?

Value From	Existence	Area
Total	0%	0%

Additional Benefits

The table above only accounts for the benefits that can be associated with a financial effect. For more on the non-financial benefits from implementing green stormwater control measures see CNT's Green Values Strategy Guide.

View Guide

Rainfall data for: Sedona, AZ edit

Avg. Annual Rainfall: **15.10** inches

Volume Capacity Capture Goal edit goal

Increase the capacity of the landscape to capture at least 0.5 inches of water over the impervious areas. For this scenario that is equal to 542 ft^3 or a volume of 4,054 gallon.

Single Site	Life-cycle Cost	% of Goal

The Green Infrastructure BMPs included below can provide runoff reduction benefits through infiltration, evapotranspiration, and reuse of captured stormwater for irrigation and other non-potable uses. Green infrastructure BMPs provide additional environmental benefits including carbon sequestration, reduced energy use, and groundwater recharge in addition to reduced construction and maintenance costs and extended design life. Experiment with applying different combinations of BMPs then see how you can progress towards meeting the specified runoff reduction goal, reduce total runoff volume from the site (annually and for the average storm), reduce site imperviousness, and affect life-cycle costs and benefits.

Roof Water Capture

☑ **Green Roof**

Total: $344,398
Capital: $155,740
Maint.: $9,750

460.1%
Potential increased capacity:
2491.7 ft^3 (18639 gal.)

Replaces: Flat Roof ft^2 available

Amount

13000 area in ft^2

100.0%
0 Volume Captured 100

Total Cost: **$0**

Results: The green infrastructure applied in this scenario increases the area's potential volume capture capacity by **2,491.7** ft^3 or **460.1%** of the desired goal.

Site Overview | Volume | Runoff | **Costs** | Benefits

Cost Summary

Using a conventional, without BMPs, approach, the costs to develop this site will be $114,430 in net present value.*

Select from the Green Improvements menu to estimate the cost to increase stormwater volume control to site reduce runoff.

Development	Initial Cost	Annual Maintenance Cost	Life Cycle Cost (NPV)
Without BMPs	$51,984	$1,819	$114,430

VIEW COST DETAILS

* The net present value calculation assumes a **3.1%** discount rate over a **30** year life-cycle - these values can be adjusted in the advanced settings.

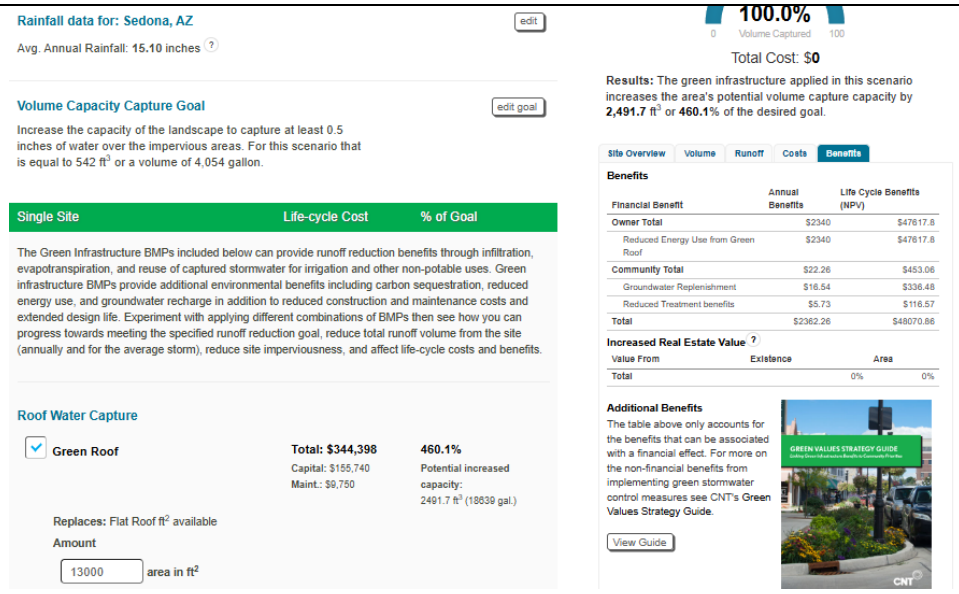


Table 1. Lifetime Savings for Efficient Cool Roof Products

Performance	Best Available	ENERGY STAR	Less Efficient
Solar Reflectance after 3 Years	0.87	0.5	0.05
Annual Energy Savings (kWh/ft^2)	1.78	1.03	======
Annual Energy Cost Savings ($/ft^2)	$0.06	$0.04	======
Lifetime Energy Cost Savings ($/ft^2)	**$1.11**	**$0.64**	======

		Single-family residential (950 sq. ft. of usable roof)	Multifamily residential (7,500 sq. ft. of usable roof)	Mixed office/retail (13,000 sq. ft. of usable roof)
Solar	Install cost	$48,260	$381,000	$660,400
	Electricity generation (kWh/year)	30,656	242,039	419,537
	Savings from electricity generation ($/year)	$4,905	$38,726	$67,126
	20 W of solar per square foot of roof			
	$2.54/W to install			
Green roof	Install cost ($)	$7,669	$59,574	$103,756
	Maintenance cost ($/year)	$586	$4,565	7931
	Savings from reduced cooling load ($/year)	$173	$1,350	2340
	Savings from stormwater management	$2	$13	22
Reflective roof	Install cost ($)	0	0	0
	Savings from reduced cooling load ($/year)	38	300	520

iv

Recommendation	For the purposes of meeting off-street parking space requirements, one parking space can be substituted by a minimum of three bicycle parking spaces up to a maximum of 10.
Types of Costs + Savings	Costs: Time + material, Permitting Savings: Reduced congestion on roadways, improved bicycle infrastructure
Possible Methodology	Calculate average cost of bicycle parking infrastructure and cost of permit to construct bicycle parking

Possible Units for Costs & Savings	Costs: • % change in construction cost (New developments) • Fixed cost for installation and maintenance of infrastructure (Existing sites and buildings) Savings: • Improved resident satisfaction and economic participation due to accessible and safe bicycle infrastructure (soft savings) •

Potential Calculators/Tools/Resources	Estimated calculation for cost of bicycle parking infrastructure:
	• Bicycle Racks:
	  ○ Rack with 1 – 10 spaces: $200 - $800[iv]
	  ○ Rack with 9 spaces: $800[iv]
	• Labor and maintenance
	  ○ $100 - $200
	• Cost of total installation[iv]
	  ○ Average $660
	  ○ Range $64 - $3,610
	•

Cost to City	• If developer or property owner installs bicycle parking: $0 • If city installs bicycle parking, **$660 per bicycle rack** (depending on number of spaces)

Cost to Developer
Cost to Property Owner
	• If city installs bicycle parking: $0
	• If developer or property owner installs bicycle parking
	  ○ **$660 per bicycle rack** (depending on number of spaces)
	  ○ Cost of permit to install bicycle parking spaces at facility **($100-$200)**

Savings to City	$0
Savings to Developer	$0
Notes/Description of Methodology & Findings	Cost Calculation & Methodology: • Source https://perma.cc/T3CA-8HXA provides average cost of bicycle racks ($660) and range of cost on page 12 of 45. Resources: • Sedona Land Development Code: 5.5.D Minimum Off-Street Parking Spaces Required | Sedona Land Development Code ○ Lists the number of off-street parking spaces required by property type • City of Sedona Fee Schedule (permit costs) 638846562195270000 – unable to find the exact cost of a permit for this kind of project / property modification • Soft Savings Source: Economic Benefits of Bicycle Infrastructure. Microsoft Word - Bicycling and the Economy_Econ Impact Studies (CS).doc • Considerations: • If developers and / or property owners are responsible for installing and maintaining bicycle parking infrastructure, permitting costs could be waived or reduced. • Alternatively, the revenue from permits relating to these projects could be used to create a maintenance fund for businesses / property owners that have participated in this program.

v

Recommendation	Reduce parking space requirements for new developments that implement a continuous sidewalk and/or protected bike lane of at least 10' in width.

