MODULE 2

INTEGRATING WATER EFFICIENCY INTO THE COMPREHENSIVE PLAN

A Guide for Colorado Communities

The comprehensive plan is a policy document, advisory in nature[1] and consistent with state law, that establishes a community's vision for the future and provides a roadmap for achieving that future by guiding land use regulations and development decisions. The comprehensive plan (sometimes called master plan or general plan) captures a community's character, provides a blueprint for its development, and can be the foundation for developing important indicators for quality of life. In Colorado, comprehensive zoning adoption by statutory municipalities must be in conformance with a comprehensive plan.[2] Further, where municipalities and statutory counties adopt and implement a comprehensive plan by resolution, the plan becomes regulatory and is no longer deemed advisory in nature.[3] Therefore, for the comprehensive plan to provide legal support for implementing water-conserving objectives, it should refer to specific water-conserving zoning strategies so that zoning amendments, when adopted, are in conformance with the plan. Conformance with the comprehensive plan helps insulate zoning amendments from charges that they violate due process and equal protection rights of land owners or that they constitute illegal spot zoning.

When incorporating water conservation into the comprehensive plan, a community should be sure to also amend the plan's land use chapter (or element), to be sure it encourages water-efficient land use patterns. The comprehensive plan's land use chapter (discussed in detail in Part 3 of this Module) should endorse water-efficient land use patterns in areas prioritized for development, discouraging developments in areas prioritized for conservation, and catalyze the regulation of new developments to create landscapes that conserve water. In order to implement these strategies, planners should be sure to accommodate and coordinate them within the zoning law to foster building types and land use patterns that minimize the use of water.

The first thing that a local government should consider when attempting to integrate land use and water conservation planning is to assess the extent to which water conservation is already incorporated into the community's comprehensive plan and the extent to which local land use regulations, building codes, and development processes are consistent with this element of the comprehensive plan. Land use planners should involve water planners

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[1] In Colorado, a comprehensive plan can be regulatory but only in home rule communities and only if the local legislature adopts it as such by way of land development regulations, which does not happen often. (COLO. REV. STAT., §§ 30-28-106(2)(a), 31-23-206(1)).

[2] COLO. REV. STAT. § 31-23-303 ("Such [zoning] regulations shall be made in accordance with a comprehensive plan…").

[3] Condiotti v. Bd. of County Comm'rs, 983 P.2d 184 (Colo. App. 1999).

in this process through the formation of a Water and Land Use Planning Integration Team (discussed further in Module 1, *Breaking Down Silos*). To do this analysis, communities may use the Self-Assessment Questions provided as the exercise for Module 1 as a guide for this analysis. Although these questions focus primarily on water conservation, they also acknowledge the importance of balancing supply and demand, maintaining water quality, and other issues that relate to water conservation and contribute to an overall water strategy within a comprehensive plan.

The comprehensive plan should contain a strategy or strategies to ensure that proposed project rezonings, development approvals, and permits do not adversely affect water supplies and resources. It is important for land use planners to be mindful of any relevant limits that might exist for developments of certain sizes based on the availability of water when planning for the future growth of a community. The developers who ultimately carry out the vision set forth in the comprehensive plan may be required to demonstrate an adequate water supply for the development before they can move forward with the project under what is often referred to as a "show me the water law". Some states, including Colorado, require local governments to verify that adequate water supply to serve a new development is available before that project is approved. Specifically, under Colorado law, applicants for a development permit are required to submit an estimated water supply report prepared by a registered professional engineer or water supply expert that includes: an estimate of the water supply requirements for the proposed development, a description of the physical source of water supply that will be used to serve the proposed development, an estimate of the amount of water yield projected from the proposed water supply under various hydrologic conditions, water conservation measures that may implemented within the development, and water demand management measures that may be implemented within the development.[4] Likewise, local governments are prohibited from approving the application without first reviewing these submittals and making a determination that the applicant has demonstrated an adequate proposed water supply.[5] The comprehensive planning process is an opportunity to look at the issue of water adequacy well before the development permit stage, and at a macro scale. Does the community have adequate water supply over the planning period to support the water needs of the land use pattern it is projecting? This is the real opportunity presented by comprehensive planning: bringing land use planners, water resource managers, and the community together in this kind of discussion.

Similarly, one of the key components of the comprehensive plan relates to the infrastructure needed to sustain the current population and to support projected growth. Difficulties can arise with both water and wastewater infrastructure when contemplating the type of water-conserving, higher-density development pattern discussed in Module 1. Significant costs can occur when implementing higher density development where onsite infrastructure costs may be lower but higher point source loads into a wastewater

[4] COLO. REV. STAT. § 29-20-304(1). *See also,* COLO. REV. STAT. § 30-28-133(3)(d) requiring subdividers to submit to the board of county commissioners data, surveys, analyses, studies, plans, and designs to show adequate evidence that a water supply is sufficient in term of quality, quantity, and dependability.
[5] COLO. REV. STAT. § 29-20-303(A).

collection system can have unanticipated consequences downline. A community could spend millions of dollars upsizing the collection system to accommodate high-density redevelopment in areas where some of these upgrades are miles away from the development site. On the water side, dense development can have smaller streets making it difficult to site mains and connections to buildings with enough room for maintenance and access. Further, the desire to meter each unit or use separately can be problematic in mixed-use development because of the number of meters and limited area to install them. All of these issues are solvable, but the discussion should occur before or when planning for development rather than after development plans are set. Infrastructure is an entire system and changes in how that system operates must be carefully evaluated.[6]

It is essential therefore that land use planners have up-to-date water supply projections from their water providers to be able to refer to the water infrastructure needed. Water planners can also contribute their knowledge regarding water conservation techniques, such as water efficient interior fixtures and water conserving landscapes, so that they and their impact on water demand can be addressed in the comprehensive plan. Likewise, the comprehensive plan could also contain strategies for ongoing input by and coordination with water providers.

EXAMPLE OF COMPREHENSIVE PLAN STRATEGIES INVOLVING WATER PROVIDER INPUT REGARDING FUTURE INFRASTRUCTURE NEEDS

San Jose, California

The City's comprehensive plan, Envision San Jose 2040 General Plan, sets forth several policies related to the need for future coordination with water providers

The Infrastructure section of the Plan's Environmental Leadership chapter contains a goal to "provide water supply, sanitary sewer, and storm drainage infrastructure facilities to meet future growth planned within the City…" To implement that goal, the Plan sets forth a policy to "work with water retailers to provide water supply facilities that meet future growth within the City's Urban Service Area and assure a high-quality and reliable supply of water to existing and future residents."[7]

The Infrastructure section also sets forth a goal to "provide and maintain adequate water, wastewater, stormwater, water treatment, solid waste and recycling, and recycled water infrastructure to support the needs of the City's residents and businesses." One policy laid out to achieve this goal—which will take careful coordination and conversation between water and land use planners—is to "ensure that public facilities and infrastructure are designed and constructed to meet ultimate capacity needs to avoid the need for future upsizing. For facilities subject to incremental upsizing, initial design shall include adequate

[6] Interview with Stu Feinglas, Senior Water Resource Analyst, City of Westminster (Oct. 2016).
[7] CITY OF SAN JOSE, CA, ENVISION SAN JOSE 2040 GENERAL PLAN, 55 (2011), https://www.sanjoseca.gov/DocumentCenter/Home/View/474.

land area and any other elements not easily expanded in the future. Infrastructure and facility planning should discourage over-sizing of infrastructure which could contribute to growth beyond what was anticipated in the *Envision General Plan*."[8]

Aurora, Colorado[9]

Collaboration is integrated into Aurora's organizational structure, especially when it comes to water. Whenever code changes are proposed, the City's departments work together to ensure that water conservation is part of the conversation. This collaboration began in earnest in 2009 when the City updated its Comprehensive Plan.[10] As the comprehensive planning process began, the City's Water Department and Planning and Development Services Department came together and have maintained a high level of communication ever since. The Comprehensive Plan itself contains language calling for the water conservation division to use a multi-faceted approach including programs for peer agency collaboration and outreach.[11] As part of this effort, the City's water department uses technology to share use information with the planning department. Similarly, the planning department shares data to enable the water department to plan for infrastructure needs. Through modeling software the departments work together to examine how water use changes under various land use development scenarios. Other departments have also been heavily integrated into the dialogue surrounding land use planning and water demand, including Public Works, the Office of Development Assistance, Parks, Recreation, and Open Space, and others. As a result of the City's focus on interdepartmental collaboration, staff has a significantly fuller picture of what is going on and what actions could raise red flags for other departments. It has also helped employees recognize they are on one team, as opposed to eight separate departments. Services are more efficient, customers are more informed, and the City has seen higher quality development.

Westminster, Colorado

The City of Westminster owns its own water and, under its Comprehensive Plan[12], the extent of water use is a key consideration in the location, type, and intensity of land uses and development.[13] The City's Water Division regularly updates its Comprehensive Water

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[8] CITY OF SAN JOSE, CA, ENVISION SAN JOSE 2040 GENERAL PLAN, 53 (2011), https://www.sanjoseca.gov/DocumentCenter/Home/View/474.

[9] Telephone interview with Lyle Whitney, Water Conservation Supervisor, City of Aurora, and Karen Hancock, Long-Range Planner & Environmental Program Supervisor, City of Aurora (Aug. 5, 2016).

[10] CITY OF AURORA 2009 COMPREHENSIVE PLAN (2010), https://www.auroragov.org/UserFiles/Servers/Server_1881137/Image/Departments/Development/Final%20Comp%20Plan.pdf.

[11] CITY OF AURORA 2009 COMPREHENSIVE PLAN, G: DEVELOPING AND PROTECTING WATER AND OTHER NATURAL RESOURCES 5 (2010), https://www.auroragov.org/UserFiles/Servers/Server_1881137/Image/Departments/Development/Final%20Comp%20Plan.pdf.

[12] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.

[13] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN 28 (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.

Supply Plan (CWSP),[14] which evaluates the current water supply projection and projected water demands based on the Comprehensive Plan in order to quantify any expected deficits or surpluses. The Comprehensive Plan notes that, as such, new development will be evaluated based on projected impacts to the City's water supply.[15] Because the City's water supply projections are so closely linked to its designated land uses, the City must identify the potential change in water demand that would result from any proposed decision to change a land use from what is currently permitted under zoning.[16]

1. Draft a Water Element for the Comprehensive Plan

Once a community has assessed the extent to which water conservation is already incorporated into the comprehensive plan as part of the Self-Assessment described above, the next step is to decide whether to add a discrete water element (which could be a stand-alone chapter or a subsection of a chapter) to the plan, or whether to move to the next step and integrate water conservation language throughout the existing plan chapters (if the latter, skip to Part 2, of this Module). A stand-alone element should establish goals for water conservation with objectives, strategies, and techniques in sufficient detail to be useful as a guide in making future land use planning decisions. Although our discussion here is limited to water conservation, communities should be mindful that a water element could contain additional components, such as water quality, supply, demand, reuse, and many more. Based upon a typical framework for comprehensive planning, a water element might contain the following components:

A. **Introduction**—including the purpose of the element, relevant findings, and related data that define the need for the element.

SAMPLE INTRODUCTION FOR A COMPREHENSIVE PLAN WATER ELEMENT

Communities may use this brief, sample introduction as a guide when adding a comprehensive plan water element.

[14] Because water use is so affected by weather, the City tries not to react to changes in a specific year but rather turns to five- or six-year Citywide use reviews when updating its Comprehensive Water Supply Plan. Email Interview with Stu Feinglas, Senior Water Resource Analyst, City of Westminster (Jan. 24, 2017).
[15] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN 172 (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.
[16] City of Westminster, CO, Representatives, Land Use Leadership Alliance Training Program (LULA), Denver, CO (April 30, 2015).

Based on recent data and studies, it is clear that the limited supply of potable water available to support new populations and jobs in the (town/city/county) of _____ requires that incentives and standards for new development result in lower per capita water use than is fostered by the current zoning, land use regulations, and codes of our community. *[Community should insert data and metrics that make this point.]* While decreases in per capita use can accommodate more population, the overall water use may increase. This overall water use is the most important factor because this is the total amount of water that a community will have available in the future. Focusing on both of these metrics is important but maintaining or reducing overall water use at planned levels should be the goal. The types of developments and urban forms that achieve lower per capita water use are also the types desired by the households now seeking housing and jobs in our market area. Demographic change indicates that the market for large-lot single-family homes is declining, while demand for small-lot single family homes, multi-family residences, and dwelling units in compact, mixed use neighborhoods is increasing. In general, these types of development are more water conserving, on a per-capita basis, than large-lot single-family housing. Significant water conservation can be achieved by increasing the number of units allowed per acre in single-family zones and increasing the acreage in the community that is zoned for denser and mixed-use development. *[Community should insert data that make this point.]* In addition, there are a number of strategies available that reduce water conservation in individual homes and buildings. These include requiring water-conserving plumbing fixtures and exterior landscaping, as well as other practices. Many of these practices can improve water conservation in existing buildings, as well, through the use of incentives, education, and appropriate regulation. For these measures to be effective over time, there must be strong monitoring and enforcement programs.

B. **Goal(s)**—listing one or more long-term water conservation goals for reducing the use of limited supplies of water for the community's anticipated population growth because of the new dwelling units permitted by zoning and the job-producing commercial development it fosters. Such goals could include:
    - To provide an adequate and reliable water supply for the existing and future population of the community.
    - To ensure that local land use planning and regulation are closely coordinated with local water planning and regulation.
    - To estimate future demands in relation to existing and future land use patterns.
    - To minimize and coordinate the impact on existing infrastructure (water, wastewater, etc.)
    - To establish a water use efficiency baseline for existing land use patterns.
    - To ensure that future water demands and supplies are in balance.
    - To optimize the use of water through innovative and cost-effective delivery measures.

- To absorb the market demand for new housing and economic development while lowering the per capita consumption of water by new residents and workers.
- To impose as little regulation as possible that increases costs on new development by employing incentives and adopting regulations that achieve long-term cost savings for residents and property owners, particularly savings achieved though lower water use.
- To ensure that local land use planning and water planning both inform and conform to regional and state land use and water conservation plans and programs, where appropriate. (This will make it more possible that state and federal financial and technical support can be received, including financial assistance for needed local water and related infrastructure improvements.)
- To cooperate with adjacent local governments on strategies that reduce the cost of water conservation, including monitoring and enforcement of standards imposed by regulations and incentives.

C. **Objectives**—including several shorter-term objectives or targets for achieving stated goals. Such objectives could include:
   - To reduce per capita annual water consumption by ___% over baseline.
   - To reduce (or, at minimum maintain) total volume of water consumed by ____% over baseline.
   - To recycle or beneficially reuse ___% of the City's wastewater supply, including the indirect use of recycled water as part of the potable water supply.
   - To reduce the purchase of imported water by ___% by 20__.[17]
   - To meter ___% of all water accounts by 20___.[18]
   - To convert ___ million square feet of impermeable surface into pervious surfaces every year.
   - To ensure that new developments employ interior and exterior best practices for water efficiency that reduce consumption, tap fees, and water rates.
   - To achieve ___ million square feet [or ___%] of new or retrofitted green buildings by 20__.
   - To revise local land use patterns so that the supply of housing is adjusted to

[17] This suggested objective may seem in opposition to the stated goals to provide adequate water for future growth and to identify potential water supplies. The authors of this Module wish to note that these are all simply options from the field that from which communities may choose. As with any decision, the community will have to run a cost benefit analysis as to whether it is the right decision for them. It would not be appropriate to do so in this Module, since one would need to know the cost of new supply, cost of new transmountain diversion, cost per acre feet saved for water conservation measures implemented, cost of treatment, cost of capital improvements, etc.

[18] Water providers with more than 600 connections are already required to do this in Colorado. Colo. Rev. Stat. Ann. § 37-97-103 (West). (Water meters are used to measure the volume of water used by residential and commercial facilities. Meters help customers monitor their water use and enable utilities to charge rates based on water use. In 1990, the General Assembly enacted a law that requires every drinking water supplier with 600 or more unmetered service connections to provide metered water delivery and billing service to its customers, with meter installation to be completed by January 1, 2009.)

provide the market with the mix of housing types it demands, in a manner consistent with future water supply and demand projections.
- To develop a future land use plan that relies upon accurate growth projections using concrete data.
- To ensure that at least ___% of new dwelling units constructed by 20__ are located within 1,500 feet of a transit station or stop.
- To evaluate the impacts of existing and planned land use patterns on water supply and demand.
- To identify potential water supplies.
- To time infrastructure repair and development appropriately.
- To achieve and maintain Sustainability Tools for Assessing & Rating Communities (STAR) certification, with a 5-STAR Community rating by 20__. (The STAR rating system has 44 objectives, which include among others: community water systems, resource-efficient buildings, resource-efficient public infrastructure, water in the environment, green infrastructure, public spaces, natural resource protection, compact and complete communities, and infill and redevelopment.)[19]
- Emphasize regional, statewide, and inter-governmental coordination and engagement to further water-conserving initiatives.

