



WATER AND SEWER BOARD REGULAR MEETING
July 10, 2019 – 6:30 a.m.
2nd Floor Conference Room - 301 Walnut Street
Windsor, CO 80550

The Town of Windsor will make reasonable accommodations for access to Town services, programs, and activities and will make special communication arrangements for persons with disabilities. Please call (970) 674-2400 by noon on the 2nd day prior to the meeting to make arrangements.

AGENDA

A. CALL TO ORDER

1. Roll Call
2. Review of Agenda by the Board and Addition of Items of New Business to the Agenda for Consideration by the Board
3. Public Invited to be Heard

B. CONSENT CALENDAR

C. BOARD ACTION

1. Approval of the June 12, 2019 Minutes
2. Resolution No. 2019-01 – A Resolution of Recognition and Appreciation to Dennis Wagner for his Service and Dedication to the Town of Windsor

D. PRESENTATIONS AND DISCUSSION

1. Presentation: Water Supply Update
2. Presentation: Non-potable water systems in Windsor
3. Discussion: WaterSense Homes Specifications

E. COMMUNICATIONS

1. Town Board Work Session July 15 – Water & Sewer Board Charter.
2. Recap of June 12, 2019 meeting with Greeley Water & Sewer Board

F. ADJOURN



WATER AND SEWER BOARD REGULAR MEETING
June 12, 2019 – 6:30 a.m.
2nd Floor Conference Room – 301 Walnut Street
Windsor, CO 80550

MINUTES

A. CALL TO ORDER

Board Chairperson Bielawski called the meeting to order at 6:30 a.m.

1. <u>Roll Call</u>	Chairperson	Greg Bielawski
	Vice-Chairperson	Carlos Medina
	Secretary	Julie Cline (absent)
		Darell Zimbelman
		Milt Tokunaga
		Milton Geiger
		Janene Willey
	Town Board Liaison	Ken Bennett

Also present:

Town Attorney	Ian McCargar
Director of Engineering	Dennis Wagner
Director of Planning	Scott Ballstadt
Water Resources Manager	John Thornhill
Customer Services Manager	Mike Lucero
Utility Billing Admin Specialist	Erin Porter

2. Review of Agenda by the Board and Addition of items of New Business to the Agenda for Consideration by the Board
There were no additional items added to the agenda.

3. Public Invited to be Heard
There was no public comment.

B. CONSENT CALENDAR

There were no items on the consent calendar

C. BOARD ACTION

1. Minutes of May 8, 2019 Regular Meeting
Board Member Tokunaga moved to accept the minutes for the May 8, 2019 Meeting with the correction of a typo; Board Member Willey seconded the motion. Motion carried unanimously.

D. PRESENTATIONS AND DISCUSSION

1. Roles and Responsibilities of the Windsor Water and Sewer Board

The Board discussed the draft of the revised Roles & Responsibilities of the Windsor Water & Sewer Board. Board Member Willey moved to approve the draft as written; Board Vice Chairperson Medina seconded the motion. Motion carried unanimously.

2. Water Bill Inserts

Mr. Thornhill presented information on the process for requesting bill inserts. Board Chairperson Bielawski asked how many bills were sent electronically, Ms. Porter stated that only about 25% of the bills are sent out electronically, and around 7,000 bills are sent out through the mail monthly. She stated that regardless of if a paper bill is sent or an electronic bill, if a customer is registered online the Town pays per account per month.

Mr. Thornhill went over the costs associated with sending inserts with the billing, and that messages should complement existing campaigns, and other mediums can be used such as the website and social media.

Board Member Geiger asked about messaging on the bill itself. Ms. Porter stated that there is space available, but messages are prioritized based on need and first come first served.

3. Growth Management Area

Mr. Ballstadt presented information to the Board regarding the current map for growth management as well as the potential future growth management area. He stated that the growth management area is defined within the Comprehensive Plan, which was last updated in 2016. The Planning Commission is responsible for adopting the Land Use Map which identifies the corporate town limits as well as the potential growth plan.

Mr. Ballstadt stated that the current growth plan accounts for a potential population of 100,000 residents total. He also went over various areas that are potential annexations into the Town limits

4. Executive Session

Board Member Tokunaga moved for the Board to enter into an Executive Session at 7:12 am; Board Vice Chairperson Medina seconded the motion. Motion carried unanimously.

An executive session pursuant to Colorado Revised Statutes § 24-6-402 (4)(b) to confer with the Town Attorney for the purposes of receiving legal advice on specific legal questions (water storage and water rights project); Ian McCargar, Town Attorney.

An executive session pursuant to Colorado Revised Statutes § 24-6-402 (4)(e)(I) for the purpose of determining positions relative to matters that may be subject to negotiations; developing strategy for negotiations; and instructing negotiators with respect to water acquisition.

Recording and minutes paused during executive session.

The Board returned to the regular meeting at 8:07 am.

E. COMMUNICATIONS

1. Regional Water Issues Meeting with Greeley, June 12, 2019 2:30pm

Mr. Thornhill and representatives of the Town will meet with Greeley to discuss maps and inventory relevant assets and projects, current delivery systems, NISP infrastructure,

opportunities for partnerships limits of 1041 and 404 permitting risks for pipelines and treatment plants, the dynamics of treating water near Glade Reservoir, opportunities for drought protection and storage, and review the existing Inter Governmental Agreement (IGA).

2. Northern Water's Conservation Gardens Fair recap

Chairman Bielawski stated that the fair was well done and there was a lot of information there. He mentioned it might be something to promote to residents next year

3. Upcoming Northern water Tours:

- a. East Slope: June 27 and September 18
- b. West Slope: August 15

4. Water Literate Leaders class applications due June 24

G. ADJOURN

Board Chairman Bielawski moved to adjourn the meeting at 8:22 am; Board Vice-Chairperson Medina seconded the motion. Motion carried unanimously.

Submitted by:

A handwritten signature in blue ink, appearing to read "Erin Porter".

Erin Porter, Utility Billing Administrative Specialist

WINDSOR WATER & SEWER BOARD
RESOLUTION NO. 2019-01

A RESOLUTION OF RECOGNITION AND APPRECIATION TO DENNIS WAGNER FOR
HIS SERVICE AND DEDICATION TO THE TOWN OF WINDSOR

WHEREAS, the Windsor Water & Sewer Board (“Board”) was established to provide advisory service to the Windsor Town Board; and

WHEREAS, the Board has been supported in its efforts through the services of Director of Engineering Dennis Wagner as the Board’s staff liaison; and

WHEREAS, both the Town and the Board have been very fortunate to have Mr. Wagner guide the Town’s Engineering Department for 39 years, and

WHEREAS, Mr. Wagner has announced his retirement from his position as Director of Engineering; and

WHEREAS, Mr. Wagner has guided the Town in the acquisition of sustainable, high-quality and reliable water supply; and

WHEREAS, Mr. Wagner has contributed his expertise to assure the construction of vast infrastructure to serve the Town’s growth from a population of 4,277 in 1980 to an estimated 31,719 today; and

WHEREAS, we, the members of the Board wish to express our utmost appreciation for the work that Mr. Wagner has done for the Town of Windsor; and

WHEREAS, the Board wishes to extend our sincere best wishes to Mr. Wagner and his family for every happiness in the future.

NOW THEREFORE BE IT RESOLVED, that the Windsor Water & Sewer Board recognizes and appreciates the service of Dennis Wagner for 39 years and we wish Dennis well in all future endeavors, and, further, that this Resolution is being duly recorded in the Minutes of the Windsor Water & Sewer Board this tenth day of July in the year 2019.

Gregory T. Bielawski, Chair

Carlos Medina

Julie Cline

Darell Zimbelman

Milt Tokunaga

Milton Geiger

Janene Willey



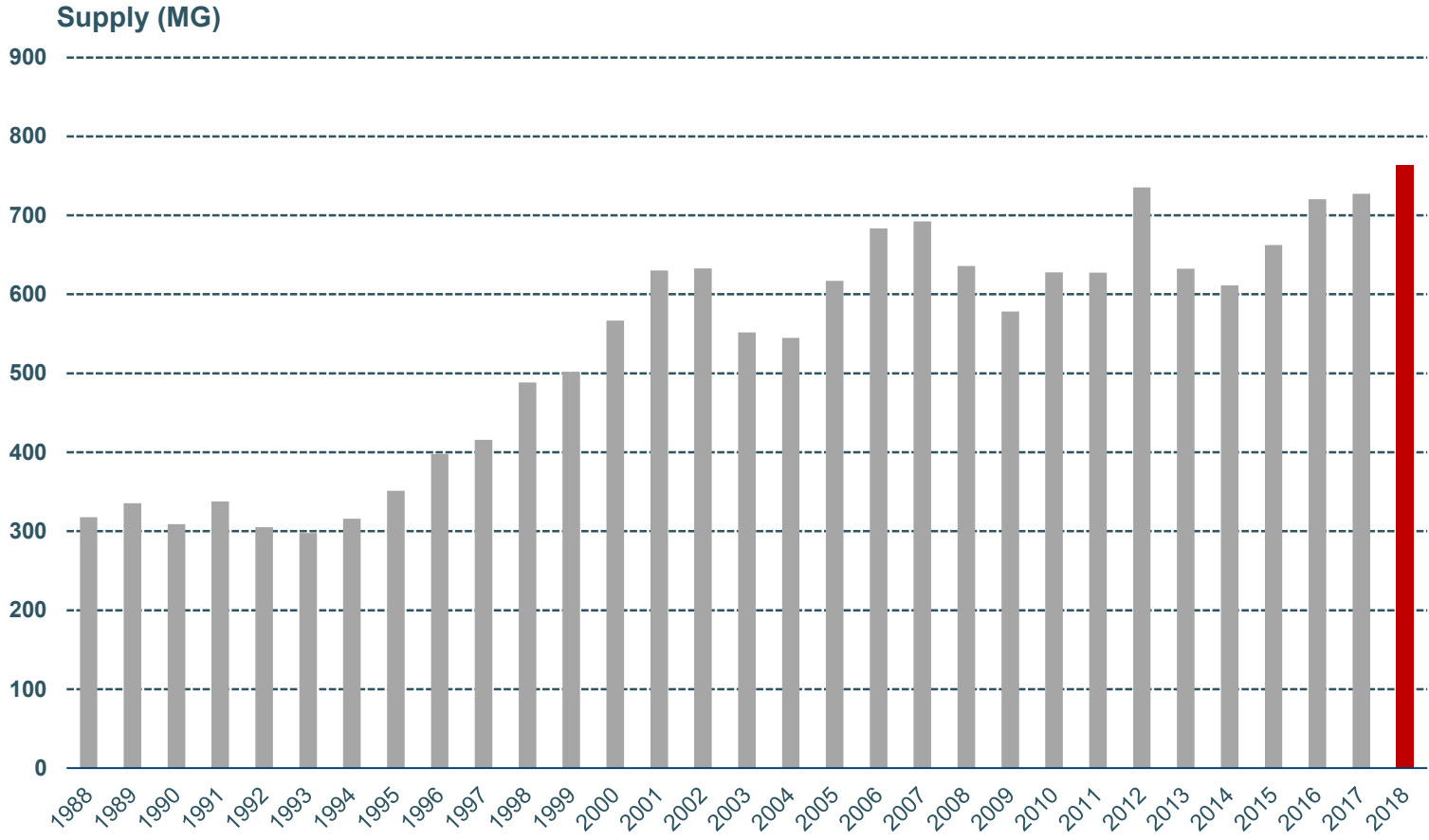
East Slope Distribution System

This map illustrates the water distribution network originating from the Rocky Mountain National Park area. Key features include:

- Reservoirs:** Horsetooth Reservoir, Pinewood Reservoir, Lake Estes, Mary's Lake, Carter Lake, Flatiron Reservoir, and Boulder Reservoir.
- Canals and Pipelines:** North Poudre Diversion Tunnel, North Poudre Supply Canal, Pleasant Valley Pipeline, Hansen Supply Canal, Dixon Feeder Canal, Hansen Feeder Canal, Dille Diversion Tunnel, Olympus Tunnel, Pole Hill Tunnel, Rams Horn Tunnel, Prospect Tunnel, Mountain Tunnel, Rattlesnake Tunnel, Saint Vrain Supply Canal, Boulder Feeder Canal, Boulder Creek Supply Canal, and South Platte Supply Canal.
- Cities and Towns:** Fort Collins, Windsor, Loveland, Greeley, Berthoud, Lyons, Longmont, Boulder, Louisville, Lafayette, Broomfield, and Superior.
- Geographical Features:** Rocky Mountain National Park, Estes Park, and the Front Range.
- Scale:** 0 to 20 miles (Approximate).