Types of Costs + Savings	Costs:
	• Time
	• Materials
	  ○ Flared curb ramp for motor vehicles
	  ▪ Concrete / asphalt
	  ○ Tactile detection for people with sight loss (ADA Warning Pads)
	  ○ Stop or yield sign on intersecting streets
	  ○ Traffic paint, reflective materials, bike lane paint stencils
	  ○ Bollards / delineators
	• Maintenance (either the responsibility of the property owners or the city)
	•
	Savings:
	• Increased pedestrian and bicyclist safety, reduced congestion in parking lots (soft savings)

Possible Methodology	Calculate approximate cost of: • Continuous sidewalk: concrete / asphalt, stop or yield signs, tactile detection • Protected bike lane: Traffic paint, bollards / delineators •
Possible Units for Costs & Savings	Costs: • % change in construction cost • Fixed cost of continuous sidewalk installation • Fixed cost of protected bike lane and annual maintenance of bollards / delineators

Potential Calculators/Tools/Resources	Continuous Sidewalk:
	• Materials
	  ○ Concrete nationwide average of $166.36 per cubic yard, $6 to $9.50 per sqft. concrete slab[v]
	  ○ Traffic paint: Starting at $179 per 5 gal container[v]
	  ○ Tactile detection: $210 - $250 each ADA warning pad[v]
	  ○ Labor: Varies by sqft, $500 – $1,000[v]
	• Overall
	  ○ Average cost for a raised crosswalk: $8,170[v]
	
	Protected Bike Lane
	• Traffic paint: Starting at $179 per 5 gallon container + bike lane stencils ($100 - $240)[v]
	• Shared lane / bicycle marking – Average: $180[v]
	• Bollards / delineators: $45 – $50 per bollard[v]
	• Estimated cost range of protected bike lane – $1,000 - $5,000

Cost to City	Maintenance of traffic paint, bollards / delineators, ADA warning pads, signage
Cost to Developer	Increased construction costs due to use concrete / asphalt, ADA warning pads, traffic paint, bollards / delineators, permitting costs for initial installation • For continuous sidewalk - $8,170 • For protected bike lane - $1,000 - $5,000 •
Cost to Property Owner	Maintenance of traffic paint, bollards / delineators
Savings to City	Projects could be eligible for competitive grant programs offered by the U.S. Department of Transportation. Grants can go towards planning, designing, and construction phases of

Savings to Developer	projects.
Savings to Property Owner	Soft Savings: "Studies have found that bicycle infrastructure improvements can have a positive overall impact on business, and that people who walk or bike to a commercial area spend more money per month than those who accessed the area by automobile."[v]

Notes/Description of Methodology & Findings	Cost Calculation & Methodology:
	• Raised / continuous crosswalk:
	  ○ Source https://perma.cc/T3CA-8HXA provides:
	  ○ average cost of raised crosswalk ($8,170) on page 16 of 45.
	• Protected bike lane estimated by:
	  ○ Shared lane / bicycle marking ($180) + Bollards ($50 each * number of bollards needed) + Time (5+ hours) + Cost of Labor (~$38.50 per hour[v]) = $1,000 - $5,000
	  ○ Largely depends on size of protected bike lane
	
	Resources:
	• U.S. Department of Transportation Funding Resources: Pedestrian and Bicycle Funding Opportunities
	  ○ Resource indicates likely eligibility for pedestrian and bicycle activities and projects under U.S. Department of Transportation surface transportation funding programs. Activities and projects need to meet program eligibility requirements.
	•
	• Benefits of continuous sidewalks and protected bike lanes
	  ○ Transportation Association of Canada Emerging Practice Briefing: Continuous Sidewalks and Bike Paths: epb-csbp-e.pdf
	•
	• Recycled rubber protected bike lane delineators: CycleLane Curbing | Bicycle Lane Safety Delineator | Traffic Logix

vi

Recommendation	Require minimum shade coverage of at least 50% for pedestrian gathering points, including outdoor dining areas, waiting areas, transit stops, trailheads, and bike parking.
Types of Costs + Savings	Costs: Time + material, Maintenance Savings: Reduced heat island effect (soft savings), improved outdoor infrastructure – benefiting tourism
Possible Methodology	• Look at sample gathering points to estimate current number of trees, square footage of coverings, etc. at pedestrian gathering points • Determine % increase in areas (square feet, acres, etc.) covered needed to hit 50% minimum coverage target
Possible Units for Costs & Savings	Costs: • % increase in annual site maintenance cost due to addition of new coverage and/or trees • Fixed cost of shade coverings and trees • % increase in water utility costs due to tree and landscaping maintenance Savings: • Monthly, quarterly, or annual % increase in visitation at pedestrian gathering places due to increase in shade coverage (soft savings)

Potential Calculators/Tools/Resources	• Commercial outdoor pavilion, 24' x 40' – $67,000[vi] • Bus shelter – Average price: $11,560[vi] • Black Hills Ponderosa Pine Trees - $120 each, 2- 3 ft[vi]

Cost to City
Cost to Developer
Cost to Property Owner
	• Initial cost of installation of coverings and landscaping / trees
	  ○ Per covering $20,000 – $70,000
	  ○ Per tree $120
	• Annual maintenance of coverings
	  ○ $100 – $500 per year
	• Routine maintenance of landscaping and resulting water use
	  ○ $200 - $600 per year

Savings to City **Savings to Developer** **Savings to Property Owner**	Direct Savings: $0 Other Savings: Program support could potentially be available through the U.S. Forest Service Urban and Community Forestry Program[vi]
Notes/Description of Methodology & Findings	Cost Calculation & Methodology: • Cost estimations for commercial coverings and pavilions collected from sources listed above. • Cost estimations for trees and landscaping collected from sources listed above. Resources: • Urban Forestry Roadmap: Provides guides and resources on urban forestry efforts, Urban Forestry Roadmap - Vibrant Cities Lab

vii

Recommendation	Mandate mid-block pedestrian access in long blocks or dead ends.
Types of Costs + Savings	Costs: • Time + material Savings: • Increased pedestrian safety (soft savings) • Reduced speed on main roadways and neighborhoods (soft savings) • Note: A 2010 Federal Highway Administration study reported that rectangular rapid flashing beacon crosswalks delivered a 96% driver yield rate •
Possible Methodology	• Look at sample block to estimate size and needed material • Conduct pedestrian study or survey to determine desired pedestrian location and line ○ Location of the mid-block pedestrian access point may alter cost of project / construction

Possible Units for Costs & Savings	% increase in annual or bi-annual budget for road maintenance May have to be absolute cost if cost of annual road maintenance baseline is unable to be determined

Potential Calculators/Tools/Resources	• Overview of Rectangular Rapid Flashing Beacon Cost and Effectiveness[vii]
	  ○ In depth look at the effectiveness of rectangular rapid flashing beacon mid-block pedestrian crosswalks
	• Costs for Pedestrian and Bicyclist Infrastructure Improvements[vii]
	  ○ Research study of average costs and benefits of pedestrian and bicycle infrastructure in the United States
	• Washington County, Oregon: Approval Process for New Pedestrian Crossings at Mid-block and Uncontrolled Intersections[vii]
	  ○ Mid-block crosswalk policy for Washington County in Oregon. Outlines application and approval process to have mid-block crosswalks created.
	•

Cost to City
Cost to Developer
Cost to Property Owner
	Materials & Labor Costs:
	• Traffic paint
	• Building material, concrete / asphalt
	• Lighted / flashing crosswalk with activation
	• Overhead signage to help identify crosswalks
	•
	Overall Costs:
	• Flashing beacon crosswalk – Average: $10,010[vii]
	• RRFB crosswalk Average price (installation, labor, materials) – $22,250[vii] per crossing
	• Additional costs to consider:
	  ○ Overhead LED streetlamps
	  ▪ $640 each[vii]
	  ▪ Average: $4,880[vii]
	  ○ Trees and landscaping for vertical elements
	  ▪ Grasses - $12 per PLS lb[vii]
	  ▪ Landscaping / cacti - $324.99 each[vii]

Savings to City **Savings to Developer** **Savings to Property Owner**	• Improved pedestrian safety and walkability (soft savings) ○ "Areas that facilitate walkability and attract pedestrians sustain higher rents, revenues and resale values."[vii]
Notes/Description of Methodology & Findings	Cost Calculation & Methodology: • RRFB mid-block crosswalk: ○ Source Overview of Rectangular Rapid Flashing Beacon Cost and Effectiveness provides average cost • LED overhead lights and landscaping costs collected from sources listed above Resources: • U.S. Department of Transportation Federal Highway Administration – Benefits of Median Crosswalks, Lesson 12 - Federal Highway Administration University Course on Bicycle and Pedestrian Transportation, July 2006 - FHWA-HRT-05-107 • Federal Highway Administration, 2010, Effects of Yellow Rectangular Rapid-Flashing Beacons on Yielding at Multilane Uncontrolled Crosswalks. Overview of Washington County, Oregon's Mid-block Crossing Policy: 1. Contact the County to discuss the proposed location. 2. Prepare the analysis described in the adopted policy and get the County Engineer's approval.