D. **Strategies**—mentioning the methods that the community will use to achieve each objective. Such strategies could include:
   - To develop a community vision for future growth.
   - To calculate the water demands of land uses and development intensities recommended by the comprehensive plan.
   - To track planned and actual water demands within the comprehensive plan so that the overall trend of water use can be seen compared to any long-term water budget.
   - To provide developers with a water budget for a specific project, which will permit them to be creative, while meeting development guidelines.
   - To create an inventory of existing and potential new water supplies.
   - To identify funding sources for infrastructure improvements.
   - To amend local zoning provisions to provide more small-lot single-family homes, multi-family housing, and mixed-use, compact developments that result in water conservation and meet market needs.
   - To amend building, plumbing, zoning, subdivision, and site plan regulations to encourage use of water conserving best practices for the interior and exterior of new development in order to minimize the amount of water used to meet the needs of new residents.
   - To encourage existing residents to lower their water usage by emphasizing effective education programs and incentives and emergency water conservation ordinances, where needed.

[19] STAR COMMUNITIES, *Understanding Framework*, http://www.starcommunities.org/rating-system/framework/ (last visited May 4, 2016).

- To increase the percentage of certified green buildings[20] each year.
- *Communities could also list strategies on regional, statewide, and inter-governmental coordination and engagement, such as:*
    - Work with the local water and sewer providers to coordinate conservation efforts, programs, and policies.
    - Work with the State to support the goals and strategies in State water plans.
    - Align local water planning with that of the State to qualify for State support, including funding.
    - Use intergovernmental agreements with neighboring jurisdictions to address land use issues of mutual concern.

E. **Implementation techniques**—listing and generally explaining all tools and techniques that will be adopted to carry out each strategy. Refer to the Matrix of Implementation Techniques (also provided in Module 1, *Breaking Down Silos*) for a list of water conservation measures and the associated plans and codes that could be amended to implement them.
    - For example, to implement the strategy listed above that reads: *"To amend building, plumbing, zoning, subdivision, and site plan regulations to encourage use of water conserving best practices for the interior and exterior of new development in order to minimize the amount of water used to meet the needs*

[20] Green buildings may be certified under many programs, almost all of which contain water efficiency standards. The most popular of such programs is the Leadership in Energy and Environmental Design (LEED) rating systems created by the U.S. Green Building Council (USGBC). (Other popular green building certification programs include Green Globes, Passiv Haus, BREEAM, and Living Buildings.) Though LEED has several rating systems available to different types of developments, the most relevant here are the LEED for New Construction and Major Renovations Rating System (LEED-NC), which applies to commercial and multifamily projects, and the LEED for Homes rating system, which applies to single-family and multi-family projects up to eight stories. Water conservation elements contained in the LEED-NC rating system include provisions for a water-conserving development pattern, such as: use of a previously developed site, compact development, and clustering / providing a high ratio of open space to development footprint. LEED-NC also includes points for high-efficiency fixtures and fittings, as well as water-conserving landscape features and systems, such as: the use of water-efficient landscaping, installation of innovative wastewater technologies, and employing strategies that, in the aggregate, reduce water use by a minimum of 20% over a building's calculated baseline, not including irrigation (20% is a prerequisite—reduction beyond that earns points incrementally: 2 points for a 30% reduction, 3 points for a 35% reduction, and 4 points for a 40% reduction). *See*, USGBC, *LEED 2009 for New Construction and Major Renovations Rating System,* http://www.usgbc.org/Docs/Archive/General/Docs5546.pdf (last visited May 21, 2016). Water conservation elements contained in the LEED for Homes rating system include provisions for a water-conserving development pattern, such as: infill development, use of a previously developed site, compact development, and use of existing infrastructure. LEED for Homes also includes points for high-efficiency fixtures and fittings, as well as water-conserving landscape features and systems, such as: the use of drought-tolerant turf (if any turf), drought-tolerant plants, permeable paving, impermeable surfaces directed to infiltration features, rainwater harvesting, greywater reuse systems, use of municipal recycled water system, use of high-efficiency irrigation system (such as that designed by a WaterSense certified professional, submetering, drip irrigation, automatic timers / shutoff, moisture sensor, etc.), and a reduction in overall irrigation demand by 20-45%. *See*, USGBC, *Checklist: LEED v4 for Homes Design and Construction,* http://www.usgbc.org/resources/leed-v4-homes-design-and-construction-checklist (last visited May 21, 2016).

of new residents", a community could, through reference to the Matrix, include the following implementation technique in the comprehensive plan: *Amend building and plumbing codes to require smart meters and sub-metering for multifamily units.*

MATRIX OF IMPLEMENTATION TECHNIQUES

Water Conservation Measures	Comp Plan	Zoning Regs	Subdivision Regs	Site Plan	Building Code	Plumbing Code
LANDUSE						
Urban growth boundary	✓					
Denser development (more homes/acre)	✓	✓	✓	✓		
Cluster development (reduce lot size)	✓	✓	✓	✓		
Mixed-use development	✓	✓	✓	✓		
Mixed housing types	✓	✓	✓	✓		
Compact mixed use	✓	✓	✓	✓		
Transit oriented development (TOD)	✓	✓	✓	✓		
In-fill zoning	✓	✓				
Overlay zone	✓	✓				
Floating zone	✓	✓				
Setback requirements	✓	✓				
Highway intersection overlay zones	✓	✓	✓	✓		
Open space dedication	✓	✓	✓	✓		
Open space preservation	✓	✓	✓	✓		
Demand based tap fees	✓					
Other incentives	✓					
EQUIPMENT						
Green plumbing code	✓		✓	✓		✓
Indoor fixture efficiency standards	✓				✓	✓
Reuse of water	✓				✓	✓
Smart meters	✓				✓	✓
Sub metering multifamily units	✓				✓	✓
Incentives	✓					
LANDSCAPE						
Landscape codes matched to land use type	✓		✓	✓		
Landscape plan requirements (xeriscaping)	✓	✓	✓	✓		
Soil quality requirements	✓		✓	✓		
Plant list/Allowable plants	✓		✓	✓		
Tree size requirement	✓		✓	✓		
Turf limitations (type and quality)	✓		✓	✓		
Artificial turf	✓		✓	✓		
Irrigation system efficiency requirements	✓		✓	✓		✓
Water waste rules	✓		✓	✓		

MATRIX OF IMPLEMENTATION TECHNIQUES						
Water Conservation Measures	**Comp Plan**	**Zoning Regs**	**Subdivision Regs**	**Site Plan**	**Building Code**	**Plumbing Code**
Rain sensors	✓		✓	✓		✓
Spray nozzle	✓		✓	✓		✓
Water harvest	✓		✓	✓		✓
Water harvesting into landscape irrigation	✓					✓
Fixture efficiency standards	✓					✓
Water loss limits	✓		✓	✓		✓
Positive shut off	✓					✓
Incentives	✓					
MONITORING AND ENFORCEMENT						
Penalties – civil and criminal	✓	✓				
Post occupancy violations	✓					
Intermunicipal inspections & prosecutions	✓					
OTHER						
Goal to be water wise	✓					
Percent reduction in water use	✓					
Water fee based on size of structure and lot	✓					
EPA water-sense standards	✓					
Model home requirements	✓					
Rebates	✓					
KEY: ✓ = Standard is applicable						

All agreed-upon strategies and techniques should be mentioned in the comprehensive plan water element, but the details left for inclusion in other land use documents, such as zoning, subdivision and site plan regulation, and building and plumbing codes.

EXAMPLES OF COMPREHENSIVE PLANS WITH A STRONG WATER ELEMENT

San Jose, California[21]

Adopted in 2011, *Envision San Jose 2040 General Plan* is the City's comprehensive plan. The Plan includes a robust water element within its Environmental Leadership Chapter called "Water Supply, Conservation, Recycling, and Quality".

The Plan's section on Water Supply, Conservation, Recycling, and Quality contains, among others, the following goals related to water conservation:

- Water Conservation:
  - Demonstrate environmental leadership through responsible and fiscally and environmentally sustainable management of water to restore the environment, enhance quality of life, and provide an adequate water supply to meet present and future community needs.
  - Continuously improve water conservation efforts in order to achieve best in class performance. Double the City's annual water conservation savings by 2040 and achieve half of the Water District's goal for the County on an annual basis.
- Water Recycling: Recycle or beneficially reuse 100% of the City's wastewater supply, including the indirect use of recycled water as part of the potable water supply.
- Water Resources: Protect water resources because they are vital to the ecological and economic health of the region and its residents.

The Plan's section on Water Supply, Conservation, Recycling, and Quality contains, among others, the following targets (objectives) related to water conservation:

- Double the City's annual water conservation savings by 2040 and achieve half of the Water District's goal for the County on an annual basis.
- Reduce citywide per capita water consumption by 25% by 2040 (from 2010 baseline).
- Achieve 50 million gallons per day of water conservation savings by 2040 by reducing water use and increasing water use efficiency (from 2008 baseline).
- Recycle or beneficially reuse 100% of the City's wastewater supply (100 million gallons per day), including the indirect use of recycled water as part of the potable water supply.

The Plan's section on Water Supply, Conservation, Recycling, and Quality contains a significant number of water-related strategies and implementation actions, which are summarized here:

- *Water Conservation and Quality:* The Plan includes strategies related to developing and maintaining policies, ordinances, guidelines, and programs that:
  - promote water-efficient landscaping for residential and non-residential uses;
  - increase groundwater infiltration (by minimizing impervious surfaces); and

[21] ENVISION SAN JOSE 2040 GENERAL PLAN (2011), https://www.sanjoseca.gov/DocumentCenter/Home/View/474.

    - reduce the use of potable water through various technologies such as water-efficient fixtures and appliances that are WaterSense certified, Energy Star rated, or equivalent, and through the use of captured rainwater, greywater, or recycled water as the preferred source for non-potable water needs such as irrigation and building cooling.
- *Responsible Management of Water Supply:* The Plan includes strategies related to managing the limited water supply, including:
    - encouraging sustainable development practices such as low-impact development, water-efficient development, and green building techniques;
    - expanding use of recycled water, channeling development into areas within the vicinity of the recycled water system, and limiting water consumption for new development outside of the recycled water service area; and
    - working with local, regional, and state entities (including local water districts) to establish policies and partnerships that allow for a comprehensive approach to water supply management, promote water use efficiency programs, ensure that plans provide for adequate water supplies and maximize water conservation and reuse, and communicate with the public about the importance of responsible water management to quality of life.
- *Water Conservation:* The Plan includes strategies related to adopting citywide policies and programs that increase the efficiency of water use, reduce potable water demand, reduce per capita water consumption (by 25% by 2040), and reduce the City's need for imported water (50 Million gallons per day of water conservation savings by 2040) by:
    - encouraging or requiring new and existing development to incorporate such measures;
    - encouraging the creation and use of new technologies;
    - encouraging or requiring water-efficient design, landscape, and irrigation;
    - encouraging stormwater capture, on-site rainwater catchment, and greywater use (in areas that do not impact groundwater quality); and
    - working with local, regional, state, and other public and private entities to: develop codes and standards for stormwater capture and greywater reuse; incentivize water conservation by developing cost-sharing agreements on rebates and other incentive programs; engage the community in an ethic of efficient water use and the use of water-efficient practices and technologies; and encourage state legislation (such as plumbing code, greywater code, and green building policy) to increase water efficient development.
- *Water Recycling:* The Plan includes strategies related to expanding the City's recycled water system and the use of recycled water by:
    - developing incentives;
    - providing technical assistance and supporting research;
    - adopting recycled water use codes and standards;
    - requiring new buildings in the vicinity of the recycled water pipeline to be constructed in a manner suitable for connection to the system;
    - requiring new and existing developments to use recycled water wherever

feasible and cost-effective;
    - requiring new development to contribute to the cost of system expansion;
    - improving recycled water treatment so that it can be used to help augment streams and recharge groundwater aquifers that provide a portion of the City's potable water supply; and
    - working with local, regional, state, and other public and private agencies to develop statewide laws, policies, and incentives that facilitate recycled water use; educate the community about the benefits, reliability, and quality of recycled water; and involve the community in development of strategies to promote the value of recycled water as an important part of a fiscally and environmentally sustainable urban water use portfolio.
- *Water Resources:* The Plan includes strategies related to water quality and quantity. Those focused on quantity include:
    - utilizing water resources in a manner that does not deplete the supply of surface or groundwater or cause overdrafting of the underground water basin; and
    - protecting groundwater recharge areas, particularly creeks and riparian corridors.

Southern California Association of Governments[22]

The Regional Comprehensive Plan adopted by the Southern California Association of Governments (SCAG) includes a robust Water Chapter. The Chapter includes a Water Action Plan, which features best practices for SCAG and voluntary local government best practices. The table provided in the plan lists each action, indicates whether it is a best practice, and also indicates any potential for direct or indirect benefits (such as land use, transportation, air quality, energy, and open space). Some notable best practices listed as voluntary local government actions with potential benefits include:

- Green Plumbing Code
    - Amend building codes to require dual plumbing in new construction, and provide incentives for plumbing retrofits in existing development, to enable the safe and easy use of recycled water in toilets and for landscaping.
- Incentives
    - Use both market and regulatory incentive mechanisms to encourage 'water wise' planning and development, including streamlining and prioritizing projects that minimize water demand and improve water use efficiencies.
    - Incentivize the use of recycled water through pricing structures that make it an attractive alternative to fresh water in non-potable situations.
- Water Waste Rules
    - Develop and implement tiered water pricing structures to discourage water waste and minimize polluting runoff.
- Goal to be Water Wise
    - Use both market and regulatory incentive mechanisms to encourage 'water wise' planning and development, including streamlining and prioritizing

[22] SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS, FINAL 2008 REGIONAL COMPREHENSIVE PLAN, Water Chapter, 60 (2008), https://www.scag.ca.gov/Documents/f2008RCP_Complete.pdf.

projects that minimize water demand and improve water use efficiencies.

Aurora, Colorado

Aurora, Colorado's Comprehensive Plan has a strong element on *Developing and Protecting Water and Other Natural Resources*. Specific language in that chapter includes the following water-conserving techniques:

- **Percent reduction in water use**
  - "Aurora's conservation goals are to reduce per capita demand by at least 10 percent over the next 20-25 years. . . . It is assumed that the conservation program will assist in maintaining these savings and in providing a significant measure of drought preparedness should additional drought conditions be experienced. The current program targets savings at 100 – 150 acre-feet (AF) per year."[23]
- **Indoor Fixture Efficiency Standard**
  - Enhance the reliability of the water system by creating continual water savings through efficiency.[24]
- **Reuse of water**
  - The city will continue to take full advantage of its current water resources through irrigation reuse and expanded water recapture through the Prairie Waters Project. [25]
  - The city will increase the percentage of water reused for irrigation as economically feasible opportunities are available.[26]
  - Expand wastewater reuse capacity and increase the percentage of water reused for irrigation. [27]
- **Landscape Plan requirements (xeriscaping)**
  - Water stewardship is a responsibility that Aurora has taken very seriously. With the development of the city's first Water Management Plan in 2003, city staff rewrote Aurora's landscape ordinance to ensure that future landscapes

[23] CITY OF AURORA 2009 COMPREHENSIVE PLAN, G: DEVELOPING AND PROTECTING WATER AND OTHER NATURAL RESOURCES 5 (2010), https://www.auroragov.org/UserFiles/Servers/Server_1881137/Image/Departments/Development/Final%20Comp%20Plan.pdf.

[24] CITY OF AURORA 2009 COMPREHENSIVE PLAN, CHAPTER IV, G: DEVELOPING AND PROTECTING WATER AND OTHER NATURAL RESOURCES 15 (2010), https://www.auroragov.org/UserFiles/Servers/Server_1881137/Image/Departments/Development/Final%20Comp%20Plan.pdf.