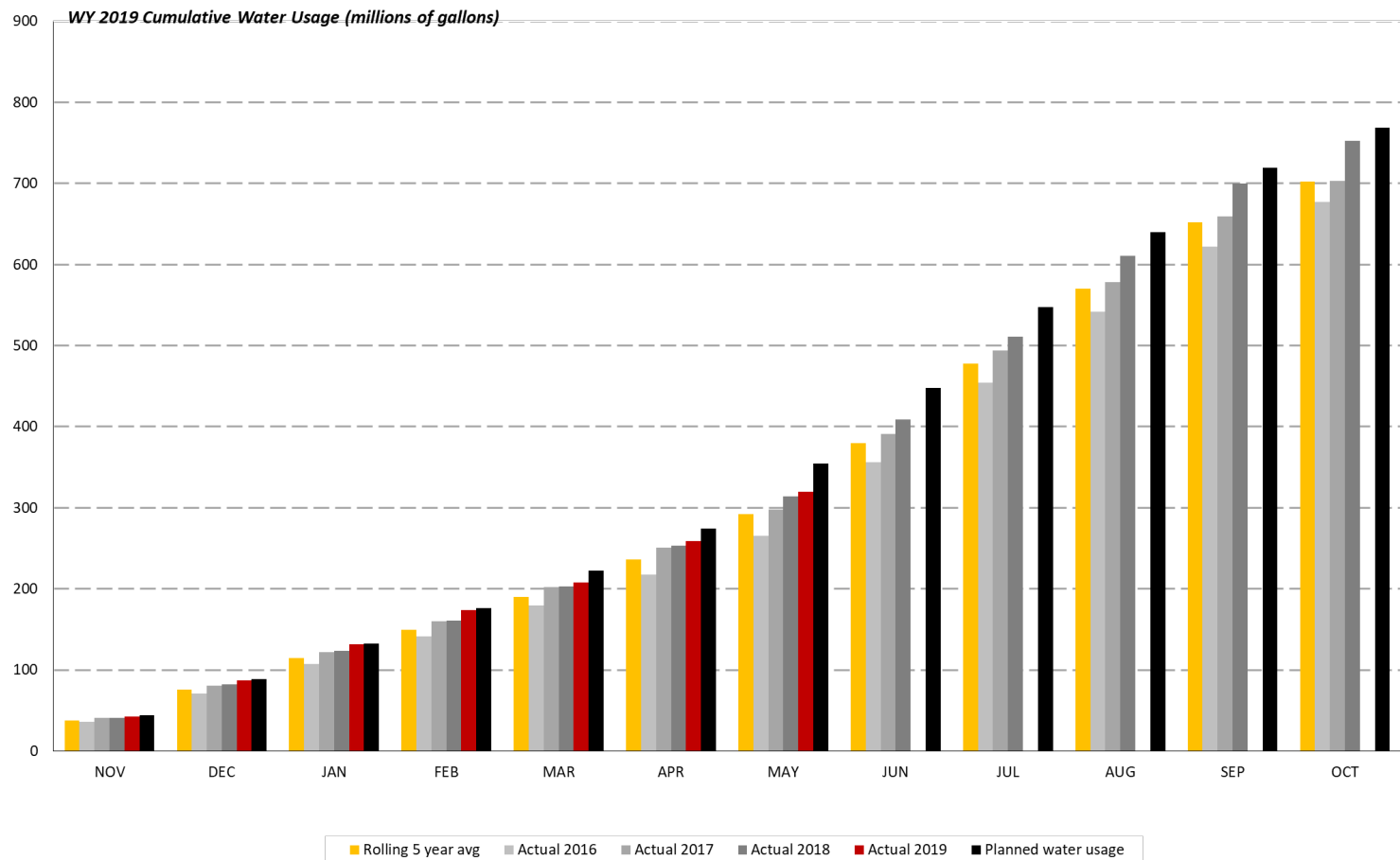


Annual Demand



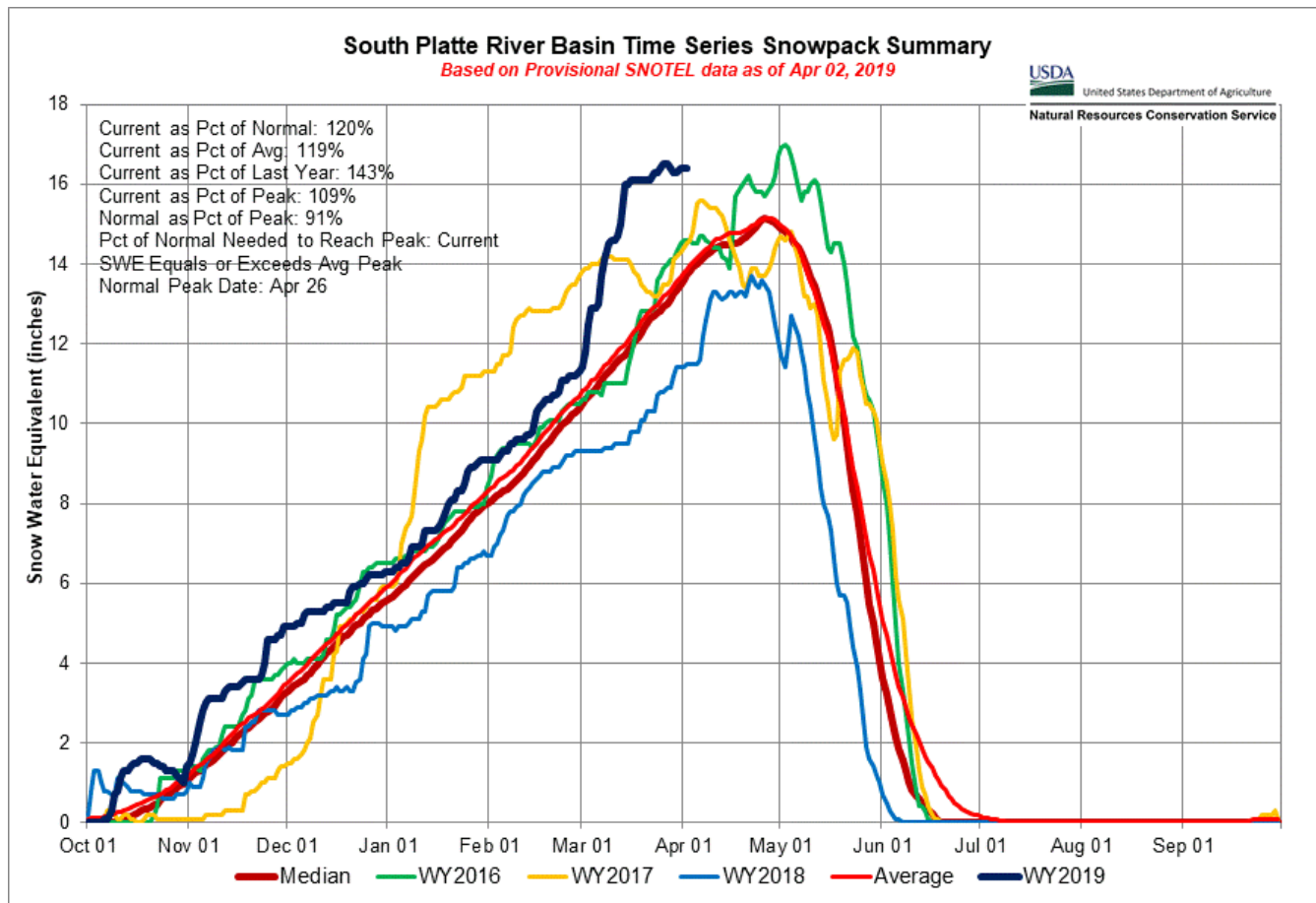


Annual Demand by Month



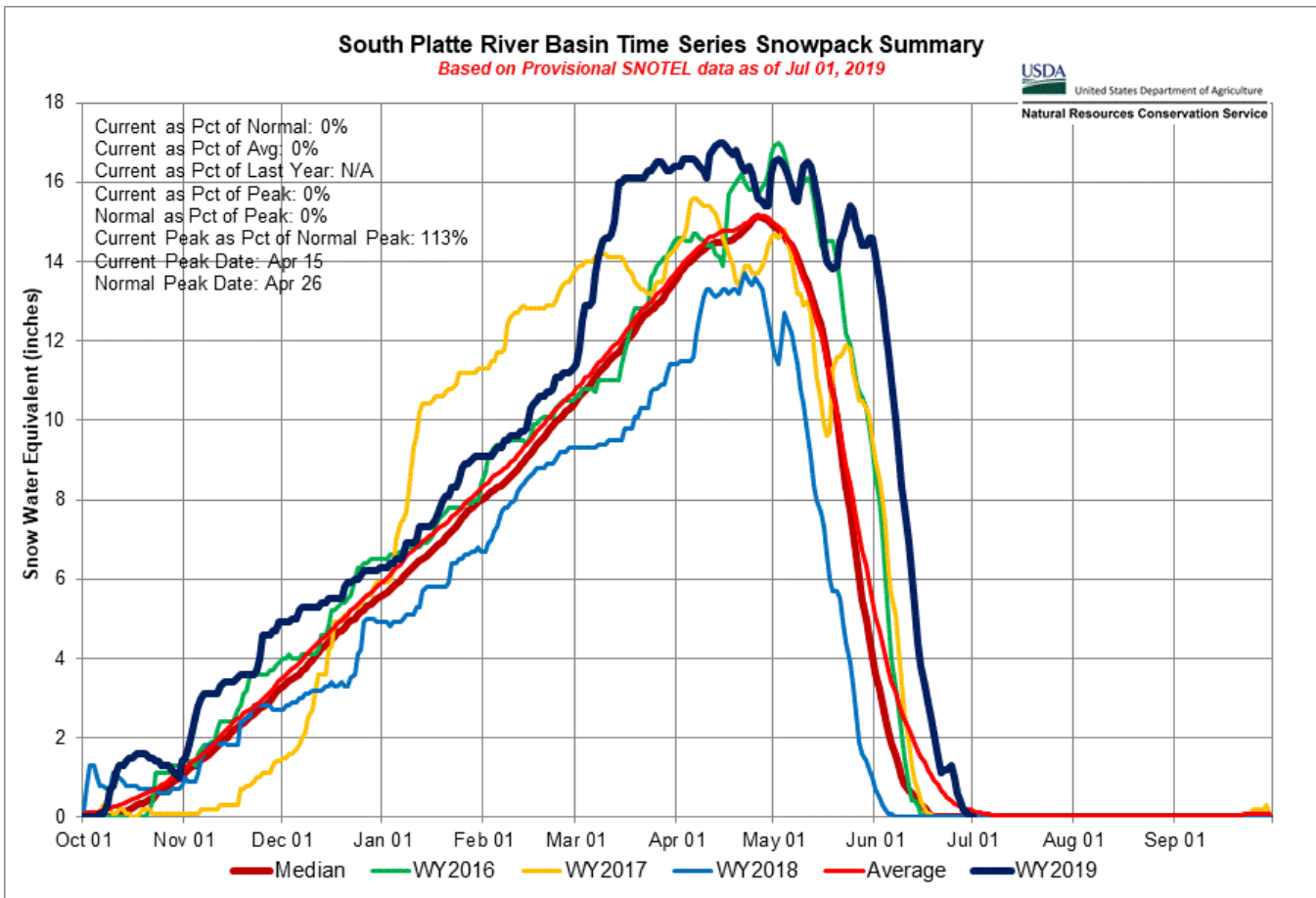


South Platte Basin Snowpack (SWE) - April



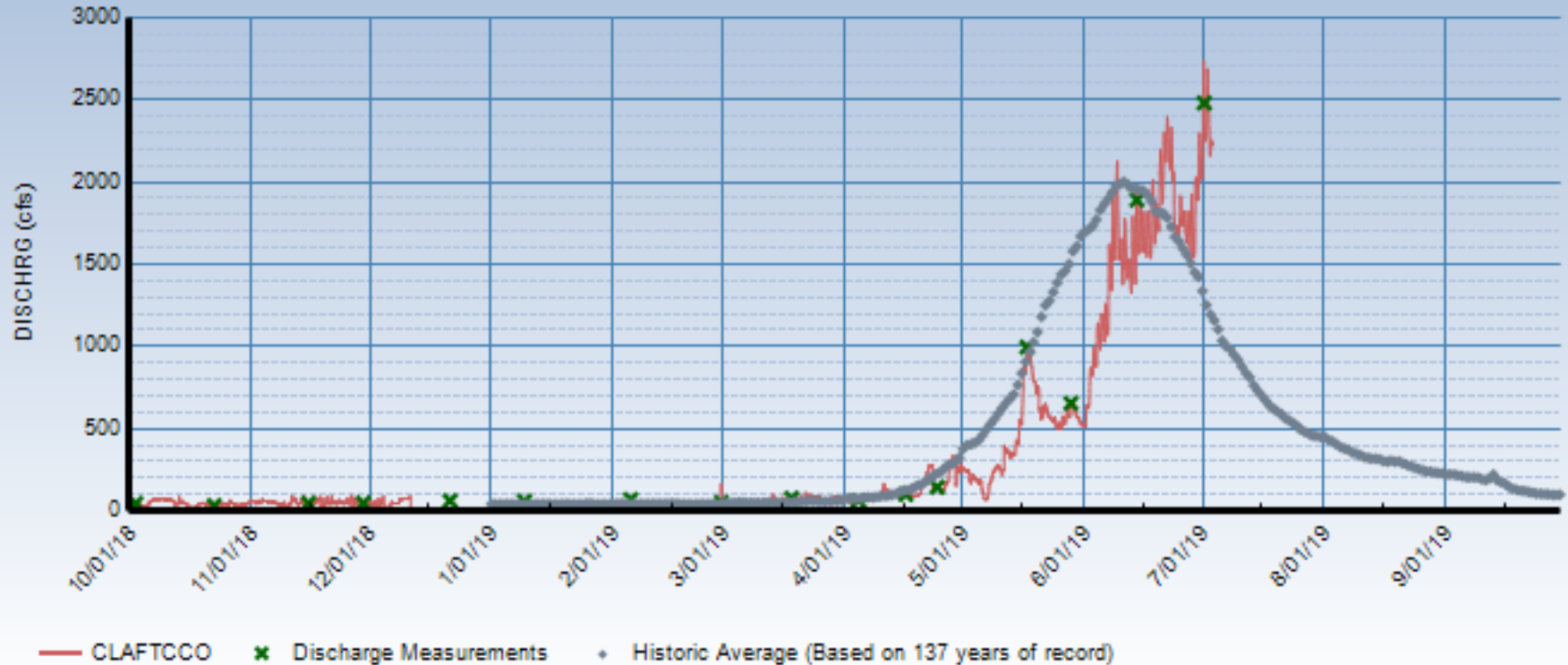


South Platte Basin Snowpack (SWE) - July





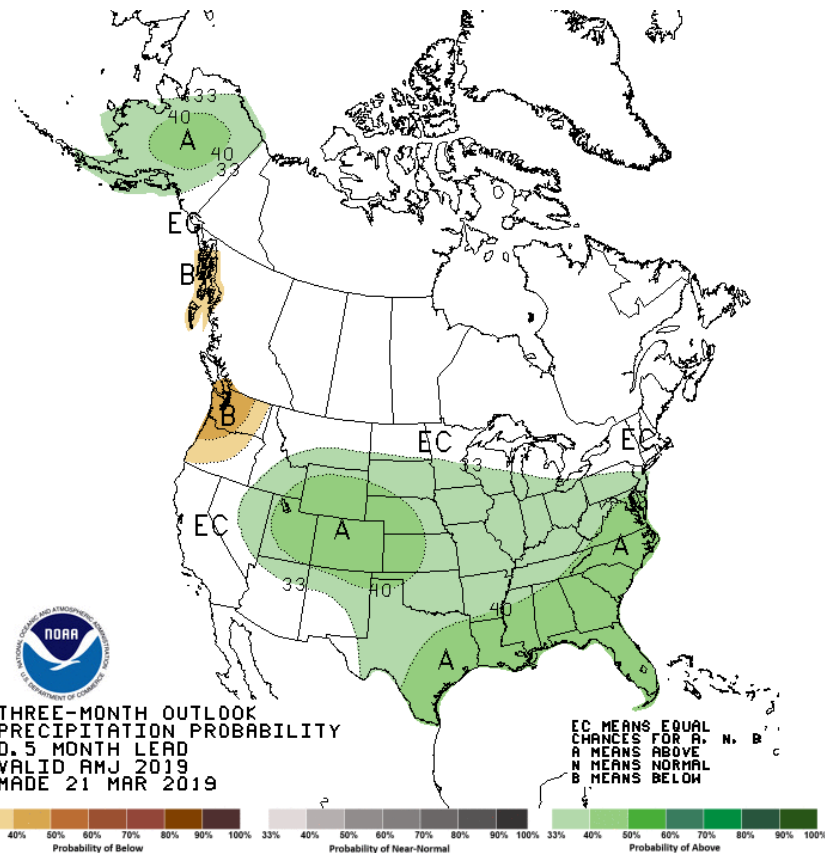
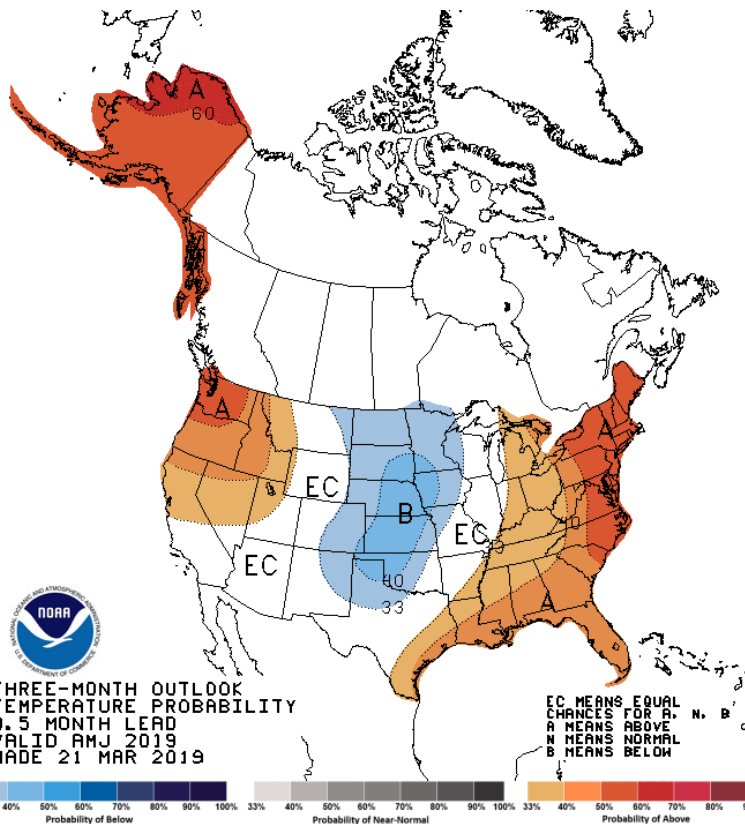
Poudre River Flows at Canyon Mouth thru July 3rd



April

Temperature

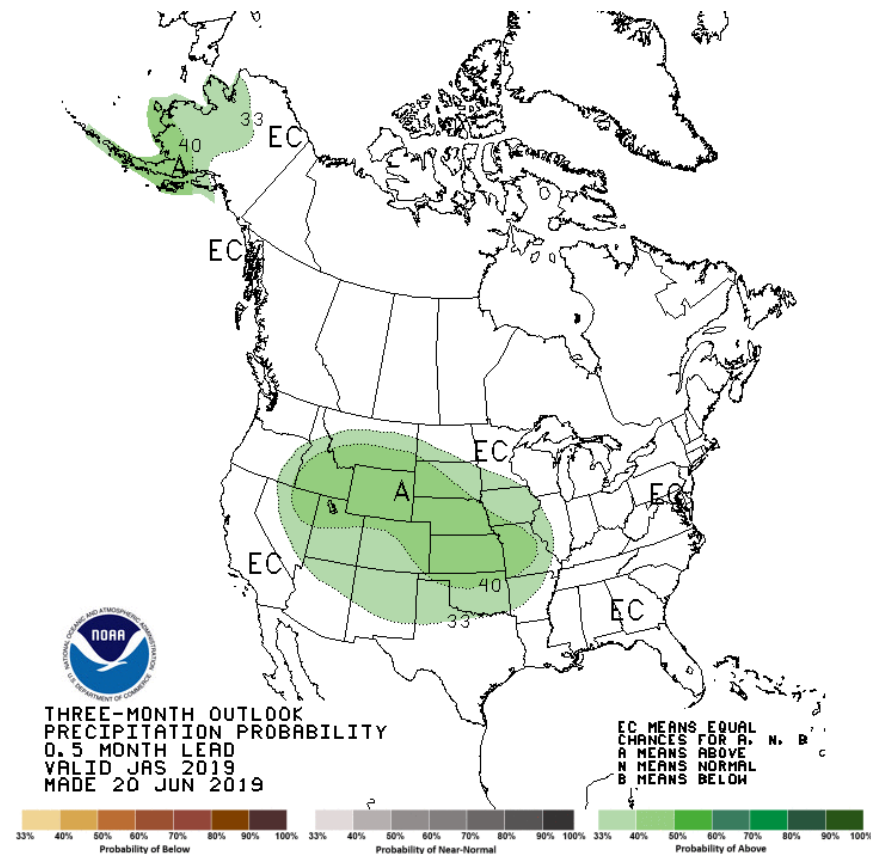
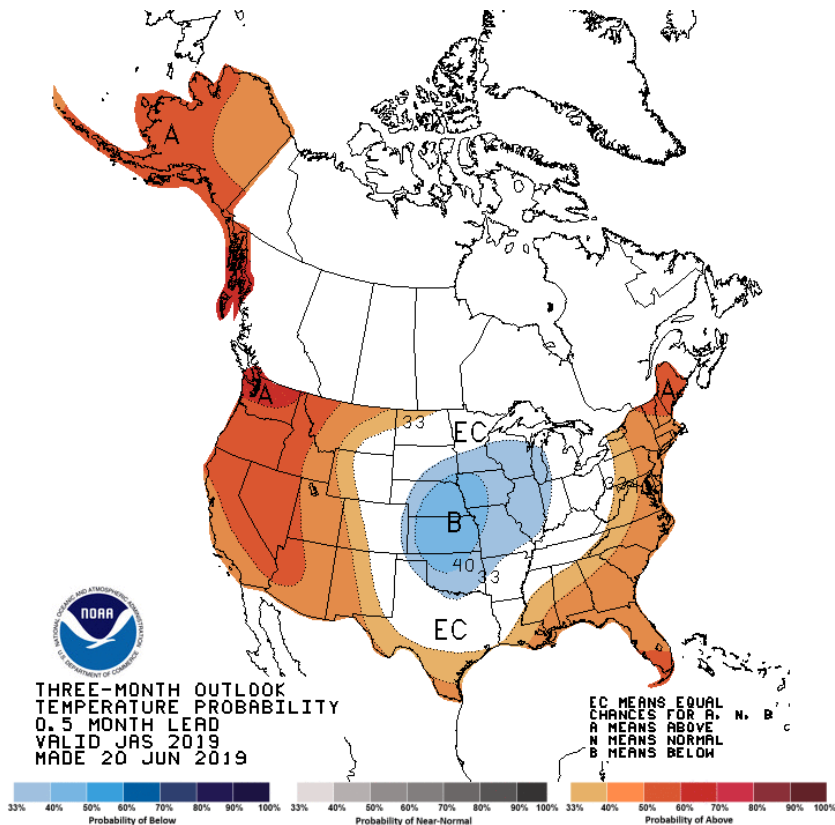
Precipitation



July

Temperature

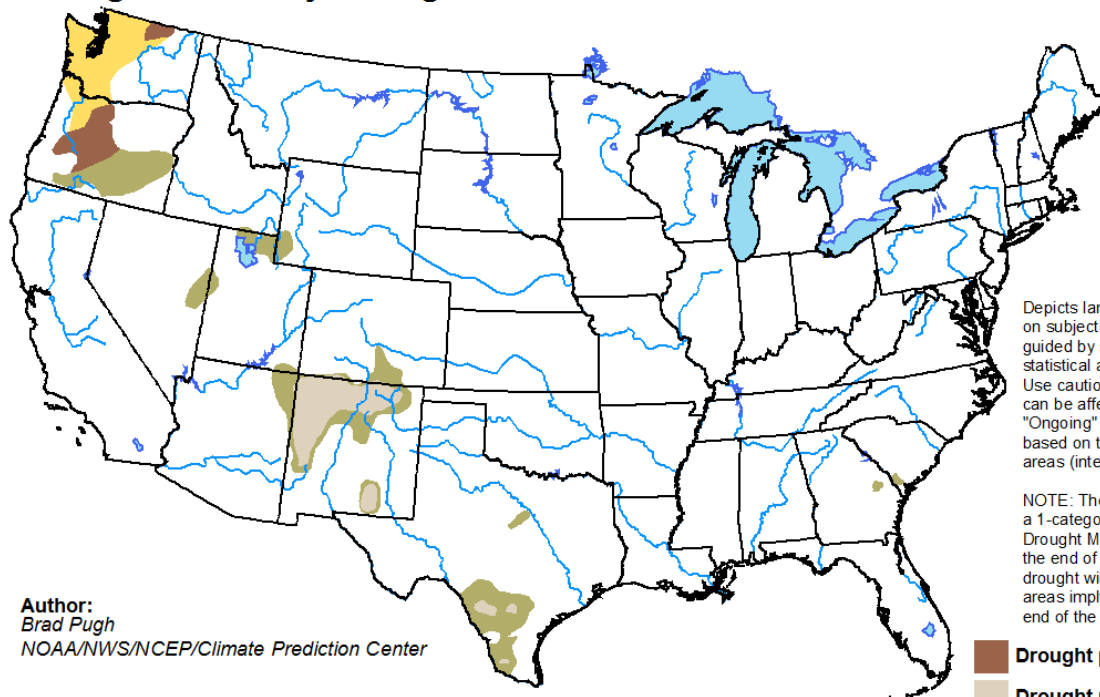
Precipitation



U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

Valid for March 21 - June 30, 2019
Released March 21

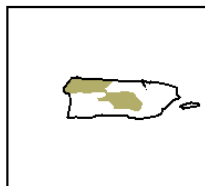
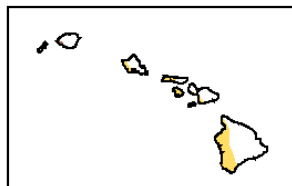
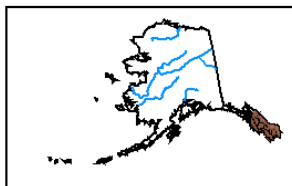


Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

Author:
Brad Pugh
NOAA/NWS/NCEP/Climate Prediction Center

- Drought persists
- Drought remains but improves
- Drought removal likely
- Drought development likely

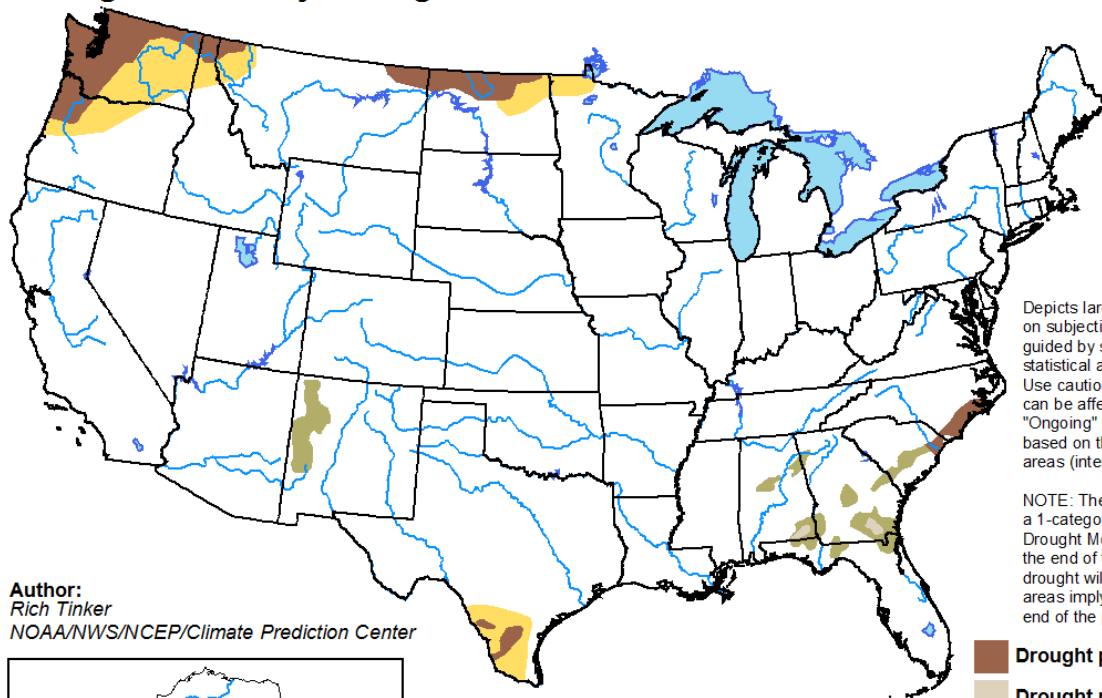


<http://go.usa.gov/3eZ73>

U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

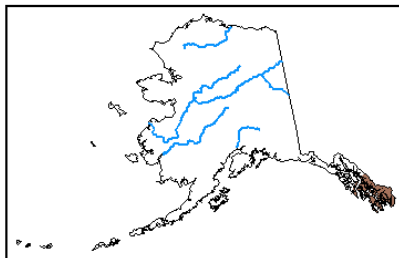
Valid for June 20 - September 30, 2019
Released June 20



Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

Author:
Rich Tinker
NOAA/NWS/NCEP/Climate Prediction Center



- Drought persists
- Drought remains but improves
- Drought removal likely
- Drought development likely



<http://go.usa.gov/3eZ73>

Demands

Historical Water Usage

Year	Amount purchased from NWCWD (million gallons)	Amount purchased from FCLWD (million gallons)	Amount purchased from Greeley (million gallons)		Total Amount purchased (million gallons)	Total Amount purchased (acre feet)
2011	327.6	110.1	189.9	▼	627.6	1,925
2012	416.8	111.3	207.2	▼	735.3	2,256
2013	337.1	110.3	185.2	▼	632.6	1,940
2014	294.4	109.8	207.3	▼	611.5	1,876
2015	354.7	110.8	196.8	▼	662.3	2,032
2016	400.6	107.6	212.3	▼	720.5	2,210
2017	414.0	110.3	203.0	▼	727.3	2,231
2018	449.5	104.7	210.0	▼	764.2	2,344
Average	374.3	109.4	201.5		685.2	2,102

→ +5% ~ 2,500 AF



2019 Projected Supply

Raw Water Supply

	Number of shares	Yield in 2019 (acre-feet)
CBT variable quota (70%)	1,771	1,240 acre-feet
CBT fixed quota (70%)	2,101	1,471
CBT carryover		771
North Poudre Irrigation Co. CBT water	513.75	1,439 2.8 af/share
Total CBT available		4,920 acre-feet
NPIC CBT water rented and/or put into Windsor Lake		400
Carryover to 2020		774
Available water before shrinkage		3,746
Available water after 17.0% shrinkage		3,201 acre-feet



2019 Actual Supply

Raw Water Supply

	Number of shares	Yield in 2019 (acre-feet)
CBT variable quota (70%)	1,771	1,240 acre-feet
CBT fixed quota (70%)	2,101	1,471
CBT carryover		771
North Poudre Irrigation Co. CBT water	513.75	1,541 3 af/share
Total CBT available		5,023 acre-feet
NPIC CBT water rented and/or put into Windsor Lake		860
Carryover to 2020		774
Available water before shrinkage		3,388
Available water after 17.0% shrinkage		2,896 acre-feet

Questions?



TOWN OF WINDSOR

2010 Non-Potable Water Master Plan



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EXECUTIVE SUMMARY

The Town of Windsor, with a current population of approximately 18,700 people, is centrally located between Fort Collins and Greeley in northern Colorado, approximately 50 miles north of Denver. Windsor has experienced tremendous growth over the last decade and will continue to attract new people to its wonderful community. The Town is committed to providing amenities such as park and open space areas for its current and future residents. The park and open space areas require irrigation water, and the Town will need renewable non-potable supplies for this irrigation.

The focal point for the Town's parks and recreation is Kern Reservoir (a.k.a. Windsor Lake). Kern Reservoir is often referred to as the "Jewel of Windsor" due to its central location within the Town as well as the amenities the Town has developed in recent years both in and around the lake including parks, trails and recreational access for boating, swimming and fishing. In addition to the recreation value, water stored in Kern Reservoir provides irrigation for Town parks and augmentation water for the Town's wells.

Non-Potable Water Master Plan Objective

This plan analyzes current water demands and how to use existing Town non-potable water supplies to meet those demands. In addition, this plan projects non-potable demands through full build-out of Town parks and open spaces and identifies new sources of water to meet future demands. The goal of this plan is to guide the Town through its non-potable needs, including water acquisition, water storage, and Kern system improvements needed for both irrigation and augmentation. Foresight into the Town's needs of "how much" and "what kind" of water supply will help position Windsor with sufficient non-potable water long term in this highly competitive water market.

Key Findings and Recommendations

1. Correct Poudre Plan well locations and decreed location of use.

Several of the Town's Poudre Plan wells, namely those at Main Park, have an incorrect well location and decreed location of use. The location and decreed location of use for these wells is the SW $\frac{1}{4}$, SW $\frac{1}{4}$ of Section 16, T6N, R67W, in the 6th P.M., which is the location of Boardwalk Park. The Town should correct the location and location of use for the Main Park wells. The decreed location for Cemetery Well #8 should also be corrected.

2. **Incorporate Town Hall as part of the irrigated acreage for the Main Park wells.** Per discussions with the CLPWUA, in the process of correcting the decreed location of use for the Main Park wells, the Town could include Town Hall since it is adjacent to the park and in the same quarter-quarter section. This will allow the Town to irrigate Town Hall from the Main Park irrigation system, which is augmented by the Poudre Plan.
3. **Re-drill Boardwalk Park Well No. 7.** Boardwalk Park is currently being irrigated directly from Kern Reservoir through the Regional Pump Station. There is an old Poudre Plan well that is no longer operational. As discussed in Section 5.1.5 of this report, the Town has sufficient Poudre Plan credits to allow this well to be re-drilled and pumped under the Poudre Plan. This will free up water resources within Kern Reservoir to be used for other demands.
4. **Correct CRC Well location.** The decreed location for the CRC Well is SE $\frac{1}{4}$, SW $\frac{1}{4}$ of Section 17, T6N, R67W, in the 6th P.M. The well permit states NW $\frac{1}{4}$, SW $\frac{1}{4}$ of Section 17, T6N, R67W, in the 6th P.M. A correction of well location form should be filed with the State Engineer. The owner of this well should also be updated to the Town of Windsor.
5. **Convert the northern portion of Chimney Park to non-potable irrigation.** Due to requirements of water measurement from the Kern Decree, it would be helpful to measure flows down the west lateral (lateral that delivers water to Chimney Park, Folkstone Nursery, Windsor Village and Broe). This is currently not possible. In addition, the southern portion of Chimney Park is currently irrigated directly from the Kern Lateral via a pump placed in the channel. There is water constantly running past this pump, regardless if the water is needed downstream. We recommend designing a structure at this location to allow for more efficient irrigation on the southern portion of Chimney Park, to allow the northern portion of Chimney Park to be irrigated from the lateral, and to measure any flows past Chimney Park that runs down the west lateral.
6. **Convert Covenant Park to well irrigation.** Currently, Covenant Park is being irrigated with potable water. A well casing exists on the property from a monitoring well. We recommend the Town complete the well and file a Water Court application and SWSP to include the well in the Kern Augmentation Plan.
7. **Install a drip irrigation system at Folkstone Nursery.** Per the Kern Decree, the Town can claim irrigation return flow credit as 17% of irrigation water applied to its parks under the Kern system. Currently, Folkstone Nursery is flood irrigated. Flood irrigation typically generates about 50% return flow. Since Windsor's irrigation return flow credit is fixed at 17% per the decree, any improvements to irrigation efficiency greatly benefits the Town.

8. **Convert Windsor Village to well irrigation.** A new well at Windsor Village was included as part of the Kern Augmentation Plan. Since this well has been decreed, the Town can drill a new well at this site upon approval of a new well permit.
9. **Meet with Windsor Development Group, LLC to discuss water requirements at the Ruff Development.** Per the agreement, Windsor Development Group, LLC conveyed 1.31 Kern shares to the Town in exchange for delivery of that water to their development. The 1.31 shares deliver 13.7 acre-feet of water. Currently, there are 8.3 acres of irrigation at this development, which has an average demand of 18.9 acre-feet. It appears that there is more developable acreage at this site. The Town should meet with the Windsor Development Group, LLC to determine how demands associated with any expansion will be met.
10. **Meet with the owners of Highland Meadows Golf Course to discuss options for delivery of early season water to Aberdour Circle Park and Windsor Highlands Park.** Due to the fact that the Loudon system does not come on until May in most years, both Aberdour Circle Park and Windsor Highlands Park cannot be irrigated as soon as desired. Town staff should meet with the owners of Highland Meadows Golf Course regarding possible early season irrigation from storage at the golf course. Typically golf courses commence irrigation before May, so it may be reasonable for the Town to irrigate its parks as well. As a potential negotiating point, the Town currently delivers more Loudon water to the golf course than is subsequently needed at the Town's parks. The golf course receives the benefit of this excess water.
11. **Pipe the open channel of the Kern Lateral across the lumber yard.** The east branch of the Kern Lateral travels through the lumber yard in Town. This east branch delivers irrigation water to several park and open space sites downstream of the lumber yard in addition to augmentation water that is measured and returned to the Cache la Poudre River. In the 2009-2010 winter season, the lumber yard plowed snow into this east branch of the Kern Lateral. By decree, the Town is required to make daily deliveries through this branch back to the river for augmentation. We recommend the Town pipe this section of the east branch to insure the required augmentation water can be delivered to the river year round.
12. **Improve language related to water supply dedication in future development agreements and revisit language in existing development agreements.** It is unclear in most of the Town's development agreements if the developer is required to provide the water and whether or not Windsor ultimately has to pay for the water through a metro district. Further, rates that Windsor will pay are not explicitly defined. Windsor should address the language in existing annexation agreements and be more explicit in future annexation agreements whether or not

the developer is to provide the water, and if so, that there is no future cost to the Town.

13. Develop storage at Eastman Park South. This location is ideal for Windsor's non-potable water needs. Initial investigation shows storage at this site to be very feasible. The Town should rehabilitate the lateral from the B.H. Eaton Ditch to improve conveyance of water to the storage vessel once constructed. Based on storm drainage needs per discussions with staff, the first section of the lateral should be left open channel and the rest should be piped.

14. Purchase additional non-potable water supplies. To meet the Town's future non-potable water needs, we recommend the following:

Table ES.1 – Recommended New Non-Potable Water

Name	Number of Shares	Estimated Cost
New Cache Irrigation Shares ¹	85	\$2,975,000
B.H. Eaton Shares ²	1	\$64,800

Non-Potable Water Master Plan Update

As plans for future parks become more concrete and development agreements to irrigate those parks get refined, the Town's progress in acquiring non-potable water to meet its demands can be monitored and this plan revised as necessary. Water supplies that are available today may not be in the future. Further, other opportunities for non-potable water may arise, which we can evaluate on a case-by-case basis. The Town may need to adjust its course as it moves forward.