	3. At the cost of the applicant, prepare the final design and obtain the necessary permits from the County. 4. Obtain the funds and build the crossing.

viii

Recommendation	In new developments, require a plan for there to be at least 30% tree canopy on-site within 10 years.
Types of Costs + Savings	Costs: • Cost of trees • Time + material to plant trees and vegetation • Time and resources to create comprehensive 10-year landscaping plan that includes considerations of strategic tree placement and selecting the appropriate tree species • Maintenance • Savings: • Improved shading in public areas, reduced heat island effect (soft savings) •
Possible Methodology	• Model different types of lots/properties to assess necessary size • Tree purchasing and planting costs • Total number of trees needed • Estimate cost change due to increased watering and maintenance costs •

Possible Units for Costs & Savings	• Costs
	  ○ % change in annual landscaping cost (year-over-year analysis may demonstrate the cost-impact of increased tree planting over the 10-year period)
	• Savings
	  ○ Over the 10-year period, % change in the average temperature of parks / outdoor gathering areas where tree canopy has been increased.
	•

Potential Calculators/Tools/Resources	• Shade Pheonix Plan: Provides estimates of tree and tree care costs, as well as tree care guidelines[viii]
Cost to City	Ownership costs will depend on location of trees (private property or public lands), and which party is planting trees and responsible for upkeep.
Cost to Developer	• Per Tree (24'' Box + labor): $750 (one time cost) • Irrigation supplies: $300 (one time cost) • Maintenance: $100 (annual cost) • Water Cost: $114.32 (annual cost)
Cost to Property Owner	

	Cost of the 10-year shading plan development: • Time + Study of heat sensitive areas and strategic placement of trees (1-2 yrs) -- **$30,000** •

Savings to City
Savings to Developer
Savings to Property Owner
	• Savings / Funding Opportunities[viii]:
	  ○ American Rescue Plan Act (ARPA)
	  ○ Capital Improvement Program (CIP)
	  ○ Arizona Public Service (APS)

Notes/Description of Methodology & Findings	Cost Calculation & Methodology:
	• Cost of tree and tree care collected from sources listed above
	
	Resources:
	• Shade Pheonix Plan[viii]:
	  ○ Pheonix has funded their shade plan through money raised in a general obligation bond approved by Pheonix voters - Pheonix GO Bond – Tree Equity and Urban Planning[viii]
	  ○ Also funded through local, federal, and private funds
	•
	  • American Planning Association, Why Urban Canopies Are Growing as Key Climate Infrastructure

ix

Recommendation	Require that new construction install cool roofing/paving for at least 50% of hardscapes.
Types of Costs + Savings	Savings: • Reduced building cooling load • Reduced stormwater runoff, improved water quality • Longer expected lifespan and ROI for cool roofing/ paving materials Costs: • Time and material •
Possible Methodology	• Model different properties to estimate coverage • Cost of cool roofing/paving vs. conventional • Explore cost savings from reduced cooling load
Possible Units for Costs & Savings	Costs: • % change in construction costs • % change in operating cost, $/kWh or $/kBtu Savings: • % change in operating cost, $/ kWh or $/kBtu • ROI of energy savings and extended lifespan of cool roofing/ paving materials vs. conventional •

Potential Calculators/Tools/Resources	• General: Estimated energy savings of cooler surfaces in cities – 2 kWh of electrical energy savings per square meter per year[ix]
	•
	• Cool Paving: Estimated cost of materials for a 30ft driveway (using national price averages)
	  ○ Conventional materials (asphalt):
	  ▪ Material cost: $1,350
	  ▪ Installation cost: $2,100
	  ▪ Total estimated cost: $3,450[ix]
	  ○ Cool Paving materials (light-colored concrete pavers)
	  ▪ Material cost: $2,400
	  ▪ Installation cost: $3,300
	  ▪ Total estimated cost: $5,700[ix]
	•
	• Cool Roofing: Estimated cost of materials[ix]
	  ○ Conventional materials (asphalt shingles / modified bitumen):
	  ▪ Range for 10,0000 sq ft. 2-story building: $20,655 - $30,982
	  ▪ Range for a 3,000 sq ft. residential home: $13,763 - $20,644
	  ○ Cool Roofing materials (natural slate / high albedo):
	  ▪ Range for a 10,0000 sqft. 2-story building: $75,228 - $112,841
	  ▪ Range for a 3,000 residential home: $47,086 - $70,630
	•

Cost to City **Cost to Developer** **Cost to Property Owner**	• Higher construction and materials cost, cool roofing/ paving materials are on average ~2x more expensive
Savings to City **Savings to Developer** **Savings to Property Owner**	• Cool roofing/ paving materials have a longer lifespan than conventional material and offer the benefits of energy savings – increasing the return on investment
Notes/Description of Methodology & Findings	Cost Calculation & Methodology: • Online tool, Hardscaping Cost Calculator: Compare Materials & Installation Prices | Ultimate Calculators, was used to calculator asphalt and concrete cost estimates • Online tool, Roofing Calculator - Estimate Roof Cost per Sq. Ft. - Free Roof Quotes, was used to calculate conventional and cool roofing materials cot estimates Resources: • Evidence-based guidance on reflective pavement for urban heat mitigation in Arizona | Nature Communications (2023) • Are cooler surfaces a cost-effect mitigation of urban heat islands? - ScienceDirect (2018)

x

Recommendation	Require transit stops to have shelters.
Types of Costs + Savings	Costs: • Time + materials • Maintenance Savings: • Improved public transit infrastructure -- can lead to increased ridership (soft savings) •
Possible Methodology	• Assume general dimensions of a typical shelter - 8'6"x5'2"x8' • Determine average price of transit shelter • Determine average annual maintenance costs
Possible Units for Costs & Savings	• % change in construction cost • % change in operating and maintenance cost
Potential Calculators/Tools/Resources	• Pricing of transit stop shelters[x]
Cost to City	• **$10,000 – $15,000** per shelter (one time cost) • **$500** for maintenance and routine cleaning (recurring cost) •
Cost to Developer	$0
Cost to Property Owner	$0
Savings to City	Improved public transit infrastructure (soft savings)
Savings to Developer	$0
Savings to Property Owner	$0
Notes/Description of Methodology & Findings	Cost Calculation & Methodology: • Average cost of 8'6"x5'2"x8' transit shelter collected from the sources listed above.

xi

Recommendation	Require surface lots greater than 10,000 ft2 to include 30% shading (trees or structures) and pedestrian pathways and/or walkable medians with crosswalks.