[25] CITY OF AURORA 2009 COMPREHENSIVE PLAN, CHAPTER IV, G: DEVELOPING AND PROTECTING WATER AND OTHER NATURAL RESOURCES 1 (2010), https://www.auroragov.org/UserFiles/Servers/Server_1881137/Image/Departments/Development/Final%20Comp%20Plan.pdf.

[26] CITY OF AURORA 2009 COMPREHENSIVE PLAN, CHAPTER IV, G: DEVELOPING AND PROTECTING WATER AND OTHER NATURAL RESOURCES 4 (2010), https://www.auroragov.org/UserFiles/Servers/Server_1881137/Image/Departments/Development/Final%20Comp%20Plan.pdf.

[27] CITY OF AURORA 2009 COMPREHENSIVE PLAN, CHAPTER IV, G: DEVELOPING AND PROTECTING WATER AND OTHER NATURAL RESOURCES 14 (2010), https://www.auroragov.org/UserFiles/Servers/Server_1881137/Image/Departments/Development/Final%20Comp%20Plan.pdf.

will be sustainable during dry periods and drought. The current ordinance limits the use of high water usage cool season grasses, requires the use of xeriscape and drought tolerant plant materials, and regulates artificial turf.[28]

- **Plant List/ Allowable Plants**
  - Aurora developed the Recommended Xeriscape Plant List, residential lot landscape standards consisting of options for turf and xeriscape applications, and buffer width reductions in conjunction with xeriscape landscaping.[29]
- **Irrigation System Efficiency Requirements**
  - Aurora also codified its first Irrigation Ordinance that is currently administered by Aurora Water. The ordinance regulates the design, installation, and operation of all irrigation systems that connect to the city's potable and/or non- potable water supply.[30]
- **Enforcement**
  - Through the Water Management Plan, seasonal water monitors are given the authority to enforce the adopted drought stage and all management programs that are associated with a given drought stage. This includes prescribed day of the week watering, hours of allowed irrigation, and waste of water.[31]
- **Goal to be Water Wise**
  - The Goal to be Water Wise includes the following strategies:
    - 1. Use this plan and the capital improvement program to direct the extension of water system infrastructure in a cost-effective manner. Plan for necessary facilities in the developing areas.
    - 2. Promote multiple use of public land and facilities.
    - 3. Continue to develop and implement a water management program consisting of aggressive water acquisition, conservation, protection, and reuse.
    - 4. Continue to cooperate with adjacent counties to encourage new development to occur by annexation to Aurora. This will promote

[28] CITY OF AURORA 2009 COMPREHENSIVE PLAN, CHAPTER IV, G: DEVELOPING AND PROTECTING WATER AND OTHER NATURAL RESOURCES 7 (2010), https://www.auroragov.org/UserFiles/Servers/Server_1881137/Image/Departments/Development/Final%20Comp%20Plan.pdf.

[29] CITY OF AURORA 2009 COMPREHENSIVE PLAN, CHAPTER IV, G: DEVELOPING AND PROTECTING WATER AND OTHER NATURAL RESOURCES 7 (2010), https://www.auroragov.org/UserFiles/Servers/Server_1881137/Image/Departments/Development/Final%20Comp%20Plan.pdf.

[30] CITY OF AURORA 2009 COMPREHENSIVE PLAN, CHAPTER IV, G: DEVELOPING AND PROTECTING WATER AND OTHER NATURAL RESOURCES 7 (2010), https://www.auroragov.org/UserFiles/Servers/Server_1881137/Image/Departments/Development/Final%20Comp%20Plan.pdf.

[31] CITY OF AURORA 2009 COMPREHENSIVE PLAN, CHAPTER IV, G: DEVELOPING AND PROTECTING WATER AND OTHER NATURAL RESOURCES 6 (2010), https://www.auroragov.org/UserFiles/Servers/Server_1881137/Image/Departments/Development/Final%20Comp%20Plan.pdf.

growth of the city's renewable water and wastewater services rather than utilizing an aquifer source that is rapidly declining. [32]

Westminster, Colorado

Westminster's Comprehensive Plan[33] is highly detailed and is adopted by ordinance,[34] not by resolution, making compliance with the Plan a legal requirement.[35] (In Colorado, a comprehensive plan can be a binding regulatory document if the local legislature adopts it as such by way of land development regulations, which does not happen often.[36]) The City relies heavily on its Plan and takes compliance with the Comprehensive Plan seriously. As noted in the Plan (and discussed above), the City's Water Division regularly updates its Comprehensive Water Supply Plan (CWSP),[37] which evaluates the current water supply projection and projected water demands based on the Comprehensive Plan in order to quantify any expected deficits or surpluses. Further, the Comprehensive Plan notes that new development will be evaluated based on projected impacts to the City's water supply.[38] Based on the Plan's assumptions for water consumption by land use, it is expected that the City's existing and planned water supply will meet the needs of projected development through the Plan horizon of 2035.[39]

Westminster focuses heavily on acquiring water rights itself before development pressures arise in a given area, in order to prevent the sudden spike in land values that could occur. The City's approach of buying its own water allows it to take the lead on making economic decisions about how to plan for and pay for the City's needed additional water, a factor that also influences development decisions. Much of the City's water supply is based on surface water, which means they have to plan more carefully (than communities relying on

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[32] CITY OF AURORA 2009 COMPREHENSIVE PLAN, G: DEVELOPING AND PROTECTING WATER AND OTHER NATURAL RESOURCES 13 (2010), https://www.auroragov.org/UserFiles/Servers/Server_1881137/Image/Departments/Development/Final%20Comp%20Plan.pdf.

[33] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.

[34] City of Westminster, CO, Ordinance No. 2475 (1997). *See also,* CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN 94, http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf9-4.

[35] In Colorado, a comprehensive plan can be a binding regulatory document if the local legislature adopts it as such by way of land development regulations, which does not happen often. COLO. REV. STAT., §§ 30-28-106(2)(a), 31-23-206(1).

[36] COLO. REV. STAT., §§ 30-28-106(2)(a), 31-23-206(1).

[37] Because water use is so affected by weather, the City tries not to react to changes in a specific year but rather turns to five- or six-year Citywide use reviews when updating its Comprehensive Water Supply Plan. Email Interview with Stu Feinglas, Senior Water Resource Analyst, City of Westminster (Jan. 24, 2017).

[38] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN 172 (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.

[39] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN 172 (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.

groundwater) for severe droughts. Under the Plan, therefore, the extent of water use is a key consideration in the location, type, and intensity of land uses and development.[40] Because the City's water supply projections are so closely linked to its designated land uses, the City must identify the potential change in water demand that would result from any proposed decision to change a land use from what is currently permitted under zoning.[41]

The City's Plan incorporates water conservation throughout, but also provides focused coverage of the issue under its "Public Utilities and Services" chapter, which contains sub-sections focused on Water Supply, Waste Water System, and Stormwater Quality. The section on Water Supply notes that "with Colorado's arid environment, the City aggressively works to protect existing water supply and ensure sufficient supply to meet future needs." This section also highlights the usefulness of reclaimed water for use as an irrigation source, while preserving potable drinking water for human consumption and reducing the burden on the City's potable water system.[42] Further, it states the following regarding water conservation: "In addition to efforts to expand recycled water availability to city water customers, the city also employs conservation efforts to address water supply and demand. Water conservation programs directed towards the consumer are focused on both indoor and outdoor water demands. Programs intended to reduce indoor water consumption promote water efficient fixtures and appliances through regulations and education. Outdoor water conservation is promoted through landscape regulations requiring water wise landscapes and smart efficient irrigation technology as well as offering free irrigation audits to existing customers that target water savings. The city's supply-side conservation measures are directed toward increasing water efficiency both before and after customer use. These strategies include improvements within the city's raw water collection and treated water distribution systems in terms of leak detection and repair, pipe replacement and corrosion control."[43]

Specific water-related goals from the chapter include:[44]

- Ensure a safe and reliable water supply.
- Strive to provide exceptional water and wastewater services at reasonable costs to City customers.

[40] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN 28 (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.
[41] City of Westminster, CO, Representatives, Land Use Leadership Alliance Training Program (LULA), Denver, CO (April 30, 2015).
[42] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN, Reclaimed Water 170 (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.
[43] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN, Water Conservation 171 (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.
[44] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN, Public Utilities and Services, Goals and Policies 187 (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.

Associated Water Supply policies from the Chapter include:[45]

- Conduct annual analysis of projected water supply and demand to ensure the City maintains a balance between supply and demand. Provide an annual water and infrastructure balance report to City Council to document progress and highlight decisions that have integrated land use and development decisions with water supply planning.
- Ensure that new development does not result in water demand that exceeds the City's existing water supply. Proposed developments that exceed the water demand associated with the property's Comprehensive Plan land use designation will be evaluated on a case-by-case basis to ensure the City's water supply is not impacted.
- Coordinate with the City's Planning Division in growth management competition evaluation of new development and long-range planning efforts to ensure land use planning is in concert with water supply availability.
- Maintain existing levels of water service for current and future development by preserving and improving infrastructure, replacing water mains as necessary, and improving water treatment facilities.
    - Work with the Planning Division to identify and evaluate areas where intensification of land use is anticipated to occur to identify potential deficiencies in capacity or level of service.
    - Update the Capital Improvement Program to identify priority improvements.
- Ensure that resource supply, infrastructure, and operational resources remain at sufficient levels to meet the City's needs during fires, emergencies, and severe drought conditions.
- Continue to expand the reclaimed water system and encourage existing and new development to connect to and utilize the system.
- Provide high-quality potable and reclaimed water to customers that meets or exceeds all standards established by the federal Safe Drinking Water Act and State regulations.
- Continue efforts to reduce water use in municipal buildings and City operations.
- Encourage water conservation in new and existing construction through education, regulation, and incentives when appropriate. Measures may include but are not limited to:
    - Educational programs
    - Indoor and/or outdoor audits
    - Fixture and appliance incentives
    - Rates and fees
    - Requirements by the Municipal Code or regulation
- Establish water saving and conservation standards for new development. Standards may include but are not limited to:
    - Efficient water fixtures and appliances
    - Landscape design (see Westminster Landscape Regulations)

[45] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN, Public Utilities and Services, Goals and Policies 187-189 (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.

- Irrigation technology and performance
- Water efficient processes and equipment

Related Stormwater Quality policies from the Chapter include:[46]

- Encourage development of consolidated facilities to support a higher-intensity use of land in urban, high-density areas.
- Encourage low impact development measures to reduce water runoff for site improvement and construction activities.

Finally, just as the Plan incorporates water conservation throughout other sections, it also incorporates land use into its Water Supply section, making the following point regarding the importance of coordinating land use and water supply: "As the Front Range of Colorado continues to develop, sources of new water supply are becoming limited within the water basins on which the City relies. As such, the Comprehensive Plan reflects a balance of land uses that will allow the City to grow and evolve within a limited water supply. As the City becomes more densely developed, maintaining the balance between demand for water by new development and the City's water supply will be a significant factor in land use decisions. New development will be evaluated based on projected impacts to the City's overall water supply. This coordination of planning efforts between land use and water supply will be augmented by Plan policies aimed at water conservation, expansion of reclaimed water use, and periodic monitoring to ensure the City can continue to provide high quality water service into the future."[47]

2. Integrate Water Efficiency Measures throughout the Comprehensive Plan

Whether or not a community chooses to include a discrete water element in the comprehensive plan, many water conservation and land use development issues may (and should) be addressed by integrating water into existing sections throughout the plan. When doing so, it is important that the community has first assessed how much water conservation language is already present in the comprehensive plan (e.g., by using the Self-Assessment Questions mentioned above), and then assesses where there are opportunities to integrate water conservation language into the plan. For example, although water conservation may not be mentioned as part of a goal or objective, does the existing plan present strategies and implementation techniques that foster water-efficient growth? Such strategies and techniques might be those related to a compact land use pattern, green building development, green infrastructure measures, clustering provisions, and the like.

[46] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN, Public Utilities and Services, Goals and Policies 190 (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.

[47] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN, Future Water Supply 172 (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.

Where such strategies and implementation techniques exist, there is opportunity to integrate water conservation language into the plan's goals and objectives. The Matrix offered in Section 1 can also be helpful in this effort to identify where various water conservation strategies might best be incorporated.

EXAMPLES OF WATER INTEGRATION THROUGHOUT THE COMPREHENSIVE PLAN

The following case studies provide examples of water conservation language that can be integrated throughout different elements of the comprehensive plan. These examples provide guidance not only on water conservation language, but also on where to integrate such language into the comprehensive plan.

Pinedale, Wyoming

The goals and policies section of the Master Land Use Plan of the Town of Pinedale, Wyoming, includes water resource management.[48] One goal is "To conserve water and to relate water resources and development to desired land use." The Plan lists three policies to achieve this goal:

- Not extending water services to subdivision or property owners that are not adjacent to existing mains;
- Encouraging water conservation through installation of water meters; and
- Developing a system to install meters in areas without meters.

Chico, California

The Open Space and Environment chapter in the General Plan of the City of Chico, California, includes a goal "to conserve water resources and improve water quality." The Plan then lists policies and actions to achieve this goal, among them, is a policy to encourage water conservation and the reuse of water through limiting the use of turf on landscape medians and common areas, requiring **water efficient landscape** irrigation, and implementing a water conservation program.[49]

Thornton, Colorado

The Transportation and Utilities chapter of Thornton, Colorado's Comprehensive Plan incorporates **a goal to be water wise.** The Plan states, **"**The City of Thornton has historically maintained one of the lowest residential daily per capita water consumption rates among cities in the Front Range. This is a result of numerous efforts that Thornton has pursued to create and instill water conservation ethics throughout the community. Water conservation is also an essential component of the City's long-term water supply

[48] TOWN OF PINEDALE, WY TOWN CODE § 275: MASTER LAND USE PLAN, http://ecode360.com/9228050#9228050.
[49] CITY OF CHICO 2030 GENERAL PLAN, CHAPTER 10, OPEN SPACE AND ENVIRONMENT ELEMENT 21 (2011), http://www.chico.ca.us/document_library/general_plan/documents/10.OpenSpaceandEnvironmentElement.pdf.

planning strategy and will ultimately reduce the amount of water that the City must develop in order to meet its build-out demand."[50] Particular to preservation and conservation, the Plan states that "the City could further encourage preservation of the natural environment and conservation of resources including water and energy. A healthy community is a sustainable community where preservation of the natural environment is a priority."[51]

Also contained within its Transportation and Utilities chapter, Thornton's Plan features language related to **indoor fixture efficiency standards:**

- The City should continue its effective conservation program which includes rebates for water efficient toilets, washing machines and irrigation systems, community education about water efficiency, as well as plumbing inspections.[52]
- The City has been leading by example through efforts to increase energy efficiency in City Hall, obtaining Leadership in Energy & Environmental Design for Existing Buildings (LEED-EB) Certification for the Margaret W. Carpenter Recreation Center for energy and water use reduction, and installing photovoltaic panels on both of these buildings.[53]
- The City should also encourage builders and homeowners to use sustainable and green building practices that decrease the use of energy, water and natural resources, create less waste, and create a more comfortable environment for occupants.[54]
- The City should continue its effective conservation program which includes rebates for water efficient toilets, washing machines and irrigation systems, community education about water efficiency, as well as plumbing inspections (under **EPA Water-Sense Standards**).[55]

[50] CITY OF THORNTON 2012 COMPREHENSIVE PLAN, TRANSPORTATION AND UTILITIES, sec. 4.2 Water and Wastewater Utilities, 9 (2012), https://www.cityofthornton.net/government/citydevelopment/planning/Documents/comprehensive-plan/sec_4_transportation_final.pdf.

[51] CITY OF THORNTON 2012 COMPREHENSIVE PLAN, TRANSPORTATION AND UTILITIES, sec. 7: Healthy City with Great Amenities, 7.5 (2012), https://www.cityofthornton.net/government/citydevelopment/planning/Documents/comprehensive-plan/sect_7_great_amenities_final.pdf.

[52] CITY OF THORNTON 2012 COMPREHENSIVE PLAN, TRANSPORTATION AND UTILITIES, sec. 7: Healthy City with Great Amenities, 7.24 (2012), https://www.cityofthornton.net/government/citydevelopment/planning/Documents/comprehensive-plan/sect_7_great_amenities_final.pdf.