¹ New Cache value is based upon previous sales

² B.H. Eaton value is based upon an estimate of \$6,000 per acre-foot of consumptive use

CHAPTER 1 – INTRODUCTION

The Town of Windsor, with a current population of approximately 18,700 people, is centrally located between Fort Collins and Greeley in northern Colorado, approximately 50 miles north of Denver. Windsor has experienced tremendous growth over the last decade and will continue to attract new people to its wonderful community. The Town is committed to providing amenities such as park and open space areas for its current and future residents. The park and open space areas require irrigation water, and the Town will need renewable non-potable supplies for this irrigation. A focal point for the Town's parks and recreation is Kern Reservoir (a.k.a. Windsor Lake). The capacity of Kern Reservoir is approximately 3,008 acre-feet and provides a central attraction for Town residents. Windsor has a master plan for park and greenbelt areas along trails surrounding the reservoir. The water stored in Kern Reservoir provides water to these adjacent parks and trails as well as for many other parks throughout Town, either directly or by providing augmentation water for park well usage. A map of the Town's existing and future park sites is included as **Figure 1**.

The Kern Decree entered in Case No. 02CW301 provides 530 acre-feet of fully consumable water from Kern Reservoir each water year, November 1 to October 31. The Town has an agreement to provide 500 acre-feet per year to the Front Range Energy (FRE) ethanol plant, which uses the water for augmentation of their wells. Although the Town is obligated to provide up to 500 acre-feet, FRE's current demands are approximately 200 acre-feet annually.

With the commitment to FRE and the irrigation at current and future parks within Town, Windsor must proactively plan and acquire new non-potable water supplies as well as manage existing supplies as efficiently as possible. Good management of the Town's non-potable water will help to insure that the Town has adequate supplies for its future. The purpose of this Non-Potable Water Master Plan is to provide the Town decision makers with information regarding non-potable water acquisition and non-potable storage. More specifically, this plan includes:

- Evaluation of existing non-potable water supplies
- Current and projected non-potable water demand
- Examination of potential new non-potable water sources
- Evaluation of potential non-potable storage sites
- Recommendations for non-potable water and storage acquisition
- General recommendations on Kern system improvements

CHAPTER 2 – CURRENT NON-POTABLE WATER SUPPLIES

The Town's water rights portfolio is comprised of ownership in non-potable sources that are classified by the State as water tributary to the Cache la Poudre Basin. Tributary waters include direct flow river diversions delivered to the Town by a mutual irrigation company as well as water pumped from wells that draw from an underlying alluvial aquifer. Each source of tributary water has specific implications associated with its allowable use, delivery schedule, and required infrastructure to take delivery. For some municipalities, effluent from the wastewater treatment plant (WWTP) can be used as an additional non-potable supply. Currently, the Town's WWTP effluent consists of Colorado Big Thompson (CBT) water, which is not fully consumable, and therefore the effluent cannot be used as a non-potable supply. The following sections provide an overview of each tributary water source, general administration of each water right, and specific information relative to the Town's ownership.

The Town is located along the banks of the Cache la Poudre River. Water in the Cache la Poudre River is administered in Water District No. 3 by the State of Colorado, Division of Water Resources, and is tributary to the South Platte River Basin in Water Division No. 1. Colorado water law recognizes the "first in time, first in right" doctrine for prioritizing uses of tributary waters. A water right's date of appropriation represents when the right was first used for beneficial purposes and holds its place in time within the State's priority system. Appropriation dates for water rights, including groundwater rights, are adjudicated when a decree is entered by the Court and are available only for the type of uses specified in the decree.¹ The manner in which the Town manages its non-potable water supply is strictly governed by the State's priority system, which dictates how the water can be used and when it can be used. Based upon Colorado water law, the Town's tributary water supplies can be categorized into three types:

- Direct Flow Water
- Storage Water
- Groundwater

¹ Not all wells have decreed groundwater rights associated with them. Some wells operate without a decree and are administered without an appropriation date (or without a placeholder within the priority system). A well owner can seek adjudication for their well by filing for a groundwater right with the Court.

2.1 Direct Flow Water Rights

The Town owns stock in six separate mutual ditch companies that divert and provide direct flow river water to its shareholders.

Table 2.1.1 - Summary of Water Rights Owned by the Town of Windsor

Direct Flow Water Right	Shares Owned by Town	Total No. of Shares	Percent Interest
North Poudre Irrigation Co.	350.5	10,000	3.5%
Whitney Irrigating Ditch Co.	2	320	0.6%
B.H. Eaton Ditch Co.	2	192	1.0%
Louden Irrigating and Canal Co.	2	600	0.3%
Louden Irrigating and Extension Co.	1	101	1.0%
New Cache la Poudre Irrigating Ditch Co.	8	2,500	0.3%

Direct flow river water is delivered to the Town via conveyance ditches in an amount that reflects the Town's interest in the total company stock. Conveyance losses are pro-rated among all shareholders, so not all of the water diverted at the river is available for use by the shareholder. Water is commonly delivered during the irrigation season, and in most cases, is decreed only for irrigation use. A description of the Town's ownership in direct flow river water is provided below.

2.1.1 North Poudre Irrigation Company

The Town owns 350.5 shares of North Poudre Irrigation Company (North Poudre). River headgate deliveries typically average three to four acre-feet per share annually and yield from April to October.² North Poudre shares are comprised of direct flow river water and trans-basin water from the CBT project. Four units of CBT are paired with each share of North Poudre direct flow river water. Currently, the Town rents out the direct flow component of its North Poudre shares to users within the North Poudre service area while using its CBT portion to meet potable demands.

2.1.2 Whitney Irrigating Ditch Company

The Town owns two shares of Whitney Ditch. River headgate deliveries typically average 33.4 acre-feet per share annually and yield from April to October.³ The Town currently uses its Whitney shares to irrigate Eastman Park, the Master Gardner's area, and trees at the Poudre Natural Area.

² Pro-rata River Headgate Deliveries are based on personal communication with Sharon Seaworth, Secretary for North Poudre Irrigation Company.

³ Based upon two prior change of use decrees (ditch loss of 15%, max farm efficiency of 60%)

2.1.3 B.H. Eaton Ditch Company

Windsor owns two shares of B.H. Eaton Ditch. River headgate deliveries typically average 25.9 acre-feet per share annually and yield from April to October.⁴ In the past, the Town has used its B.H. Eaton Ditch shares to irrigate Eastman Park South. However, there are difficulties in delivering these shares through the old ditch lateral.

2.1.4 Louden Irrigating and Canal Company (Louden Main) and Louden Irrigating and Extension Company (Louden Extension)

Windsor owns two shares of Louden Main and one share of Louden Extension. Combined, deliveries are comprised of both direct flow river water and storage water. The annual yield of direct flow river water from the Louden Main averages around 22.2 acre-feet per share between April and October.⁵ The Louden Ditch diverts water in Water District No. 4 and delivers water to the Town, and to other users in District No. 3, via the Louden Extension Ditch. Shareholders of Louden Main located within District No. 3 must also own shares in the Louden Extension, which has its own decreed water rights associated with it. Louden Extension shareholders receive their supply from Donath Reservoir, which yields approximately 4.9 acre-feet per share annually.⁶ Windsor Highlands Park and Aberdour Circle Park are currently being irrigated with Louden supplies after being routed through Highland Meadows Golf Course.

2.1.5 New Cache la Poudre Irrigating Ditch Company

The Town, through its 100 percent ownership in Kern Reservoir and Ditch Company (KRDC), owns eight shares of New Cache la Poudre Irrigating Ditch Company (New Cache), which is made available via the Greeley No. 2 Canal. River headgate deliveries typically average 14.9 acre-feet per share annually and typically yield from May to early July.⁷ The shares have been used for irrigation purposes within the historical Kern service area, located generally northeast and south of the reservoir. In recent years, the Town has not specifically used New Cache shares to meet non-potable demands, but can and should in the future.

Since most direct flow river water was originally decreed for irrigation use, this water is well-suited for park irrigation and can serve as a good supply to meet non-potable water demands within the ditch system's historical service area. Drawbacks of using direct

⁴ Based upon three prior change of use decrees (ditch loss of 15%, max farm efficiency of 60%)

⁵ Pro-rata River Headgate Deliveries are based upon a change of use analysis provided in Case No. 03CW046

⁶ Pro-rata delivery records are based upon very limited release data from Donath Reservoir from 1994 to 2005 and change of use analysis provided in Case No. 03CW046

⁷ Pro-rata River Headgate Deliveries are based upon a January 2010 Ditch-wide Historical Use Analysis prepared by HRS Water Consultants

flow water rights are primarily associated with the lack of flexibility as ditch companies only divert when in priority. The Town may need or prefer water for irrigation outside of the ditch irrigation season, which is currently the issue at Windsor Highlands Park and Aberdour Circle Park under the Loudon System. Wells provide the most flexibility as they can be used on demand. Some of the Town's water rights can be changed in the future to be used for well augmentation.

2.2 Storage Water Rights – Kern Reservoir

2.2.1 Description of Kern Reservoir

Kern Reservoir is centrally located within the Town just north of Highway 392, between Highway 257 and Weld County Road 19. **Figure 2** shows the reservoir location and various structural and operational elements. The reservoir is filled, in part, from the Greeley No. 2 Canal, which is owned and operated by New Cache. The reservoir is also filled via drainage and seepage inflows from lands north and west of the reservoir, including inflows directly from Osterhout Reservoir.

Kern Reservoir has three outlet works: (1) the South Outlet is used to deliver water from the reservoir for irrigation and augmentation through the Kern Lateral, (2) the Regional Pump Station is currently used to deliver irrigation water to lands located along the perimeter of Kern Reservoir, including Greenspire and Boardwalk Park, (3) the Greeley No. 2 Rubicon gate outlet is used by New Cache to equalize flows in the Greeley No. 2 Canal downstream of the reservoir.⁸

Kern Reservoir was enlarged beginning in 2002 and can currently hold 3,008 acre-feet without spill. At this capacity, the surface area of the reservoir is approximately 169.4 acres.

2.2.2 Kern Reservoir Water Rights Owned by Town

KRDC Priority #1 Right

The Town has 100 percent ownership (100 shares) in KRDC. KRDC was awarded storage priority number one on the Cache la Poudre River for 1,800 acre-feet of storage to irrigate approximately 1,000 acres under the KRDC service area.⁹ Following is pertinent water rights information for the KRDC Priority #1 Water Right:

⁸ New Cache uses the Kern Reservoir as a sort of pass through for their water supplies diverted at the Cache la Poudre River and Timnath and Big Windsor Reservoirs. New Cache uses their Rubicon control gate to either release from or back up flows into the reservoir so as to equalize the flow available from these sources to their downstream water users.

⁹ The applicant at the time the decree was entered was the Lake Supply Ditch Company; in 1906, the Lake Supply Ditch Company turned over its shares of stock to KRDC.

Table 2.2.2.1 – Kern Priority #1 Water Right

Water Right	Appropriation Date	Adjudication Date	Case No.	Amount (acre-feet)
KRDC Priority #1	February 10, 1882	December 9, 1904	CA1591	1800

In Case No. 02CW301, KRDC changed the use of all 100 shares in KRDC to include municipal uses within the service area of the Town, including augmentation, recreation and irrigation. The Town began operating the Kern Reservoir under the terms and conditions established in Case No. 02CW301 in January 2010 after a final decree was entered in the case in Division One Water Court. The Court found that the annual fill shall be limited to 1,277 acre-feet and the average annual consumptive use shall be limited to 530 acre-feet for the KRDC Priority #1 Water Right.

KRDC Junior Water Right

KRDC filed an application for a new water right in Case No. 02CW276 for the Kern Reservoir enlargement that occurred beginning in 2002. The amount claimed in the application is 1,966 acre-feet, conditional, with the right to fill and refill in priority. The source of supply for this junior water right includes water from the Cache la Poudre River diverted via the Greeley No. 2 Canal as well as seepage, wastewater, and storm water runoff from approximately 16 square miles of land located north and northwest of the reservoir. The proposed uses claimed for this right include irrigation, commercial, industrial, municipal, domestic, fish and wildlife, recreation, augmentation, and exchange. The application entered in this case is still pending.

Clammer & Gregory Ditch

The Town also owns the rights to the Clammer and Gregory Ditch (C&G Ditch), which was decreed for two cubic feet per second (cfs) for irrigation on approximately 226 acres located in the SE ¼ and E ½ of the SW ¼ of Section 22, Township 6N, Range 67W, in the 6th P.M. By contract, the Town currently owns interest to one cfs of this right, while the remaining one cfs of the right is held by Martin Lind.

The C&G Ditch discharges into Kern Reservoir through a pipe under Highway 257 from Osterhout Reservoir (**Figure 2**). The source of supply for the C&G Ditch is surface waste, seepage and drain water from lands above the Osterhout Reservoir. Following is pertinent water rights information for the C&G Ditch water right:

Table 2.2.2.2 – Clammer & Gregory Right

Water Right	Appropriation Date	Adjudication Date	Case No.	Amount (cfs)
Clammer & Gregory Ditch	December 28, 1904	December 12, 1988	86CW046	2

The C&G water right is being diverted to Kern Reservoir as flows through Osterhout Reservoir. The Kern Junior Water Right claims seepage flows into the reservoir, which includes flows through Osterhout. The C&G water right is essentially “within” the Kern Junior Water Right. The Town can deliver other water to the Martin Lind property to satisfy the one cfs.

Other Water Rights

In addition to the above mentioned water rights, Kern Reservoir is also used to store CBT water brought in by the Town or other entities using CBT for irrigation on lands located within the KRDC service area.¹⁰ The Town can also take delivery of their eight shares of New Cache through Kern Reservoir, but has not done so in recent years. New Cache also uses the reservoir as an equalizer and passes a variety of water rights through the reservoir.

2.2.3 Multiple Uses of Kern Reservoir

Windsor Non-Potable Irrigation and Well Augmentation

The water rights stored in Kern Reservoir by the Town are used for direct irrigation at Town parks, recreation facilities, and open space areas including Diamond Valley Park, Greenspire, Boardwalk Park, Chimney Park, Folkstone Tree Nursery, Windsor Village, Ruff Pond, Broe¹¹, and Martin Lind. Water from the reservoir is either pumped from the Regional Pump Station to these parks or is released through the South Outlet to the Kern Lateral for irrigation delivery via gravity.

Water in Kern Reservoir is also used indirectly to augment wells that are used to irrigate three Town parks. Currently, alluvial groundwater wells located at Eastman Park, Diamond Valley Park and the Community Recreation Center are used for irrigation and are augmented with water rights in Kern Reservoir. The decree entered in Case No. 02CW301 establishes the terms and conditions related to the augmentation of well pumping.

¹⁰ Dennis Betz/Broe Land Company is currently using CBT units to irrigate the property located in the N ½, Section 27, T6N, R67W, 6th P.M.

¹¹ Broe owns CBT which they bring in through the reservoir and deliver via the Kern Lateral; the Town does not use their water rights for delivery to Broe.

Return Flow Obligations for Changed Water Rights

When KRDC changed the use of the 100 shares in the KRDC, they incurred an obligation to replace the historical irrigation return flows associated with those shares. In the future, the Town will continue to take delivery of the KRDC #1 water right at the reservoir in an amount that will average 1,048 acre-feet per year, but will be obligated to use a portion of that water to replace historical irrigation return flows. On an average annual basis, the return flow obligation associated with the KRDC shares will be approximately 518 acre-feet, leaving 530 acre-feet (1,048 – 518 acre-feet) of consumptive use available for irrigation, augmentation, or recreation in the reservoir.

Augmentation Leasing

Windsor currently leases some of its water rights in the reservoir to other entities for their needs, which primarily are for augmentation. As discussed in more detail later in this report, the Town has entered into a 99-year lease agreement with Front Range Energy (FRE) to supply augmentation water to the Cache la Poudre River to replace depletions from FRE's groundwater wells. The lease agreement indicates the Town is to provide up to 500 acre-feet per year of augmentation water to the Cache la Poudre River, but actual use in recent years has been approximately 200 acre-feet annually. The Town has also entered into smaller volume and shorter term leases for augmentation water with other entities including Hall-Irwin. The Town currently delivers these leased sources through the Kern Lateral to the river in the same manner they deliver the Town's augmentation water.

New Cache Equalizer

Since 1934, KRDC and New Cache have been operating the reservoir according to an agreement that governs the use of the reservoir by both entities. The original agreement established that New Cache could use Kern Reservoir to equalize flow in the Greeley No. 2 Canal, which is used to deliver irrigation water to New Cache shareholders downstream of Kern Reservoir. In return for use of the reservoir, New Cache agreed to operate and maintain the reservoir including the dam, inlet works, and outlet works to the Greeley No. 2 Canal. This agreement also affirmed that New Cache would continue to deliver KRDC's Priority #1 Water Right to the reservoir via the Greeley No. 2 Canal.

Aside from a supplement added to the original agreement in 1982, the basic provisions of the 1934 agreement have remained intact since 1934. KRDC and New Cache are currently in the process of updating the agreement to address new operational and accounting issues associated with the entry of the decree in Case No. 02CW301 as well as the 2002 reservoir enlargement.

New Cache currently runs the following sources through Kern Reservoir for delivery to their downstream shareholders: New Cache senior direct flow, New Cache junior water right, Timnath Reservoir, Big Windsor Reservoir, Fossil Creek Reservoir, and CBT. New Cache will temporarily detain these sources in Kern Reservoir for purposes of equalizing the flow in their canal, but they are not allowed to store these sources in the reservoir for more than 72 hours.

Town Recreation and Aesthetics

Kern Reservoir is often referred to as the “Jewel of Windsor” due to its central location within the Town as well as the amenities the Town has developed in recent years both in and around the lake including parks, trails and recreational access for boating, swimming and fishing. The reservoir water rights owned by the Town are used in part to maintain the water levels in the lake to maintain aesthetic appeal.

2.3 Groundwater

2.3.1 Well Information

The Town is located over an alluvial aquifer deposit and benefits from its geographical location to utilize groundwater as an additional resource for water. Currently, there are 12 wells included in the Town’s water portfolio that can provide non-potable water supplies for irrigation (**Figure 1**).

Table 2.3.1.1 - Summary of Wells Owned by the Town of Windsor

	Permit No.	Depth (feet)	Pumping Rate (gpm)	Decreed Use	Augmentation
Diamond Valley Park Well	63110-F	40	600	Irrigation	Kern Augmentation Plan
Eastman Park Well	63109-F	30	600	Irrigation	
CRC Well	15004	20	250	Irrigation, domestic, and general farm usage	
Main Park East Well #2 (Windsor Well 2-13410)	13410-R-R	35	300	Municipal, Irrigation of 10 acres of Town parks	Poudre Plan (76.8 acre-feet)
Main Park West Well #3 (Windsor Well 3-13413)	13413-R-R	38	160		
Cemetery Field Well #4 (Windsor Well 4-13414)	13414	26	180	Municipal, Irrigation	
Cemetery Field Well #5 (Windsor Well 5-13415)	13415	38	100	Irrigation	
Cemetery Field Well #6 (Windsor Well 6-10962)	10962-F	38	175		
Cemetery Field Well #8 (Windsor Well 8-13412)	13412-R-R	38	150		
Boardwalk Park Well #7 (Windsor Well 7-2704)	2704-F	32	40	Municipal, Irrigation of 6 acres of Town parks	
Boardwalk Park Well #1 ¹² (Windsor Well 1-13411)	13411-RF	32	110	Municipal	
Windsor West Park Well (Hickman Well 1-6397)	6397-RR	35	100	Irrigation	(11.1 acre-feet)

The Town's wells average 35 feet in depth and are permitted from 40 to 600 gpm. The wells offer operational flexibility for the Town as they can provide water on demand at the location of use. The wells are located at the irrigation site, which eliminates the need for a large amount of infrastructure and infrastructure maintenance required by other non-potable supplies. Further, the infrastructure that is required can be concealed in a pump house or underground, which is generally out of sight and reach to the general public.

¹² Boardwalk Park Well #1 was abandoned in 1979

2.3.2 Well Augmentation

The wells operated by the Town are classified as non-exempt wells administered by the State Engineer's Office. They require a valid permit from the State Engineer's Office and augmentation when pumped out-of-priority. The Town's out-of-priority well uses are covered by one of two augmentation plans: the Cache la Poudre Water Users Association or Kern Case No. 02CW301. A general description of each are provided below.

Cache la Poudre Water Users Association

The first augmentation plan was set forth by a decree of the Court in Case No. W-4300 herein referred to as the Cache la Poudre Water Users Association (CLPWUA) "Poudre Plan." The CLPWUA is an association that collects assessments and in turn provides augmentation supplies for its member wells. The Town has nine wells included in the Poudre Plan and is current on its annual assessments for all nine wells.¹³ Of these nine wells, four are currently inactive. The inactive wells are located at the Cemetery and Boardwalk Park.

Currently, the CLPWUA provides the Town with augmentation water for out-of-priority irrigation use of up to 87.89 acre-feet annually. In 2010, the annual assessment was \$2.50 per acre-foot of pumped well use and \$10.00 per well structure. Poudre Plan assessments of Windsor's wells totaled \$309.73 for the 2010 irrigation season. Since the Town is a member in good standing and has remained current on its annual assessments for all nine wells, rehabilitation of any of the four inactive wells could provide additional means of delivering water. These four inactive wells could potentially be rehabilitated or re-drilled so long as the Town does not seek augmentation for more than its 87.89 acre-feet allotment and the decreed location of use is maintained. The Town would need to contact the CLPWUA for their approval prior to re-drilling any wells in the Poudre Plan.

The CLPWUA requires that its wells are used in the same location as where it was originally decreed. In our investigation, we found some of the Town's Poudre Plan wells were decreed in error. We provide recommendations to the Town later in this report (Chapter 7).

Kern Augmentation Plan

The second augmentation plan was decreed by the Court in Case No. 02CW301 in 2010, herein referred to as the "Kern Augmentation Plan." Three of the Town's existing wells, and one proposed well, are augmented as outlined by the Kern Augmentation

¹³ Based upon personal communication with Dale Trowbridge, Secretary for the Weld County Underground Water Users Association, a governing entity for the Poudre Plan within Weld County.

Plan decree. The three existing wells are the Diamond Valley Park Well, Eastman Park Well, and the CRC Well. A new well is planned at Windsor Village Park.

The 530 acre-feet associated with the KRDC #1 Water Right is stored in Kern Reservoir and is available for recreation, irrigation use within the Town and for augmentation of existing and future wells the Town adds under this augmentation plan. Case No. 02CW301 also identifies additional sources that can be used for augmentation. The water right to be decreed in Case No. 02CW276 (Kern Junior) will be stored in Kern Reservoir and is available for direct irrigation, augmentation or left in the reservoir for recreation. Any other water sources separately decreed for augmentation purposes may also be used for the augmentation of these wells.¹⁴

2.3.3 Existing Wells

A detailed description of the Town's existing wells and augmentation is provided below.

Diamond Valley Park Well

The Diamond Valley Park Well is an active well that currently operates under Permit No. 63110-F. The Town filed for a new well permit that was received by the State on June 15, 2005. Prior to the approval of a well permit, the Town dug an infiltration gallery well at Diamond Valley Park in 2001. The State provided notice to the Town that the well did not meet the Minimum Construction Standards for Water Wells. The Town responded with a request for variance on July 21, 2005. Subsequently, the gallery well was inspected by the State and Well Permit No. 63110-F was issued on August 24, 2005.

The current permit identifies the owner as the Town of Windsor for irrigation use on 60 acres at Diamond Valley Park. The permitted well yield is 600 gpm and well depth is 40 feet. Augmentation is provided by the Kern Augmentation Plan.

Eastman Park Well

The Eastman Park Well is an active well that currently operates under Permit No. 63109-F. The Town filed for a new well permit that was received by the State on June 15, 2005. Prior to the approval of a well permit, the Town dug an infiltration gallery well at Eastman Park in 2002. The State provided notice to the Town that the well did not meet the Minimum Construction Standards for Water Wells. The Town responded with a request for variance on July 21, 2005. Subsequently, the gallery well was inspected by the State and Well Permit No. 63109-F was issued on October 6, 2005.

¹⁴ See Paragraph 21 of Case No. 02CW301 for conditions under which additional replacement supplies can be dedicated to the augmentation plan.

The current permit identifies the owner as the Town of Windsor for irrigation use on 51.82 acres at Eastman Park, which includes potential irrigation on Eastman Park South. The permitted well is a gallery well with a yield of 250 gpm and depth of 20 feet. Augmentation is provided by the Kern Augmentation Plan.

CRC Well

The CRC Well is an active well that operates under Permit No. 15004-R. The State Engineer's Office identifies the current owner as Weld County School District (WCSD) RE-4 for irrigation use. Well Permit No. 15004-R was first issued on June 30, 1960 to Henry Krause for an existing well originally used in 1918. The permit indicates that the well was enlarged or deepened in 1941. The current permitted location of the CRC Well is incorrect. The current permit specifies the well as being located in the NW $\frac{1}{4}$, SW $\frac{1}{4}$ of Section 17, T6N, R67W, in the 6th P.M. The actual location is in the SE $\frac{1}{4}$, SW $\frac{1}{4}$ of same Section 17.

The Town acquired Well 15004-R from WCSD RE-4 and began operating this well for landscape irrigation in July 2004. This well is used to irrigate approximately four acres of Kentucky bluegrass. Augmentation is covered by the Kern Augmentation Plan.

Boardwalk Park Well No. 1

Boardwalk Park Well No.1 is an inactive well with an abandoned Well Permit No. R-13411-RF. The original Registration No. 13411 was issued on June 17, 1960 as a secondary well (listed as Well No. 2 on registration) to Permit No.13410 (referred to as Well No. 1 by the State and in the decree) for a well first used in 1906. A replacement Well Permit No. R-13411-RF was approved on October 7, 1977 to re-drill. A well completion, installation report, and statement of beneficial use were submitted in 1978. A well abandonment report was filed on behalf of the Town in 1979 and the well no longer exists.

The well was decreed in Case No. W-4300 on June 23, 1972 with an appropriation date of December 31, 1906 for the amount of 0.55 cfs at Boardwalk Park. The decreed use is municipal, and although it no longer exists, it is still included in the Poudre Plan for augmentation.

Boardwalk Park Well No. 7

Boardwalk Park Well No. 7 is an inactive well with a valid Well Permit No. 2704-F issued for 30 gpm of irrigation of park located in the SW $\frac{1}{4}$, SW $\frac{1}{4}$, Section 16, T6N, R67W, in the 6th P.M. This well is still included in the Poudre Plan.

