KEYSTONE
POLICY CENTER

**Colorado Water & Growth Dialogue**
**CWCB 75% Progress Report**
**November 2016**

**I. Project description:**

Colorado is projected to experience a sustained increase in population and with it a substantial increase in demand for water. In a state with limited supplies, this increase in demand will result in a well-known water supply gap. This pressing problem for the future of Colorado has thus far been managed by developing new supply and water storage projects, implementing reuse projects, and encouraging water conservation. The Colorado Water and Growth Dialogue intends to explore and demonstrate how the integration of water and land use planning should be utilized to reduce water demand from the development and re-development associated with the projected population increase. This approach to planning aims to direct and incentivize smart, water-wise growth in lieu of allowing only market conditions to guide how Colorado grows.

Thus, the purpose of the Colorado Water and Growth Dialogue is three-fold:

- Quantitatively demonstrate how much water can be saved through the integration of water and land use planning for homes and neighborhoods that will be developed or redeveloped in the future;
- Qualitatively develop a consensus-based set of recommended management levers/mechanisms/strategies for communities that can be incorporated into their planning that recognizes the uncertainties of how and where people in the future will want to live;
- Disseminate these recommendations, and demonstrate the potential for achieving water savings through strategic land use planning decisions while still meeting the current and future needs of the community.

**II. Project Successes and Progress toward Achieving Goals and Objectives:**

The Colorado Water and Growth Dialogue is looking to complete its first phase by the first quarter of 2017. Phase I of the Dialogue is defined as developing the data and information that can be disseminated to land and water planners, developers and policy makers that will answer the high-level questions:

- Why integrate land and water planning, what are the range of potential water demand savings from urban form and landscaping practices?
- What are the management levers/mechanisms/strategies for achieving these water demand savings?

Answering these questions includes both the qualitative and quantitative components. In our last report, we focused on the Exploratory Scenario Planning process which constituted the qualitative analysis. This process relied on gathering data, information, and opinions from our Working Group in two full-day workshops conducted in the summer of 2016. The Steering Committee is now in the

process of sorting through that data and developing a set of fleshed-out strategies that will be recommended to land and water planners to implement. Please see Appendix A for a list of the draft strategies.

In this report, we'll focus on the development of the Residential Land Use and Water Demand Tool that will enable land planners to input their own scenarios of growth and see the projected water demands associated with the scenarios they develop.

## III. Residential Land Use and Water Demand Tool

In acknowledging that local planners have the best understanding in how their own region will grow, as part of the Colorado Water and Growth Dialogue, Denver Water has developed a Residential Land Use and Water Demand Tool that can be used by local planners to create their own scenarios of growth and development. The tool asks planners to input a population growth estimate and then develop up to three scenarios based on the housing-product types in which they expect those people to live. The co-efficients for these product types have been determined by using customer data in both the Denver water and Aurora Water service areas based on 2014 consumption data. The planners will be asked to distribute the number of people they expect to move to their region into the following housing product types:

- Large Single Family
- Typical Single Family
- Small Single Family
- Townhome
- 3-Story Walkup
- Mid-Range Multifamily
- High Density Multifamily

There is also an indoor and outdoor water use component. Users are asked to input their assumptions of:

- People per household
- Average units per acre
- Indoor gallons per capita per day, and
- Seasonal gallons per square foot of pervious area

The Tool gives users guidance on what these typically are, so if they do not specifically know the answers they can rely on the guidance or make decisions based on the expected plumbing code for example. Please see Appendix B for a snapshot of the User Guidance tables.

The Residential Land Use and Water Demand Tool is still in draft form and is being beta-tested by a group of land planners on January 18, 2017. The tool will then be refined based on feedback and disseminated.

## IV. Future reporting timeline and Contact

- Final report – March 31, 2017
- Project Lead and Contact
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## Scenario Planning Strategy Ranking - Water & Growth

**Appendix A**

**The following strategies were identified by the exploratory scenario planning process as being common to all four of the identified scenarios. Please rank each of them from 1 (not relevant) to 5 (extremely relevant) according to its relevance to the future work of the Water & Growth**