[53] CITY OF THORNTON 2012 COMPREHENSIVE PLAN, TRANSPORTATION AND UTILITIES, sec. 7: Healthy City with Great Amenities, 7.24 (2012), https://www.cityofthornton.net/government/citydevelopment/planning/Documents/comprehensive-plan/sect_7_great_amenities_final.pdf.

[54] CITY OF THORNTON 2012 COMPREHENSIVE PLAN, TRANSPORTATION AND UTILITIES, sec. 7: Healthy City with Great Amenities, 7.25 (2012), https://www.cityofthornton.net/government/citydevelopment/planning/Documents/comprehensive-plan/sect_7_great_amenities_final.pdf.

[55] CITY OF THORNTON 2012 COMPREHENSIVE PLAN, TRANSPORTATION AND UTILITIES, sec. 7: Healthy City with Great Amenities, 7.24 (2012), https://www.cityofthornton.net/government/citydevelopment/planning/Documents/comprehensive-plan/sect_7_great_amenities_final.pdf.

Aurora, Colorado

Aurora, Colorado's Comprehensive Plan contains language in its Sustainability Plan element that includes a **goal to be water wise**:

- Drought conditions in Colorado have focused Aurora's effort to seek innovative solutions to capture and conserve this precious natural resource. Conserving water is conserving energy. The City of Aurora is committed to providing a socially, environmentally and economically sustainable water supply.[56]

Similarly, the Plan's element on Maintaining Regional Leadership contains language that supports strong water enforcement measures, including **intermunicipal inspections and prosecutions**:

- Continue to monitor, anticipate, and influence new regulatory requirements, especially related to land use, water quality, and environmental issues.[57]
- Overall, the city continues to influence federal, state, and regional policy on a wide variety of subjects, including water development, for the betterment of Aurora citizens.[58]

Westminster, Colorado

The City of Westminster relies heavily on its Comprehensive Plan,[59] which is highly detailed and adopted by ordinance,[60] making compliance mandatory[61]—a legal requirement that the City takes seriously. As noted in the Plan, the City's Water Division regularly updates its Comprehensive Water Supply Plan,[62] which evaluates the current water supply projection and projected water demands based on the Comprehensive Plan in

[56] CITY OF AURORA 2009 COMPREHENSIVE PLAN, CHAPTER II, SUSTAINABILITY PLAN 18 (2009), https://www.auroragov.org/UserFiles/Servers/Server_1881137/Image/Departments/Development/Final%20Comp%20Plan.pdf.

[57] CITY OF AURORA 2009 COMPREHENSIVE PLAN, CHAPTER IV, N: MAINTAINING REGIONAL LEADERSHIP 5 (2009), https://www.auroragov.org/UserFiles/Servers/Server_1881137/Image/Departments/Development/Final%20Comp%20Plan.pdf.

[58] CITY OF AURORA 2009 COMPREHENSIVE PLAN, CHAPTER IV, N: MAINTAINING REGIONAL LEADERSHIP 1 (2009), https://www.auroragov.org/UserFiles/Servers/Server_1881137/Image/Departments/Development/Final%20Comp%20Plan.pdf.

[59] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.

[60] City of Westminster, CO, Ordinance No. 2475 (1997). *See also,* CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN 94, http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf9-4.

[61] In Colorado, a comprehensive plan can be a binding regulatory document if the local legislature adopts it as such by way of land development regulations, which does not happen often. COLO. REV. STAT., §§ 30-28-106(2)(a), 31-23-206(1).

[62] Because water use is so affected by weather, the City tries not to react to changes in a specific year but rather turns to five- or six-year Citywide use reviews when updating its Comprehensive Water Supply Plan. Email Interview with Stu Feinglas, Senior Water Resource Analyst, City of Westminster (Jan. 24, 2017).

order to quantify expected deficits or surpluses. As set forth in the Comprehensive Plan, the City evaluates new development based on projected impacts to the City's water supply.[63] The City's Plan has a strong water element within its Public Utilities and Services chapter, but water conservation is also incorporated throughout other sections of the Plan.

The Plan's Land Use chapter notes that a majority of the City's land area is zoned as Planned Unit Development (PUD), under which all proposed uses must conform to the Comprehensive Plan.[64] Under the Plan, development must conform to adopted design guidelines, many of which include water efficiency requirements, including water-conserving landscape specifications (such as turf limitations), permeable pavement, and water-conserving fixtures.[65] The agreed upon standards are written into the PUD's Official Development Plan, making them the legal requirements for that project.[66] Through the PUD process, the City has the opportunity to negotiate all standards for each proposed project in the same way that another community might through a development agreement. Likewise, because the City owns its own water and has done such a good job of tying together land use and water supply projections, they can negotiate and mandate from a much stronger position, thus requiring more conservation elements.

The Land Use chapter also notes, as new opportunities for redevelopment and infill arise beyond what is currently identified in the Plan, that planning for water resources and utilities, among other things, will continue to be reevaluated as future development potential is identified in subsequent Comprehensive Plan updates.[67] The chapter includes the following related policy:

- Ensure that adequate infrastructure and public services are available for new development. Evaluate the impact of new development to the City's future water supply, considering land use, intensity, and proposed conservation measures.[68]

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[63] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN 172 (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.

[64] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN, Land Use Classification 40 (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.

[65] *Regulations and Design Guidelines*, CITY OF WESTMINSTER, CO, PLANNING DIVISION, http://www.ci.westminster.co.us/CityGovernment/CommunityDevelopment/PlanningDivision/RegulationsandDesignGuidelines. Because the State of Colorado recently (as of the writing of this Module) began requiring water-sense fixtures, the water-based points in Westminster's system are not as robust as they once were. The City plans to update the criteria in the near future to once again award points for going beyond code requirements. Telephone Interview with Mac Cummins, Planning Manager, and Stu Feinglas, Senior Water Resource Analyst, City of Westminster (Sept. 1, 2016).

[66] CITY OF WESTMINSTER, CO, CITY CODE, § 11-3 GROWTH MANAGEMENT PROGRAM (2010), http://www.ci.westminster.co.us/CityGovernment/CityCode/TitleXI/3GrowthManagementProgram.

[67] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN, Development Potential 59 (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.

[68] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN, Land Use, Policies 70 (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.

The Plan's City Identity and Design chapter includes a section on Sustainable Design, which emphasizes that "through the City's landscape and stormwater management regulations, developments are encouraged to design sites to reduce water consumption and increase on-site mitigation of stormwater. Regulations encourage minimizing impervious surfaces on a site and employing low-impact design measures like increased planting and groundcover to increase on-site infiltration. The City's landscape regulations also encourage use of native planting that reduces the need for potable or reclaimed water for irrigation."[69] The Sustainable Design section also highlight's the City's focus on green buildings, including the use of high-efficiency water fixtures, and that city's intention to continue to support and encourage sustainable design throughout the community with City-led building and planning efforts serving as an example for private development.[70]

The chapter includes the following water-related goal:[71]

- Encourage sustainable design practices in all aspects of physical planning in the city, with a focus on site, landscape, and building design.

Water-conserving policies from the Chapter include:[72]

- Develop cohesive streetscape plans, which should consider, among other things: unified landscape treatments, medians, and plantings that minimize water use and runoff.
- Incorporate sustainable site planning, development, and maintenance standards and procedures as part of updates to the Westminster Municipal Code, Landscape Regulations, and design guidelines.
- Reduce the amount of stormwater runoff that reaches the City's storm drain system. Maximize permeable area and minimize the amount of runoff flowing toward impermeable areas.
- Design public parks, plazas, and streetscapes with plantings and features that reduce water use and maximize on-site treatment of stormwater.
- Require new development to connect to the City's reclaimed water system wherever possible for landscape irrigation. Ensure landscape plans address stormwater runoff and reduce water consumption.
- Encourage new developments to…utilize green building techniques and materials.
- Incorporate green building principles and practices to the extent practicable and financially feasible into the planning, design, construction, management, renovation,

[69] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN, Sustainable Design 146 (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.
[70] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN, Sustainable Design 146-147 (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.
[71] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN, City Identity and Design, Goals 148 (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.
[72] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN, City Identity and Design, Policies 149-153 (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.

operations, and demolition of all facilities that are constructed, owned, managed, or financed by the City.

Castle Rock, Colorado

The Natural Resources Chapter of Castle Rock's Comprehensive Master Plan encourages environmental building standards calling for **indoor fixture efficiency standards**. Policy NR-7.1 states that "the Town shall study and consider adoption of building standards for our public facilities in order to maximize energy and water efficiency, construction, reuse and recycling, use of low toxic paints and sealants, certified wood, recycled building materials, and on-site storm water and erosion control. The Town shall encourage similar building practices in new construction, redevelopment projects and retrofitting existing structures."[73]

The Plan's chapter on Community Services calls for the **reuse of treated wastewater** for irrigation to reduce potable water demand.[74] Similarly, it also calls for the development of a reuse water policy for irrigation.[75] It includes strategies for **landscape plan requirements (xeriscaping)**, such as "develop appropriate landscape design guidelines to correlate to our semi-arid climate"[76] and "implement water conserving principles related to landscape design, installation and maintenance."[77] Finally, the Community Services chapter also includes a **goal to be water wise**: **"**Manage water demand to minimize infrastructure investments required to meet peak demands, to conserve the finite Denver Basin aquifer resource."[78]

Palo Alto, California

The City of Palo Alto Comprehensive Plan includes within its Natural Environment chapter a policy to further **fixture efficiency standards**. Policy N-20 states: "Maximize the conservation and efficient use of water in new and existing residences, businesses and industries: Water should be regarded as a limited natural resource. A variety of economic and financial incentives can be used to encourage its conservation. In addition, water-saving appliances, drought-tolerant landscaping, recycled wastewater, and other measures can encourage its efficient use."[79] The Plan's Natural Environment chapter also contains

[73] CASTLE ROCK 2020 COMPREHENSIVE MASTER PLAN, NATURAL RESOURCES, 11-6 (2002), https://co-castlerock2.civicplus.com/DocumentCenter/View/238.
[74] TOWN OF CASTLE ROCK 2020 COMPREHENSIVE MASTER PLAN, COMMUNITY SERVICES, 7-3 (2002), https://co-castlerock2.civicplus.com/DocumentCenter/View/238.
[75] TOWN OF CASTLE ROCK 2020 COMPREHENSIVE MASTER PLAN, COMMUNITY SERVICES, 7-14 (2002), https://co-castlerock2.civicplus.com/DocumentCenter/View/238.
[76] TOWN OF CASTLE ROCK 2020 COMPREHENSIVE MASTER PLAN, COMMUNITY SERVICES, 7-14 (2002), https://co-castlerock2.civicplus.com/DocumentCenter/View/238.
[77] TOWN OF CASTLE ROCK 2020 COMPREHENSIVE MASTER PLAN, COMMUNITY SERVICES, 7-3 (2002), https://co-castlerock2.civicplus.com/DocumentCenter/View/238.
[78] TOWN OF CASTLE ROCK 2020 COMPREHENSIVE MASTER PLAN, COMMUNITY SERVICES, 7-3 (2002), https://co-castlerock2.civicplus.com/DocumentCenter/View/238.
[79] CITY OF PALO ALTO COMPREHENSIVE PLAN, SEC. 5: NATURAL ENVIRONMENT 14 (2007), http://www.cityofpaloalto.org/gov/topics/projects/landuse/compplan.asp.

Program N-26: "Implement **incentives** for the use of drought-tolerant landscaping and recycled water for landscape irrigation."[80]

Parker, Colorado

In the Land Use chapter of its comprehensive plan, Parker 2035: Changes and Choices, Parker, Colorado encourages **landscape plan requirements** to promote water conservation practices. Strategy 7.A. states that to achieve this goal the town should "implement responsible creation of landscaping that utilizes the seven Xeriscape principles."[81] The Public Services and Facilities chapter further states that "Parker Water continues to develop other programs and projects to reduce our impact on the aquifers including actively pursuing additional renewable water rights, metering, xeriscape education and reuse of wastewater for irrigation."[82] The Public Services and Facilities chapter also includes language to "actively encourage the conservation of water and the **reuse of wastewater**."[83] Finally, the chapter also includes a **goal to be water wise**: "Coordinate with the Parker Water and Sanitation District and other special districts that serve Parker residents and businesses to ensure a sustainable water supply and adequate sanitation systems."[84]

San Jose, California[85]

Adopted in 2011, *Envision San Jose 2040 General Plan* is the City's comprehensive plan. As discussed in Part 1 of this Module, the Plan includes a strong stand-alone water element within its Environmental Leadership Chapter (called "Water Supply, Conservation, Recycling, and Quality"). The plan also, however, does an excellent job of incorporating various water conservation methods into other chapters and sub-sections.

The Plan's introductory chapter sets forth 12 major strategies that inform the Plan's goals, policies, and implementation actions. Among these strategies are "Focused Growth" and "Measurable Sustainability / Environmental Stewardship". The Focused Growth strategy concentrates new growth into designated growth areas that surround the City's regional employment center and maximize use of the transit systems within the region. This approach reflects the City's built-out nature, desire to preserve established neighborhood character outside of these growth areas, and the Plan's emphasis on reducing

[80] CITY OF PALO ALTO COMPREHENSIVE PLAN, SEC. 5: NATURAL ENVIRONMENT 14 (2007), http://www.cityofpaloalto.org/gov/topics/projects/landuse/compplan.asp.
[81] PARKER 2035: CHANGES AND CHOICES, TOWN OF PARKER, COLORADO, 12.6, http://www.parkeronline.org/DocumentCenter/View/21759 (the seven Xeriscape principles suggested are: "proper planning and design; irrigation systems (e.g., Netafim); use of mulches to reduce evaporation; use of soil amendments; grouping of plant materials of similar water needs together (e.g., hydrozoning); limiting of turf areas; and appropriate maintenance of the landscape").
[82] PARKER 2035: CHANGES AND CHOICES, TOWN OF PARKER, COLORADO, 11.6, http://www.parkeronline.org/DocumentCenter/View/21759.
[83] PARKER 2035: CHANGES AND CHOICES, TOWN OF PARKER, COLORADO, 11.16, http://www.parkeronline.org/DocumentCenter/View/21759.
[84] PARKER 2035: CHANGES AND CHOICES, TOWN OF PARKER, COLORADO, 11.16, http://www.parkeronline.org/DocumentCenter/View/21759.
[85] ENVISION SAN JOSE 2040 GENERAL PLAN (2011), https://www.sanjoseca.gov/DocumentCenter/Home/View/474.

environmental impacts while fostering transit use and walkability. The Measurable Sustainability / Environmental Stewardship strategy furthers the City's multiple policies[86] that support the implementation of environmental best practices, especially those that minimize waste, efficiently use natural resources, and manage and conserve resources for use by present and future generations.

The Plan's chapters and subsections contain, among others, the following goals related to water conservation (beyond those contained in the water-specific section):
Green buildings

- Green Buildings:
    - Demonstrate local and global environmental leadership through progressive use of green building policies, practices, and technologies to achieve 100 million square feet of new or retrofitted green buildings by 2040.
    - Maximize the use of green building practices in new and existing development to minimize use of potable water and to reduce water pollution.
- Land Use and Transportation:
    - Establish a land use pattern that fosters a more fiscally and environmentally sustainable, safe, and livable city.
    - Meet the housing needs of existing and future residents by fully and efficiently utilizing lands planned for residential and mixed-use and by maximizing housing opportunities in locations within a half mile of transit, with good access to employment areas, neighborhood services, and public facilities.
    - Focus new growth into identified Growth Areas to protect the quality of existing neighborhoods while establishing new mixed-use neighborhoods with a compact and dense form that is attractive to the City's projected demographics (i.e., young and senior population) and that supports walking, provides opportunities to incorporate retail and other services in a mixed-use format, and facilitates transit use.
    - Respect the designated growth boundaries to preserve the beauty and natural resources and non-urban character of lands outside of the Urban Growth Boundary, to maintain the fiscal health of the City, to direct private and public investment within identified growth areas, and to preclude development in areas subject to natural hazards.