The well was decreed in Case No. W-4300 on June 23, 1972 with an appropriation date of August 18, 1960 for 0.089 cfs. The decreed use is municipal and supplemental irrigation of six acres of park.

Main Park East Well No. 2

The Main Park East Well No. 2 is an active well that currently operates under Permit No. 13410-R-R. The permitted location for the Main Park East Well is incorrect. The correct location of the well is in the NE $\frac{1}{4}$, NW $\frac{1}{4}$ of Section 21, T6N, R67W, in the 6th P.M. (south of Town Hall) and not in the SW $\frac{1}{4}$, SW $\frac{1}{4}$ of Section 16 of the same Township and Range, which is the location of Boardwalk Park.

Original Permit No.13410 was issued on June 17, 1960 to the Town of Windsor for an existing well first used in 1906. This well was plumbed in tandem with the well identified in Permit No. 13411. Replacement Well Permit No. R-263 was issued on June 23, 1964 to replace the existing Well No. 13410. Permit No. 13410-R-R was reissued upon the completion of the well replacement in 1964.

The current permit identifies the owner as the Town of Windsor for irrigation use at Main Park. The permitted well yield is 300 gpm and well depth is 35 feet. The well was decreed in Case No. W-4300 on June 23, 1972 with an appropriation date of December 31, 1906 for 0.67 cfs. The decreed use is municipal with irrigation of 10 acres in the SW $\frac{1}{4}$, SW $\frac{1}{4}$ of Section 16, T6N, R67W, in the 6th P.M., which is the location of Boardwalk Park. The well is currently used for irrigation at Main Park. The location of use should be corrected. Augmentation is covered by the Poudre Plan.

Main Park West Well No. 3

The Main Park West Well No. 3 is an active well that operates under Permit No. 13413-R-R. Original Permit No.13413 was issued on June 17, 1960 to the Town of Windsor for an existing well first used in 1957. The well collapsed in 1986 and re-drilled under replacement Well Permit No. R-13413-RF, issued on November 13, 1986. The Town filed a well abandonment report in 1996 for Permit No. R-13413-RF. A replacement Well Permit No. 13413-R-R was issued on January 24, 1996.

The current permit identifies the owner as the Town of Windsor for irrigation use at Main Park. The permitted well yield is 160 gpm and the well depth is 38 feet. The well was decreed in Case No. W-4300 on June 23, 1972 with an appropriation date of June 30, 1957 for an amount of 0.356 cfs. The decreed use is municipal with irrigation of ten acres in the SW $\frac{1}{4}$, SW $\frac{1}{4}$ of Section 16, T6N, R67W, in the 6th P.M., which is the location of Boardwalk Park. The well is currently used for irrigation at Main Park. The location of use should be corrected. Augmentation is covered by the Poudre Plan.

Cemetery Field Well No. 4

Cemetery Field Well No. 4 is an active well that operates under Well Permit No. 13414 (identified as Well No. 5 on permit) issued on June 17, 1960 to the Town of Windsor for an existing well first used in 1934. The well is permitted for 180 gpm to irrigate the cemetery and cemetery fields in the NE $\frac{1}{4}$, NE $\frac{1}{4}$, Section 21, T6N, R67W, in the 6th P.M. The well was decreed in Case No. W-4300 on June 23, 1972 with an appropriation date of December 31, 1934 for 1.00 cfs. The decreed use is irrigation of 18.5 acres of park and cemetery. Augmentation is covered by the Poudre Plan.

Cemetery Field Well No. 5

Cemetery Field Well No. 5 is an inactive well with a valid Well Permit No. 13415. Well Permit No. 13415 (identified as Well No. 6 on permit) was issued on June 17, 1960 to the Town of Windsor for an existing well first used in 1934. The well is permitted for 100 gpm to irrigate the cemetery and cemetery fields in the NE $\frac{1}{4}$, NE $\frac{1}{4}$, Section 21, T6N, R67W, in the 6th P.M. The well was decreed in Case No. W-4300 on June 23, 1972 with an appropriation date of December 31, 1934 for 1.00 cfs. The decreed use is irrigation of 18.5 acres of park and cemetery. This well is still included in the Poudre Plan.

Cemetery Field Well No. 6

Cemetery Field Well No. 6 is an inactive well with a valid Well Permit No. 10962-F issued on May 31, 1966 for 175 gpm for irrigation on 15 acres at the cemetery and cemetery fields located in the NE $\frac{1}{4}$, NE $\frac{1}{4}$, Section 21, T6N, R67W, in the 6th P.M. The well was decreed in Case No. W-4300 on June 23, 1972 with an appropriation date of June 7, 1966 for 0.39 cfs. The decreed use is irrigation of 18.5 acres of park and cemetery. This well is still included in the Poudre Plan.

Cemetery Field Well No. 8

Cemetery Field Well No. 8 is an active well that operates under permit No. 13412-R-R. Well Permit No. 13412 was first issued on June 17, 1960 to the Town of Windsor for an existing well originally used in 1934. A replacement Well Permit No. 13412-R-R was issued on January 24, 1996 to re-drill. Well Permit No. 13412 was abandoned.

The current permit identifies the owner as the Town of Windsor for irrigation use on 18.5 acres. The well is permitted for 150 gpm to irrigate the cemetery and cemetery fields in the NE $\frac{1}{4}$, NE $\frac{1}{4}$, Section 21, T6N, R67W, in the 6th P.M. The well was decreed in Case No. W-4300 on June 23, 1972 with an appropriation date of December 31, 1934 for 0.33 cfs. The decreed use is municipal and irrigation of 18.5 acres of park and cemetery.

The decreed location for the Cemetery Field Well No. 8 is incorrect and should be corrected. Augmentation is covered by the Poudre Plan.

Windsor West Well

Windsor West Well is an active well that currently operates under Permit No. 6397-R-R. The original well permit was issued to R.P. Hickman on November 21, 1958 for an existing well first used in 1935. The Town of Windsor filed an application for a replacement Well Permit No. R-6397-RF on November 7, 1975 to replace Well No. 6397-R. This well permit was valid from November 11, 1975 to November 7, 1976. The Town filed a well completion report and pump installation report received by the State on January 7, 1976. However, a Statement of Beneficial Use was received by the State (on April 28, 1977) past the original expiration date. The Town filed a new well permit and Statement of Beneficial Use report on January 5, 2000.

The current Permit No. 6397-R-R identifies the owner as the Town of Windsor for irrigation use at Windsor West Park. The permitted well yield is 100 gpm and the permitted location is at 10th Street and Cottonwood Drive in Windsor. An original 1.11 cfs was decreed in Case No. W-641 entered on December 13, 1971. Case No. 00CW113, entered on February 28, 2002, abandoned 0.89 cfs, moved the location of the replacement well more than 200 feet from the original location, and decreed 0.22 cfs as absolute for irrigation use. Augmentation is provided by the Poudre Plan.

2.3.4 Future Wells

Any future well will need to be included in the Kern Augmentation Plan or a new plan for augmentation filed to Division 1 Water Court to offset depletions resulting from all planned future uses of the proposed well. Although the Poudre Plan does not allow the addition of new wells to their plan, there are some opportunities for the Town to re-drill wells still included in the Poudre Plan.

Kern Augmentation Plan

A well can be added to the Kern Augmentation Plan decreed in Case No. 02CW301 by following the procedures outlined in Paragraph 25 of the decree. Those procedures are summarized as follows:

1. File a new application to Water Court.
2. File a substitute water supply plan (SWSP) with the State Engineer. This step is only required if the Town wants to expedite the process to operate the well sooner.
3. Complete and submit the well permit application to the State Engineer.
4. Revise the projection and accounting forms as necessary per decree.

5. Negotiate with objectors.
6. Draft an Order to Water Court to include the new well in the Town's current plan for augmentation.
7. Court proceedings, if required.

New Augmentation Plan

A well can be included in a new plan for augmentation. This would require filing an application to Water Court and securing long-term replacement water for the new well.

Other Considerations

1. All new wells will require a well permit to be issued by the State Engineer. In 2010, a new well permit application fee is \$100.
2. Request a SWSP from the State Engineer's Office. If the new well is to be included in the Kern Augmentation Plan, a SWSP is only required if the Town wants to expedite the process and begin operating the new well before the Court process is completed for the new well. If the new well is to be included in a new plan for augmentation, a SWSP is required. In 2010, the fee for a new SWSP is \$300.
3. Contract with a licensed and competent well driller to drill, develop, and install a new well once the well permit is approved by the State Engineer's Office. In June 2010, we received quotes to drill and develop a new well at a cost of around \$20,000 for a 35-foot deep well. The price of a 25 horsepower line shaft turbine pump was quoted to cost between \$10,000 and \$15,000 to purchase and install. This does not include the cost of any appurtenances or power supplies.
4. All wells require a properly installed meter. Typically, most meters require five pipe diameters of straight pipe run upstream and three pipe diameters of straight pipe run downstream. Sufficient space to fit the meter and all required pipe appurtenances should be considered in the early stages of planning a new well to insure that the meter provides accurate readings.

As an additional appurtenance to the meter, we highly recommend that the Town fit all of its wells with a "test tee." A test tee can be described as a 90-degree tee with isolation valves fitted on the outlets, located downstream of the meter. This can be used for periodic field testing of the flow meter. The isolation valves allow water to be shut off from entering the irrigation system and discharged immediately downstream of the meter. Town staff can easily fill a known volume (i.e., tank or water truck) with the discharged water to compare the meter reading.

5. On-going monthly accounting will be required under a SWSP approved by the State Engineer's Office and a decree entered by Water Court.

CHAPTER 3 – NON-POTABLE WATER DEMAND

For the purpose of this Non-Potable Water Master Plan, untreated supplies are considered “non-potable water.” The most efficient use of the Town’s water portfolio is to meet its non-potable demands with non-potable water. Non-potable demands by the Town consists of irrigation of park and open spaces and use of the water for well augmentation. The Town does have some subdivisions that use potable water for outdoor irrigation. However, a majority of the Town’s residential developments use non-potable water for irrigation. The Town has an ordinance in place that requires any new subdivision to develop a secondary, non-potable system for outdoor water use if that annexed property historically used non-potable water for irrigation. This progressive ordinance insures the Town’s water sources are used cost-effectively.

3.1 Irrigation

3.1.1 Existing Parks

The Town currently irrigates 19 park and open space areas. Current sources of irrigation water are direct flow water, well water, or potable water. A description of each park, including the current and build-out acreage, and its source of irrigation water is provided below. **Figure 1** identifies the location of each park.

Table 3.1.1.1 - Existing Town Parks with Irrigation

Name	Current Acreage (acres)	Build-out Acreage (acres)	Comments
Aberdour Circle Park	4.0	4.0	
Boardwalk Park	6.1	6.1	
Cemetery & Cemetery Fields	13.1	13.1	
Chimney Park	8.7	13.1	4.4 acres on the northern portion is irrigated with potable water
Community Recreation Center	4.0	4.0	
Covenant Park	2.4	2.4	
Diamond Valley Park	7.4	51.4	
Eastman Park	20.1	20.1	Includes 2 acres for Catholic church
Folkstone Tree Nursery	2.0	2.0	Flood irrigated trees
Founder's Green Park	1.7	1.7	Currently paying metro district for water
Greenspire	8.1	96.0	240 acres total, assume 40% will be irrigated
Main Park	7.9	7.9	
Martin Lind Property	54.0	54.0	Irrigated with 1 cfs out of Kern Reservoir
Poudre Natural Area	0.4	0.4	20 trees irrigated w/drip irrigation. 0.4 ac represents the tree canopy area
Ruff Development	8.3	8.3	No new irrigated acreage is assumed at the Ruff Development as current demand has exceeded water dedicated
Town Hall	0.3	0.3	Currently irrigated with potable water
Windsor Highlands Park	3.6	6.7	
Windsor Village Park	2.1	2.1	
Windsor West Park	2.6	2.6	
Total	156.7	296.1	

Aberdour Circle Park

Aberdour Circle Park (formerly Stonehenge Park) is a neighborhood community park with paved walking trails and consists of approximately 4.0 acres of Kentucky bluegrass. The source of irrigation supply to Aberdour Park is the Loudon Ditch. Windsor's Loudon Main and Loudon Extension water is diverted and delivered to a pond at Highland Meadows Golf Course, which is then pumped and distributed to Aberdour Park by agreement.

Boardwalk Park

Boardwalk Park is located adjacent southwest to Kern Reservoir and due to its location, hosts some of Windsor's Town-wide events. The park consists of 6.1 acres of irrigated bluegrass. Currently, Boardwalk Park is irrigated directly from the Regional Pump Station with supplies in Kern Reservoir.

Cemetery and Cemetery Fields

Cemetery Well No. 4 (Permit No. 13414) and Cemetery Well No.8 (Permit No. 13412-R) are used to irrigate the Town cemetery and adjacent sports fields. Combined, the two wells provide irrigation for approximately 13.1 acres of Kentucky bluegrass.

The two wells are part of four original wells located at the cemetery. Cemetery Well Nos. 5 and 6 (Permit Nos. 13415 and 10962-F) are valid well permits, although the structures are no longer used at the cemetery. Uses from the two active wells are augmented by the Poudre Plan. The two inactive wells are still included in the Poudre Plan and can be rehabilitated should Windsor need more water at this site.

Chimney Park

Chimney Park is a community park with sports fields and a swimming pool. Currently, the southern portion of the park is irrigated with Kern water and totals approximately 8.7 acres of Kentucky bluegrass. The north portion of the park, approximately 4.4 acres, is currently irrigated with potable water. In the future, the Town should convert the northern portion of the park to non-potable irrigation. A test well drilled in the southeast corner resulted in low yields as did another test well located on the north end of the site. Irrigation may be best served with sources from Kern Reservoir.

Community Recreation Center

The CRC Well (Permit No. 15004) is used as the sole source for irrigation at the Community Recreation Center. Windsor began operating this well for landscape irrigation in July 2004. This well is used to irrigate approximately four acres of Kentucky bluegrass and surrounding landscape.

Covenant Park

Covenant Park consists of 2.7 acres of irrigated Kentucky bluegrass. The site is currently irrigated with potable water although this site should be converted over to non-potable irrigation.

Diamond Valley Park

Diamond Valley Park currently consists of three baseball diamonds, totaling approximately 7.4 acres of irrigated Kentucky bluegrass. An additional 86 acres of undeveloped land is available to the Town for expansion at this park site. The Town estimates 51.4 acres of irrigated area will be developed at approximately five acres per year. Historically, the primary source of irrigation at Diamond Valley Park is one-half (one cfs) of the C&G Ditch water right. Diamond Valley Park will be irrigated, in part,

with water from Kern Reservoir in the future. The Diamond Valley Park Well (Permit No. 63110-F) is used to provide supplemental irrigation to Diamond Valley Park and began operation in April 2003.

Water is released from Kern Reservoir, conveyed through the Kern Lateral, and diverted into the Diamond Valley Pond as shown in **Figure 2**. Water from the Diamond Valley Well is pumped into the Diamond Valley Pond and mixed with water from Kern Reservoir before water is applied to the park for irrigation.

Eastman Park

Eastman Park consists of approximately 18.1 acres of Kentucky bluegrass with sports fields, walking trails, outdoor pavilions, and a small pond. Of the total acreage, approximately ten acres are used as sports fields. The primary source of irrigation supply to Eastman Park is the Whitney Ditch. The Town owns two shares of Whitney Ditch, which are dedicated for irrigation at Eastman Park. Water from the Whitney Ditch is diverted and delivered to the Eastman Park Pond as shown in **Figure 2**. The Eastman Park Well (Permit No. 63109-F) is used for supplemental irrigation at Eastman Park and began operation in August 2002. Water from the Eastman Park Well is pumped into the pond and mixed with Whitney Ditch water prior to irrigation. In addition, the Town utilizes a portion of its Whitney Ditch water to irrigate approximately 2.0 acres at the Catholic Church property, which is located adjacent north to Eastman Park.

Eastman Park South is undeveloped as a town park and currently serves as open space. Future plans are being determined, but include the possibilities of constructing a pond, a botanical garden, walking trails, and a mix of trees and shrubs. In the past, the Town has irrigated the land with its two shares of B.H. Eaton Ditch water. The lateral from the B.H. Eaton Ditch to Eastman Park South should be rehabilitated as it is currently extremely difficult to carry water down the lateral. Based on storm drainage needs per discussions with staff, the first section of the lateral should be left open channel and the rest should be piped.

Folkstone Tree Nursery

The Folkstone Tree Nursery is comprised of approximately two acres of flood irrigated land where the Town is growing seedlings with water from Kern Reservoir. This site can potentially be expanded by an additional 1.5 acres, but there currently are no plans to do so. Town staff has estimated that irrigation occurs five times per year at a rate of one cfs delivered for 48 hours per irrigation event.

The Kern Decree outlines procedures by which the Town can claim return flow credit for any unused irrigation water that returns to the river system. The decree allows for a

return flow credit calculated as 17% of the amount of water diverted and measured for irrigation. Typical flood irrigation practice returns approximately 50% of the water delivered for irrigation. To the extent Windsor can improve its irrigation efficiency at this site, the Town will benefit as the current flood irrigation returns 50% to the stream whereas only 17% can be claimed as credit.

Founder's Green Park

Founder's Green Park is a neighborhood community park with playground equipment and open space that totals approximately 1.7 acres of irrigated Kentucky bluegrass. Irrigation is provided by a metro district and costs are passed through to the Town. The metro district has a tiered rate structure, and the Town's irrigation use results in paying rates associated with the highest tier. Staff has made a request to the metro district that the Town be charged a fixed rate per thousand gallons at an amount less than the highest tier. Depending on the outcome, the Town should consider purchasing its own irrigation water for this site as bills for the metro district water have reached \$2,500 in a single month.

Greenspire

Greenspire is a new development located north and east of Kern Reservoir. Per agreement, the Town provides Greenspire with water from the reservoir. Greenspire currently has 8.1 acres of irrigation with a projected build-out of 96.0 acres. There are a total of approximately 240.0 acres at Greenspire, which 40% is assumed will be irrigated.

Main Park

Main Park is a community park located adjacent south to Town Hall. The site consists of approximately 7.9 acres of Kentucky bluegrass irrigated by the Main Park East Well (Permit No. 13410-R-R) and Main Park West Well (Permit No. 13413-R-R).

Martin Lind Property

Martin Lind owns one cfs of the C&G Ditch water right. By agreement, the Town is required to deliver this flow rate to the Martin Lind Property during the irrigation season. Since the C&G Ditch water right has essentially been absorbed in the Kern Junior Water Right, the Town will deliver other sources to satisfy the one cfs contractual right to the Lind Property.

Poudre Natural Area

The Poudre Natural Area is an open space area located northwest of Eastman Park that consists of primarily non-irrigated native landscape and approximately 20 irrigated trees. The trees are irrigated with water from the Eastman Park Pond, which is filled with Whitney Ditch water and water from the Eastman Park Well.

Ruff Development

In 2004, the Town entered into an agreement with Windsor Development Group, LLC whereby Windsor Development Group, LLC conveyed 1.31 Kern shares to the Town in exchange for delivery of that water to the development. This development currently consists of 8.3 acres of irrigated turf grass within Windsor Tech Business Center II, Diamond Valley Subdivision 3rd Filing and a portion of Diamond Valley Subdivision 4th Filing.

Town Hall

Town Hall is located adjacent north of Main Park. Irrigation at Town Hall includes approximately 0.3 acres of lawn and landscaping, which is currently supplied with potable water. It would be beneficial to use a non-potable water source for Town Hall irrigation, particularly from a perception standpoint since Windsor requires non-potable irrigation for its new residential subdivisions.

Windsor Highlands Park

Windsor Highlands Park consists of playground equipment, walking trails, and open space. Approximately 3.6 acres are irrigated Kentucky bluegrass with an additional 2.9 acres of natural grasses. The natural grasses are irrigated at a reduced schedule. For the purpose of this plan, and to be conservative, we assume all 6.7 acres is irrigated on the same schedule. Windsor uses its Loudon Main and Loudon Extension shares for irrigation, which is delivered through the Highland Meadows Golf Course system by agreement.

Windsor Village Park

Windsor Village Park is a neighborhood community park currently irrigated with water from Kern Reservoir and consists of approximately 2.1 acres of Kentucky bluegrass. The Town is planning to convert the irrigation source at this park to well water. The park was included in the Kern Augmentation Plan, so once a well permit is issued by the State Engineer per the decree, the Town can drill and operate the well.

Windsor West Park

Windsor West Park is a neighborhood park. The Windsor West Well (Permit No. 6397-RR) is used to irrigate approximately 2.6 acres of Kentucky bluegrass at this site.

3.1.2 Current Irrigation Demands

Quantification of irrigation water demands at park sites is dependent upon the species of turf grass planted at the park, climate conditions, park use and aesthetic quality, and the application uniformity of the specific irrigation system. The quality of Kentucky bluegrass lawns have been described by Metcham.¹⁵ High performance lawns are defined as being heavily used, such as sports fields or lawns where a high aesthetic appearance is desired. Standard lawns are defined as typical lawn areas in residential neighborhoods, businesses, or shopping centers where foot traffic and use of the open space is not excessive. Low maintenance is used to describe areas that are seldom used for activities, yet they provide a green ground cover. For the purpose of this master plan, we use the consumptive use values associated with a standard lawn.

To determine the turf grass consumptive use of water, we used the Modified-Blaney Criddle method with local climate data, which was the approach that was used in the Kern Water Court case. Our analysis found that turf grass uses a net 2.28 acre-feet per acre (after rainfall was considered) for the Windsor area. Currently, the Town irrigates 156.7 acres of grass at its existing parks and open space areas. The table below shows the estimated non-potable water demand from the Town's current irrigation.

¹⁵ Metcham, B. 2006. Historical Reference ET for Northern Colorado Front Range, Northern Colorado Water Conservancy District.

Table 3.1.2.1 - Current Non-Potable Water Demand

Name	Current Acreage (acres)	Current Non-Potable Demand (acre-feet)
Aberdour Circle Park	4.0	9.1
Boardwalk Park	6.1	13.9
Cemetery & Cemetery Fields	13.1	29.9
Chimney Park	8.7	19.8
Community Recreation Center	4.0	9.1
Covenant Park ¹⁶	2.4	0.0
Diamond Valley Park	7.4	16.9
Eastman Park	20.1	45.8
Folkstone Tree Nursery	2.0	4.6
Founder's Green Park	1.7	3.9
Greenspire	8.1	18.5
Main Park	7.9	18.0
Martin Lind Property	54.0	123.1
Poudre Natural Area	0.4	0.8
Ruff Development	8.3	18.9
Town Hall ¹⁷	0.3	0.0
Windsor Highlands Park	3.6	8.2
Windsor Village Park	2.1	4.8
Windsor West Park	2.6	5.9
Total	156.7	351.3

3.1.3 Future Irrigation Demands

The Town is planning numerous future parks and open space areas. Additional irrigation will occur from the expansion of existing parks and open spaces and also from new sites. Some of the new sites will be within developments. Upon annexation into Town limits, developers are required to provide sufficient water to meet the demands of the development, both domestic and irrigation use. There are many future park areas where the water will be provided by the developer. However, per the annexation agreements, it is unclear for those developments where the developer is required to provide the water if Windsor ultimately has to pay for the water through the metro district. Further, rates that Windsor will pay are not explicitly defined. Windsor should address the language in existing annexation agreements and be more explicit in future annexation agreements whether or not the developer is to provide the water, and if so, that there is no future cost to the Town.

A summary of the Town's future irrigation and whether or not the Town is responsible for providing the water is detailed in the following table.

¹⁶ Covenant Park is currently irrigated with potable water

¹⁷ Town Hall is currently irrigated with potable water

Table 3.1.3.1 - Proposed Future Town Parks

Name	Build-out Acreage (acres)	Responsible Party to Provide Irrigation Source
Belmont Ridge Park	8.1	Windsor
Bison Ridge Park	2.0	Windsor
Broe Annexation	unknown	Developer
Eastbrook	6.4	Developer
Eastman Park South	5.0	Windsor
Fossil Creek Meadows	18.6	Developer
Harmony Annexation	6.0	Developer
Jacoby Farm Park	3.0	Developer
Poudre Heights	5.2	Developer
Prospect Park	4.5	Windsor
Tacincala Community Park	50.0	Developer
Tacincala Community Park	25.1	Windsor
W. Wayne Miller Park	6.5	Windsor
Windshire	6.0	Developer
Windsor Lake Trail	7.1	Windsor
Winter Farm	5.6	Developer

Belmont Ridge Park and Bison Ridge Park will be irrigated with potable water due to the lack of non-potable supplies at their location. The other proposed parks designated as “Windsor” will require additional non-potable water.

The table below shows the total non-potable water demand for future parks, including the expansion of existing parks.

Table 3.1.3.2 - Future Non-Potable Water Demand

Name	Build-out Acreage (acres)	Future Non-Potable Demand (acre-feet)	Comments
Aberdour Circle Park	4.0	9.1	
Boardwalk Park	6.1	13.9	
Cemetery & Cemetery Fields	13.1	29.9	
Chimney Park	13.1	29.9	North portion to be converted to non-potable
Community Recreation Center	4.0	9.1	
Covenant Park	2.4	5.5	To be converted to well water
Diamond Valley Park	51.4	117.2	
Eastman Park	20.1	45.8	Includes 2 acres of irrigation at Catholic church
Eastman Park South	5.0	11.4	Assumes 5.0 acres of irrigation after construction of storage
Folkstone Tree Nursery	2.0	4.6	
Founder's Green Park	1.7	3.9	Windsor pays metro district for non-potable water
Greenspire	96.0	218.9	
Jacoby Farm Park	3.0	6.8	Windsor to pay metro district. We recommend drilling a well and augmenting.
Main Park	7.9	18.0	
Martin Lind Property	54.0	123.1	
Poudre Natural Area	0.4	0.8	
Prospect Park	4.5	10.3	Windsor to pay metro district. We recommend drilling a well and augmenting.
Ruff Development	8.3	18.9	Assume no new acreage since 1.31 Kern shares dedicated delivers less than the current irrigation demand
Tacincala Community Park	25.1	57.2	
Town Hall	0.3	0.6	To be converted to well water
W. Wayne Miller Park	6.5	14.8	
Windsor Highlands Park	6.7	15.3	
Windsor Village Park	2.1	4.8	
Windsor West Park	2.6	5.9	
Windsor Lake Trail	7.1	16.2	
Total	347.3	791.9	

Windsor has a current non-potable irrigation demand of approximately 351 acre-feet, which will increase to nearly 800 acre-feet based on the Town's park master plan. The Town will need to acquire additional non-potable water supplies to meet this increase demand.