Types of Costs + Savings	Costs:
	• Time + material
	  ○ Shading trees / structures
	  ○ Pedestrian pathways
	  ○ Walkable medians with crosswalks
	• Maintenance
	
	Savings:
	• Cost savings from solar production if solar capable shelters are used
	• Potential for reduced stormwater runoff from pathways/medians
	• Reduced heat island effect
	•

Possible Methodology	Calculate cost of different shading options (solar canopy, trees, shelters, etc.) and pedestrian pathways/medians for different sizes of surface lots
Possible Units for Costs & Savings	Costs: • % change in construction cost • % change in operating and maintenance cost Savings: • % change in operating cost (energy use and stormwater runoff) •

Potential Calculators/Tools/Resources	Pedestrian Pathways:
	• Average cost for a raised crosswalk: **$8,170**[xi]
	• Average cost of a painted pedestrian crossing: **$360**[xi]
	
	Natural Shading:
	• Tree / landscaping Costs[xi]
	  ○ Per Tree (24'' Box + labor): **$750** (one time cost)
	  ○ Irrigation supplies: **$300** (one time cost)
	  ○ Maintenance: **$100** (annual cost)
	  ○ Water Cost: **$114.32** (annual cost)
	
	Shade Shelters:
	• Average cost range for small shade shelter: **$2,700 – $10,000**[xi]
	• Average cost range for a small shade shelter with solar capabilities: **$20,000 – $30,000**[xi]

Cost to City	$0
Cost to Developer	• Construction and materials ○ For crosswalks, tree shading, and shelters: **$20,000 (no solar) - $30,000 (solar)** • Permitting - **$300**[xi] •
Cost to Property Owner	• Maintenance of structures and crossways: **$1,000 - $2,000 annually**
Savings to City	• Reduced heat island effect, reduced stormwater runoff
Savings to Developer	$0

Savings to Property Owner	• If solar capable shelters are used, total cost of energy purchased from the grid could be decreased

Notes/Description of Methodology & Findings	Cost Calculation & Methodology:
	• Cost estimations for materials listed above in "Potential Calculators/ Tools/ Resources" have been collected from the cited sources
	• Calculation of range of construction materials (crosswalks, tree shading, shelters)
	  ○ Average cost of a painted pedestrian crosswalk ($360 * 2) + Tree Costs ($750 + $300 * 5) + small shade shelter ($6,000) + small shade shelter with solar ($20,000) = $30,730
	• Calculation of estimated maintenance costs (recurring):
	  ○ Tree maintenance (100 + 114.32 * 5) + crosswalk paint ($179) + maintenance of shelters ($100) = $1,350.60

xii

Recommendation	Require new multifamily construction to have Level 2 EV chargers installed at a rate of at least one charger per three units.
Types of Costs + Savings	Costs: • Time + EV chargers • Maintenance of chargers • Evaluation / consultation that current electric systems are equipped for the installation of level 2 chargers • Permitting and inspection fees • Savings: • Improved air quality due to less gas-powered cars (soft savings) • Improved EV infrastructure • ROI of installation for charger owner •
Possible Methodology	Calculate T+M cost assuming 30-unit building
Possible Units for Costs & Savings	Costs: • % change in construction cost • % change in operating cost Savings: • $/kWh or $/MWh for charger owner once investment is recovered •
Potential Calculators/Tools/Resources	• Overview of Level 2 EV charger installation costs[xii] (cost breakdown below) • Calculate your EV charging ROI for multifamily[xii]
Cost to City	$0
Cost to Developer	• Permitting and inspection fees

Cost to Property Owner	○ $100 - $500 • Labor costs ○ $500 - $2,000 • Evaluation of current electrical system ○ Electrical panel upgrades: **$500 - $2,000** ○ Wiring and conduit: **$500 - $1,500** • EV chargers ○ **$400 - $1,500** per charger, varies by features and charging capacity • Maintenance / repairs of EV chargers ○ $100 - $500 annually First time cost per charger: **$2,000 - $7,500** • Total cost for a 30-unit building (10 chargers): $20,000 - $75,000 Recurring charges: **$100 - $500 annually** •
Savings to City	$0
Savings to Developer	$0
Savings to Property Owner	• Attract and retain residents • EV drivers are willing to pay more for parking spaces that allow them to charge at home, increasing property owner revenue and ROI.[xii] • EV chargers raise property values Sample ROI Calculation[xii]: (assuming 10 chargers) • Property owners / EV charging owners can charge residents to use the EV spaces (expected $0.20 – 0.25 / per kWh) ○ Average residential electricity rate in Sedona, AZ is $0.15/kWh[xii] • Property owners can expect to recover their investment in EV charging after 1.8 years when no incentive funding is used. • Annual net profit after recovering investment will be **~$7,000**
Notes/Description of Methodology & Findings	Cost Calculation & Methodology: • First time cost per charger range: calculated based on lowest and highest amounts for each charge category • Sample ROI assessment for property owner savings collected from source cited.

xiii

Recommendation	Require that new EV chargers on commercial properties be at least Level 2.
Types of Costs + Savings	Costs: • Time + EV chargers • Maintenance of chargers • Evaluation / consultation that current electric systems are equipped for the installation of level 2 chargers • Permitting and inspection fees • Savings: • Improved air quality due to less gas-powered cars (soft savings) • Improved EV infrastructure • ROI of installation for charger owner
Possible Methodology	Compare cost of Level 1 charger installation vs. Level 2 charger • Average Level 1 price: **$200 - $1,000**[xiii] • Average Level 2 price: **$400 - $1,500**[xiii]
Possible Units for Costs & Savings	Costs: • % change in construction costs • % change in operating cost Savings: • $/kWh for charger owner once investment is recovered
Potential Calculators/Tools/Resources	Cost of Level 2 Charger[xiii] (cost breakdown below)
Cost to City	$0

Cost to Developer
Cost to Property Owner
	• Permitting and inspection fees
	  ○ $100 - $500
	• Labor costs
	  ○ $500 - $2,000
	• Evaluation of current electrical system
	  ○ Electrical panel upgrades: **$500 - $2,000**
	  ○ Wiring and conduit: **$500 - $1,500**
	• EV chargers
	  ○ **$400 - $1,500** per charger, varies by features and charging capacity
	• Maintenance / repairs of EV chargers
	  ○ $100 - $500 annually
	•
	• First time cost per charger: **$2,000 - $7,500**
	  ○ Total cost for a 30-unit building (10 chargers): $20,000 - $75,000
	• Recurring charges: $100 - $500 annually

Savings to City	Improved EV infrastructure
Savings to Developer **Savings to Property Owner**	Sample ROI Calculation[xiii]: (assuming 2 chargers at a commercial location) • Property owners / EV charging owners can charge residents to use the EV spaces (expected $0.25 / per kWh) ○ Average commercial electricity rate in Sedona, AZ is $0.12/kWh[xiii] • Property owners can expect to recover their investment in EV charging after 3.7 years when no incentive funding is used.

	• Annual net profit after recovering investment will be **~$1,600**
Notes/Description of Methodology & Findings	Cost Calculation & Methodology: • Average costs of level 1 and level 2 chargers collected from sources listed above • Estimated cost totals and ROI calculations collected from sources listed above

xiv

Recommendation	Require public hydration stations for people and pets, waste and recycling receptacles, and shaded seating at public/civic spaces and trailheads.