The Plan's chapters and subsections contain, among others, the following targets (objectives) that directly or indirectly relate to water conservation (beyond those contained in the water-specific section):

- Green Buildings:
    - Achieve 50 million square feet of new or retrofitted green buildings by 2022 and 100 million square feet by 2040. (An estimate 40% of the community's

[86] Such as the Green Vision, the Greenhouse Gas Reduction Strategy, the Green Building Policies, the Stormwater Management Plan, the Hydromodification Management Policy, the Riparian Corridor Policy, and the Habitat Conservation Plan. *See,* ENVISION SAN JOSE 2040 GENERAL PLAN, 48 (2011), https://www.sanjoseca.gov/DocumentCenter/Home/View/474.

total energy use and 16% of its water goes into buildings.)

- Land Use and Transportation:
    - Fostering a water-conserving land use pattern: Achieve 75% of residents who can access 25% of their retail/service needs within a 20-minute walk and 50% of residents who can access 50% of their retail/service needs within a 20-minute walk.

The Plan's chapters and subsections contain, among others, the following strategies and implementation actions that relate to water conservation (beyond those contained in the water-specific section):

- Green Buildings:
    - Foster the construction and retrofit of new or existing commercial and residential buildings to achieve green building standards; and
    - Operate and maintain those buildings to reduce waste, conserve water, and meet other environmental objectives.
- Land Use and Transportation:
    - Collaborate with appropriate external agencies with land use authority or regulations in the City. Consider applicable Airport Land Use Commission, Water District, Local Area Formation Commission, and other policies from outside agencies when reviewing new or expanded uses.
    - Review criteria in the Zoning Ordinance and update it as appropriate to reflect Land Use goals, policies, and implementation actions in this Plan.
    - Incorporate appropriate land use policies developed as part of the Water Pollution Control Plant Master Plan process into the *Envision General Plan*, to more clearly identify the distribution of jobs in that area.
    - Provide significant job and housing growth capacity within strategically identified "Growth Areas" in order to maximize use of existing or planned infrastructure (including fixed transit facilities), minimize the environmental impacts of new development, provide for more efficient delivery of City services, and foster the development of more vibrant, walkable urban settings.
    - Develop residentially- and mixed-use-designated lands adjacent to major transit facilities at high densities.
    - Respect the designated growth boundaries to preserve the beauty, natural resources, and non-urban character of lands outside of the Urban Growth Boundary. To this end, limit all new development on lands outside of the boundary as follows.
        - Do not provide urban services to new development outside of the boundary.
        - Require that new development projects cause no significant increase in public services or infrastructure and are non-urban in terms of, among other things: wastewater generation rates; the extent of grading, vegetation removal, drainage modifications or other alteration of the natural environment; and water consumption, excluding the environmentally beneficial use of recycled water.

        - Distinguish between urban and non-urban uses in terms of water usage by limiting water consumption for new development to use of non-urban sources, including on-site well water, and rainfall catchment. Use of recycled water may be allowed.
    - For all non-residential uses allowed outside of the Urban Growth Boundary, other than agricultural and single-family residential land uses, preserve open space through dedication of an open space or conservation easement.
    - Preserve the non-urban character of lands outside of the Urban Growth Boundary by locating and, if possible, clustering new development within the minimum area necessary to accommodate it, in order to avoid or reduce the need for improvements and minimize any potential environmental impacts

Arvada, Colorado

Arvada's Comprehensive Plan contains a chapter on the City's "Visions, Goals, and Policies". There, the City sets forth several actions furthering water conservation:

- **Indoor Fixture Efficiency Standards**
    - The City will use demonstration projects to encourage energy and water conservation and will incorporate energy and water- saving methods in public projects.[87]
    - The City will encourage new developments to incorporate energy-efficient materials and design and water-saving measures.[88]
    - The City will encourage the development of buildings utilizing materials and design that reduces energy and resource consumption and impacts on the environment.[89]
- **Landscape Plan Requirements (xeriscaping)**
    - The City will encourage and require, where appropriate, new developments to incorporate water saving measures, such as using xeriscape (drought-tolerant) landscape.[90]
    - The City will promote and educate the public about the use of xeriscape and "natural" landscaping for new parks. The City will also use drought-tolerant landscape materials and convert non-drought tolerant landscape turf wherever possible.[91]
    - Site materials should consist of open or unobtrusive fencing, natural drought-tolerant landscaping, and low level lighting.[92]

[87] CITY AND COMMUNITY OF ARVADA, 2005 COMPREHENSIVE PLAN, ch.3 Visions, Goals, and Policies, 24 (2005), http://static.arvada.org/docs/11298499632005_Comp_Plan_CH_3.pdf.
[88] CITY AND COMMUNITY OF ARVADA, 2005 COMPREHENSIVE PLAN, ch.3 Visions, Goals, and Policies, 24 (2005), http://static.arvada.org/docs/11298499632005_Comp_Plan_CH_3.pdf.
[89] CITY AND COMMUNITY OF ARVADA, 2005 COMPREHENSIVE PLAN, ch.3 Visions, Goals, and Policies, 24 (2005), http://static.arvada.org/docs/11298499632005_Comp_Plan_CH_3.pdf.
[90] CITY AND COMMUNITY OF ARVADA, 2005 COMPREHENSIVE PLAN, ch.3 Visions, Goals, and Policies, 23 (2005), http://static.arvada.org/docs/11298499632005_Comp_Plan_CH_3.pdf.
[91] CITY AND COMMUNITY OF ARVADA, 2005 COMPREHENSIVE PLAN, ch.3 Visions, Goals, and Policies, 18 (2005), http://static.arvada.org/docs/11298499632005_Comp_Plan_CH_3.pdf.
[92] CITY AND COMMUNITY OF ARVADA, 2005 COMPREHENSIVE PLAN, ch.4 Community Development Principles, 6 (2005), http://static.arvada.org/docs/12096657852005_Comp_Plan_CH_4.pdf.

- **Goal to be Water Wise**
  - Additional water is required to meet the increased water demand brought on by development on vacant lands and redevelopment areas. This Plan recommends a combination of increased water storage and conservation activities to ensure an adequate water supply for the future.[93]
  - The City will continue to promote water conservation.[94]

Yavapai County, Arizona[95]

The Water Resources element of Yavapai County's Comprehensive Plan includes several strategies intended to integrate **water harvesting into landscape irrigation**:

- Promote approved methods of recharge or rainwater harvesting for new development.
- Educate the public about rainwater harvesting and land contouring to create catchment basins.
- Promote greywater harvesting, efficient plumbing and other methods of water harvesting, such as rainwater catchments, catchment basins and passive water harvesting in cases where technologically feasible.

Douglas County, Colorado

Douglas County's *Comprehensive Master Plan 2035* lays out several policies related to water conservation. Among them, is a **turf limitations** policy in the Water Supply chapter to "limit the size and location of irrigated landscapes, such as turf grass areas."[96] The Plan's Rural Communities chapter includes a policy for **rain sensors** and other water-conserving fixtures: "Support water conservation through such means as low-flow toilets and shower heads, xeric landscaping, sensor-based sprinkler systems, and greywater reuse."[97]

Sample[98]

Below is sample language communities may incorporate throughout the comprehensive plan in appropriate places to promote water conservation. These sample provisions are offered here because such provisions were not discovered in local case study examples but are important for communities to consider.

- **Demand-based tap fees:** *Calibrate water connection, or tap, fees to ensure that new development pays for the full capital cost of its impact on our community's current and proposed water supply infrastructure. Conduct studies of these full costs and adjust tap*

[93] CITY AND COMMUNITY OF ARVADA, 2005 COMPREHENSIVE PLAN, CH.2 ARVADA ISSUES, 10 (2005), http://static.arvada.org/docs/11298500352005_Comp_Plan_CH_2.pdf.
[94] CITY AND COMMUNITY OF ARVADA, 2005 COMPREHENSIVE PLAN, CH.3 VISIONS, GOALS, AND POLICIES, 23 (2005), http://static.arvada.org/docs/11298499632005_Comp_Plan_CH_3.pdf.
[95] YAVAPAI COUNTY COMPREHENSIVE PLAN, IV WATER RESOURCES ELEMENT, 55 (2012), http://www2.yavapai.us/devserv/files/2012/03/YavapaiCountyComprehensivePlan.pdf.
[96] DOUGLAS COUNTY COLORADO, COMPREHENSIVE MASTER PLAN 2035, SEC. 8 WATER SUPPLY, 1-2 (2014), http://www.douglas.co.us/documents/full-cmp.pdf.
[97] DOUGLAS COUNTY COLORADO, COMPREHENSIVE MASTER PLAN 2035, SEC. 4 RURAL COMMUNITIES, 10 (2014), http://www.douglas.co.us/documents/full-cmp.pdf.
[98] This example was developed by the authors of this Module to offer additional sample language for consideration.

fees to impose costs on new development based on projected water use given the building and lot sizes and land uses involved.

- **Soil Quality Requirements:** *The type and quality of soil used in new developments relates directly to the amount of water used to sustain the landscape. The [City, Town, County] will encourage and require, where appropriate, new developments to utilize water conserving soil types and soil amendment/installation practices.*
- **Artificial Turf:** *The use of artificial turf can significantly reduce on-site water use and is consistent with a high quality visual environment when installed in certain locations. The [City, Town, County] will encourage and require, where appropriate, the use of artificial turf in new developments.*
- **Water Loss Limits:** *New and existing developments should be discouraged from engaging in any type of practice or using any type of equipment that causes water waste from over-watering, leakages, water pooling, etc. These types of practices and equipment include: [Local land and water planners should insert a list of these practices and equipment here.] Where appropriate, these practices and equipment should be added to regulations and codes, including enforcement sections where sanctions should be added.*
- **Penalties – Civil and Criminal:** *Zoning, land use regulations, and code provisions should be enforced by the [insert title of local official], who shall be responsible for monitoring and enforcing all zoning, land use regulation, and code provisions that relate to water conservation, including conditions imposed on developments by any local land use board or by the staff charged with administrative approvals. Monetary penalties for violations of any of these provisions should be set at a high enough level to ensure compliance and not become just an affordable cost of doing business. Civil penalties should be set so that each day's violation after notice is given constitutes a separate violation. Criminal penalties (imprisonment) should be provided in the case of extended periods of violation.*
- **Post Occupancy Violations:** *Experience indicates that many required building and site improvements are not maintained by building owners over time. To combat this tendency, the [City's, Town's, County's] code must provide for post-occupancy inspections, agreed to by the developer upon issuance of the certificate of occupancy. These inspections should be carried out regularly for several years after the certificate of occupancy is issued. New owners should be given a maintenance checklist, informing them of the standards imposed on their buildings and sites and instructed regarding how to maintain them. Inspectors charged with monitoring should be legally permitted to inspect both the interior of buildings and exterior site conditions and facilities and to issue cease-and-desist orders where water-conserving standards are violated. Civil and criminal fines and penalties for post-occupancy violation should be imposed where such orders are ignored or complied with only in part. In order to reduce the cost of monitoring and enforcement, post-occupancy, the [City, Town, County] should explore the possibility of retaining inspectors in conjunction with neighboring local governments and sharing the costs of inspection and enforcement with those local governments on a ratable basis.*
- **Model Home Requirements:** *Education is an effective method of convincing home owners to invest in water conserving fixtures and landscaping. To further this end,*

developers will be encouraged, or required when feasible, to build a model home that utilizes all available, cost-effective, interior and exterior equipment, fixtures, facilities, and practices and prospective buyers shown the model to learn about the benefits, costs, and cost savings of such improvements and practices.

- **Rebates:** *The [City, Town, County] should provide cash rebates to owners of existing buildings to encourage them to replace grass with drought resistant native plants, convert to drip irrigation, and adopt other exterior water conserving practices that involve capital expenditures. The costs of these conversions will be incentivized by the rebate, which must be paid back if these practices are discontinued. Funding should be sought for this program from regional and state agencies. The rebate program should be accompanied by a robust educational effort to inform residents of the need to conserve water and to prepare for droughts. These incentives and initiatives should help to change residents' expectations and practices regarding exterior landscaping and watering.*

3. Encourage Water-Conserving Land Use Patterns

Whether or not a comprehensive plan contains a stand-alone water element or incorporates water conservation throughout, communities concerned with water supply-demand imbalances should undoubtedly encourage water-efficient land use patterns within the plan, so that it can most effectively serve as a blueprint for the community to make future water-conscious land use decisions. By calling for more compact development (especially infill and redevelopment), paired when possible with open space / green infrastructure, both land use and water conservation plans set the stage for significant water savings and a reduction in infrastructure costs. This is also consistent with the *Metro Vision 2035 Plan* by the Denver Regional Council of Governments (DRCOG).[99] (See Module 1 for a more detailed discussion of the link between such development patterns and water conservation.)

Both land use and water conservation plans could be amended to make a strong, clear link between land use patterns and water conservation. When doing so, it may be useful to document the potential water savings that can be achieved through increasing residential density to accommodate growth (instead of spreading growth outward into lesser developed areas), along with supporting data (see Module 1 for references). Incorporating relevant data on limited water resources or delivery capacity and the potential savings that can be achieved by the listed strategies and techniques will also make the plan stronger and can advance the public debate about appropriate water policies.[100]

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[99] *See* DENVER REGIONAL COUNCIL OF GOVERNMENTS, METRO VISION 2035 PLAN (2014), https://drcog.org/sites/drcog/files/resources/2011%20MV%202035%20Plan%20revision%202016%20v1_0.pdf ("Compact development, infill, and redevelopment . . . help reduce water demand and related infrastructure costs").

[100] CLARION ASSOCIATES, THE KEYSTONE CENTER, COLORADO WATER AND GROWTH DIALOG 26 (Mar. 2015), http://cwcbweblink.state.co.us/WebLink/ElectronicFile.aspx?docid=194475&&dbid=0.

Among the strategies and techniques for encouraging water-efficient land use patterns are:

- Designate priority areas for growth and areas for conservation;
- Designate an urban growth boundary;
- Promote cluster development;
- Prioritize infill development;
- Allow for more varieties of multi-family and attached housing; and
- Plan for green infrastructure.

a. Designate Priority Areas for Growth & Areas for Conservation

The critical task for the comprehensive plan is to delineate areas prioritized for growth, where more water-efficient forms of development can occur, and conservation areas, where development could be discouraged or minimized. Compact, mixed-use development generally requires less water per household than single-family housing and the infrastructure requirements of both types of development are quite different. In areas designated for growth, clustered development coupled with green infrastructure, infill, mixed-use, attached housing, small lot development, and multi-family land uses (all discussed within this Module) should predominate. In areas designated for conservation, open space and natural resource preservation should be the objective, as well as maintaining existing community character.

Additional benefits of concentrating development in priority growth areas include[101]:

- More compact development allows for shorter transmission systems, lessening the cost of water and sewer infrastructure, reducing leak losses, and reducing energy needs for pumping and pressurization.
- In-fill development leverages taxpayers' investment in existing water delivery systems and other infrastructure.
- A smaller footprint per household reduces overall impervious surfaces. This generates less surface runoff, limits flooding, and minimizes the pollution of surface and groundwater recharge areas that receive the runoff.
- Higher-density and mixed-use development can be designed to increase walkability, lessen car dependency, save transportation costs, and lower air pollution.
- Changing demographics are lowering the demand for large-lot, single-family housing and increasing real property values in neighborhoods that have mixed-uses, available transit, shops, services, and amenities, and are lively and livable.

In some localities the idea that some areas of the community might be designated for conservation will be unpopular. It is through the comprehensive planning process that a productive conversation about this can be held. At issue is not only water consumption, but also infrastructure costs, local taxes, and environmental integrity. By focusing

[101] *See generally,* ENVIRONMENTAL PROTECTION AGENCY, SMARTH GROWTH: OUR BUILT AND NATURAL ENVIRONMENTS : A TECHNICAL REVIEW OF INTERACTIONS BETWEEN LAND USE, TRANSPORTATION, AND ENVIRONMENTAL QUALITY (2001), https://www.epa.gov/sites/production/files/2014-03/documents/our-built-and-natural-environments.pdf.

comprehensive plan citizen participation sessions on this topic, a community can involve stakeholders representing all views about these issues. In the process, the pros and cons of concentrating development in some areas while minimizing it in others can be discussed and accommodations reached. In most communities, land use plans must embrace growth, but there is no reason that it cannot be water-smart growth.