3.2 Front Range Energy Contract

In 2005, Windsor entered into a 99-year lease agreement with FRE to supply augmentation water to the Cache la Poudre River to replace depletions from FRE's groundwater wells, which they use in their ethanol plant for processing and cooling.¹⁸ The agreement indicates Windsor is to provide augmentation water in an amount of 500 acre-feet annually.

The FRE plant began operation in June 2006 and has since required a relatively uniform supply of augmentation water. In 2009, FRE's net depletions at the river ranged between 15 and 18 acre-feet per month for an annual total of 198.5 acre-feet. Although FRE has been using less than the 500 acre-feet, we plan for 500 acre-feet for the purpose of this plan.

¹⁸ In Case No. 05CW226, FRE filed an application to Water Court for an underground water right and a plan for augmentation. Since 2005, FRE has operated their wells under annual SWSPs.

CHAPTER 4 – POTENTIAL NEW SOURCES OF WATER SUPPLY

This chapter describes non-potable water supplies that are available to Windsor to meet future non-potable demands. Any shortage in demand will need to be met with new water sources, either through direct irrigation or through new well pumping and associated augmentation.

4.1 Potential New Water Supply Considerations

There are many factors or limitations that will ultimately govern if the Town will irrigate directly from a ditch or drill a new well and augment, including location, water availability and cost. With these factors in mind, we examine the following water rights/irrigation systems in the vicinity of the Town that we believe may provide for future irrigation supplies:

- New Cache la Poudre Irrigating Company and Cache la Poudre Reservoir Company
- Lake Canal and Lake Canal Reservoir Company
- Whitney Irrigating Ditch Company
- B.H. Eaton Ditch Company

4.1.1 Location of Future Irrigation Sites

Figure 1 includes the proposed location of known future irrigation sites within the Town as identified and discussed in Chapter 3. **Figure 3** includes the general service area and project components associated with the aforementioned irrigation systems. Whether or not a future park can be irrigated directly with water from these irrigation systems is in large part based on the location of the park relative to lands historically served under these ditch systems. First, it must be physically feasible to deliver the water to the irrigation site through existing or proposed ditches, laterals, pipelines or pumps. Secondly, to use shares in these systems for direct irrigation without changing the use of the water rights, the irrigation sites must be located within the historical service area.

Before specifically pursuing any particular source of supply for a site, the Town should consult the service area information provided in **Figure 3** as well as discuss the physical feasibility of delivering such water to the site with individuals that may have specific insight into the system (i.e., superintendents, ditch riders, board members, producers, and water commissioners). If a future irrigation site is located outside a system's historical service area or if other factors make the potential supply unfeasible, the Town may consider irrigating the site with groundwater wells and augmenting the use from the wells.

4.1.2 Water Availability

Another factor the Town should consider when selecting a particular water source for a site is water availability relative to water demand. Most irrigation systems in the Cache la Poudre Basin begin irrigation deliveries in April and May and cease irrigation deliveries by September or October. Irrigation demands for some Town parks may begin prior to and end after the historical delivery season for these agricultural based irrigation systems. Without a supplemental source such as storage water, wells, and potable water to cover demands during these “shoulder months,” the Town may not be able to meet their irrigation demands solely with direct flow water rights.

In most cases, the use of groundwater wells will provide the Town with optimal operational flexibility because groundwater is available on-demand. However, to-date the Town has had difficulty establishing groundwater wells at some irrigation sites due to yield variability in the aquifer system surrounding Windsor.

4.1.3 Cost

In general, pursuing non-potable water for direct irrigation will be most cost effective for Windsor. If a proposed irrigation site is located near an existing irrigation canal, it will likely be more feasible to deliver irrigation water directly to the site. Further, if the site is located within the historical service area, no change of use or engineering analysis would be required to use the water for landscape irrigation. The primary cost under this alternative is water acquisition and site development.

Drilling a well and augmenting still may be preferred due to the flexibility of use. The cost of this alternative is generally more than direct irrigation. These costs include water acquisition, change of water rights engineering, Water Court proceedings, and infrastructure development.

4.1.4 Estimated Yields

The delivery and consumptive use information provided in this section is intended to provide the Town with an order of magnitude level of information concerning these water rights. A more detailed water delivery and yield analysis should be conducted on a site-by-site basis to insure a proposed water source will be adequate to meet site demands, both on an annual and daily basis.

4.2 New Cache System

4.2.1 Background: New Cache la Poudre Irrigating Company

The Greeley No. 2 Canal (a.k.a. New Cache Ditch) diverts water from the north side of the Cache la Poudre River and services lands that extend from the Windsor/Timnath area on the west to the Barnesville area on the east. **Figure 3** includes an overview of the New Cache system, including the extent of its service area.¹⁹

The New Cache system includes the main Greeley No. 2 Canal as well as numerous laterals. New Cache delivers a variety of sources to its shareholders for irrigation. In addition to water diverted directly from the river, New Cache also delivers irrigation water to their shareholders from Timnath Reservoir (a.k.a. Cache la Poudre Reservoir), Big Windsor Reservoir, Fossil Creek Reservoir, CBT, and other minor sources. Timnath and Big Windsor water are delivered directly to the Greeley No. 2 Canal downstream of the Greeley No. 2 river diversion, but above Kern Reservoir. Fossil Creek and CBT are typically diverted at the river for delivery to New Cache shareholders. New Cache also uses the Kern Reservoir as an equalizer reservoir (see Section 2.2.3).

New Cache has direct flow rights for diversions from the Poudre River through the Greeley No. 2 Canal. There are 2,499.69 shares of stock in the company.²⁰ The following table includes some pertinent water rights information associated with this water right.

Table 4.2.1.1 – New Cache la Poudre Irrigating Company Information

Priority No.	Adjudication Date	Appropriation Date	Decreed Flow Rate (cfs)
37	April 11, 1882	October 25, 1870	110
44	April 11, 1882	September 15, 1871	170
72	April 11, 1882	November 10, 1874	184
83	April 11, 1882	September 15, 1877	121
-	December 31, 1975	May 27, 1974	65

4.2.2 Background: Cache la Poudre Reservoir Company

The Cache la Poudre Reservoir (CLP Reservoir) Company owns the rights decreed to Timnath Reservoir, which is an off-channel reservoir located five miles northwest of Kern Reservoir. The reservoir is filled with sources from the Cache la Poudre River via an inlet canal as well as other inflows from tributary streams and drainage inflows. The

¹⁹ Source of information taken from a ditch-wide report and the CDSS.

²⁰ Source of information taken from a ditch-wide analysis.

reservoir outlet delivers water directly to the Greeley No. 2 Canal and the Lake Canal. The CLP Reservoir Company is often associated with the New Cache system because many of the shareholders in the New Cache system also own shares of stock in the CLP Reservoir Company, which they use among other sources to supplement their New Cache direct flow rights.²¹

There are 3,000 shares of stock in the CLP Reservoir Company.²² The following table includes some pertinent water rights information associated with this water right. According to the New Cache Ditch-wide Report, 2,646.5 shares of the 3,000 shares have been used by shareholders under the New Cache system, while the remaining 353.5 shares have been used by shareholders under the Lake Canal system.

Table 4.2.2.1 – Cache la Poudre Reservoir Company Information

Priority No.	Adjudication Date	Appropriation Date	Decreed Volume (acre-feet)
28	December 9, 1904	March 17, 1892	8,379
61	April 22, 1922	December 1, 1902	1,740
136 (refill)	September 10, 1953	December 31, 1923	5,948

4.2.3 Historical Service Area

In Case No. 02CW301, it was determined that New Cache direct flow shares and CLP Reservoir shares were historically used for irrigation throughout the Kern Reservoir service area. The Kern Reservoir service area generally includes lands south and east of the reservoir as well as lands directly northeast of the reservoir. Exhibit 1 of the decree entered in Case No. 02CW301 delineates the Kern Reservoir service area. We understand that because these sources were used historically throughout this service area that in the future they can also be used for irrigation within this service area, without a change of use. However, per the requirements of the Kern Decree, New Cache shares and CLP Reservoir shares cannot be used to irrigate lands claimed on an annual basis as dry-up under the 02CW301 case.²³

4.2.4 Changes of Water Rights

In Case No. 06CW295, New Cache, CLP Reservoir Company, and Lower Poudre Augmentation Company are seeking a change of use for 316.5 shares of New Cache. In support of this change, a draft ditch-wide historical use analysis has been completed.

²¹ Source: SPDSS New Cache memo

²² Source of information from ditch-wide report and SPDSS New Cache Memo

²³ The Town/KRDC submits a dry-up map annually on April 1 of each year under Case No. 02CW301. The lands identified as dry-up for purposes of the KRDC #1 water right cannot be irrigated with New Cache shares.

Once this case is decreed, it is expected that future changes of New Cache and CLP Reservoir shares will adhere to the findings of this decree.

4.2.5 Water Availability

The irrigation season under the New Cache system generally begins between the 1st and 15th of May and ends between the 10th and 20th of September.²⁴ New Cache will divert its river rights first when available, which is typically in the spring and early summer when stream runoff is at or near peak conditions (i.e., May and June) and senior rights downstream are not calling. New Cache refers to the season of direct flow diversions (May through early July) as their “river run” season. When direct flow or river water is unavailable, New Cache will begin their “reservoir run” or delivery of their reservoir or other supplemental sources.²⁵

In most years, New Cache is able to continue some limited diversions under their direct flow water rights even during the “reservoir run.” New Cache refers to direct flow diversion diverted during the reservoir run as “river credits.” According to the New Cache website, river credits are calculated from the portion of the water being delivered during reservoir season that is river or direct flow decree water. We understand that the water commissioner calculates total system river credits on a weekly basis and that New Cache allocates those credits to its shareholders on a pro-rata basis. River credits provide some supplies to shareholders after the primary river run ends in early July, but on a grand scale they tend to make up a smaller portion of total irrigation diversions during the months of August, September and October.

If New Cache shares are acquired in the future by the Town for direct irrigation, Windsor can anticipate that on average this source will be available to meet nearly all water demands in May and June, but only a fraction of total irrigation demand in all other months.

If CLP Reservoir shares are acquired in the future by the Town for direct irrigation, Windsor can anticipate that on average this source will be available to meet demands when New Cache or other direct flow shares are unavailable. It is unlikely that this source would be used alone to meet non-potable needs for the Town; instead the source is likely to be used as a supplemental source.

Timing of deliveries for both New Cache and CLP Reservoir is no longer an issue if the shares are changed and stored in Kern Reservoir. Storage within Kern would allow the water rights to be “retimed” as needed, i.e., stored when they are available and released at a later date when needed.

²⁴ Source of information: SPDSS New Cache memo

²⁵ Source: SPDSS New Cache memo, New Cache website

4.2.6 Delivery and Consumptive Use

The table below includes per share river diversion/reservoir releases, farm headgate delivery volumes and consumptive use values for New Cache's direct flow water rights and CLP Reservoir's storage rights. This information was obtained from the January 2010 Draft Ditch-wide Engineering Report, which we understand is based on a time period representative of historical operation.

Table 4.2.6.1 – New Cache and CLP Reservoir Delivery and Consumptive Use

Water Right	River Diversions (ac-ft/share)	Reservoir Releases (ac-ft/share)	Farm Headgate Deliveries (ac-ft/share)	Consumptive Use Credit (ac-ft/share)
New Cache	-	2.76	2.07	1.29
CLP Reservoir Co.	14.91	-	11.54	6.64

4.3 Lake Canal System

4.3.1 Background

The Lake Canal system consists of Lake Canal and the Gray Reservoirs located along Box Elder Creek. The Lake Canal system is associated with the New Cache system through partial ownership in Timnath Reservoir, of which they own approximately ten percent. With the exception of the partial ownership in Timnath Reservoir, the New Cache system and the Lake Canal system are generally separate. Irrigated areas under the two systems do not overlap and each system has an independent delivery system.²⁶

The Lake Canal system is governed by two separate entities, the Lake Canal Company and the Lake Canal Reservoir Company. The Lake Canal Company diverts direct flow water from the Cache la Poudre River through the Lake Canal ditch north of the Old Town area in Fort Collins. There are 260 shares of stock in the Lake Canal Company.

The Lake Canal Reservoir Company owns storage rights decreed on Box Elder Creek including North Gray Reservoir, South Gray Reservoir, and Gray Reservoir No. 3. Water stored in the reservoirs is released back into Box Elder Creek and then diverted into the Lake Canal Ditch for delivery to shareholders. The Lake Canal Reservoir Company also owns storage rights associated with Lake Canal Reservoir No. 1, which diverts water from the Cache la Poudre River. Maintenance and repair of the Lake Canal structures is performed by New Cache through an operating agreement. There are 160 shares of stock in the Lake Canal Reservoir Company. **Figure 3** includes an overview of the Lake Canal system, including the extent of its service area.

²⁶ SPDSS Memorandum, Final. Presecan, M. and E. Wilson. March 5, 2005. Task 5 – Key Structure, New Cache la Poudre Irrigating Company and Cache la Poudre Reservoir Company

Table 4.3.1.1 – Lake Canal Direct Flow Rights

	Priority No.	Adjudication Date	Appropriation Date	Decreed Flow Rate (cfs)
Lake Canal	53	April 11, 1882	November 1, 1872	158.35

Table 4.3.1.2 – Lake Canal Storage Rights

	Priority No.	Adjudication Date	Appropriation Date	Decreed Volume (acre-feet)
North Gray	2	December 9, 1904	April 1, 1882	135
	50	December 9, 1904	November 1, 1902	140
	77	April 22, 1922	November 15, 1904	57
South Gray	3	December 9, 1904	April 1, 1882	275
	51	December 9, 1904	November 1, 1902	236
	78	April 22, 1922	November 10, 1904	222
Gray No.3	76	April 22, 1922	November 14, 1904	111
Lake Canal Reservoir No.1	41	December 9, 1904	October 15, 1898	803

4.3.2 Historical Service Area

From the headgate, the ditch services lands on the north side of the Cache la Poudre River, northeast of the City of Fort Collins, in and around the Timnath area, and areas north of the Greely No. 2 Canal near the Town of Windsor. The Lake Canal system currently services approximately 5,200 acres of farm and pasture land.

4.3.3 Changes of Water Rights

To date, none of the shares in the Lake Canal system have been changed and all of its water is still used for irrigation of agricultural lands. As such, there is a limited amount of information available regarding the system. Case No. 92CW129 provided the Lake Canal Ditch as an alternate point of diversion or exchange for numerous other water rights.

4.3.4 Water Availability

Based upon our conversations with officials at the Lake Canal, water is typically available from May 15 to July 1 from the Lake Canal Ditch.²⁷ Diversion records from the State show small diversion amounts in July through October. The right is priority No. 54 on the river. Typically, there needs to be 1,000 cfs of river flow in the Cache la Poudre River for the Lake Canal Ditch to divert.

²⁷ Personal communication with Shawn Hoff

Recently, the Lake Canal Reservoir has not yielded much due to the conditions of the storage structures and low flows in Box Elder Creek. Rehab on Lake Canal Reservoir No.1 is slated to begin soon and should help with yields. Once Lake Canal Reservoir No.1 is completed, it should function as the hub of the Lake Canal system. Lake Canal Reservoir shares are mostly held by developers and municipalities because of its location.

4.3.5 Delivery and Consumptive Use

Monthly diversion records for Lake Canal Ditch from 1950 to 2005 average 33.0 acre-feet per share. Assuming an average system ditch loss of 15 percent, the pro-rata farm headgate delivery would historically have been around 28.0 acre-feet. Assuming a historical irrigation efficiency of 50 percent, approximately 14.0 acre-feet of consumptive use credit might be reasonable from these shares. According to our conversation with Mr. Shawn Hoff, shares in the Lake Canal Reservoir yield around 10.0 acre-feet. Assuming a ditch loss of 15 percent and farm efficiency of 50 percent, approximately 4.25 acre-feet of consumptive use credit might be expected from these shares. These values are used in this report.

4.4 Whitney Ditch Irrigating Company

4.4.1 Background

The Whitney Ditch Irrigating Company is a small mutual ditch company that operates near the Town of Windsor under two priorities originally decreed in Case No. CA320. Both priorities are fairly senior; the most senior right being Priority No. 7, which provides the majority of the Whitney water. There are a total of 320 active shares in the Whitney Ditch.

Table 4.4.1.1 – Whitney Ditch Information

Priority No.	Adjudication Date	Appropriation Date	Decreed Flow Rate (cfs)
7	April 11, 1882	September 1, 1862	48.23
48	April 11, 1882	September 10, 1871	12.95

4.4.2 Historical Service Area

The Whitney Ditch diverts water from the north side of the Cache la Poudre River near the NW corner of the SE ¼ of Section 19, T6N, R67W, in the 6th P.M. in Water District 3. From its point of diversion, the Whitney Ditch has historically serviced around 4,000

acres located along the north side of the Cache la Poudre River to the northwest edge of Greeley.

4.4.3 Changes of Water Rights

Two change of use cases have been decreed, changing a total of 48 out of the 320 Whitney Ditch shares. Case No. 02CW390 changed 40 shares and determined the historical pro-rata farm headgate deliveries were 24.0 acre-feet per share with 14.4 acre-feet of consumptive use. Case No. 02CW331 changed eight shares decreed as historically providing 28.4 acre-feet of farm headgate deliveries per share with 16.3 acre-feet of consumptive use credit. It is our understanding that a draft ditch-wide analysis has been performed where it was determined that the historical pro-rata farm headgate deliveries averaged at 22.8 acre-feet per share with 13.7 acre-feet of consumptive use credit. However, we have not been able to acquire a copy of the ditch-wide report. All three analyses used an average ditch loss of 15 percent and an on-farm irrigation efficiency of 60 percent.

4.4.4 Water Availability

The Whitney Ditch has historically diverted from April through September with reduced diversions in October. In 1995, the Whitney Ditch diverted water as early as March. Prior change of use cases have decreed the water available from April through October.

4.4.5 Delivery and Consumptive Use

Pro-rata river headgate diversion records between the years 1950 and 1998 averaged 33.4 acre-feet per share. Assuming a ditch loss of 15 percent, pro-rata farm headgate deliveries were 28.4 acre-feet per share. Assuming a farm efficiency of 50 percent, the consumptive use credit is estimated to be 14.0 acre-feet per share. This broad-brush calculation provides values consistent with the aforementioned change cases and are the values used in this report.

4.5 B.H. Eaton Ditch Company

4.5.1 Background

The B.H. Eaton Ditch diverts water from the Cache la Poudre River in the NW corner of the SE $\frac{1}{4}$ of Section 19, T6N, R67W, in the 6th P.M. in Water District 3. There are a total of 192 active shares in the B.H. Eaton that operate under three priorities, originally decreed in Case No. CA320. All three water rights are fairly senior and allow diversions under priority Nos. 9, 18, and 25.

Table 4.5.1.1 – B.H. Eaton Ditch Information

Priority No.	Adjudication Date	Appropriation Date	Decreed Flow Rate (cfs)
9	April 11, 1882	April 1, 1864	29.1
18	April 11, 1882	June 1, 1866	3.33
25	April 11, 1882	July 25, 1872	9.27

4.5.2 Historical Service Area

Historically, the B.H. Eaton Ditch serviced approximately 933 acres below the Cache la Poudre River from its headgate. The B.H. Eaton Ditch headgate is located next to the Whitney Ditch headgate and services lands south of the Cache la Poudre River. The Whitney Ditch services lands north of the Cache la Poudre River.

4.5.3 Changes of Water Rights

A total of 145 out of the 192 active B.H. Eaton shares have already been changed. Trolco changed 114 shares in a partial ditch-wide analysis as part of Case No. 02CW390, which concluded that the historical pro-rata farm headgate delivery was approximately 20.6 acre-feet per share with 10.5 acre-feet of consumptive use credit. The remaining changed shares were performed on a parcel-specific basis and concluded that the historical farm headgate deliveries were 22.0 acre-feet with 11.2 to 11.9 acre-feet per share of consumptive use credit.²⁸ In all change of use cases, the ditch loss was determined to be 15 percent and an average on-farm irrigation efficiency of 60 percent.

4.5.4 Water Availability

The B.H. Eaton has historically diverted from April to October, according to records provided by the State. Prior change of use cases have decreed a diversion season of April 1 through October 31, which is consistent with historical operations.

4.5.5 Delivery and Consumptive Use

Pro-rata river headgate diversions from 1950 and 2005 averaged 25.9 acre-feet per share. Assuming a ditch loss of 15 percent, pro-rata farm headgate deliveries were 22.0 acre-feet per share. Assuming a farm efficiency of 50 percent, we might expect that the consumptive use credit would be 10.8 acre-feet per share, which is consistent with prior change of use cases. These are the values used in this report.

²⁸ A total of 25 shares were included in the application for Case No.05CW093 but only 16.9 shares were decreed for changed uses. The remaining 8.1 were determined to have had no consumptive use credit. A total of 6 shares were changed in Case No.00CW219

CHAPTER 5 – NON-POTABLE WATER SUPPLY SHORTFALL AND RECOMMENDATIONS

To understand the water supply shortfall, we analyzed existing water rights and the current commitment of those rights for either direct irrigation or well augmentation. By doing this, we could determine which non-potable water rights are sufficient for Town irrigation and how much additional water may be required. We should note that we use average yields from water rights to quantify the Town's shortfall of non-potable supplies. In a dry year, non-potable water supply yields may decrease and thus be insufficient for full irrigation of the Town's park and open space areas. Under these conditions, Windsor may need to lease additional supplies or incorporate water conservation measures. However, we believe it is appropriate to plan for average conditions when planning non-potable water acquisition.

5.1 Non-Potable Water Supply vs. Demand

5.1.1 KRDC – Priority #1 Right vs. Demand

Table 5.1.1.1 – Kern Priority #1 Water Right vs. Demand

Name	Future Non-Potable Water Requirement (acre-feet)	Comments
Kern Priority #1 Water Right		
Chimney Park	29.9	Only consider consumptive use portion for well augmentation and direct irrigation since return flows are credited for direct irrigation
Community Recreation Center	9.1	
Covenant Park	5.5	
Diamond Valley Park	117.2	
Folkstone Tree Nursery	4.6	
Greenspire	218.9	
Jacoby Farm Park	6.8	
Martin Lind Property	123.1	
Ruff Development	18.9	
Windsor Lake Trail	16.2	
Windsor Village Park	4.8	
W. Wayne Miller Park	14.8	
FRE	500.0	Obligation per contract
Total	1,069.8	
Kern Priority #1 Water Right	530.0	Consumptive use for 100 shares per decree
Eight New Cache Irrigation Shares	53.1	One share has a consumptive use of 6.64 acre-feet
Surplus/(Deficit)	-486.7	
Recommend 74 New Cache Irrigation Shares	491.4	One share has a consumptive use of 6.64 acre-feet

The Kern Priority #1 Water Right was awarded 530 acre-feet of consumptive use in the decree entered in Case No. 02CW301. The table above shows the future non-potable demand for this water supply. In addition to the 530 acre-feet, the eight shares of New Cache owned by Kern Reservoir and Ditch Company are included and provide approximately 53.1 acre-feet of consumptive use.

As shown, the bulk of the demand for this water is from the FRE contract for 500 acre-feet. The water provided to FRE is for augmentation of their wells, so the water must be fully consumable. In the future, the Town may utilize other fully consumable sources to satisfy the FRE obligation.

We recommend the Town acquire 74 shares of New Cache to help offset future needs from the reservoir. New Cache water provides the most flexibility for the Town. Since New Cache water was used within the historical Kern service area, additional shares

can be used for direct irrigation of the sites listed in the table above. Further, the New Cache shares can be changed in the future to include augmentation use and storage within Kern Reservoir. Changed New Cache water can be easily diverted and stored within Kern Reservoir for later use. We should note again that New Cache shares typically deliver from early May through the first week in July. Should the Town want to use New Cache for direct irrigation, the Town would also need to acquire CLP Reservoir shares. However, we recommend the Town only acquire and change New Cache water, so it can be stored in Kern Reservoir, which allows the water to be stored for use later in the irrigation season. In addition, once a decree is entered for New Cache based on the ditch-wide analysis, future changes of this water right should be simpler.

Any water delivered to the reservoir under the Kern Junior Water Right would potentially be available to meet future non-potable demands under the Kern system. After the reservoir enlargement, a base volume of water is needed to keep the water levels up in the reservoir. We assume that the Kern Junior water, when available, will be left in the reservoir to maintain higher water levels for aesthetic value and recreation purposes. In the future if the Kern Junior Water Right delivers water in excess of filling the void in the reservoir, potentially less New Cache water may be needed. However, early post-decree operations show that the Kern Junior Water Right will be needed to maintain higher water levels.

5.1.2 Whitney Ditch Water vs. Demand

Table 5.1.2.1 – Whitney Ditch Water vs. Demand

Name	Future Non-Potable Demand (acre-feet)	Future Non-Potable Water Requirement (acre-feet)	Comments
Whitney Ditch			
Eastman Park	45.8	53.9	Assume 85% irrigation efficiency for sprinkler
Poudre Natural Area	0.8	0.8	Assume 95% irrigation efficiency for drip irrigation
Total		54.7	
Two Whitney Ditch Shares		56.8	One share delivers 28.4 acre-feet after 15% ditch loss
Surplus/(Deficit)		2.1	

Whitney Ditch is currently used to irrigate Eastman Park, the Catholic church (included in Eastman Park), and trees at the Poudre Natural Area. Since the Whitney water is used for direct irrigation, we include an irrigation efficiency for each site as noted in the table. As can be seen, the Town's current ownership in the Whitney Ditch is adequate for these sites. Irrigation at these two sites is supplemented with the Eastman Park Well. Operationally, the Town should irrigate directly with Whitney Ditch water first and only use the Eastman Park Well sparingly since the well requires augmentation, i.e.,

during dry weather conditions or for shoulder month irrigation when the ditch is not running.