Types of Costs + Savings	Costs:
	• Time / labor
	• Maintenance
	• Waste disposal/recycling receptacles
	• Hydration stations
	• Shaded seating
	  ○ Benches located under shade
	  ○ Trees / shading if needed
	
	Savings:
	• Potential cost benefit from more pedestrians/visitors
	• Cost savings for waste cleanup
	•

Possible Methodology	• Identify average cost for hydration stations, waste/recycling receptacles, and shading • Estimate number of hours and funds needed for labor / installation (first time) and maintenance (monthly / quarterly / annual)
Possible Units for Costs & Savings	Costs: • % change in construction cost • % change in operating / maintenance cost •
Potential Calculators/Tools/Resources	• Park Warehouse[xiv] - for determining equipment prices
Cost to City **Cost to Developer** **Cost to Property Owner**	Equipment: • Average cost of public hydration stations: **$2,519 – $5,507**[xiv] • Average cost of benches: **$557 – $1,056**[xiv] • Average cost of trash / recycling outdoor receptacles: **$1,979 – $2,419**[xiv] • Average cost of permanent shading structures: **$4,000 – $20,000**[xiv] • Total cost range for equipment: **$9,055 - $20,982**

	Maintenance: • Annual maintenance of equipment structures: $100 - $500 annually • Waste pickups / cleaning: $1,000 – $5,000 annually
Savings to City	Benefits local tourism industry by improving infrastructure (soft savings)
Savings to Developer	$0
Savings to Property Owner	Same as savings to city
Notes/Description of Methodology & Findings	Cost Calculation & Methodology: • Equipment prices sourced from Park Warehouse • Maintenance costs estimated

xv

Recommendation	Require that new construction greater than 1,000 ft^2 provide a construction and demolition waste management plan to be filed.
Types of Costs + Savings	Costs: • Labor cost to prepare plan • City filing fee • Administrative effort/time/cost for the city to review construction waste management plan Savings: • Potential cost savings for property owner / developer due to improved waste management practices and planning •
Possible Methodology	• Approximate hours to develop and file a plan; apply hourly rate assumption • Approximate hours needed for construction site to successfully comply with waste management plan (training / education of employees)
Possible Units for Costs & Savings	Costs: • % change in construction cost • % change in operating cost • $ increase in construction cost Savings: • % change in operating costs • % change in total number of waste hauler pickups and costs

	• $ decrease in construction cost
Potential Calculators/Tools/Resources	• LEED BD+C v4 New Construction – Sample Construction Waste Management Plan[xv]
Cost to City	• Administrative effort / time to process and ensure compliance of construction waste management plans •

Cost to Developer
Cost to Property Owner
	• Time / effort to create construction management plan and execute plan throughout construction process
	  ○ 5 – 10 hrs to develop plan and determine waste haulers needed
	  ○ Cost of plan development: $250 - $500
	  ○ Costs will be higher if on-site waste coordinator is hired to oversee the plan
	• Cost of materials needed in order to sort and organize waste materials correctly
	  ○ Additional time + labor (+5 extra hours of construction labor)
	  ○ Estimated cost of additional labor: $200 - $500
	• Cost of coordinating and contracting waste haulers
	  ○ Costs can be expected to be lower if one waste hauler is able to take all forms of waste material from the site, if the area does not have a waste hauler that can accept all types, multiple haulers will need to be contracted
	  ○ Average cost of construction waste haulers in Sedona area:
	  ▪ 40-yard dumpster: $550 - $750 per container[xv]
	•

Savings to City	• Organized waste management and correct disposal of construction waste can lead to less pollution of local areas and waste disposal centers •
Savings to Developer **Savings to Property Owner**	• Avoided costs and fees associated with mismanagement of construction waste • Increased time efficiency in construction process due to streamlined waste management

Notes/Description of Methodology & Findings	Cost Calculation & Methodology:
	• Assumed 5 – 10 hours for plan research and development (less time needed if LEED BC+C waste management template can be used)
	• Assumed $38/hr for construction labor[xv]
	
	Resources:
	• Sedona Recycles: Sedona Recycles – Recycling service in Sedona and the Verde Valley
	  ○ Local non-profit organization dedicated to recycling in Sedona. Property owners and developers should look to coordinate with Sedona Recycles to determine what types of construction waste can be accepted at location recycling locations.
	• Taylor & Sons Hauling
	  ○ Offer commercial and construction waste hauling in Sedona

xvi

Recommendation	Require all commercial properties to have recycling bins available, and all commercial properties greater than 10,000 ft^2 to have a recycling plan in place.
Types of Costs + Savings	Costs: • Cost of recycling management (recurring monthly / annual cost) • Labor cost to put recycling plan together (fixed cost) Savings: • Reduced landfill / general waste utility charges due to implementation of recycling pickups
Possible Methodology	• Approximate cost for landfill and recycling bins (exact pricing will depend on hauler and number / size of bins) • Approximate costs of developing an internal recycling management plan
Possible Units for Costs & Savings	Costs & Savings: • % increase / decrease in operating cost • $ increase / decrease in operating cost
Potential Calculators/Tools/Resources	Waste Management Commercial Recycling Pick-Up Availability[xvi]
Cost to City	Greater amounts of recycling material being sent to recycling facilities requires more support for these facilities •
Cost to Developer	$0
Cost to Property Owner	**$73 - $126 per container service for roll-off dumpsters or toters** Prices are dependent on size of containers, total number of containers, frequency of pickups, types of material, and waste hauler •
Savings to City	Increase in recycling leads to less dependency on local landfills
Savings to Developer	$0
Savings to Property Owner	Implementation of recycling pickups will decrease the costs of landfill pickups

Notes/Description of Methodology & Findings	Cost Calculation & Methodology:
	• Estimation of recycling container costs collected from source listed above
	
	Resources:
	• List of waste haulers in Sedona (** denotes that haulers do not offer recycling)
	  ○ Waste Management
	  ○ Taylor & Sons**

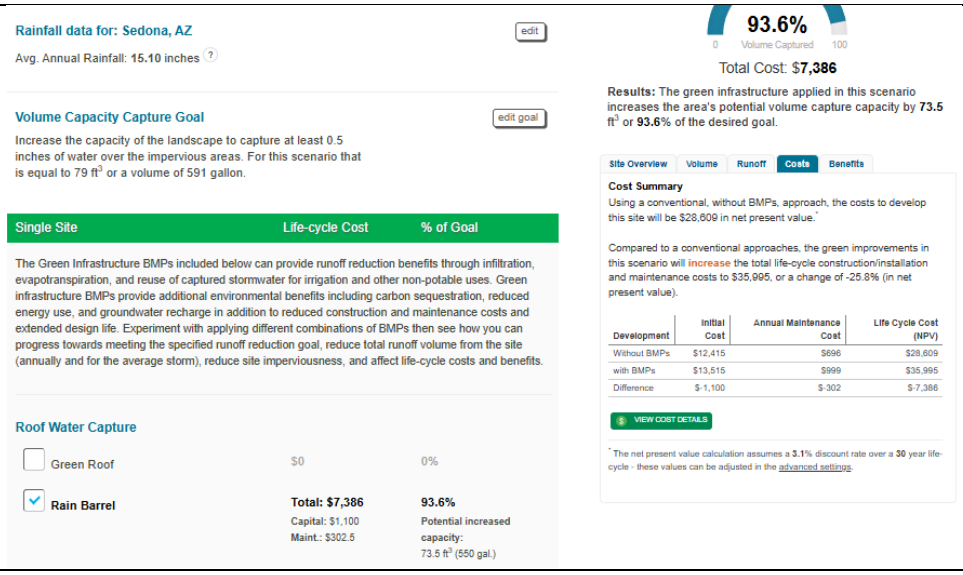
xvii

Recommendation	Require an average water efficiency of 1.8 gpm across all fixtures in new construction.
Types of Costs + Savings	Savings from increased water efficiency Compare cost of less efficient fixtures against efficient fixtures
Possible Methodology	Identify an assumed baseline (e.g., 2.6 gpm) and calculate water demand and consumption for ~3 property types/sizes; compare against new 1.8 gpm baseline
Possible Units for Costs & Savings	% decrease in water utility costs $ increase/decrease in construction costs
Potential Calculators/Tools/Resources	EPA WaterSense calculator
Cost to City	$0
Cost to Developer	$0
Cost to Property Owner	$0
Savings to City	$0
Savings to Developer	$0
Savings to Property Owner	$150 for single-family, $1,000 for multifamily, $800 for mixed office/retail

Notes/Description of Methodology & Findings

	Single-family	Multifamily	Mixed office/retail
Assumed WUI (gal/ft^2/year)	32	61.19	23.8
Assumed gal/year	60800	458925	309400
Assumed GFA	1900	7500	13000
Assumed water cost ($/gal)	$0.008	$0.008	$0.008
Assumed baseline (gpm)	2.6	2.6	2.6
Proposed (gpm)	1.8	1.8	1.8
With proposed efficiency	42,092	317,717	214,200
Cost savings	$150	$1,130	$762

xviii

Recommendation	Require rainwater harvesting for irrigation water on commercial sites greater than 5,000 ft^2.
Types of Costs + Savings	Time + material Savings from less water demand for irrigation
Possible Methodology	Identify baseline cost for irrigation water and compare against construction cost for rainwater harvesting system
Possible Units for Costs & Savings	
Potential Calculators/Tools/Resources	Green Values Stormwater Management Calculator
Cost to City	$0
Cost to Developer	$1,100 for single-family home, $4,000 for multifamily, $27,500 for mixed office/retail
Cost to Property Owner	$300 for single-family home, $1,200 for multifamily, $7,500 for mixed office/retail
Savings to City	$0
Savings to Developer	$0
Savings to Property Owner	$130 for single-family, $500 for multifamily, $3,200 for mixed office/retail
Notes/Description of Methodology & Findings	

Rainfall data for: Sedona, AZ (edit)

Avg. Annual Rainfall: **15.10** inches

Volume Capacity Capture Goal (edit goal)

Increase the capacity of the landscape to capture at least 0.5 inches of water over the impervious areas. For this scenario that is equal to 79 ft^3 or a volume of 591 gallon.