EXAMPLES OF COMPREHENSIVE PLAN PROVISIONS CALLING FOR INCREASED DENSITY IN DESIGNATED AREAS TO PROMOTE WATER CONSERVATION

Castle Rock, Colorado

Castle Rock, Colorado's Comprehensive Master Plan includes a policy that **promotes high-density development** in certain interchange districts. Policy LU-8.1 provides, "the desired higher density urban level development will be required to **protect significant natural drainage ways** by creating opportunities for natural design and added value; to protect the Plum Creek Corridor and its tributaries; to protect the designated floodplains and designated mouse habitat protection areas; and to integrate water conservation and water quality design concepts into the proposed land use plans."[102]

Aurora, Colorado

Aurora, Colorado's Comprehensive Plan integrates water conservation language in its Building Urban Activity Centers section, calling for **compact development** to promote sustainability. The plan states, "Compact development promotes efficiency in infrastructure, and may require innovative approaches to detention and water quality. Buildings account for a significant amount of energy usage, and the use of sustainable or "green" buildings requires less water and energy.[103]

Douglas County, Colorado

Douglas County's Comprehensive Master Plan includes a policy to "encourage **compact development** patterns that conserve water resources."[104]

Westminster, Colorado[105] The City of Westminster's Comprehensive Plan is highly detailed. The Plan designates five **focus areas**, selected for their large potential for growth and change. The focus areas comprise both new and existing activity centers near major

[102] TOWN OF CASTLE ROCK 2020 COMPREHENSIVE MASTER PLAN, 5A INTERCHANGE DISTRICTS, 7 (2002), https://co-castlerock2.civicplus.com/DocumentCenter/View/238.
[103] CITY OF AURORA 2009 COMPREHENSIVE PLAN, CHAPTER IV, K: BUILDING URBAN ACTIVITY CENTERS 10 (2009), https://www.auroragov.org/UserFiles/Servers/Server_1881137/Image/Departments/Development/Final%20Comp%20Plan.pdf.
[104] DOUGLAS COUNTY COLORADO, COMPREHENSIVE MASTER PLAN 2030, SEC. 8 WATER SUPPLY, 2-3 (2014), http://www.douglas.co.us/documents/cmp-section-8.pdf.
[105] City of Westminster, CO, Representatives, Land Use Leadership Alliance Training Program (LULA), Denver, CO (April 30, 2015).

crossroads and transit stations—locations that will serve as key opportunities for gateway development, establishing a strong City identity and fostering economic vitality.[106]

The City also has a regularly-updated Comprehensive Water Supply Plan,[107] which evaluates the current water supply projection and projected water demands based on the City's detailed Comprehensive Plan in order to quantify any expected deficits or surpluses.[108] Because the majority of the City's land area is zoned as Planned Unit Development[109]—which requires submittal of a development plan into which agreed upon design standards are incorporated[110]—the City has the opportunity to negotiate all standards for each proposed project in the same way that another community might through a development agreement. Likewise, because the City owns its own water and has done such a good job of tying together land use and water supply projections, they can negotiate and mandate from a much stronger position, thus requiring more conservation elements. This process further influences development decisions because Westminster has a **growth management program** tied to available water.[111] Annually, the City allocates a certain number of service commitments (water taps), based upon available water supply, into competitive and non-competitive categories; the competitive categories are all residential.[112] The City uses a point system, the scoring criteria for which is adopted periodically through City Council resolution, which sets forth what weight to give to various standards and criteria based on their impact on the City's utility system and the

[106] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN 77 (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.

[107] Because water use is so affected by weather, the City tries not to react to changes in a specific year but rather turns to five- or six-year Citywide use reviews when updating its Comprehensive Water Supply Plan. Email Interview with Stu Feinglas, Senior Water Resource Analyst, City of Westminster (Jan. 24, 2017).

[108] CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN 172 (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.

[109] CITY OF WESTMINSTER, CO, CITY ZONING MAP (2010), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/zoningmap.pdf.

[110] CITY OF WESTMINSTER, CO, CITY CODE, § 11-5-4 PRELIMINARY DEVELOPMENT PLAN (PDP) REQUIREMENTS (2015), http://www.ci.westminster.co.us/CITYGOVERNMENT/CITYCODE/TITLEXI/5PROCEDURESANDREQUIREMENTS.

[111] "The City Council further finds that, although the City has implemented water conservation techniques and programs withing the City, has entered into a water reuse program, has taken other steps to maximize the efficient use of the resources available to the City, because of the elements set forth in [the Findings] above, it is essential for the preservation of the health, safety, and welfare of the citizens of Westminster that the City maintain and modify, from time to time, a growth management program which balances growth and the ability of the City to effectively and safely absorb and serve such growth." CITY OF WESTMINSTER, CO, CITY CODE, § 11-3-1 GROWTH MANAGEMENT PROGRAM, FINDINGS (2010), http://www.ci.westminster.co.us/CityGovernment/CityCode/TitleXI/3GrowthManagementProgram.

[112] Service Commitment awards do not guarantee approval of a project. Service Commitments that are allocated but are not awarded to new development during the year are returned to the water supply figures for use in future years. CITY OF WESTMINSTER, CO, COMPREHENSIVE PLAN 195 (2015), http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf.

health, safety, and welfare of the Community. The Council may establish a minimum number of points to be obtained in the award criteria.[113] The points themselves are found in the City's design guidelines, which include water efficiency requirements.[114] The system is set up so that each proposal is essentially competing against each other. Proposals receive points in the competition for doing something above and beyond code requirements. Those with the most points are awarded the service commitments. Developers must submit a Preliminary Development Plan and Official Development Plan (ODP), bringing the project into compliance with City Design Guidelines. All commitments made by an applicant as a condition of the Service Commitment award must be reflected in these plans.[115] If the project cannot meet the minimum and incentive design requirements and other requirements included within its ODP, it will be subject to Planning Commission review and approval or denial.[116]

Sample[117]

Below is sample language for **highway intersection base or overlay zones** that communities may incorporate into the comprehensive plan to designate such an area as appropriate for development. This sample provision is offered here because it was not discovered in local case study examples.

- *Our community contains several undeveloped or partially developed highway intersections that are appropriate for higher density development. In each of these intersection areas, an overlay zone should be created that does not change the current underlying zoning, but contains standards including higher density, mixed use, water conservation techniques, and design provisions that allow developers to propose developments that are needed by the market and supported by existing financing sources. [As an alternative to an overlay zone, the base zoning district may be changed to achieve this same end.]*

b. Designate an Urban Growth Boundary

[113] CITY OF WESTMINSTER, CO, CITY CODE, § 11-3-5 GROWTH MANAGEMENT PROGRAM (2010), http://www.ci.westminster.co.us/CityGovernment/CityCode/TitleXI/3GrowthManagementProgram.
[114] *Regulations and Design Guidelines*, CITY OF WESTMINSTER, CO, PLANNING DIVISION, http://www.ci.westminster.co.us/CityGovernment/CommunityDevelopment/PlanningDivision/RegulationsandDesignGuidelines. Because the State of Colorado recently (as of the writing of this Module) began requiring water-sense fixtures, the water-based points in Westminster's system are not as robust as they once were. The City plans to update the criteria in the near future to once again award points for going beyond code requirements. Telephone Interview with Mac Cummins, Planning Manager, and Stu Feinglas, Senior Water Resource Analyst, City of Westminster (Sept. 1, 2016).
[115] CITY OF WESTMINSTER, CO, CITY CODE, § 11-3 GROWTH MANAGEMENT PROGRAM (2010), http://www.ci.westminster.co.us/CityGovernment/CityCode/TitleXI/3GrowthManagementProgram.
[116] CITY OF WESTMINSTER, CO, CITY CODE, § 11-3-2 GROWTH MANAGEMENT PROGRAM (2010), http://www.ci.westminster.co.us/CityGovernment/CityCode/TitleXI/3GrowthManagementProgram.
[117] This example was developed by the authors of this Module to offer additional sample language for consideration.

One strategy for designating areas of development and conservation is to create an urban growth boundary, which may be modified over time as needed. An urban growth boundary (sometimes called an urban service area) is a boundary delineating the limit beyond which urban development and services will not be extended.[118] In a non-urban context, "the terms town boundary, village curtilage, or village envelope may be used to apply the same constraining principles."[119] Growth boundaries aim to discourage sprawl and are used by local governments to guide land use decisions. They help direct growth and development into compact and efficient patterns by capitalizing on vacant or underused sites and by carefully considering the expansion of the urban center, reducing the encroachment of cities upon rural land. Sprawl has a large impact on water consumption, as it consists of dispersed, large lot, low-density development separated from the urban center, resulting in higher total water use. (See Module 1 for more information on this.)

EXAMPLES OF COMPREHENSIVE PLAN URBAN GROWTH BOUNDARY LANGUAGE

Boulder, Colorado[120]

Boulder's history with growth boundaries dates back to 1959, when the City's voters approved a "Blue Line" charter amendment that limited water service from being used to further urban development up into the foothills, to preserve the mountain backdrop. Guided by the City's success, the County of Boulder also began growth management planning in 1974. The Comprehensive Plan for Boulder County, which became effective in 1978, was guided by several fundamental concepts, including that development requiring urban services should occur only within incorporated cities.[121] In 1977, the City and County approved an intergovernmental agreement and the Boulder Valley Comprehensive Plan (which has been updated many times since) to concentrate urban development in the city and to preserve lands outside the city service area. (To the extent that there is any conflict, the joint plan supersedes the County plan.)

Guided by 25-year growth projections, the Boulder Valley Comprehensive Plan contains a section on Community Identity / Land Use Pattern, which prioritizes the City's preference for redevelopment and infill in order to create a compact community and prevent service area expansion; as well as the City and County's intention to preserve lands with open space values. The Plan's Natural Environment chapter emphasizes that the City and County will promote water resource conservation through a combination of protection, public education, monitoring, and policies that promote appropriate water usage; the City will endeavor to minimize water waste and reduce water use during peak demand periods; and

[118] AMERICAN PLANNING ASSOCIATION, SMART CODES: MODEL LAND-DEVELOPMENT REGULATIONS 153 (2010), https://www.planning.org/pas/reports/archive.htm.
[119] *Urban Growth Boundary*, WIKIPEDIA, https://en.wikipedia.org/wiki/Urban_growth_boundary (last visited 02/22/17).
[120] BOULDER VALLEY COMPREHENSIVE PLAN (2010), https://www-static.bouldercolorado.gov/docs/boulder-valley-comprehensive-plan-2010-1-201410091122.pdf.
[121] Joseph N. de Raismes, III, et al., *Growth Management in Boulder Colorado: A Case Study*, http://livableboulder.org/wp-content/uploads/2015/04/Growth-Management-In-Boulder-Colorado-a-Case-Study-.pdf.

will encourage new development and redevelopment that is designed to conserve water. The chapter also includes specifications on efforts related to water resource planning and acquisition, and the impacts of land development on surface and groundwater.

The City also has a robust open space program, which has guided zoning and acquisition of a significant amount of open space beyond its urban growth boundary. As part of any land purchases made under the open space program, the City also purchases the water rights associated with the land, as well as additional water rights to ensure minimum stream flows in the streams that flow through the open space and to provide irrigation for farming and ranching activities on the open space land.[122]

Sample[123]

Below is sample language communities may incorporate into the comprehensive plan to promote the use of urban growth boundaries for the purpose of conserving water. The following sample language relies upon the recommendations of the Denver Regional Council of Governments but may be tailored to serve community-specific needs with a citation to a similar report or recommendation applicable to a community's particular location.

- *The MetroVision plan of the Denver Regional Council of Governments (DRCOG) recommends that development in its region be concentrated within urban growth boundaries and lists the benefits of such concentration.[124] For similar reasons, the [City's/Town's/County's] zoning and land use regulations should create land use patterns that avoid expensive extensions of infrastructure, including water supply and waste water infrastructure, indicating where new populations should be supported by land use policy and infrastructure investments. As zoning is reformed in conformance with the provisions of this element of the comprehensive plan, it should accommodate new market demands and create water conserving land use patterns that effectively define the boundaries of urban growth.*

San Jose, California

Envision San Jose, the City's comprehensive plan, sets forth a policy to ensure that development is planned and built in a manner consistent with the fiscally and environmentally sustainable use of current and future water supplies by encouraging sustainable development practices, including low-impact development, water-efficient development, and green building techniques.[125] The policy also calls for supporting the

[122] Joseph N. de Raismes, III, et al., *Growth Management in Boulder Colorado: A Case Study*, http://livableboulder.org/wp-content/uploads/2015/04/Growth-Management-In-Boulder-Colorado-a-Case-Study-.pdf.

[123] Where strong examples of important techniques could not be found, this Module offers sample language for consideration.

[124] DENVER REGIONAL COUNCIL OF GOVERNMENTS, METRO VISION 2035 PLAN 17 (2011), https://drcog.org/documents/MetroVision2035FinalPlanIntro-Ch%202.pdf.

[125] ENVISION SAN JOSE 2040 GENERAL PLAN 3-19 (2011), https://www.sanjoseca.gov/DocumentCenter/Home/View/474.

location of new development within the vicinity of the City's recycled water system[126] and limiting residential development outside of the Urban Service Area, therefore encouraging density within the locations that can accommodate it with the greatest level of water-efficiency. For residential development outside of the Urban Service Area, water usage should be restricted "to well water, rainwater collection, or other similar environmentally sustainable practice."[127] The Plan also states that, to maximize the efficient and environmentally beneficial use of water outside of the Urban Service Area, water consumption should be limited for new development so that it does not diminish the water supply available for projected development in areas planned for urban uses.[128]

The Comprehensive Plan sets forth 12 major, over-arching strategies for the City, the third of which is "Focused Growth." The City has a "Greenline" Urban Growth Boundary (UGB)—with an Urban Service Area—beyond which lands are preserved for primarily open space, habitat, parkland, or agricultural activities.[129] The Focused Growth strategy aims to channel growth into identified Growth Areas within the UGB, "while the majority of the City is not planned for traditional growth or intensification."[130] The City's scheme creates small growth areas within a larger urban growth boundary. This approach promotes growth within designated Growth Areas and "strictly limits new residential development through neighborhood infill outside of these Growth Areas" in order to reduce environmental impacts and strengthen the City's UGB, among other things. Behind this approach is that infill development within some of the City's residential neighborhoods within the UGB has been at a density and form inconsistent with existing neighborhood patterns and therefore disruptive to neighborhood character. The City's approach of designating focused growth areas within the UGB in a way that supports a significant amount of new job and housing growth capacity "will help protect the quality of existing neighborhoods while also enabling the development of new Urban Village areas with a compact and dense form."[131] Through this plan, "most new housing development will be achieved through higher-density redevelopment within existing urbanized areas," especially through the conversion of older commercial areas to mixed-use.[132] The Plan sets forth specific amounts of job and housing growth capacity for each of the identified growth areas.[133]

[126] ENVISION SAN JOSE 2040 GENERAL PLAN 3-19 (2011), https://www.sanjoseca.gov/DocumentCenter/Home/View/474.
[127] ENVISION SAN JOSE 2040 GENERAL PLAN 3-19 (2011), https://www.sanjoseca.gov/DocumentCenter/Home/View/474.
[128] ENVISION SAN JOSE 2040 GENERAL PLAN 3-19 (2011), https://www.sanjoseca.gov/DocumentCenter/Home/View/474.
[129] ENVISION SAN JOSE 2040 GENERAL PLAN 5-5 (2011), https://www.sanjoseca.gov/DocumentCenter/Home/View/474.
[130] ENVISION SAN JOSE 2040 GENERAL PLAN 1-16 (2011), https://www.sanjoseca.gov/DocumentCenter/Home/View/474.
[131] ENVISION SAN JOSE 2040 GENERAL PLAN 1-16 (2011), https://www.sanjoseca.gov/DocumentCenter/Home/View/474.
[132] ENVISION SAN JOSE 2040 GENERAL PLAN 1-17 (2011), https://www.sanjoseca.gov/DocumentCenter/Home/View/474.
[133] ENVISION SAN JOSE 2040 GENERAL PLAN 1-27 (2011), https://www.sanjoseca.gov/DocumentCenter/Home/View/474.

As part of the Plan's goal to "provide housing that minimizes the consumption of natural resources and advances [the] City's fiscal, climate change, and environmental goals,"[134] the Plan sets forth a policy to "design high-density residential and mixed residential/commercial development, particularly development located in identified Growth Areas, to…allow residents to conduct routine errands close to their residence, especially by walking, biking, or transit."[135]

c. Promote Cluster Development

Cluster development is similar to the concept of priority growth and conservation areas—but is applied at a site-specific level. Clustering is a form of land development in which principal buildings and structures are grouped together on a site, thus saving the remaining land area for open space, conservation, stormwater infiltration, aquifer recharge, agriculture, recreation, or public uses.[136] According to the American Planning Association, "cluster development has a number of distinct advantages over conventional subdivision development. A well-planned cluster development concentrates dwelling units on the most buildable portion of the site and preserves natural drainage systems, vegetation, open space, and other significant natural features that help control stormwater runoff and soil erosion."[137] Over the past 20 years, cluster development has moved from a rare and little understood form of site and subdivision layout to one that is encouraged, incentivized, and sometimes required as the preferred form of raw land development in many communities.