5.1.3 New Cache Water vs. Demand

Table 5.1.3.1 – New Cache Water vs. Demand

Name	Future Non-Potable Demand (acre-feet)	Future Non-Potable Water Requirement (acre-feet)	Comments
New Cache			
Tacincala Community Park	57.2	57.2	Since recommended to be well irrigated and augmented, only net pumping is considered
Prospect Park	10.3	10.3	Since recommended to be well irrigated and augmented, only net pumping is considered
Total	67.5	67.5	
Currently No Water Supply		0	
Surplus/(Deficit)		-67.5	
Recommend 11 New Cache Irrigation Shares		73.0	One share has a consumptive use of 6.64 acre-feet

Within the historical service area of the Lake Canal system, two proposed parks are planned – Tacincala and Prospect Park. Tacincala will require a new source of water and currently the plan for Prospect Park is to purchase water from the metro district. Although both sites are within the Lake Canal service area, we do not recommend Lake Canal as the first option for irrigation. Due to the location of Tacincala and Prospect Park, service from the Lake Canal system will likely require many infrastructure upgrades. Further, as described in Section 4.3, the source has a limited season of delivery. The Lake Canal system typically diverts early and has limited late season supplies, which would require the Town to purchase shares in both the Lake Canal Ditch and Lake Canal Reservoir to provide water during the entire irrigation season.

We recommend the installation of a new well to service the Tacincala Park site. Since a test well has not been drilled at this location, we do not know for certain that a well would yield in this area. However, within a quarter-mile of the proposed Tacincala site, there are six constructed wells between 19 and 37 feet deep that are permitted to provide between 110 and 510 gpm, suggesting that a new well may be feasible at Tacincala.

Although the current plan for Prospect Park is to purchase water from the metro district, we recommend drilling a new well for irrigation at this site. When considering the amount of money being paid to the metro district for irrigation water for Founder's Green Park, we do not recommend that arrangement.

Assuming a new well is drilled at each site, the augmentation requirement is 67.5 acre-feet. We recommend the Town purchase 11 New Cache shares to meet this augmentation requirement. The Town would need to change the New Cache shares in Water Court. However, as described in Section 4.2, the change should be simpler after a decree is entered based on the ditch-wide analysis and changed shares provide Windsor with the most flexibility for the water right.

If a well at these locations do not produce sufficient water for an irrigation system, then Lake Canal water is the next option for irrigation at these sites since they both reside within the Lake Canal service area. The requirement of needing both Lake Canal and Lake Canal Reservoir shares to irrigate throughout the full season causes some inefficiencies on the number of shares required. Irrigation from the Lake Canal system would require approximately 1.5 shares of Lake Canal Ditch and five shares of Lake Canal Reservoir.

5.1.4 Louden Ditch Water vs. Demand

Table 5.1.4.1 – Louden Ditch Water vs. Demand

Name	Future Non-Potable Demand (acre-feet)	Future Non-Potable Water Requirement (acre-feet)	Comments
Louden Ditch			
Aberdour Circle Park	9.1	10.7	Assume 85% irrigation efficiency for sprinkler
Windsor Highlands Park	15.3	18.0	Assume 85% irrigation efficiency for sprinkler, natural grass is fully irrigated
Total		28.7	
Two Louden Ditch & 1 Extension		42.7	One share Louden Ditch delivers 18.9 acre-feet after 15% ditch loss. One share Louden Extension delivers 4.9 acre-feet
Surplus/(Deficit)		14.0	

Aberdour Circle Park and Windsor Highlands Park are both irrigated with Louden water. An irrigation efficiency of 85 percent is considered in the water demand for these sites. The Town's current ownership in the Louden Main and Louden Extension are adequate to meet its irrigation requirements at these two park sites. The primary issue with irrigation at these parks is early season irrigation since Louden typically does not come on until May. However, well water is not an option as they do not yield at these sites. The Town should consider negotiating an agreement with the owners of Highland Meadows Golf Course to pump water from storage at the golf course earlier in the season until the ditch begins delivery. As can be seen in the table, Windsor provides more water than what is needed to irrigate the two Town parks. This provides a benefit to the golf course and can be a potential negotiating point.

5.1.5 Poudre Plan Augmentation vs. Demand

Table 5.1.5.1 – Poudre Plan Augmentation vs. Demand

Name	Future Non-Potable Demand (acre-feet)	Future Non-Potable Water Requirement (acre-feet)	Comments
Poudre Plan			
Boardwalk Park	13.9	16.4	Assume 85% irrigation efficiency for sprinkler
Cemetery & Cemetery Fields	29.9	35.1	Assume 85% irrigation efficiency for sprinkler
Main Park	18.0	21.2	Assume 85% irrigation efficiency for sprinkler
Town Hall	0.6	0.7	Assume 85% irrigation efficiency for sprinkler
Total		73.4	
Poudre Plan Augmentation		76.8	
Surplus/(Deficit)		3.4	
Windsor West Park	5.9	7.0	Assume 85% irrigation efficiency for sprinkler
Total		7.0	
Poudre Plan Augmentation		11.1	Per Decree, 11.1 acre-feet is tied to augmentation of well pumping at Windsor West Park
Surplus/(Deficit)		4.1	

Augmentation of well use within the Poudre Plan provides the most economical and convenient option for non-potable water. Thus, the Town should maximize its use from wells covered by the Poudre Plan and take all necessary action to remain in good standing with the plan. As can be seen in the table, we recommend the Town rehabilitate Boardwalk Well No. 7 (Permit No. 7-2704) for irrigation at Boardwalk Park. Currently, Boardwalk Park is irrigated from the Regional Pump station, which utilizes sources in Kern Reservoir. It is our understanding that the well has collapsed. Rehabilitation and use of Boardwalk Well No. 7 makes most efficient use of Windsor's resources and reduces demand on Kern Reservoir. The well can be re-drilled within 200 feet of the decreed and permitted location for irrigation of Boardwalk Park.

We also recommend that the Town complete the required steps to irrigate Town Hall from a Main Park irrigation system. The location of use for the Main Park wells needs to be corrected. During the process of correcting the location of use for the Main Park wells, we believe Town Hall irrigation can be included. Our initial conversations with the attorneys for the Poudre Plan show that this option is feasible. As can be seen in the table, there is still sufficient water under the Poudre Plan to include both Boardwalk Park and Town Hall.

Windsor West Park is irrigated by the Windsor West Well. The Windsor West Well can only be used at this location by decree and has sufficient Poudre Plan augmentation to fully irrigate this site.

5.1.6 B.H. Eaton Ditch Water vs. Demand

Table 5.1.6.1 – B.H. Eaton Ditch Water vs. Demand

Name	Future Non-Potable Demand (acre-feet)	Future Non-Potable Water Requirement (acre-feet)	Comments
B.H. Eaton Ditch			
Eastman Park South	53.8	63.3	Assume 85% irrigation efficiency for sprinkler
Total		63.3	
Two B.H. Eaton Ditch Shares		44.0	One share delivers 22.0 acre-feet after 15% ditch loss
Surplus/(Deficit)		-19.3	
Recommend 1.0 Additional B.H. Eaton Shares		22.0	One share delivers 22.0 acre-feet after 15% ditch loss

Historically, the B.H. Eaton Ditch serviced lands south of the river, which are now located in the southern part of Windsor. We recommend the Town purchase an additional B.H. Eaton share for irrigation at Eastman Park South. Should the site be used as a storage pond, the additional B.H. Eaton share could be changed to include storage, recreation, and augmentation of the Town's wells.

5.2 Recommended New Non-Potable Supplies

We recommend the Town target the following non-potable water.

Table 5.2.1 – Recommended New Non-Potable Water

Name	Number of Shares	Estimated Cost
New Cache Irrigation Shares ²⁹	85	\$2,975,000
B.H. Eaton Shares ³⁰	1	\$64,800

²⁹ New Cache value is based upon previous sales

³⁰ B.H. Eaton value is based upon an estimate of \$6,000 per acre-foot of consumptive use

CHAPTER 6 – POTENTIAL NON-POTABLE STORAGE ALTERNATIVES

Due to Windsor's planned growth and commitment to develop new parks and amenities, non-potable storage along the river in the Windsor area would be extremely beneficial for the Town. In order for non-potable storage to be valuable, Windsor needs the ability to store its existing water rights, either directly or by exchange, into the storage vessel. A river exchange consists of returning a substitute supply downstream back to the river in order to divert a like amount of water upstream. Storage, in addition to Kern Reservoir, that can be used for non-potable uses such as augmentation and/or direct irrigation will take pressure off of Kern Reservoir and ultimately help the Town manage its non-potable supplies more efficiently. An example of this would be the management of the Kern Priority #1 Water Right. The Kern Priority #1 Water Right is entitled to one annual fill between November 1 and October 31. Unused Kern #1 water stored in the reservoir as of October 31 counts against the next year's fill beginning on November 1. Further, if there are other supplies in the reservoir that are taking up space as of October 31, this water would have to be "booked over" to the Kern #1 Water Right, which also counts against the next year's fill. Having storage along the Cache la Poudre River at the proper location would allow Windsor to evacuate unused Kern Priority #1 water stored in Kern Reservoir and place that water into another storage vessel. This would allow for better management of the Kern Priority #1 Water Right, improving the likelihood of fully diverting the 1,277 acre-feet each water year.

The Town has several options for storage, each with advantages and disadvantages. We discuss several storage alternatives for the Town in this chapter. Some of these potential storage vessels have been explored further than others. Constructability and costs have not been investigated at this time and is outside the scope of this report. The purpose of this chapter is to give the Town a general sense of potential non-potable storage available, how the storage would benefit the Town, and water rights related issues with the potential storage sites. For the current storage alternatives, an exchange of water is required. The two sources of water supply that Windsor would exchange include water from Kern Reservoir that returns to the river through the Kern Lateral and future reusable effluent returned to the river at the Town's WWTP outfall. These are the "exchange from" points and once the water is returned to the river can be diverted upstream under certain river conditions.

In Windsor's Potable Water Master Plan, we recommend the Town acquire WSSC and/or Windy Gap. Northern Colorado Water Conservancy District is hesitant to allow the addition of new participants in Windy Gap or having existing

Windy Gap participants sell some of their participation due to where they are at in the permitting process. However, we believe there will be Windy Gap available in the future once the project becomes a reality as there are still many entities that have participated in more than they need. If the Town acquires either source in the future, Windsor would generate reusable effluent at the Town's WWTP after first use of the water within Windsor's municipal system.

6.1 Potential Storage Sites

In this section, we discuss three potential non-potable storage sites. These potential sites are shown in **Figure 4**.

6.1.1 Everitt Storage

Everitt is considering constructing storage located in the SW ¼ of Section 20, T6N, R67W, in the 6th P.M. This storage would be approximately 11 surface acres and have an estimated volume of 100 to 125 acre-feet. This storage could be filled by the Whitney Ditch or from a pump station along the river. Everitt has approached the Town to solicit interest in this storage vessel. Storage in this reach of the river will help the Town with non-potable needs. As described above, the Town would utilize storage at this location to exchange and store unused Kern Priority #1 water or reusable effluent in the future. Although the Town currently owns two shares of Whitney Ditch, this water is being used to irrigate Eastman Park and the Poudre Natural Area. There would be the potential to deliver Kern Junior or free river water to the Everitt storage as well.

The Town would need to evaluate the exchange potential from the Kern Lateral and the WWTP outfall up to either a pump station along the Cache la Poudre River into the Everitt storage or up to the Whitney Ditch headgate, which then could be diverted through the Whitney Ditch to the storage site. An exchange to the Whitney Ditch headgate would require a carriage agreement with the ditch company to run that water down to the Everitt storage. If the exchange potential is adequate, Windsor could move fully consumable credits from Kern Reservoir or credits generated at the WWTP up to the Everitt storage. Once the water is in storage, it can be released to the river on an as-needed basis for well augmentation.

Advantages

- It is a good location on the river for Windsor's needs.
- There is an existing headgate at the site.

Disadvantages

- There are higher costs related to infrastructure to divert from and back to the Cache la Poudre River as the site is further from the river than the other storage options.
- There is a limitation on public trail access due to Everitt's operations on the southern conservation area.
- Windsor is not in full control of project.
- There is a cost to acquire the storage.
- Windsor would need to coordinate the use of the storage with Everitt and the future HOA since there will be home sites overlooking the reservoir.

6.1.2 Eastman Park South Storage

Town staff suggested the possibility of constructing storage on Eastman Park South. Currently, Eastman Park South is slated to be a park area with native and low water use landscape. The site is located in the NE ¼ of Section 29, T6N, R67W, in the 6th P.M. and consists of approximately 30 acres. The Town has completed a geotechnical investigation and storage at this location appears very feasible. Preliminary calculations show approximately 200 acre-feet of storage could be constructed at this location.

Storage at Eastman Park South would work similar to storage at Everitt as both sites are located in the same general reach on the river. It would involve an exchange of water up to a pump station along the Cache la Poudre River or to the B.H. Eaton headgate. A carriage agreement would still be needed to deliver water to the storage vessel at Eastman Park South, but the agreement would be with the B.H. Eaton Ditch Company. The primary advantage to develop storage at Eastman Park South is the Town already owns the site. The water storage could be used as a park amenity, although use for the Town's augmentation needs would likely result in water level fluctuations throughout the season.

Advantages

- It is a good location on the river for Windsor's needs.
- There is an existing headgate at the site.
- The storage would serve as a good amenity for Eastman Park.
- Windsor has full control in construction and future operation.
- Windsor already owns the site.
- Windsor is currently not utilizing its B.H. Eaton water for its needs. This water can be changed and stored at this site for augmentation.
- There will be less infrastructure cost due to the proximity to the river.

Disadvantages

- There may be floodplain/floodway issues due to the proximity to the river.

6.1.3 Serfer Pit

The Serfer Pit is located in the NE ¼ of Section 24, T6N, R68W, in the 6th P.M., southwest of the intersection of Highway 392 and CR 13. Storage at this location is projected to be on the order of a few thousand acre-feet. In order to get water to this property, a headgate and pipeline would be required from the Greeley No. 2 Canal or a pump station on the river. For storage at this location to be beneficial, an exchange would be required up to a pump station along the river or to the Greeley No. 2 Canal headgate. Because the Whitney Ditch and B.H. Eaton Ditch divert water from the river between the Serfer Pit and both the Town's WWTP outfall and Kern Reservoir outlet, exchanging water may be more difficult. A carriage agreement would be needed with New Cache.

Advantages

- Potentially workable location on the river for Windsor's needs, but not as good as the other two storage options.
- This site could serve as an amenity for the Town.

Disadvantages

- There will be a higher cost for infrastructure and easements to convey water to the property from the Greeley No. 2 Canal.
- There are higher costs related to infrastructure to divert from and back to the Cache la Poudre River.
- Windsor is not in full control of project.
- There is a cost to acquire the storage.
- There is more storage at this location than Windsor needs. The Town would need to coordinate the use of the storage with other owners of the reservoir.
- There may be floodplain/floodway issues due to the proximity to the river.

6.2 Non-Potable Water Storage Recommendation

We recommend the Town construct storage at Eastman Park South. As discussed, there are many advantages to this site. From a water rights standpoint, the site is ideally located for a river exchange of water from Kern Reservoir or future reusable effluent from the WWTP. Additionally, storage at this location would allow the Town to utilize its two B.H. Eaton shares.

CHAPTER 7 – CONCLUSIONS AND RECOMMENDATIONS

It is important for the Town Board and staff to have a clear understanding of the recommendations related to meeting its future non-potable water needs. The conclusions and recommendations in this chapter outline the next steps that should be completed for successful implementation of this Non-Potable Water Master Plan. The Town Board and staff can be confident that the recommendations proposed in this plan will adequately cover the Town's needs as it moves forward.

Following is a list summarizing the recommendations from this plan. The intent of this list is to provide the key decision makers an easy reference point upon which to guide the Town by keeping the decision makers on the same page. This chapter should be referenced periodically to insure the proper actions are taken for successful implementation.

- 1. Correct Poudre Plan well locations and decreed location of use.**
Several of the Town's Poudre Plan wells, namely those at Main Park, have an incorrect well location and decreed location of use. The location and decreed location of use for these wells is the SW $\frac{1}{4}$, SW $\frac{1}{4}$ of Section 16, T6N, R67W, in the 6th P.M., which is the location of Boardwalk Park. The Town should correct the location and location of use for the Main Park wells. The decreed location for Cemetery Well #8 should also be corrected.
- 2. Incorporate Town Hall as part of the irrigated acreage for the Main Park wells.** Per discussions with the CLPWUA, in the process of correcting the decreed location of use for the Main Park wells, the Town could include Town Hall since it is adjacent to the park and in the same quarter-quarter section. This will allow the Town to irrigate Town Hall from the Main Park irrigation system, which is augmented by the Poudre Plan.
- 3. Re-drill Boardwalk Park Well No. 7.** Boardwalk Park is currently being irrigated directly from Kern Reservoir through the Regional Pump Station. There is an old Poudre Plan well that is no longer operational. As discussed in Section 5.1.5 of this report, the Town has sufficient Poudre Plan credits to allow this well to be re-drilled and pumped under the Poudre Plan. This will free up water resources within Kern Reservoir to be used for other demands.
- 4. Correct CRC Well location.** The decreed location for the CRC Well is SE $\frac{1}{4}$, SW $\frac{1}{4}$ of Section 17, T6N, R67W, in the 6th P.M. The well permit

states NW ¼, SW ¼ of Section 17, T6N, R67W, in the 6th P.M. A correction of well location form should be filed with the State Engineer. The owner of this well should also be updated to the Town of Windsor.

5. **Convert the northern portion of Chimney Park to non-potable irrigation.** Due to requirements of water measurement from the Kern Decree, it would be helpful to measure flows down the west lateral (lateral that delivers water to Chimney Park, Folkstone Nursery, Windsor Village and Broe). This is currently not possible. In addition, the southern portion of Chimney Park is currently irrigated directly from the Kern Lateral via a pump placed in the channel. There is water constantly running past this pump, regardless if the water is needed downstream. We recommend designing a structure at this location to allow for more efficient irrigation on the southern portion of Chimney Park, to allow the northern portion of Chimney Park to be irrigated from the lateral, and to measure any flows past Chimney Park that runs down the west lateral.
6. **Convert Covenant Park to well irrigation.** Currently, Covenant Park is being irrigated with potable water. A well casing exists on the property from a monitoring well. We recommend the Town complete the well and file a Water Court application and SWSP to include the well in the Kern Augmentation Plan.
7. **Install a drip irrigation system at Folkstone Nursery.** Per the Kern Decree, the Town can claim irrigation return flow credit as 17% of irrigation water applied to its parks under the Kern system. Currently, Folkstone Nursery is flood irrigated. Flood irrigation typically generates about 50% return flow. Since Windsor's irrigation return flow credit is fixed at 17% per the decree, any improvements to irrigation efficiency greatly benefits the Town.
8. **Convert Windsor Village to well irrigation.** A new well at Windsor Village was included as part of the Kern Augmentation Plan. Since this well has been decreed, the Town can drill a new well at this site upon approval of a new well permit.
9. **Meet with Windsor Development Group, LLC to discuss water requirements at the Ruff Development.** Per the agreement, Windsor Development Group, LLC conveyed 1.31 Kern shares to the Town in exchange for delivery of that water to their development. The 1.31 shares deliver 13.7 acre-feet of water. Currently, there are 8.3 acres of irrigation at this development, which has an average demand of 18.9 acre-feet. It appears that there is more developable acreage at this site. The Town should meet with the Windsor Development Group, LLC to determine how demands associated with any expansion will be met.

10. **Meet with the owners of Highland Meadows Golf Course to discuss options for delivery of early season water to Aberdour Circle Park and Windsor Highlands Park.** Due to the fact that the Loudon system does not come on until May in most years, both Aberdour Circle Park and Windsor Highlands Park cannot be irrigated as soon as desired. Town staff should meet with the owners of Highland Meadows Golf Course regarding possible early season irrigation from storage at the golf course. Typically golf courses commence irrigation before May, so it may be reasonable for the Town to irrigate its parks as well. As a potential negotiating point, the Town currently delivers more Loudon water to the golf course than is subsequently needed at the Town's parks. The golf course receives the benefit of this excess water.
11. **Pipe the open channel of the Kern Lateral across the lumber yard.** The east branch of the Kern Lateral travels through the lumber yard in Town. This east branch delivers irrigation water to several park and open space sites downstream of the lumber yard in addition to augmentation water that is measured and returned to the Cache la Poudre River. In the 2009-2010 winter season, the lumber yard plowed snow into this east branch of the Kern Lateral. By decree, the Town is required to make daily deliveries through this branch back to the river for augmentation. We recommend the Town pipe this section of the east branch to insure the required augmentation water can be delivered to the river year round.
12. **Improve language related to water supply dedication in future development agreements and revisit language in existing development agreements.** It is unclear in most of the Town's development agreements if the developer is required to provide the water and whether or not Windsor ultimately has to pay for the water through a metro district. Further, rates that Windsor will pay are not explicitly defined. Windsor should address the language in existing annexation agreements and be more explicit in future annexation agreements whether or not the developer is to provide the water, and if so, that there is no future cost to the Town.
13. **Develop storage at Eastman Park South.** This location is ideal for Windsor's non-potable water needs. Initial investigation shows storage at this site to be very feasible. The Town should rehabilitate the lateral from the B.H. Eaton Ditch to improve conveyance of water to the storage vessel once constructed. Based on storm drainage needs per discussions with staff, the first section of the lateral should be left open channel and the rest should be piped.
14. **Purchase additional non-potable water supplies.** To meet the Town's future non-potable water needs, we recommend the following:

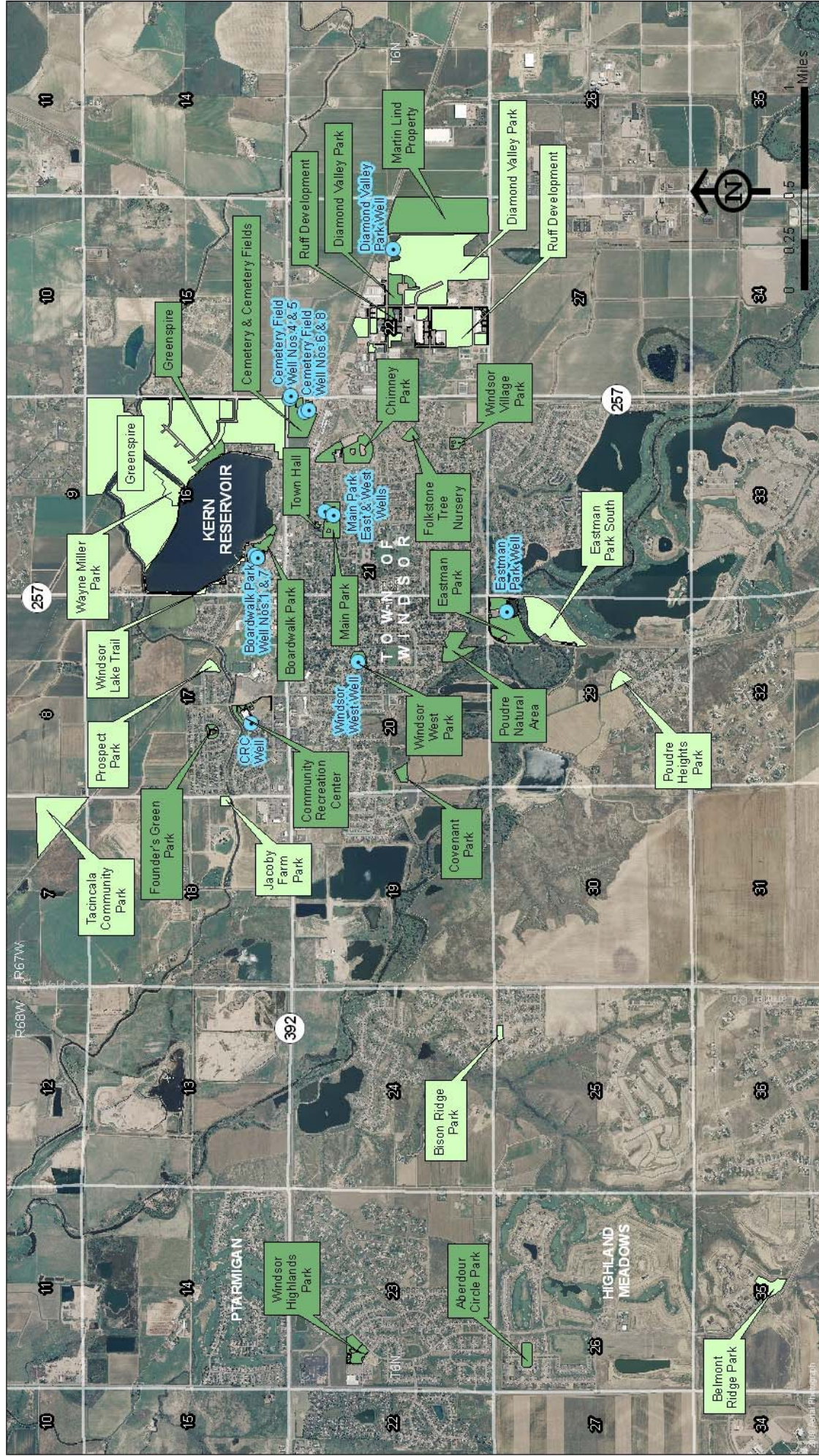
Table 7.1 – Recommended New Non-Potable Water

Name	Number of Shares	Estimated Cost
New Cache Irrigation Shares ³¹	85	\$2,975,000
B.H. Eaton Shares ³²	1	\$64,800

³¹ New Cache value is based upon previous sales

³² B.H. Eaton value is based upon an estimate of \$6,000 per acre-foot of consumptive use