| Answer Options | Not relevant | Somewhat relevant | Moderately relevant | Very relevant | Extremely relevant | Rating Average | Response Count |
|---|---|---|---|---|---|---|---|
| Develop, track, and compare community water budgets to inform policies, programs, plans, and practices. | 1 | 0 | 1 | 1 | 0 | 2.67 | 3 |
| Find the sweet spot between density and the point of diminishing returns | 0 | 0 | 0 | 0 | 3 | 5.00 | 3 |
| Develop suite of stewardship incentives (e.g. tap fee credits, small lots, etc) | 0 | 1 | 1 | 1 | 0 | 3.00 | 3 |
| ; codes basoal landscaping codes based on state mo( | 0 | 0 | 2 | 1 | 0 | 3.33 | 3 |
| Implement agricultural efficiency and conservation measures. | 2 | 0 | 1 | 0 | 0 | 1.67 | 3 |
| Increase regional collaboration between the Front Range and West Slope communities and representatives. Plan water infrastructure with a collaborative, transboundary perspective. | 2 | 0 | 0 | 0 | 1 | 2.33 | 3 |
| Develop a "water in the west welcome wagon" for new and existing homeowners, residents, developers, and policy makers. | 0 | 1 | 1 | 1 | 0 | 3.00 | 3 |
| Eliminate barriers, permit and increase water sharing agreements. | 2 | 0 | 0 | 1 | 0 | 2.00 | 3 |
| Develop and track new metrics, including water use per square foot categorized by land use. | 0 | 1 | 0 | 2 | 0 | 3.33 | 3 |
| Adopt a "true cost" pricing policy. | 2 | 1 | 0 | 0 | 0 | 1.33 | 3 |
| Adopt new design and engineering standards. | 0 | 0 | 0 | 3 | 0 | 4.00 | 3 |
| Create water wise land use plans. | 0 | 0 | 1 | 1 | 1 | 4.00 | 3 |
| Nurture a water efficient economy founded on efficient industries. | 1 | 1 | 0 | 1 | 0 | 2.33 | 3 |
| Fund implementation of long-range planning strategies via utility revenues. | 2 | 0 | 0 | 0 | 1 | 2.33 | 3 |
| Include designers in engineering departments. | 2 | 0 | 0 | 1 | 0 | 2.00 | 3 |
| Partner with trained water stewards, including designers, builders, maintenance crews, etc. | 1 | 1 | 1 | 0 | 0 | 2.00 | 3 |
| Update codes and standards to increase the adoption of emerging water conservation technology. | 1 | 1 | 0 | 1 | 0 | 2.33 | 3 |
| Measure, monitor, and message about market data and success stories. | 0 | 0 | 0 | 2 | 1 | 4.33 | 3 |

# Appendix B
# Draft User Guidance

**Units per Acre Guide**

| Product Type Observations | Min | Mean | Max |
|---|---|---|---|
| Large Single Family | 0.2 | 2.8 | 4.0 |
| Typical Single Family | 3 | 5.1 | 6.5 |
| Small Single Family | 6 | 8.6 | 19.7 |
| Townhome | 7 | 16.0 | 49.7 |
| 3-Story Walkup | 19 | 24.3 | 49.3 |
| Mid-Range Multifamily | 28 | 71.8 | 164.3 |
| High Density Multifamily | 57 | 115.2 | 387.3 |

**Indoor GPCD Coefficient Guide**

| Indoor GPCD | Typical GPCD Range |
|---|---|
| Inefficient | > 60 |
| Federal Fixture Standards | 45-60 |
| State Fixture Standards | 35-45 |
| Efficient at Currently Available Technology | 25-35 |

| Indoor GPCD Observations | Theoretical Minimum | Median | 95th Percentile |
|---|---|---|---|
| Large Single Family | 25.0 | 63.5 | 144.3 |
| Typical Single Family | 25.0 | 50.9 | 111.3 |
| Small Single Family | 25.0 | 52.0 | 104.3 |
| Townhome | 25.0 | 52.6 | 103.6 |
| 3-Story Walkup | 25.0 | 59.8 | 110.0 |
| Mid-Range Multifamily | 25.0 | 69.3 | 107.0 |
| High Density Multifamily | 25.0 | 60.2 | 81.2 |

**Seasonal Gallons per Square Foot Guide**

| Seasonal GPSF (Pervious) | Typical GPSF Range |
|---|---|
| Inefficient for Bluegrass | 18+ |
| Efficient for Bluegrass | 12 to 18 |
| Highly Efficient for Bluegrass/Some Xeriscape | 9 to 12 |
| Xeriscape | 5 to 9 |
| Little or No Seasonal Use | < 5 |

| Seasonal GPSF (Pervious) Observations | 5th Percentile | Median | 95th Percentile |
|---|---|---|---|
| Large Single Family | 1.4 | 11.9 | 22.5 |
| Typical Single Family | 2.2 | 8.2 | 33.0 |
| Small Single Family | 1.2 | 12.5 | 19.7 |
| Townhome | 2.9 | 13.1 | 37.5 |
| 3-Story Walkup | 9.1 | 27.2 | 57.9 |
| Mid-Range Multifamily | 12.6 | 31.9 | 166.3 |
| High Density Multifamily | 26.4 | 57.1 | 326.0 |

## Notes:

Indoor GPCD and Outdoor GPSF figures are based on a sample of homes in the Denver Water service area using 2014 consumption data. Users are encouraged to analyze data from their area of interest in order to model a best representation of local water use behaviors.

For indoor per capita demand, there is a theoretical minimum based on the most efficient indoor fixtures available on the market today. If a home has installed the most efficient fixtures available, the theoretical minimum gpcd, assuming normal frequency of use, is approximately 25 gpcd

Outdoor GPSF is influenced by many variables including weather, landscape type and landscape configuration. The research performed in developing this tool found a large range for outdoor water application rates. It was noted that landscapes configured with narrow strips of turf or vegetation tended to use more water than required by their landscapes. Furthermore, as density increases and the amount of pervious area decreases, it was found that small areas of turf or vegetation tended to use more water per square foot than required by the plants. Finally, with increased density comes the potential for greater seasonal use of water for cooling purposes.