Single Site	Life-cycle Cost	% of Goal

The Green Infrastructure BMPs included below can provide runoff reduction benefits through infiltration, evapotranspiration, and reuse of captured stormwater for irrigation and other non-potable uses. Green infrastructure BMPs provide additional environmental benefits including carbon sequestration, reduced energy use, and groundwater recharge in addition to reduced construction and maintenance costs and extended design life. Experiment with applying different combinations of BMPs then see how you can progress towards meeting the specified runoff reduction goal, reduce total runoff volume from the site (annually and for the average storm), reduce site imperviousness, and affect life-cycle costs and benefits.

Roof Water Capture

Green Roof	$0	0%
Rain Barrel	**Total: $7,386** Capital: $1,100 Maint.: $302.5	**93.6%** Potential increased capacity: 73.5 ft^3 (550 gal.)

93.6%

0 Volume Captured 100

Total Cost: $**7,386**

Results: The green infrastructure applied in this scenario increases the area's potential volume capture capacity by **73.5** ft^3 or **93.6**% of the desired goal.

Site Overview | Volume | Runoff | Costs | Benefits

Cost Summary

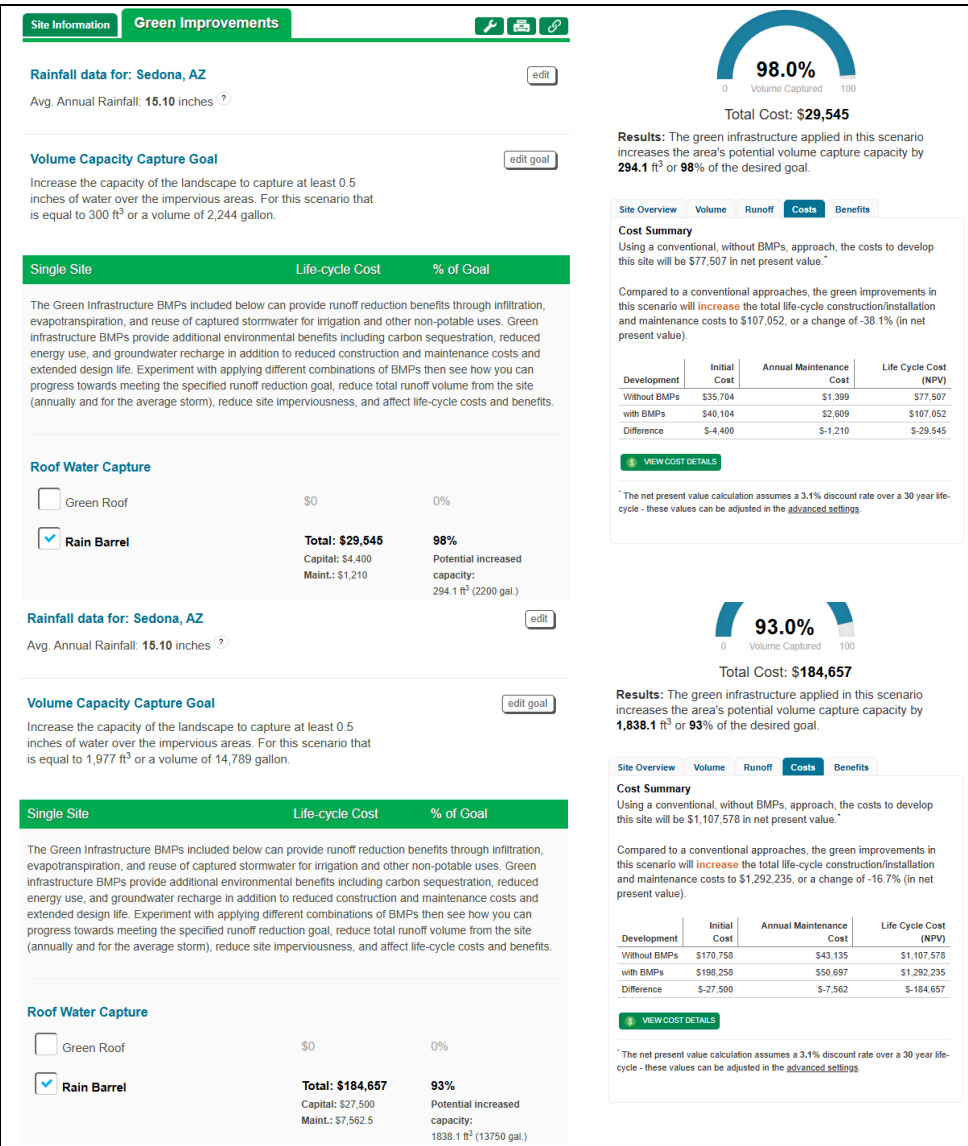
Using a conventional, without BMPs, approach, the costs to develop this site will be $28,609 in net present value.*

Compared to a conventional approaches, the green improvements in this scenario will increase the total life-cycle construction/installation and maintenance costs to $35,995, or a change of -25.8% (in net present value).

Development	Initial Cost	Annual Maintenance Cost	Life Cycle Cost (NPV)
Without BMPs	$12,415	$696	$28,609
with BMPs	$13,515	$999	$35,995
Difference	$-1,100	$-302	$-7,386

VIEW COST DETAILS

* The net present value calculation assumes a **3.1**% discount rate over a **30** year life-cycle - these values can be adjusted in the advanced settings.



Also used 15.10 inches of rain per year in Sedona to determine water savings from rainwater collection based on the volume collected per 0.5 inches of rain and a water cost of $0.008/gallon

xix

Recommendation	Require greywater reuse in commercial buildings greater than 5,000 ft².
Types of Costs + Savings	Costs: • Administrative, Permitting • Time/Labor • Material • Maintenance • Outreach/TA Savings: • Reduced water demand • Lower water utility fees • Green building credits/incentives

Possible Methodology	Estimate water savings Estimate greywater reuse system installation cost – baseline and range Estimated annual operating and maintenance costs
Possible Units for Costs & Savings	Costs: • $ per system installation & maintenance Savings: • $ per year in water and sewer fees • Reduced utility demand
Potential Calculators/Tools/Resources	
Cost to City	Permitting, Administrative
Cost to Developer	Installation
Cost to Property Owner	Operation & Maintenance
Savings to City	$0
Savings to Developer	$0
Savings to Property Owner	$0
Notes/Description of Methodology & Findings	Cost of greywater system and installation - GWIG UCLA Water Recycling

Cost Summary

Using a conventional, without BMPs, approach, the costs to develop this site will be $1,107,578 in net present value.*

Compared to a conventional approaches, the green improvements in this scenario will **increase** the total life-cycle construction/installation and maintenance costs to $1,123,894, or a change of -1.5% (in net present value).