TOWN OF WINDSOR

Figure 1

TOWN OF WINDSOR

Parks, Open Spaces, & Wells

Date: 11-8-2010

Drawn By: DS

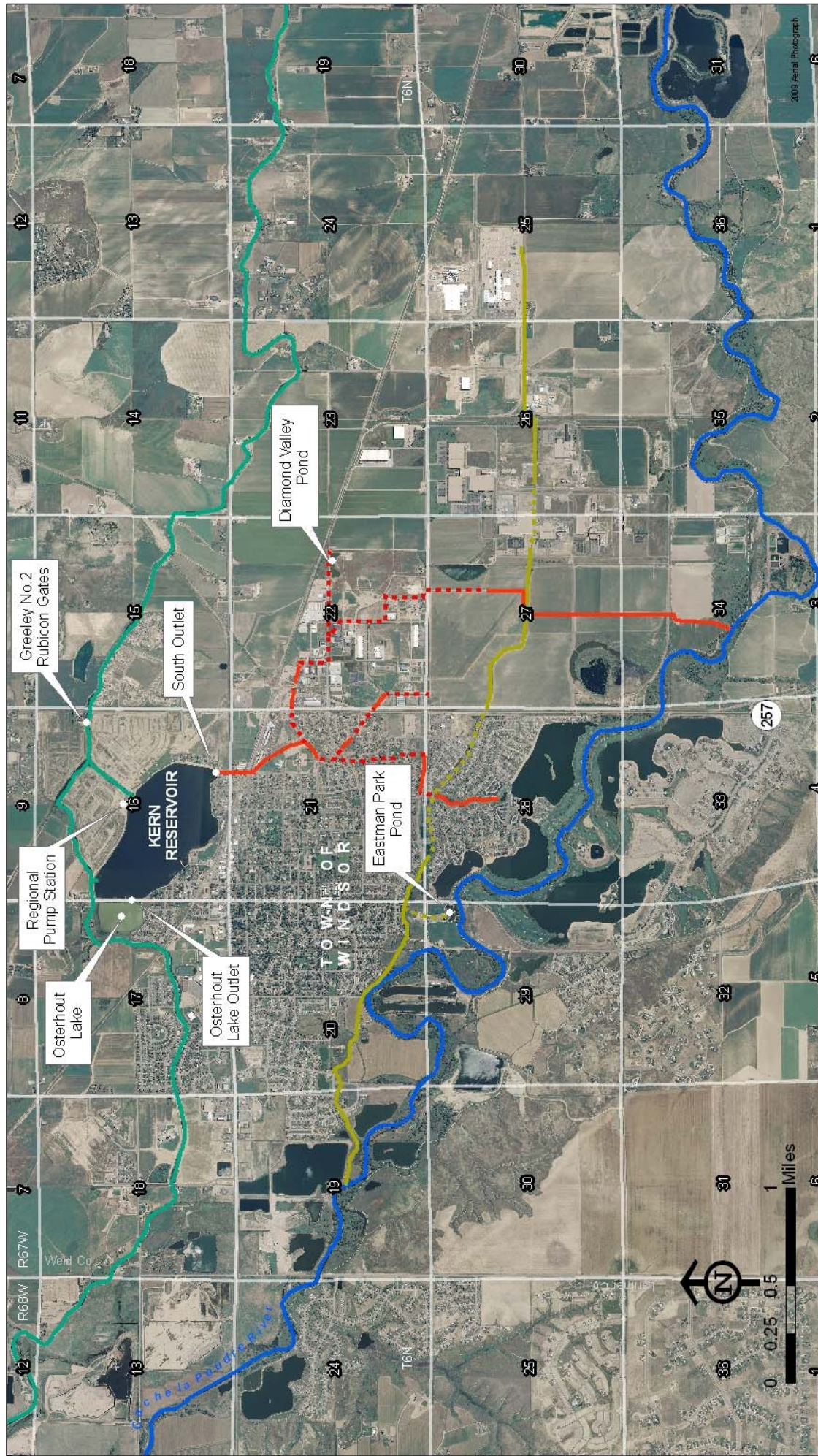
Scale: as shown

Job No: 10-100

Figure: 1 of 1

Legend:

- Existing Town Parks
- Future Park Site





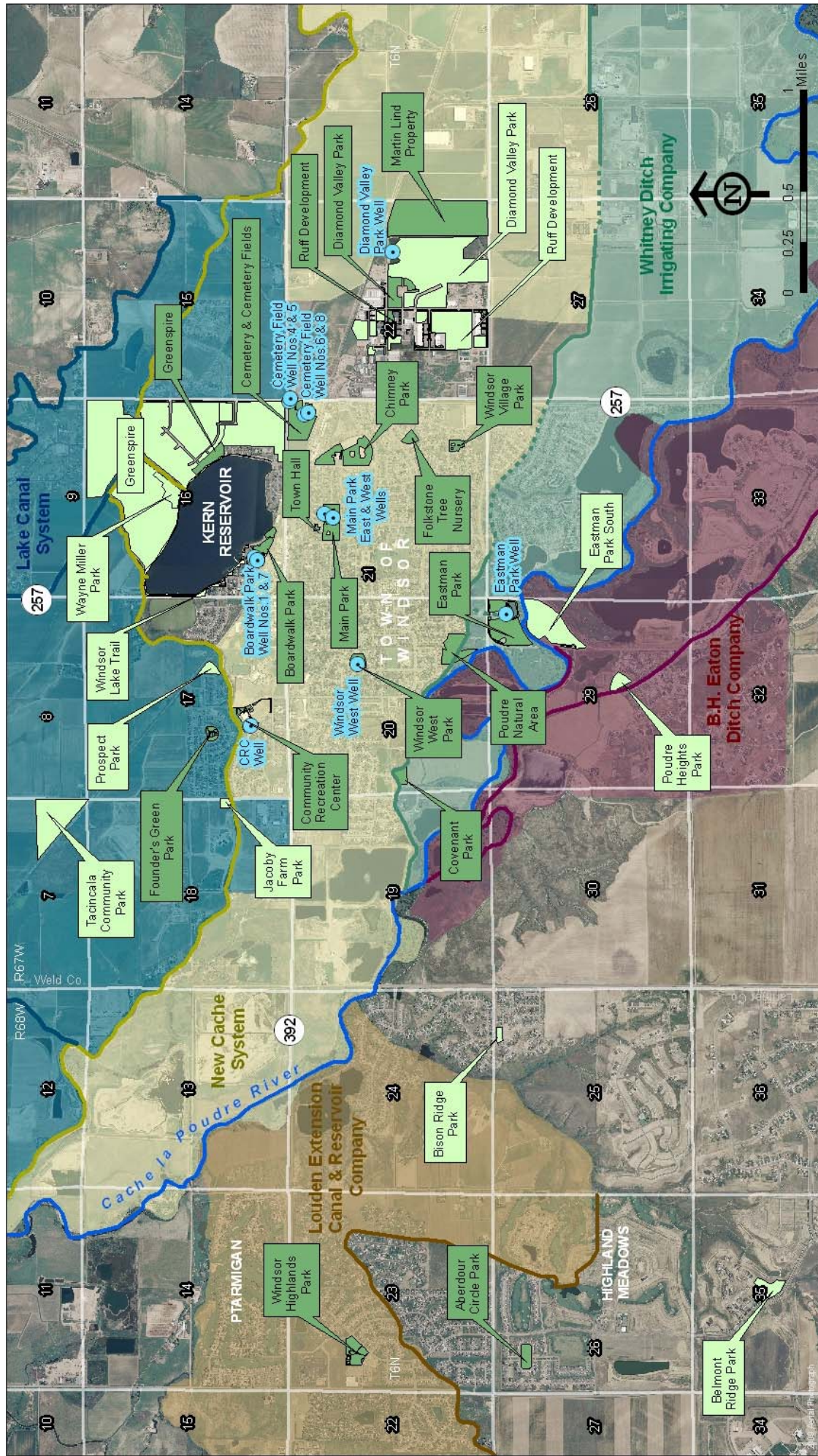
clearwatersolutions
water • land • planning • engineering



TOWN OF WINDSOR

Figure 2
TOWN OF WINDSOR
Kern, Diamond Valley, & Eastman Park Systems

Date:	11-8-2010
Drawn By:	DS
Scale:	as shown
Job No:	10-100
Figure:	1 of 1



Date:	11-8-2010
Drawn By:	DS
Scale:	as shown
Job No:	10-100
Figure:	1 of 1

Legend:	
	Existing Town Parks
	Future Park Site

Figure 3
TOWN OF WINDSOR
 Irrigation Ditch Service Areas

TOWN OF WINDSOR

clearwater solutions
 water facts • planning • engineering

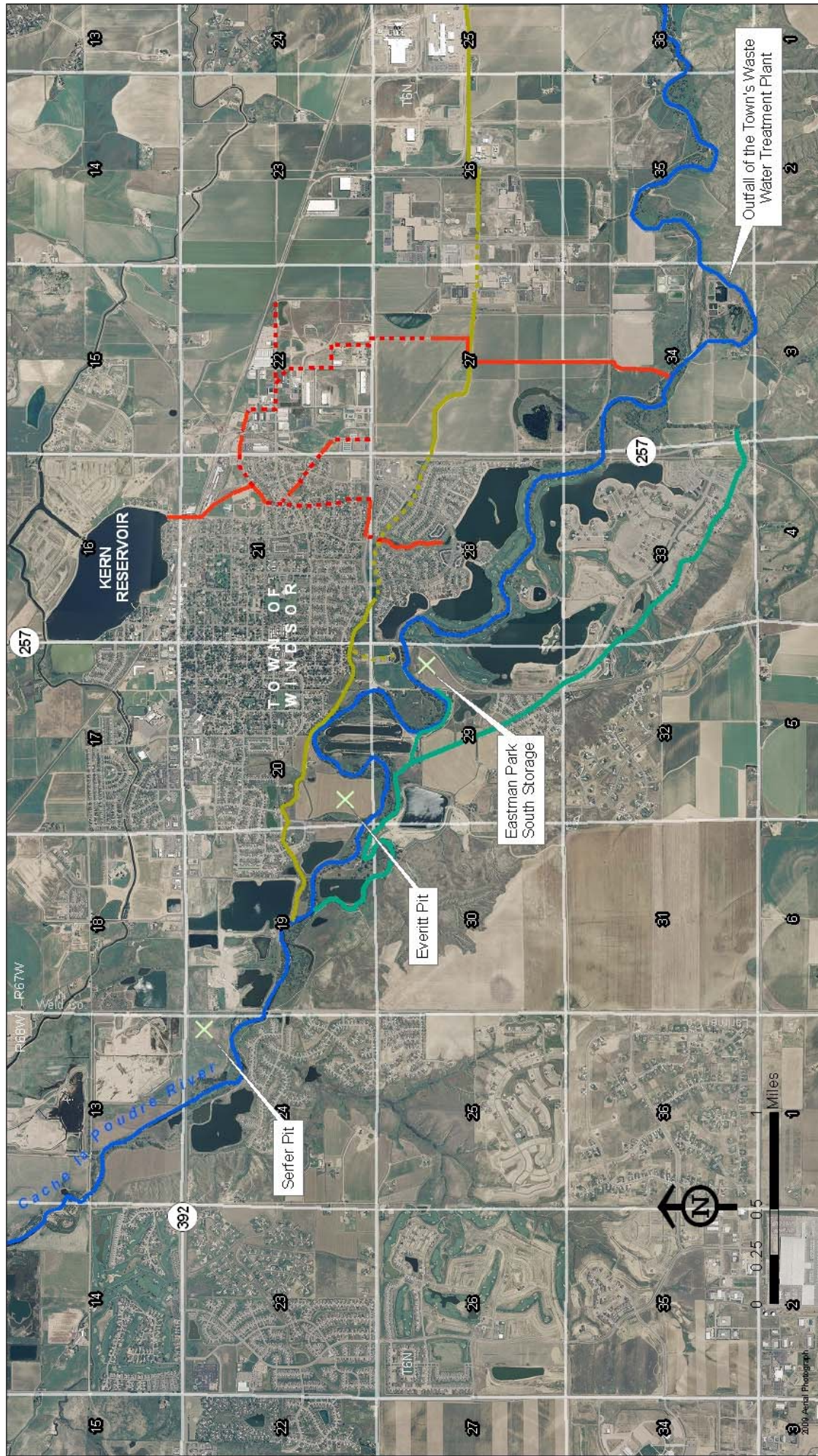
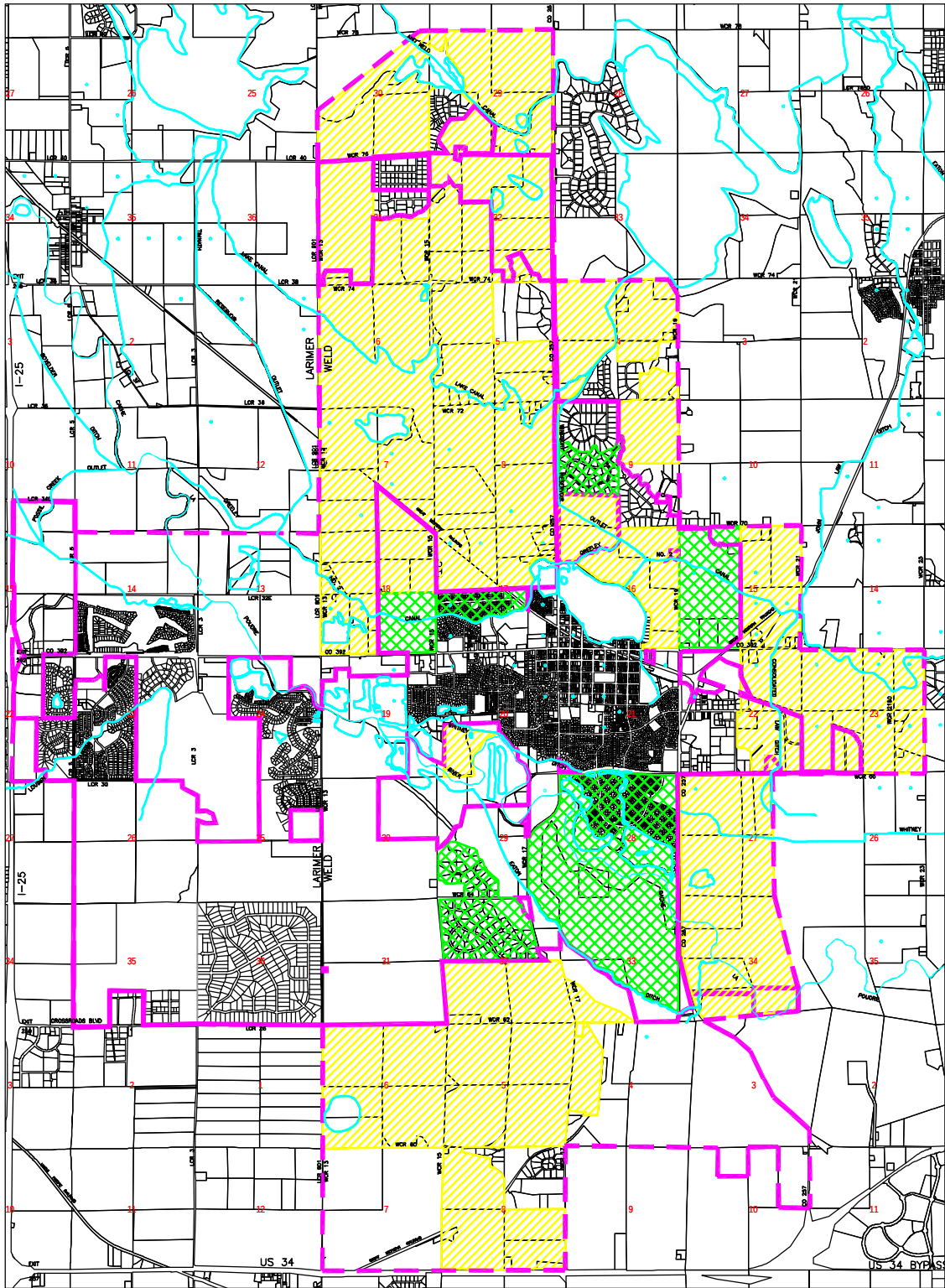


Figure 4
TOWN OF WINDSOR
 Potential Non-Potable Storage Sites





TOWN OF WINDSOR

LEGEND

- TOWN LIMITS
- - - GMA BOUNDARY
- WATER WELL

- EXISTING NON-POTABLE SYSTEM AREA
- POTENTIAL NON-POTABLE SYSTEM AREA



1"=4400'

NON-POTABLE WATER SYSTEM AREAS

Ordinance 2003-1142

TOWN OF WINDSOR

ORDINANCE NO. 2003- 1142

BEING AN ORDINANCE REQUIRING NON-POTABLE SECONDARY WATER SYSTEMS FOR THE PURPOSES OF IRRIGATION FOR NEW RESIDENTIAL DEVELOPMENT IN CERTAIN DESIGNATED AREAS WITHIN THE TOWN OF WINDSOR URBAN GROWTH BOUNDARY, AND AUTHORIZING THE ADOPTION OF REGULATIONS FOR THE CONSTRUCTION, TESTING AND OPERATION OF SUCH NON-POTABLE SECONDARY SYSTEMS.

WHEREAS, for the past several years, the Windsor Water and Sewer Board, in conjunction with the Director of Engineering, has studied the advisability of requiring secondary water systems for the purposes of irrigation in areas of new residential development in the Town; and

WHEREAS, certain secondary water systems have already been constructed in the Town, and the operation of those systems has been successful and has benefited the residents of the developments where those systems are operating; and

WHEREAS, statistics developed by the Director of Engineering and the Public Works Department indicate that where secondary systems are operative, potable water usage is greatly reduced, thereby creating significant savings to the Town in infrastructure investment and generally promoting conservation of limited potable water resources in Northern Colorado; and

WHEREAS, the Water and Sewer Board, in conjunction with the Director of Engineering, has designated areas of the Town within the Urban Growth Boundary where the construction of secondary water systems would logically serve the purposes of cost savings and conservation as aforesaid;

NOW, THEREFORE, BE IT ORDAINED BY THE BOARD OF TRUSTEES OF THE TOWN OF WINDSOR, COLORADO, AS FOLLOWS:

1. **Mandatory construction of non-potable secondary water systems for irrigation.** Commencing upon the adoption of this Ordinance, all new residential development within those areas of the Urban Growth Boundary of the Town designated by the Board of Trustees as suitable for the construction of non-potable secondary water systems, shall be required, as part of any subdivision process, to construct a non-potable secondary water system for irrigation of all residential lots and common areas within the subdivision. Likewise, proponents of all new residential development shall provide for adequate non-potable water in amounts sufficient in both quantities and quality to operate said system so that the system will provide an assured and sufficient amount of water to adequately irrigate all residential lots and common areas.

2. **Private management of non-potable secondary water systems.** As a condition of subdivision approval of any residential development wherein a non-potable secondary water system shall be required, such system shall be operated, repaired, and maintained by a metropolitan district, homeowners association, or other public or private entity. The nature and structure of such entity shall be subject to approval by the Town, and the management entity and the Town shall enter into a written agreement prior to final subdivision approval to provide for the entity's management and operation of the non-potable secondary water system and specifically providing for such credits as may be appropriate from the Town for the construction of such system, including reduced raw water dedication requirements reflective of the existence of a non-potable secondary water system, as well as reduced water plant investment fees likewise reflective of the existence of the non-potable secondary water system.

Any agreement between the management entity and the Town shall also provide that the non-potable water resources designated by the management entity for the operation of the non-potable secondary water system shall be available both physically and legally in perpetuity, thereby assuring to the Town that in the event the management entity fails and the Town is subsequently required to operate the non-potable secondary water system, adequate water resources will be available to the Town for the operation of the non-potable secondary water system. Therefore, the agreement must also provide for the transfer of such water resources, as well as the water acquisition and distribution system, to the Town at its option, should the management entity be unable to operate, repair, maintain and replace the system so that it functions to provide a reliable and sufficient supply of non-potable water for the purposes set forth in the agreement. The adequacy and reliability of the non-potable water resources shall be determined by the Town in its sole discretion. Any funds held by or for the management entity for the operation, repair, maintenance and replacement of such system shall also be transferred to the Town, with the use of such funds limited to the operation, repair, maintenance and replacement of such system.

3. **Establishment of geographical areas where non-potable secondary water systems shall be required.** Upon the adoption of this Ordinance, the Board of Trustees shall, by resolution, designate those areas within the Town of Windsor's Urban Growth Boundary wherein the construction of a non-potable secondary water system shall be required as a condition of development. Such designation by the Town shall include areas within the Urban Growth Boundary of the Town that have historically been irrigated by agricultural wells or ditch and canal systems, as well as other areas wherein, for reasons of topography and access to raw water, the construction of non-potable secondary water systems is determined by the Town to be feasible.

The Town may, by a resolution subsequently adopted and after appropriate findings, remove from or add to the original areas wherein non-potable secondary water systems are required within the Town of Windsor's Urban Growth Boundary.

4. **Annexation.** The construction of a non-potable secondary water system at the time of development shall be a condition of annexation when annexation is proposed for residential development in an area designated for the construction of non-potable secondary water systems.

5. **Feasibility review and determination.** In the event it can be established to the satisfaction of the Board of Trustees that the construction of a non-potable secondary water system as part of new residential development in an area designated for the construction of non-potable secondary water systems is not economically feasible and would work an undue hardship, the Board of Trustees may relieve the developer from the operation of this Ordinance. Any such determination by the Board of Trustees shall be conditioned upon compliance with the following conditions:

- a. The developer shall submit an application seeking relief from the operation of this Ordinance on a form prescribed by the Town and containing such information and supporting documentation as may be required by the Town.
- b. The developer shall submit an analysis of the economic feasibility of the proposed non-potable system using a standardized cost benefit analysis approved by the Town.
- c. The developer may submit such additional information and documentation as may be deemed relevant in support of its proposition that the construction of a non-potable system is not economically feasible and would work an undue hardship, including but not limited to, information concerning the availability and cost of raw water and issues of engineering relating to the delivery of raw water to the system in question.
- d. Upon receipt of the aforesaid application, cost benefit analysis and additional information and documentation, the Town's Director of Engineering may, in his sole discretion, employ such engineers, financial analysts and such other experts as may be necessary to review and evaluate the data provided and to submit an independent analysis of the developer's application for relief from the operation of this Ordinance. The reasonable and necessary expenses incurred by the Town shall be paid by the developer and shall be advanced by the developer as a condition of this process.
- e. Upon the completion of the independent analysis as aforesaid, the Director of Engineering, upon notice to the developer, shall schedule a hearing before the Board of Trustees. At the time of the hearing, the developer and the Town shall each be afforded a full opportunity to present all relevant evidence in the form of testimony and exhibits. Within ten (10) days of the conclusion of the hearing, the Board of Trustees shall prepare and submit a written decision affirming the requirements of this Ordinance or providing the developer relief therefrom. The

decision of the Board of Trustees shall be final upon submission of its written decision.

6. **Regulations.** The Director of Engineering is hereby authorized to develop regulations for the construction and operation of non-potable secondary water systems. Such regulations shall include, but shall not be limited to, specifications for transmission lines, connections, pumps, and storage requirements for non-potable water.

7. **Emergency clause.** In the opinion of the Board of Trustees of the Town of Windsor, Colorado, this Ordinance is necessary for the preservation of the public peace, health, and safety, and shall become effective immediately.

Introduced, considered favorable on reading, and ordered published this 24th day of March, 2003.

TOWN OF WINDSOR, COLORADO

By W. Wayne Miller
Mayor

ATTEST:

Cathy McKeeney
Town Clerk





Dual – Use Systems



History

1994: Water Valley becomes Windsor's first development to propose building a dual water distribution system.

1995: Data for existing homes showed that approximately 50% of total water use was for indoor use.

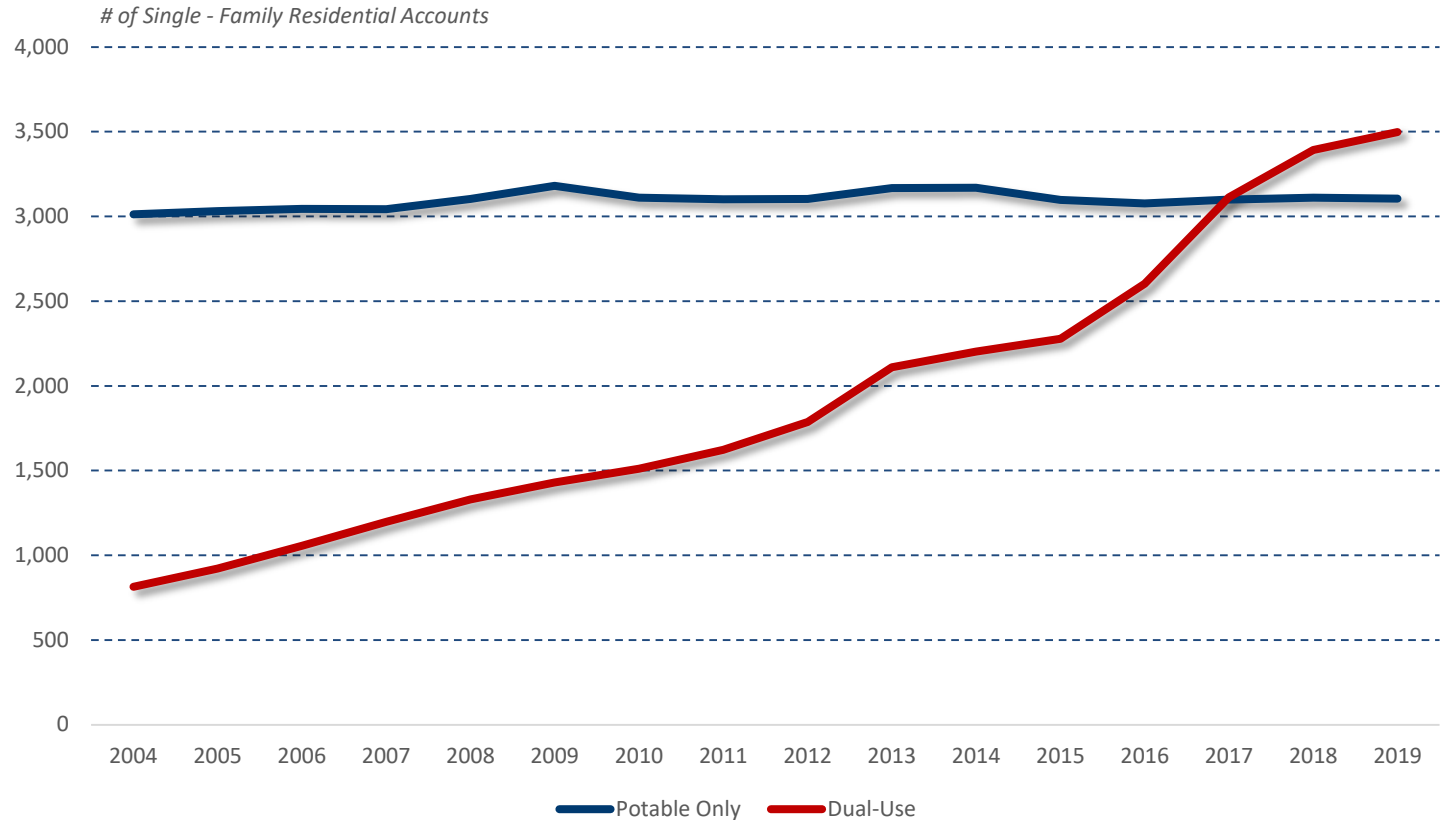
2003: Passed ordinance requiring secondary water systems for irrigation of new residential development within the Town of Windsor urban growth boundary.