Cluster development supports smaller lot, compact development, which conserves water supplies. The key aspect of conserving water in cluster developments is that there must be some non-irrigated areas. If a cluster development has the same number of units and irrigated area as a traditional development, there most likely will not be much water savings. Cluster Development also promotes greater preservation of open space and permeable surfaces than traditional development patterns, which is crucial to promoting proper groundwater recharge. Implementation techniques calling for cluster development in a community's comprehensive plan can aid efforts to increase permeable surfaces allowing water to percolate through to recharge overdrawn aquifers, and can call for the preservation of native grasses and plants, which increases water conservation.[138] The

[134] ENVISION SAN JOSE 2040 GENERAL PLAN 4-32 (2011), https://www.sanjoseca.gov/DocumentCenter/Home/View/474.
[135] ENVISION SAN JOSE 2040 GENERAL PLAN 4-32 (2011), https://www.sanjoseca.gov/DocumentCenter/Home/View/474.
[136] AMERICAN PLANNING ASSOCIATION, SMART CODES: MODEL LAND-DEVELOPMENT REGULATIONS 117 (2010), https://www.planning.org/pas/reports/archive.htm.
[137] AMERICAN PLANNING ASSOCIATION, SMART CODES: MODEL LAND-DEVELOPMENT REGULATIONS 118 (2010), https://www.planning.org/pas/reports/archive.htm.
[138] NRCS, WILDLIFE HABITAT MANAGEMENT INSTITUTE, NATIVE WARM-SEASON GRASSES AND WILDLIFE (2005), http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_010044.pdf ("Modern development continues to change the landscape and destroy natural grasslands. The deep root systems of native grasses hold soil in place, reducing erosion and decreasing runoff, which helps keep waterways healthy and recharges ground water.").

impervious coverage that multiplies with traditional full parcel subdivision development damages the environment and prevents percolation of rainfall into the groundwater aquifer.

Communities may use the comprehensive plan to provide for future growth that promotes water conservation by including provisions that call for cluster development and the preservation of open space. Under clustering provisions, development can vary from the traditional subdivision plat, where lots must conform to all the lot size and coverage requirements of zoning. Comprehensive plans can include implementation techniques to develop a local cluster law, which would allow the modification of the dimensional requirements set forth in the zoning law and can permit lots that are smaller and buildings that are closer together to accommodate the otherwise allowable number of housing units, while conserving areas of open space within the subdivision. Used in this way, cluster development can be much like using priority growth and conservation areas, but on a smaller, site-based scale. Clustering is also more cost-effective due to the more efficient servicing of developments with utilities, roads, and other services. A community might discuss these advantages as part of a comprehensive plan objective or strategy for clustering.

Communities should be mindful that clustering does not always allow the developer to build additional dwelling units (though bonuses can be built in and do increase participation in the program), but it does permit the planning commission to reduce lot sizes, which, in turn, reduces the size of lawns and the water needed to maintain them, or residential unit size, which may reduce indoor water use. Clustering, in this way, provides an optional method to achieving the smaller homes on smaller lots that is proven to lower per household water consumption.

Instead of offering implementation techniques that would rezone areas from large lot, single-family homes to small lot houses, comprehensive plans could recommend the amendment of permitted land uses or dimensional standards in residential zoning districts to include cluster development.

EXAMPLES OF COMPREHENSIVE PLAN CLUSTER DEVELOPMENT LANGUAGE AIMED AT NATURAL RESOURCE PRESERVATION

Larimer County, Colorado

Larimer County, Colorado's Master Plan provides the basic framework for land use development patterns in unincorporated Larimer County in its Land Use chapter. The chapter strongly emphasizes cluster development as a way to preserve the county's character and preserve open space, stating:

"The basic concept of Rural Conservation Development (RCD) is to require that all new subdivisions outside designated urban areas be clustered and designed based on the characteristics of the specific site.... Rural Conservation Development will generally include

a minimum of 80% open space, and maximum allowed housing units will be determined by dividing the gross developable land area by the minimum lot size of the existing zoning district. Open space is achieved by allowing housing to be clustered on lots smaller than would otherwise be allowed by the existing zoning.... The proposed design must be consistent with applicable principles of the Master Plan including preservation of open character, protection of sensitive natural areas, neighborhood compatibility and efficient provision of utilities and services."[139]

Southern California Association of Governments

The Southern California Association of Governments' Regional Comprehensive Plan includes provisions under its land use and transportation policies that call for cluster development to aid in improving water quality and conservation. The plan provides:

"The RCP encourages development strategies that promote compact growth patterns. Concentrated or clustered development will help to reduce impervious surfaces, conserve energy used for water conveyance, and provide a greater level of overall water quality protection. Concentrated development protects the watershed by leaving a larger percentage of the watershed in its natural condition. It reduces urban and agricultural runoff that can contain significant volumes of pollutants from entering surface waters, reducing future impacts on surface and groundwater quality and supply. Compact growth also requires less water and less energy for water transport and water treatment than a diffuse, sprawling pattern."[140]

Chico, California

The Open Space and Environment chapter in the General Plan of the City of Chico, California, includes a *goal* "to conserve water resources and improve water quality." One *policy* listed to achieve this goal is to "protect groundwater and aquifer recharge areas to maintain groundwater supply and quality." The plan then lists an *action* to support this policy that focuses on protecting recharge areas, which states: "avoid impacts to groundwater recharge areas through open space preservation, runoff management, stream setbacks and clustering of development."[141]

Fowler, Colorado[142]

The Fowler Comprehensive Plan sets forth a vision for the Town to become one of the most sustainable communities in Colorado. In the Plan, Fowler aims to grow while maintaining economic development and environmental benefits. To do this, the Plan focuses on cluster developments that reserve significant open space with any residential project. In order to

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[139] LARIMER COUNTY MASTER PLAN, CHAPTER 3, 3.2.1: RURAL CONSERVATION DEVELOPMENT (1997), http://larimer.org/planning/planning/master_plan/chapter_3.htm.

[140] SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS, FINAL 2008 REGIONAL COMPREHENSIVE PLAN, 56 (2008), http://www.scag.ca.gov/rcp/pdf/finalrcp/f2008RCP_Complete.pdf.

[141] CITY OF CHICO, CALIFORNIA, 2030 GENERAL PLAN, CHAPTER 10, OPEN SPACE AND ENVIRONMENT ELEMENT 20 (2011), http://www.chico.ca.us/document_library/general_plan/documents/10.OpenSpaceandEnvironmentElement.pdf.

[142] TOWN OF FOWLER, COLORADO, 2035 COMPREHENSIVE PLAN 26 (2009), http://www.fowlercolorado.com/Notices/Final_Fowler_Comp_Plan.pdf.

meet these objectives, the Plan sets forth that the Town will revise its Municipal Code to allow for rural cluster developments to provide greater areas of conservation. Within this revision, the Town will require any residential development to be in the form of rural clusters in order to preserve the farmland community and natural amenities while not overextending community services or resources.

d. Prioritize Infill Development

On average, new residents and employees occupying infill development consume less water per capita than those who occupy new buildings constructed in less developed areas.[143] (See Module 1 for more information on this.) To promote water-efficient land use patterns, a community could consider amending its comprehensive plan to encourage infill—the development of vacant, partially developed, or underutilized sites and structures surrounded by or in close proximity to areas that are substantially or fully developed. Infill development minimizes outdoor water use and leverages a community's current investment in infrastructure, including water systems and wastewater treatment.

The call for infill development should be contained within a plan's goals, objectives, or strategies. The community may then further amend the plan to include implementation techniques utilizing a number of mechanisms that can be geared toward promoting infill. For example:

- Goal: Reduce per capita water consumption.
- Objective: Reduce water use and leverage current investments in infrastructure by encouraging residential and commercial development in existing developed areas.
    - Strategy 1: Amend the zoning code and official map to add methods for achieving infill development in areas where such development will achieve per capita water conservation.
    - Implementation techniques:
        - Rezone underused commercial lands [*specify identified areas*] to promote infill development through small lot single-family, attached or row housing, multi-family, three- and four-plex residences, mansion apartments, co-housing, and mixed-use development. [*Select the most appropriate of these for each selected area.*]
        - Amend the official zoning map to create an Infill/Redevelopment zoning district or overlay zone, which should allow for a mix of uses in existing denser neighborhoods and along major streets.
        - Identify single-family residential neighborhoods where street, electricity, water, and wastewater infrastructure have been in place

[143] Environmental Protection Agency, Growing Toward More Efficient Water Use: Linking Development, Infrastructure, and Drinking Water Policies 3 (2006), https://www.epa.gov/smartgrowth/growing-toward-more-efficient-water-use.

for a minimum of ___ years[144] and amend the zoning code to permit accessory dwelling units in these neighborhoods.
        - Create incentives for the rehabilitation of existing buildings.
        - Create a water conservation floating zone to promote water-conserving compact, mixed-use development with increased density and to secure the benefits of water-conscious development, including the adaptive reuse of existing buildings, sites, and infrastructure. Language regarding use of the floating zone should restrict its application to developed areas with existing infrastructure that are most appropriate for infill. (For more details on this, see Module 3, Integrating Water Efficiency into the Zoning Code, part 7, *Create a Water Conservation Floating Zone*.)
        - Where a change in use is contemplated to a more water-intensive use, provide developers with the existing budgeted water for the area, spurring innovating solutions to achieving desired development using budgeted water.
    - Strategy 2: Amend site plan and subdivision requirements to add methods for achieving infill development in areas where such development will achieve per capita water conservation.
    - Implementation techniques:
        - Amend site plan and subdivision requirements to include approval criteria encouraging or requiring site selection measures for development projects that include:
            - Locating in an infill site.
            - Locating in a brownfield redevelopment area.
            - Not locating in a drinking water protection area.
            - Incorporating one or more historic buildings in the project and/or rehabilitating the building(s) in compliance with local or federal standards.
        - Amend subdivision requirements to encourage or require single- and two-family home development projects to be located as infill on existing streets that do not require extensive new infrastructure, or where street, electricity, water, and wastewater infrastructure have been in place for a minimum of 25 years.
        - Amend site plan and subdivision requirements to restrict developments from locating on greenfield sites, defined as a parcel of land not previously developed beyond that of agriculture or forestry use.
        - Amend the administrative procedures for site plan or subdivision approval to provide a streamlined approval procedure for projects that are located in infill areas.

[144]The length of time provided here is important; some communities use 25 years. The point is to use the life of the infrastructure as the time period and direct development into established areas.

Infill zoning near public transit promises increased benefits, not the least of which is lowering costs of living for lower and middle income residents of Transit Oriented Development (TOD) Districts. TOD infill zoning generally allows developers flexibility to design projects in accordance with market demands, while paying close attention to connectivity among new buildings, the transit station, retail, services, restaurants, work places, and amenities along streets. Zoning densities in TOD districts generally vary from higher dwelling units (du) per acre close to the station, lowering and leveling off near surrounding lower density neighborhoods.

EXAMPLES OF COMPREHENSIVE PLAN INFILL DEVELOPMENT LANGUAGE

Aurora, Colorado

In setting out the City's vision, Aurora, Colorado's Comprehensive Master Plan states that "when the goals of the City are achieved… Established areas of the City remain quality places to live and work. Change occurs at a measured pace. Infill and redevelopment projects contribute to neighborhood livability."[145] The plan also calls for a strategy to phase the extension of water and sewer lines in the most cost-effective manner.[146]

The Plan's "Building Urban Activity Centers" chapter lays out planning principles for TOD, intended to guide the formulation of all TOD policies and documents within the City and assist in evaluating the conformity of individual development applications in TODs to the goals of the Comprehensive Plan, even when they do not have a station area plan. One of the principles set forth in the Plan is "promoting sustainability", which reads: "Compact development promotes efficiency in infrastructure, and may require innovative approaches to detention and water quality. Buildings account for a significant amount of energy usage and the use of sustainable or 'green' buildings requires less water and energy." This principle then lays out several strategies, including encouraging the development of green buildings—which include water efficiency measures—and a reduction in the amount of impervious surfaces by utilizing methods such as landscaped curb extensions, drainage swales, permeable paving, street trees, and green roofs.[147] Also related to the implementation of this Plan, Aurora's TOD ordinance ranges from 60du at the station, 40du in between, and 20du adjacent to the surrounding lower-density areas.[148]

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[145] CITY OF AURORA, CO, COMPREHENSIVE MASTER PLAN § A, MANAGING THE GEOGRAPHY OF GROWTH, (2009), https://www.auroragov.org/UserFiles/Servers/Server_1881137/Image/Departments/Development/Final%20Comp%20Plan.pdf.

[146] CITY OF AURORA, CO, COMPREHENSIVE MASTER PLAN § 146-732, DEVELOPING AND PROTECTING WATER AND OTHER NATURAL RESOURCES, (2009), https://www.auroragov.org/UserFiles/Servers/Server_1881137/Image/Departments/Development/Final%20Comp%20Plan.pdf.

[147] CITY OF AURORA 2009 COMPREHENSIVE PLAN, CHAPTER IV, K: BUILDING URBAN ACTIVITY CENTERS 6-10 (2009), https://www.auroragov.org/UserFiles/Servers/Server_1881137/Image/Departments/Development/Final%20Comp%20Plan.pdf.

[148] CITY OF AURORA, CO, BUILDING AND ZONING CODE § 146-728, DEVELOPMENTAL STANDARDS (2013), *available at*, https://www.municode.com/library/co/aurora/codes/building_and_zoning?nodeId=BUILDING_ZONING_CODE_CH146ZO_ART7MIESPDI_DIV6TRIEDETODI_S146-728DEST.

Austin, Texas

The Austin, Texas Comprehensive Plan calls for using the City's S.M.A.R.T. (Safe, Mixed-Income, Accessible, Reasonably-priced, Transit-Oriented) Housing Program as a starting point for examining process and practice issues within the City's Land Development Code.[149] The SMART Housing Program[150] includes not only larger developments but also infill construction. The goals of the Program include promoting the use of existing City infrastructure and services. Housing built under the Program is located in neighborhoods throughout the City and must meet the City's minimum Green Building standards[151] (which include requirements for water efficiency), Accessibility and Visitability Standards, and the Transit-Oriented standards.

Under the program, staff work with developers and buildings of single-, multi-, and mixed-use developments that meet S.M.A.R.T. Housing standards and the City provides fee waivers and a faster review process. While total fees waived will vary depending on the project (for example, whether rezoning is required), fees generally add up to about $1,500 per unit for single-family infill projects (which include permit fees and water/wastewater capital recovery fees). All qualifying developments are eligible for these fee waivers, as well as waivers for water meters, sewer taps, and right-of-way closure and licensing.

Before beginning a S.M.A.R.T. Housing application, applicants are encouraged to contact the City's Development Assistance Center in order to confirm project feasibility, including discussion of whether the property is adequately served by water and wastewater utilities. As part of the approval process, developers of projects other than single-family infill must have a pre-submittal meeting with S.M.A.R.T. Housing staff and reviewers, which include the water utility.

Douglas County, Colorado

Douglas County, Colorado integrated overlay zoning standards for infill development within its Zoning and Subdivision Resolutions. A component of these standards—the "Water Supply-Overlay District" Map—is reproduced within the Comprehensive Plan. It depicts the identified "water supply zones", which represent the four types of geologic and hydrologic conditions within the County. Each zone has differing water supply standards in order to appropriately guide land use decisions based upon the available water supply within the specific location within the County.[152]

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[149] CITY OF AUSTIN, TEXAS, IMAGINE AUSTIN COMPREHENSIVE PLAN, 209 (2012), https://www.austintexas.gov/sites/default/files/files/Planning/ImagineAustin/webiacpreduced.pdf.

[150] CITY OF AUSTIN, TEXAS, S.M.A.R.T. HOUSING POLICY RESOURCE GUIDE (2008), https://www.austintexas.gov/sites/default/files/files/Housing/Application_Center/SMART_Housing/smart_guide_0708.pdf.