Development	Initial Cost	Annual Maintenance Cost	Life Cycle Cost (NPV)
Without BMPs	$170,758	$43,135	$1,107,578
with BMPs	$176,238	$43,695	$1,123,894
Difference	$-5,480	$-560	$-16,316

VIEW COST DETAILS

	Area	Initial Cost	Annual Maintenance Cost	Life Cycle Cost (NPV)
Flat Roof	10,000 ft^2	$40,000	$1,400	$88,050
Parking Surface	32,450 ft^2	$98,973	$30,179	$753,958
Driveway	5,000 ft^2	$30,000	$11,250	$257,864
Shrub and Bushes	2,550 ft^2	$1,785	$306	$7,706
Other BMPs not replacing any specific area.				
Cistern	NA ft^2	$5,480	$560	$16,316

xx

Recommendation	Require greywater readiness in new construction.
Types of Costs + Savings	
Possible Methodology	
Possible Units for Costs & Savings	
Potential Calculators/Tools/Resources	
Cost to City	$0
Cost to Developer	$200 - $1,500
Cost to Property Owner	$0
Savings to City	$0
Savings to Developer	$0
Savings to Property Owner	$0
Notes/Description of Methodology & Findings	Negligible change in cost Cost of greywater system and installation - GWIG

xxi

Recommendation	Mandate permeable paving, bioswales, and/or bioretention islands in hardscapes greater than 5,000 ft^2.
Types of Costs + Savings	
Possible Methodology	
Possible Units for Costs & Savings	
Potential Calculators/Tools/Resources	https://greenvalues.cnt.org/#tabtop
Cost to City	
Cost to Developer	
Cost to Property Owner	
Savings to City	
Savings to Developer	
Savings to Property Owner	
Notes/Description of Methodology & Findings	**Total Land Use**

Land Use	Original Area	Area including BMP(s)
Total Impervious Area	47,450 ft^2	37,450 ft^2
Flat Roof	10,000 ft^2	10,000 ft^2
Parking Surface	32,450 ft^2	22,450 ft^2
Permeable Parking		10000 ft^2
Driveway	5,000 ft^2	5,000 ft^2
Total Landscape Area	2,550 ft^2	2,550 ft^2
Shrub and Bushes	2,550 ft^2	2,550 ft^2
Total BMP Area		10,000 ft^2
Total Lot Area	50,000 ft^2	50,000 ft^2
Other Volume Control		0 gallons

Runoff and Hydrology

Runoff	Without BMPs	With BMPs	Difference
Average Annual Rainfall: 15.1" Rain			
Runoff	6.237"	2.845"	54%
Runoff Volume	25989.1 ft^3 194412.1 gal.	11855.3 ft^3 88684.1 gal.	14133.8 ft^3 105727.9 gal.
Average Storm Rainfall: 1.75" Rain			
Runoff	1.391"	1.002"	28%
Runoff Volume	5794.9 ft^3 43349.1 gal.	4175.8 ft^3 31237.5 gal.	1619.1 ft^3 12111.5 gal.

Hydrology	Without BMPs	With BMPs	Difference
Average Initial Abstractions Rainfall: " Rain			
Initial Abstractions	0.07"	0.18"	0.11%
Initial Abstractions Volume	291.25 ft^3 2178.72 gal.	743.86 ft^3 5564.43 gal.	452.6 ft^3 3385.72 gal.
Average Cumulative Abstractions			
Cumulative Abstractions	0.35"	0.89"	0.54%
Cumulative Abstractions Volume	1456.26 ft^3 10893.59 gal.	3719.28 ft^3 27822.17 gal.	2263.02 ft^3 16928.58 gal.
Curve Number	96.6	91.8	

	Area	Initial Cost	Annual Maintenance Cost	Life Cycle Cost (NPV)
Flat Roof	10,000 ft^2	$40,000	$1,400	$88,050
Parking Surface	32,450 ft^2	$98,973	$30,179	$753,958
Permeable Parking	10,000 ft^2	$86,800	$200	$125,324
Parking Surface BMPs Total	10,000 ft^2	$86,800	$200	$125,324
Remaining Parking Surface area	22,450 ft^2	$68,473	$20,879	$521,614
Parking Surface with BMPs	32,450 ft^2	$155,273	$21,079	$646,938
Driveway	5,000 ft^2	$30,000	$11,250	$257,864
Shrub and Bushes	2,550 ft^2	$1,785	$306	$7,706
Cistern	NA ft^2	$5,480	$560	$16,316

xxii

Recommendation	Require resilience and sustainability checklist at design review.
Types of Costs + Savings	
Possible Methodology	
Possible Units for Costs & Savings	
Potential Calculators/Tools/Resources	
Cost to City	Negligible
Cost to Developer	Negligible
Cost to Property Owner	Negligible
Savings to City	Negligible
Savings to Developer	Negligible

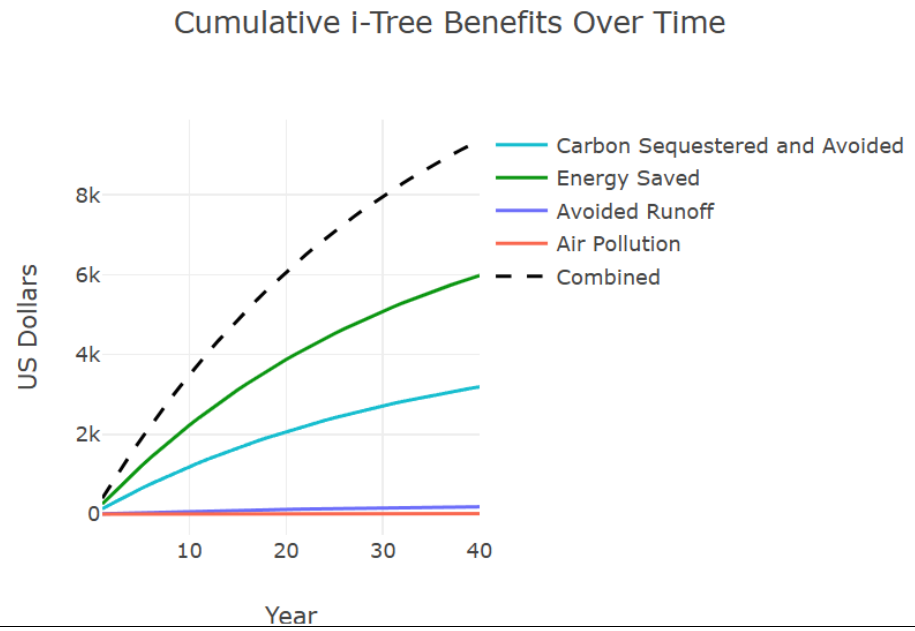
Savings to Property Owner	Negligible
Notes/Description of Methodology & Findings	

xxiii

Recommendation	Require a minimum tree canopy for new construction of at least 20% for residential and 10% for commercial.
Types of Costs + Savings	Costs: • Time • Material • Maintenance Savings: • Reduced stormwater runoff • Reduced heat island effect

Possible Methodology	• Tree purchasing and planting costs
	• Total number of trees needed
	• Estimate cost change due to increased watering and maintenance costs
	• Estimate of quantified benefits
	  ○ Energy savings
	  ○ Stormwater mitigation
	  ○ Heat mitigation
	  ○ Increase in property value

Possible Units for Costs & Savings	Costs: • $ per tree • $ per sq ft Savings: • # of gallons of stormwater reduction • $ savings • % increase or $ per ft for property value
Potential Calculators/Tools/Resources	i-Tree Community Tree Guides
Cost to City	• Review • Permitting • Enforcement
Cost to Developer	Residential (.25-acre lot): Estimated $300/tree X 7 trees = $2150 Commercial (.50-acre lot): Estimated $300/tree X 7 trees = $2150
Cost to Property Owner	Maintenance - Annual Water Sedona Water Rates Residential: Commercial:
Savings to City	https://planting.itreetools.org/app/report/



Savings to Developer

Savings to Property Owner

Tree Group Characteristics	Initial Number of Trees	Electricity Saved (kWh)	Electricity Saved ($)	Fuel Saved (MMBtu)	Fuel Saved ($)
• 7 Desert ironwood(Olneya tesota) trees of 24 inches initial DBH. • Planted 20-39 feet and northeast (45°) of buildings that were built post-1980 with heating and cooling. • Trees are in excellent condition and planted in full sun.	7	45,169.4	$5,772.65	12.5	$204.29