[151] CITY OF AUSTIN, TEXAS, AUSTIN ENERGY GREEN BUILDING, GUIDEBOOK (2013), https://greenbuilding.austinenergy.com/wps/portal/aegb/home/!ut/p/a1/hc6xDoIwEAbgZ2Fg5Q4JCG6NgykxYTKWLgZMKZjSklLh9UXjYqJ423_5_twBBwZcV1MnK9cZXaln5sklonEaZgXSYh9vkOaUZiQ5hHjaLqBcAP4Ygv_6Z-DrJHmDlRM5cKlM_Xq3JLqOUgncikZYYYO7Xdatc8O489HHeZ4DaYxUIria3sdvldaMDtinhKFneIvVdCSe9wAIyy1e/dl5/d5/L2dBISEvZ0FBIS9nQSEh/ (last visited May 20, 2016).

[152] DOUGLAS COUNTY COLORADO, COMPREHENSIVE MASTER PLAN 2030, SEC. 8 WATER SUPPLY, 1-2 (2014), http://www.douglas.co.us/documents/cmp-section-8.pdf . *See also,* DOUGLAS COUNTY, COLORADO,

Colorado Springs, Colorado

Colorado Springs has many corridors along major arterial streets and state highways with commercial auto-oriented uses. According to the Comprehensive Plan, these corridors include "Mature/Redevelopment Corridors", which historically have been developed as commercial strips along older arterial streets, with multiple curb cuts, individual parking lots, cluttered signage, and small lots, and which include significant infill and redevelopment opportunities.[153]

The Plan's Land Use Chapter devotes a section to Infill and Redevelopment.[154] The objective laid out in this section encourages infill projects, acknowledging their efficient use of the City's infrastructure, which includes water and wastewater. The Plan's strategies for furthering this objective include:

- *Identify Infill and Redevelopment Opportunities and Target Public Investments* – Identify major infill and redevelopment opportunities and target infrastructure improvements to the preferred infill development and redevelopment areas.
- *Provide Incentives to Foster Private Reinvestment* - Utilize incentives to encourage infill and redevelopment. Regulatory incentives can be used to expedite the development approval process. Available financial incentives, such as rehabilitation loans/grants, if targeted and strategic, should be utilized to support additional investment in the community, as well as to assist existing residents to remain in areas that are redeveloping.
- *Establish Design Guidelines and a Review Process that Support Infill and Redevelopment* - Adopt design guidelines and standards to ensure that infill and redevelopment projects are compatible with existing neighborhoods in terms of scale and design. Incorporate them in the development review process for infill and redevelopment proposals.
- *Adopt Zoning Standards and Apply Building Codes that Support Infill and Redevelopment* – Adopt flexible zoning standards to encourage infill and redevelopment projects. Ensure that public health and safety considerations are addressed through the appropriate building codes and standards. Apply building codes and standards to infill and redevelopment projects in a uniform and consistent manner.

The chapter also promotes infill development within its section on Commercial Development,[155] calling for the following strategies—all of which encourage a water-efficient land use pattern:

COMPREHENSIVE MASTER PLAN 2030, WATER SUPPLY ZONES, MAP 8.1 (2014), http://www.douglas.co.us/documents/cmp-8-1-map.pdf.

[153] CITY OF COLORADO SPRINGS, COLORADO, COMPREHENSIVE PLAN, CHAPTER 1 – LAND USE, 2 (2000), https://coloradosprings.gov/sites/default/files/planning/comp_plan-chap_1.pdf.

[154] CITY OF COLORADO SPRINGS, COLORADO, COMPREHENSIVE PLAN, CHAPTER 1 – LAND USE, 9-10 (2000), https://coloradosprings.gov/sites/default/files/planning/comp_plan-chap_1.pdf.

[155] CITY OF COLORADO SPRINGS, COLORADO, COMPREHENSIVE PLAN, CHAPTER 1 – LAND USE, 12-13 (2000), https://coloradosprings.gov/sites/default/files/planning/comp_plan-chap_1.pdf.

- *Redevelop Obsolete Commercial Areas as Activity Centers* - Redevelop commercial areas that are obsolete or underutilized either as community activity centers, commercial centers, or employment centers, depending on their size, location and primary function.
- *Redevelop and Infill Commercial Uses in Mature/Development Corridors to Form Activity Centers* - Redevelop and infill commercial uses in mature/redevelopment corridors to support the formation and evolution of new activity centers. Coordinate the formation of new activity centers with the redevelopment of the entire corridor.
- *Support and Encourage the Evolution of Existing Commercial Areas into Activity Centers* - Support and encourage the evolution and transformation over time of existing commercial areas from their exclusive auto orientation and single use functions into activity centers with mixed uses, pedestrian and transit orientation, and better relationships to the surrounding residential areas.

e. Allow for Multi-Family & Attached Housing

Promoting the development of a wide variety of multi-family and attached housing in a community's comprehensive plan is another means of conserving water through land use. A study from Portland State University suggests that an increase in one household per acre is associated with a decrease of water use by 411,000 gallons per year when controlling for demographic factors.[156] The study also observed that areas with more than five households per acre provide for highly predictable water use trends, while those with neighborhoods with lower densities have greater variability.[157] The same study also found a direct correlation between house size and water demand. Because higher density development reduces water consumption and increases a community's ability to plan for water needs, the comprehensive plan could promote this type of development as reducing per-capita water consumption.

EXAMPLE OF COMPREHENSIVE PLAN MULTI-FAMILY HOUSING LANGUAGE FOR WATER CONSERVATION

Southern California Association of Governments

The Southern California Association of Governments' Comprehensive Plan chapter on land use and housing focuses on the multiple benefits that certain development policies can provide. Specifically focusing on the benefits of these policies on water supply, the plan states: "Greater emphases on multi-family and non-traditional housing and green building

[156] Vivek Shandas, *Water and Land Use Planning: A Case for Better Coordination*, OR. PLANNERS J., Mar.-Apr. 2010, at 6, http://pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=1075&context=iss_pub.
[157] Vivek Shandas, *Water and Land Use Planning: A Case for Better Coordination*, OR. PLANNERS J., Mar.-Apr. 2010, at 6, http://pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=1075&context=iss_pub.

practices help reduce per-capita water consumption, particularly for residential irrigation use."[158]

San Jose, California[159]

Envision San Jose, the City's comprehensive plan, sets forth a policy to ensure that development is planned and built in a manner consistent with the fiscally and environmentally sustainable use of current and future water supplies by encouraging sustainable development practices, including low-impact development, water-efficient development, and green building techniques.[160] As part of the Plan's goal to "provide housing that minimizes the consumption of natural resources and advances [the] City's fiscal, climate change, and environmental goals,"[161] it sets forth a policy to "encourage development of higher residential densities in complete, mixed-use, walkable and bikeable communities…"[162] Similarly, the Plan includes a policy to "design high-density residential and mixed residential/commercial development, particularly development located in identified Growth Areas, to…allow residents to conduct routine errands close to their residence, especially by walking, biking, or transit."[163]

Commerce City, Colorado[164]

The Commerce City Comprehensive Plan includes a goal to monitor the location of newly constructed single and multi-family dwellings to ensure that new neighborhoods contain a mix of housing types, styles, and densities, with higher-density housing located near collector and arterial streets, transit stations, and services.

f. Plan for Green Infrastructure

As a community promotes denser, more compact development to aid in increasing overall water conservation, it must also recognize that this type of development could potentially increase stormwater generation in those areas targeted for growth. Although these water efficient land use patterns promote water conservation, they also necessarily result in increased portions of the built environment becoming hardscape—covered by buildings, parking lots, streets and other impervious surfaces that prevent rain and snow from

[158] SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS, FINAL 2008 REGIONAL COMPREHENSIVE PLAN, 15 (2008), http://www.scag.ca.gov/rcp/pdf/finalrcp/f2008RCP_Complete.pdf.
[159] ENVISION SAN JOSE 2040 GENERAL PLAN (2011), https://www.sanjoseca.gov/DocumentCenter/Home/View/474.
[160] ENVISION SAN JOSE 2040 GENERAL PLAN 3-19 (2011), https://www.sanjoseca.gov/DocumentCenter/Home/View/474.
[161] ENVISION SAN JOSE 2040 GENERAL PLAN 4-32 (2011), https://www.sanjoseca.gov/DocumentCenter/Home/View/474.
[162] ENVISION SAN JOSE 2040 GENERAL PLAN 4-33 (2011), https://www.sanjoseca.gov/DocumentCenter/Home/View/474.
[163] ENVISION SAN JOSE 2040 GENERAL PLAN 4-32 (2011), https://www.sanjoseca.gov/DocumentCenter/Home/View/474.
[164] COMMERCE CITY COMPREHENSIVE PLAN INDICATORS, 27 (2014), https://www.c3gov.com/DocumentCenter/Home/View/695.

percolating into the ground. A typical city block, for example, generates more than five times the stormwater runoff produced on a woodland area of the same size.[165] Increased stormwater negatively impacts water quality (which in the aggregate can diminish usable quantity) because stormwater travels over the land's surface, picking up contaminants such as oil, fertilizer and other chemicals, and then flows either directly into streams and ponds, or into storm sewers that then discharge into these same water bodies. Further, increasing impervious surface directly reduces the amount of possible water infiltration that is essential for recharging groundwater supplies.

Communities may address and mitigate these issues by promoting green infrastructure[166] in developed areas. Green infrastructure refers to using and enhancing natural systems to absorb and filter pollutants from the air and water, protect communities from flooding and storm surges, reduce erosion, and create healthier, more sustainable environments. Using green infrastructure in developed areas might include such site-specific practices as the installation of bioswales, tree planters, pervious pavement, and rain gardens among others.

Some green infrastructure strategies, such as green roofs, are sometimes not thought of as water-conserving—the thinking being that water is used to grow the new vegetation (on a roof, for example). That said, green roofs reduce heat island effect, which conserves energy. The production of energy requires a tremendous amount of water, while treatment and distribution of water is dependent on readily available low-cost energy.[167] In addition, as mentioned above, green roofs and similar green infrastructure measures also improve stormwater quality, which in the aggregate can preserve the quantity of drinkable water. Green infrastructure measures are especially effective at conserving water when they incorporate additional strategies such as low-water use vegetation and rainwater capture and, most importantly, when they do not increase the amount of irrigated open space.

It is important that a community's comprehensive plan lay the foundation for encouraging and implementing green infrastructure as a mechanism for promoting maximum water quantity and quality.

EXAMPLES OF COMPREHENSIVE PLAN GREEN INFRASTRUCTURE LANGUAGE FOR WATER CONSERVATION

Southern California Association of Governments

The Southern California Association of Governments' Comprehensive Plan chapter on

[165] *Protecting Water Quality from Urban Runoff*, EPA, https://www3.epa.gov/npdes/pubs/nps_urban-facts_final.pdf (last visited 02/25/17).

[166] On a broader level, green infrastructure can include landscape-level strategies, such as the adoption of stream protection overlay zones with associated riparian buffers and floodplain designations; the creation of pocket parks within existing neighborhoods; and site-specific practices such as green roofs, bioswales, tree planters, pervious pavement, and rain gardens among many others.

[167] CITY OF AURORA 2009 COMPREHENSIVE PLAN, CHAPTER II, SUSTAINABILITY PLAN 17-19 (2009), https://www.auroragov.org/UserFiles/Servers/Server_1881137/Image/Departments/Development/Final%20Comp%20Plan.pdf.

Water sets forth the following policies related to green infrastructure, which the Plan recommends as near-term, feasible policies that stakeholders should consider for implementation:[168]

- Implement green infrastructure and water-related green building practices through incentives and ordinances.[169]
- Encourage Low Impact Development and natural spaces that reduce, treat, infiltrate, and manage runoff flows caused by storms and impervious surfaces.[170]
- Maximize pervious surface area in existing urbanized areas to protect water quality, reduce flooding, allow for groundwater recharge, and preserve wildlife habitat. New impervious surfaces should be minimized to the greatest extent possible, including the use of in-lieu fees and off-site mitigation.[171]

Newburgh, New York

The City of Newburgh, New York includes a goal in its Comprehensive Plan to reduce impervious cover and promote stormwater management best practices. The Plan lists specific actions that the City should take to achieve this goal:

- "The City wants to reduce impervious cover and promote stormwater management best practices (Municipal Services Goal 3) by:
    - Allowing the use of permeable surfaces for driveways and parking areas in residential and commercial developments; and
    - Encouraging best management practices by minimizing and treating stormwater at its source, including the use of grass swales, rain gardens and green infrastructure techniques."

Aurora, Colorado

The City of Aurora's comprehensive plan contains a chapter focused on sustainability, which includes, among other initiatives, a green infrastructure/landscaping program. The program includes:

- Community gardens (in partnership with a regional group),
- Tree planting program,
- Xeriscape standards,
- Existing parks and open space (as contributors to green infrastructure), and
- Xeriscape demonstration gardens at the City's main municipal building.[172]

The Plan's sustainability chapter also describes the following:

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[168] SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS, FINAL 2008 REGIONAL COMPREHENSIVE PLAN, 10 (2008), https://www.scag.ca.gov/Documents/f2008RCP_Complete.pdf.
[169] SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS, FINAL 2008 REGIONAL COMPREHENSIVE PLAN, 60 (2008), https://www.scag.ca.gov/Documents/f2008RCP_Complete.pdf.
[170] SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS, FINAL 2008 REGIONAL COMPREHENSIVE PLAN, 60 (2008), https://www.scag.ca.gov/Documents/f2008RCP_Complete.pdf.
[171] SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS, FINAL 2008 REGIONAL COMPREHENSIVE PLAN, 61 (2008), https://www.scag.ca.gov/Documents/f2008RCP_Complete.pdf.
[172] CITY OF AURORA 2009 COMPREHENSIVE PLAN, CHAPTER II, SUSTAINABILITY PLAN 11 (2009), https://www.auroragov.org/UserFiles/Servers/Server_1881137/Image/Departments/Development/Final%20Comp%20Plan.pdf.

- Community Gardens: Plants sequester carbon and new gardens that displace traditional blue grass can reduce water needs by 30%. A burgeoning movement is underway to provide incentives to local residents to grow their own food and expand the number of urban gardens throughout the city.
- The Role of Water: The City is committed to providing a socially, environmentally, and economically sustainable water supply. The Plan's chapter on Developing and Protecting Water and Other Natural Resources discusses in detail the City's "Prairie Waters" project to provide a sustainable water supply and the City's water reclamation efforts. That chapter also describes recently codified regulatory measures and the City's ongoing commitment to water conservation.
- Green Infrastructure: The Plan describes that the City's zoning code has incorporated several green infrastructure features over the years, including development and water incentives for native plant material or xeriscape landscaping, and an extensive park and open space trail and greenway system. Staff dedicates a significant portion of development application review to working with applicants to incorporate green infrastructure and support developers who proactively initiate green infrastructure elements.[173]

LEED-ND Technical Guidance Manual

The Technical Guidance Manual for Sustainable Neighborhoods, created by the Land Use Law Center and the U.S. Green Building Council (USGBC) and based upon the standards of the LEED for Neighborhood Development Rating System,[174] includes a chapter on incorporating sustainable neighborhood development into community comprehensive plans. Under the Water Protection/Conservation section of this chapter, the manual suggests incorporating certain goals and planning actions into the local government's comprehensive plan such as:

- Goal: Reduce pollution and hydrologic instability from stormwater, reduce flooding, promote aquifer recharge, and improve water quality.
- Action: Require stormwater management plans that emulate natural hydrologic conditions and use infiltration, evapotranspiration, and other best management practices to prevent stormwater runoff.

[173] CITY OF AURORA 2009 COMPREHENSIVE PLAN, CHAPTER II, SUSTAINABILITY PLAN 17-19 (2009), https://www.auroragov.org/UserFiles/Servers/Server_1881137/Image/Departments/Development/Final%20Comp%20Plan.pdf.

[174] LEED, which stands for Leadership in Energy and Environmental Design, comprises a set of rating systems developed by the USGBC designed to evaluate and guide the design and construction of various aspects of development projects. The LEED-ND rating system—which USGBC created in partnership with the Congress for the New Urbanism (CNU) and the Natural Resources Defense Council (NRDC)—aligns the principles of smart growth, New Urbanism, and green building into a set of national standards for green planning and design at the neighborhood scale.