Notes/Description of Methodology & Findings

AP Nursery - Tree Costs 2025

USFS - Municipal forest benefits and costs in five U.S. cities

APA - Municipal Forest Benefits and Costs in Five US Cities

Average residential lot size in Sedona, AZ = 0.25 to .5 acres
.25 acres=10,890 sq ft * 20% = 2,178 sq ft

Average commercial lot size in Sedona, AZ = .5 to 2 acres
.5 acres = 21780 sq ft * 10% = 2,178 sq ft

EG: Desert Ironwood Trees – 25-50ft spacing = 7 trees

Source: https://altos.re/r/455af3e?data=median_per_sqft

Mesa, AZ Tree Maintenance recommends 5 gallons/watering

5 gallons/tree X 7 Trees = 35 gallons/watering X 2x/week= 70 gallons/week

70gallons X 52 weeks = 3640 gallons annually

	Water Rate Arizona Water Company Water Rates: Residential Meter Size: 5/8 x ¾, Minimum Charge: $33.28,

xxiv

Recommendation	Require that every tree, bush, or plant removed be replaced by three of a native variety on commercial properties and by two of a native variety on residential properties.
Types of Costs + Savings	Costs: • Administrative • Outreach + Enforcement • Time + Material • Maintenance Savings: • Reduction in Stormwater Runoff fees • Energy Cost
Possible Methodology	Planting Cost vs Stormwater Savings Removal of 1 tree, bush, or plant and installation of 3 native trees.
Possible Units for Costs & Savings	Costs: $ per tree planted Savings: Energy/Stormwater savings per tree
Potential Calculators/Tools/Resources	
Cost to City	
Cost to Developer	
Cost to Property Owner	
Savings to City	
Savings to Developer	

Savings to Property Owner	

Tree Group Characteristics	Initial Number of Trees	Electricity Saved (kWh)	Electricity Saved ($)	Fuel Saved (MMBtu)	Fuel Saved ($)
3 Desert ironwood(Olneya tesota) trees of 24 inches initial DBH. Planted 20-39 feet and northeast (45°) of buildings that were built post-1980 with heating and cooling. Trees are in excellent condition and planted in full sun.	3	19,358.3	$2,473.99	5.4	$87.55

Tree Group Characteristics	Initial Number of Trees	Rainfall Interception (gallons)	Evaporation (gallons)	Transpiration (gallons)	Avoided Runoff (gallons)	Avoided Runoff ($)
3 Desert ironwood(Olneya tesota) trees of 24 inches initial DBH. Planted 20-39 feet and northeast (45°) of buildings that were built post-1980 with heating and cooling. Trees are in excellent condition and planted in full sun.	3	155,353.2	152,982.2	320,729.9	8,810.7	$78.73

Notes/Description of Methodology & Findings	

xxv

Recommendation	Require one shade tree per eight parking spaces on commercial properties.
Types of Costs + Savings	Costs: • Permitting • Administration • Time/Labor • Material Savings: • Reduced Stormwater Fees • Lower Cooling Energy Costs
Possible Methodology	• Calculate required # of trees • Determine tree costs for developer ○ Developer Cost = (Number of Trees) × (Planting Cost per Tree)
Possible Units for Costs & Savings	$ per tree Annual $ savings per tree - Energy reduction Annual $ for maintenance per tree
Potential Calculators/Tools/Resources	AP Nursery: Average estimated cost per tree planting: $300 Modeled Scenario - 80 space commercial parking lot – 10 required trees

Cost to City	$0
Cost to Developer	$300 (average tree planting cost) X 10 trees = $3000
Cost to Property Owner	
Savings to City	
Savings to Developer	
Savings to Property Owner	
Notes/Description of Methodology & Findings	

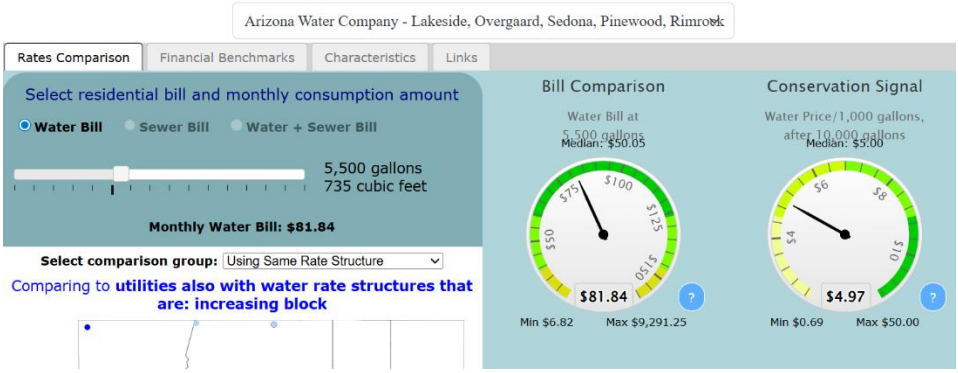
Tree Group Characteristics	Initial Number of Trees	Electricity Saved (kWh)	Electricity Saved ($)	Fuel Saved (MMBtu)	Fuel Saved ($)
• 10 Palo verde(Chlorocardium rodiei) trees of 18 inches initial DBH. • Planted 0-19 feet and northeast (45°) of buildings that were built post-1980 with heating and cooling. • Trees are in good condition and planted in full sun.	10	4,662.9	$595.91	1.7	$28.40

Tree Group Characteristics	Initial Number of Trees	Rainfall Interception (gallons)	Evaporation (gallons)	Transpiration (gallons)	Avoided Runoff (gallons)	Avoided Runoff ($)
• 10 Palo verde(Chlorocardium rodiei) trees of 18 inches initial DBH. • Planted 0-19 feet and northeast (45°) of buildings that were built post-1980 with heating and cooling. • Trees are in good condition and planted in full sun.	10	16,068.1	15,822.9	33,173.0	911.3	$8.14

Mesa, AZ Tree Maintenance recommends 5 gallons/watering

5 gallons/tree X 10 Trees = 50 gallons/watering X 2x/week= 100 gallons/week

100 gallons X 52 weeks = 5200 gallons annually



Source: AZ Water and Wastewater Rates Dashboard

Recommendation	Cultural/visual impact statements required for projects greater than 50,000 ft^2.
Types of Costs + Savings	Costs: • Administrative • Outreach/Marketing Savings:
Possible Methodology	-
Possible Units for Costs & Savings	
Potential Calculators/Tools/Resources	
Cost to City	$0
Cost to Developer	$0
Cost to Property Owner	$0
Savings to City	$0
Savings to Developer	$0
Savings to Property Owner	$0
Notes/Description of Methodology & Findings	

Recommendation	Wildland-urban interface developments must include defensible space, emergency access, and fire-resilient materials.
Types of Costs + Savings	Costs: • Design, site upgrades • Time • Material Savings: • Reduced fire risk insurance
Possible Methodology	Cost differential between standard and fire resilent materials.
Possible Units for Costs & Savings	$ per sq ft $ per unit
Potential Calculators/Tools/Resources	https://www.iccsafe.org/products-and-services/wildland-urban-interface-code/
Cost to City	Administrative – Plan Review
Cost to Developer	
Cost to Property Owner	Maintenance
Savings to City	Average $ for wildfire serviced & rescue
Savings to Developer	$ of reduction in liability
Savings to Property Owner	Reduction in fire risk insurance
Notes/Description of Methodology & Findings	

Recommendation	Require bioswales with native, drought-resistant vegetation around new, modified, or repaired storm drains.
Types of Costs + Savings	Costs: • Time • Material • Installation • Maintenance Savings: Stormwater Reduction
Possible Methodology	
Possible Units for Costs & Savings	$ per sq ft
Potential Calculators/Tools/Resources	
Cost to City	Negligible
Cost to Developer	Negligible
Cost to Property Owner	Negligible
Savings to City	$ stormwater reduction - Residential storm drain - Commercial storm drain
Savings to Developer	Negligible
Savings to Property Owner	Negligible
Notes/Description of Methodology & Findings	