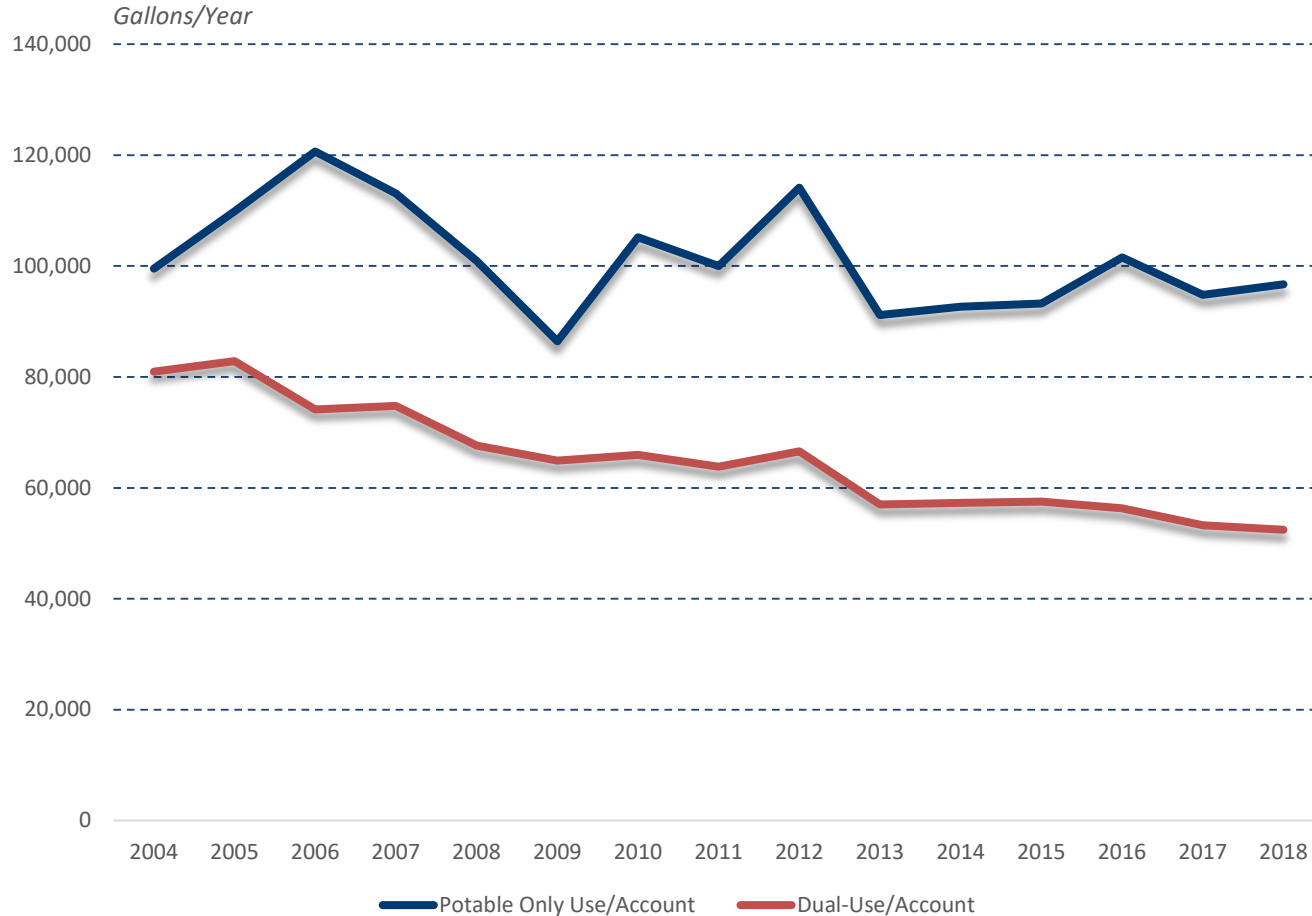
Ordinance

- Mandatory construction of non-potable secondary water systems for irrigation
- Systems privately managed by metropolitan districts, HOAs, or other public or private entity subject to approval by the Town of Windsor
- Established geographical areas where non-potable systems shall be required
- Construction of non-potable secondary water systems shall be a condition of annexation

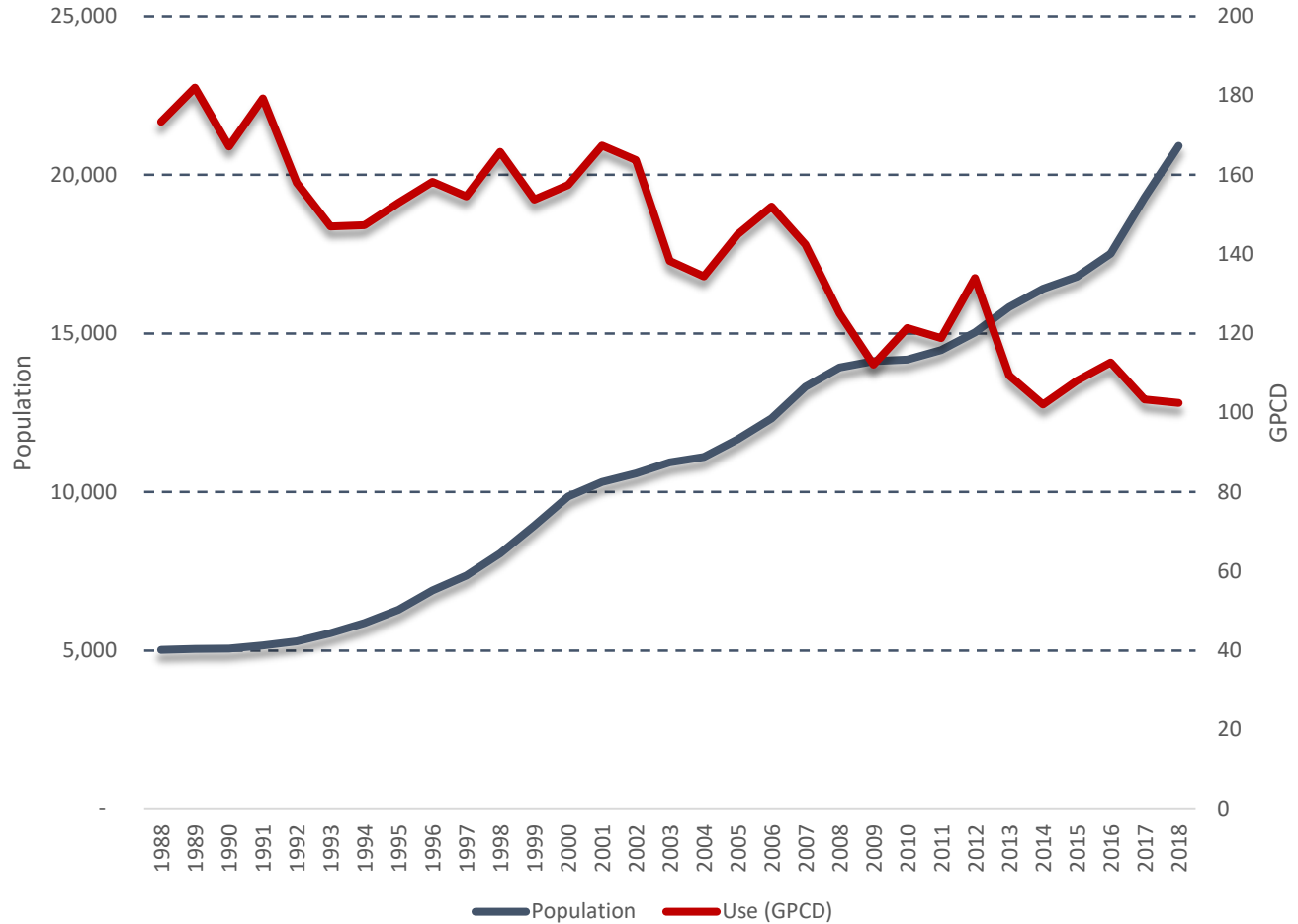
Growth of Dual-Use Systems (SF)



Water Use per Account (SF)



Water Usage (GPCD) Compared with Population - At the Plant



Benefits

- Benefits the ditch company and ag users – keeps water in the ditch and maintains the ditch.
- Stretches the capacity of existing water treatment plants and delays the need to upgrade facilities or build new ones.

Benefits cont..

- Reduction in peak summer demands keeps costs of potable treatment lower.
- Keeps water in the river – supplies are not exchanged or diverted elsewhere for treatment.
- Environmental benefits – reduced chemical use, reduced transportation of supplies, reduction in harmful residuals processing



Municipal Non-Potable System



Objectives

- Common Terminology and Irrigated Lands
 - How Much to Irrigate an Acre
 - What is an Acre Foot
 - Park Inventory
- The Kern/ Windsor Lake System
- Guiding Documents and Goals
- Tracking
 - Meter Reads/ Decree Accounting



Overview

- On average it takes 2.5 to 3 AF to irrigate 1 Acre of Bluegrass.
- Parks, Trails and Open Space manages approx. 650 Acres
- Of that about 100 acres are irrigated
- The Town has about 162 Acres that are yet to be developed, about 2/3 will be irrigated

WATER IS MEASURED IN ACRE-FEET



**1
ACRE-FOOT**

**326,000
GALLONS**

**1 FOOTBALL
FIELD,
1 FOOT DEEP**



COMMUNITY PARKS

Boardwalk Community Park (Kirby Farm Annex) 100 5th Street *Windsor Lake & Shore Line
Chimney Community Park (Chimney Park 1st Sub) 200 E. Chestnut Drive
Diamond Valley Community Park (DV 5th Sub) 801 Diamond Valley Drive
Eastman Community Park (Eastman Park Sub) 7025 Eastman Park Drive
Main Community Park (Town of Windsor 2nd Sub) 300 Locust Street
Tacincala Community Park (WH Exchange) N. 15th Street (25 acres deeded, 31.7 acres to be deeded per DA) 34225 WCR 15
Sub-Totals

Total Acres Managed

Acres of Turf Non Pot

Acres of Turf Potable

52.1 4.3

NEIGHBORHOOD PARKS

Aberdour Circle Park (Highland Meadows Golf Sub) 6600 Aberdour Circle
Bison Ridge Park (Bison Ridge Sub) 1990 Yankee Drive
Brunner Farm Park (Brunner Farm Sub) 305 Prospector Street
Covenant Park (Westwood Village 2nd Sub) 1401 Fernwood Drive
Founders Green Park (Brunner Farm 5th Sub) 1201 Grand Avenue
Northern Lights Park (Winter Farm Sub) 550 Saratoga Way
Poudre Heights Park (Poudre Heights Sub) 1670 Green River Drive
Westwood Village Park 15th and Walnut
Windsor Highlands Park (Highland Meadows Sub) 7985 Highland Meadows Pkwy
Windsor Village (Windsor Village Sub) 55 Rochester Drive
Windsor West Park (Windsor West Sub) 500 10th Street
Coyote Gulch (Fossil/Belmont Ridge Sub) 7005 N. Aladar
Sub-Totals

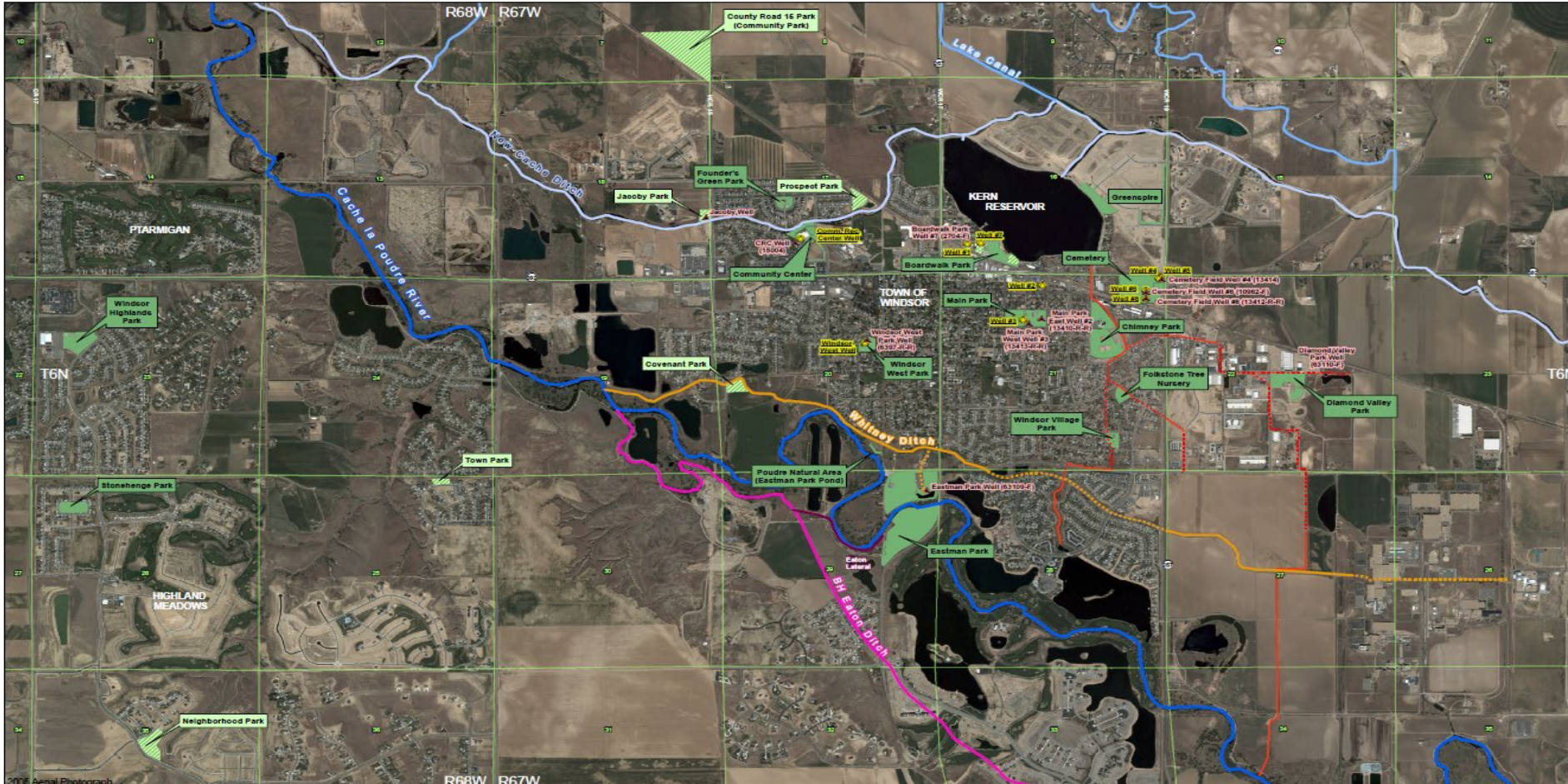
3.5 1.8 0.8 3.0 1.5 4.0 2.3 0.0 3.5 1.8 2.2 1.5 22.6 3.3

OTHER FACILITIES

Art & Heritage Center 116 N. 5th Street	
Chimney Park Pool 421 Chimney Park Drive	
Community Recreation Center 250 11th Street	3.3
Police Department 290 11th Street	
Lake View Cemetery 38215 Highway 257	13.1
Town of Windsor Museum 100 5th Street Depot, School, Church, 4 Square, Beet shanty, Summer kitchen, Eaton House (521 Birch)	
Windsor-Severance Fire Rescue Museum 121 6th Street	
15th and Walnut 1500 Walnut	
Sub-Totals	0.0 16.4 0.0



The Kern/Windsor Lake System





clear WATER solutions
water rights • planning • engineering

FROM ORIGINAL MAP:
KERN RESERVOIR &
DITCH COMPANY
WINDSOR PLAN
FOR AUGMENTATION

Altergott Exhibit

Town of Windsor

Date: 06-13-2017

Drawn by: NEA

Scale: As Shown

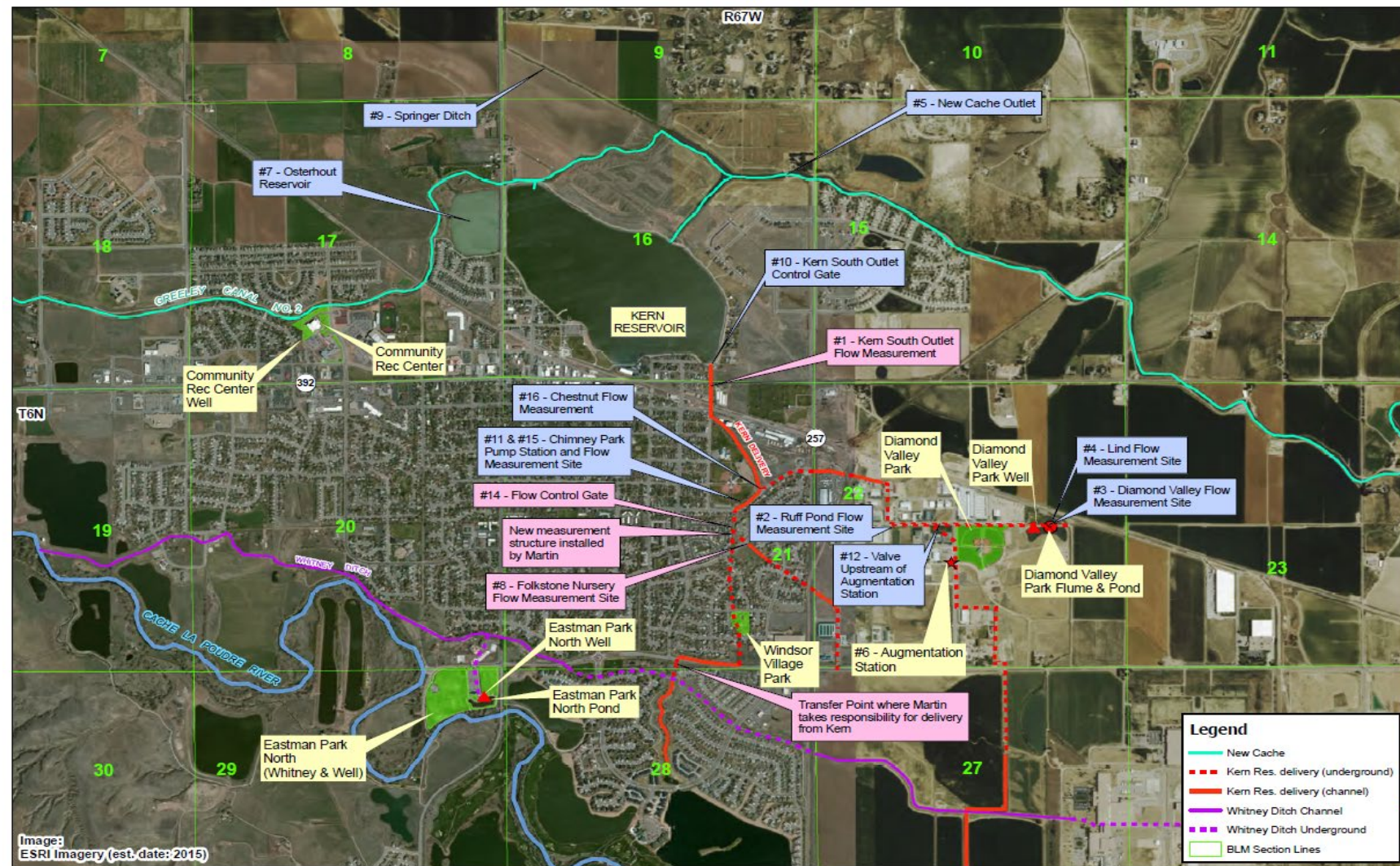
Job No.: 09-280



0 395 790 1,580
Feet

Legend

- New Cache
- Kern Res. delivery (underground)
- Kern Res. delivery (channel)
- Whitney Ditch Channel
- Whitney Ditch Underground
- BLM Section Lines





Kern Irrigated Area



Date: 3/26/2018

IRRIGATED AREA MAP
KERN RESERVOIR & DITCH COMPANY
PARKS AND OPEN SPACE THAT CAN BE IRRIGATED BY KERN

0 750 1,500
Feet



Guiding Documents



2010 Non-Potable Water Master Plan (NPWMP)



- Master Plan Objectives
 - Analyze current water demands
 - Use of existing supplies to meet demands
 - Project future demands and sources of supply
 - Water Acquisition
 - Water Storage
 - System improvements

TOWN OF WINDSOR

2010 Non-Potable Water Master Plan





NPWMP - Key Findings and Recommendations

Complete

Ongoing

Removed

- Correct Poudre Plan Well Locations and decreed use
- Incorporate Town Hall as part of irrigated acreage for Main Park
- Re-drill Boardwalk Park Well No.7
- Correct CRC Well Location
- Convert northern portion of Chimney Park to non-potable
- Convert Covenant Park to well irrigation
- ~~Install a drip irrigation system at Folkstone Nursery~~
- Convert Windsor Village to well irrigation
- Meet with Windsor Development Group to discuss Ruff Development
- Meet with Highland Meadows GC to discuss shoulder water for Parks
- Pipe the open channel of Kern lateral across UFP
- Improve language related to water dedication in future development agreements
- ~~Develop storage at Eastman Park South~~
- Purchase Additional non-potable supplies - ongoing

Kern Reservoir Water Rights

- Town owns 100% (100 shares) of the Kern Reservoir
 - 1,800 acre-feet of storage
 - Irrigation of ~ 1,000 acres
 - Appropriation date of February 10, 1882
 - Case No. 02CW301
 - Annual Fill Limit of 1,277 acre-feet (1,048 average)
 - Return flow obligation of 518 acre-feet
 - Annual Consumptive Use Limit of 530 acre-feet
 - Front Range Energy 500 AF augmentation rental
- Kern Junior Water Right
 - Case No. 02CW276
 - Reservoir enlargement in 2002
 - Claimed 1,966 acre-feet with right to fill and refill in priority



Tracking

-Meter Reads



	A	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU
1	OTHER PARK																			
2																				
3	Site Name:	Diamond Valley PH (10 Acres)			Downtown Windsor			Downtown Windsor			Eastman/Whitney Ditch			Eastman PH (17 Acres)			Founder's Green (1.5 Acres)			Governor's Park
4	Water Source:	Well/Kern			DDA Meter			Potable Windsor			Whitney Ditch			Well/Whitney			Lake Canal			
5	Month-Year	Meter Reading gallons	Date of Reading	Monthly Usage	Meter Reading cu ft	Date of Reading	Monthly Usage	Meter Reading cu ft	Date of Reading	Monthly Usage	Meter Reading gallons	Date of Reading	Monthly Usage	Meter Reading gallons	Date of Reading	Monthly Usage	Meter Reading gallons	Date of Reading	Monthly Usage	Meter Reading cfs
6																				
36	Oct-16	110,088,141	10/1	2,080,515	9170	10/1	670	956,920.00	10/1	56,320	81,007,000	10/1		210,267,107	10/1	971,818	966,296	10/1	0	4,043,650.00
37	Nov-16		11/1			11/1	-9,170		11/1	-956,920		11/1	-81,007,000	211,093,099	11/1	825,992		11/1	-966,296	
38	Dec-16		12/1	0		12/1	0		12/1	0		12/1	0		12/1			12/1	0	
39																				
40		Gallons AF	10,252,016 31		Gallons AF	-6,320 0		Gallons AF	-719,130 -2		Gallons AF	-75,180,000 -231		Gallons AF	16,941,921 52		Gallons AF	#VALUE! #VALUE!		
41																				
42			AF/ Acre	3.15		AF/ Acre	0.00		AF/ Acre	-0.25		AF/ Acre	-25.64		AF/ Acre	3.06		AF/ Acre	#VALUE!	
43																				
44	Apr-17	111093099	4/1	0	9170	4/1	0	956920	4/1	0	81007000	4/1	0	211,093,099	4/1	0	966296	4/1	0	4043650
45	May-17	111615601	5/1	3,607,975	9210	5/1	0	0	5/1	0	81013000	5/1	6,000	211634345	5/1	2,339,056	966296	5/1	966,296	4077940
46	Jun-17	112376342	6/1	760,741	9210	6/1	0		6/1	0	81013000	6/1	0	212803590	6/1	1,169,245	966296	6/1	0	4436940
47	Jul-17	115545557	7/1	3,169,215	9890	7/1	680	977480	7/1	977,480	81013000	7/1	0	216732776	7/1	3,929,186	220000	7/1	-746,296	4597600
48	Aug-17	118569138	8/1	3,023,581	10530	8/1	640	977480	8/1		84289000	8/1	3,276,000	220825491	8/1	4,092,715	671900	8/1	451,900	4874560
49	Sep-17	119340320	9/1	771182	11330	9/1	800	100969	9/1	-876,511	84287000	9/1	0	223018585	9/1	2,193,094	979000	9/1	307,100	
50	Oct-17	120997035	10/1	1,656,715	11790	10/1	460	104448	10/1	3,479	84289000	10/1		224375091	10/1	1,356,506	1136000	10/1	157,000	5384670
51	Nov-17		11/1		11790	11/1	0	104448	11/1	0	84289000	11/1	0	224386869	11/1	11,778	1136000	11/1	0	5384670
52	Dec-17		12/1	0		12/1	-11,790		12/1	-104,448		12/1	-84,289,000		12/1			12/1	-1,136,000	
53																				
54		Gallons AF	12,989,409 40		Gallons AF	-9,210 0		Gallons AF	0 0		Gallons AF	-81,007,000 -249		Gallons AF	15,091,580 46		Gallons AF	0 0		
55																				



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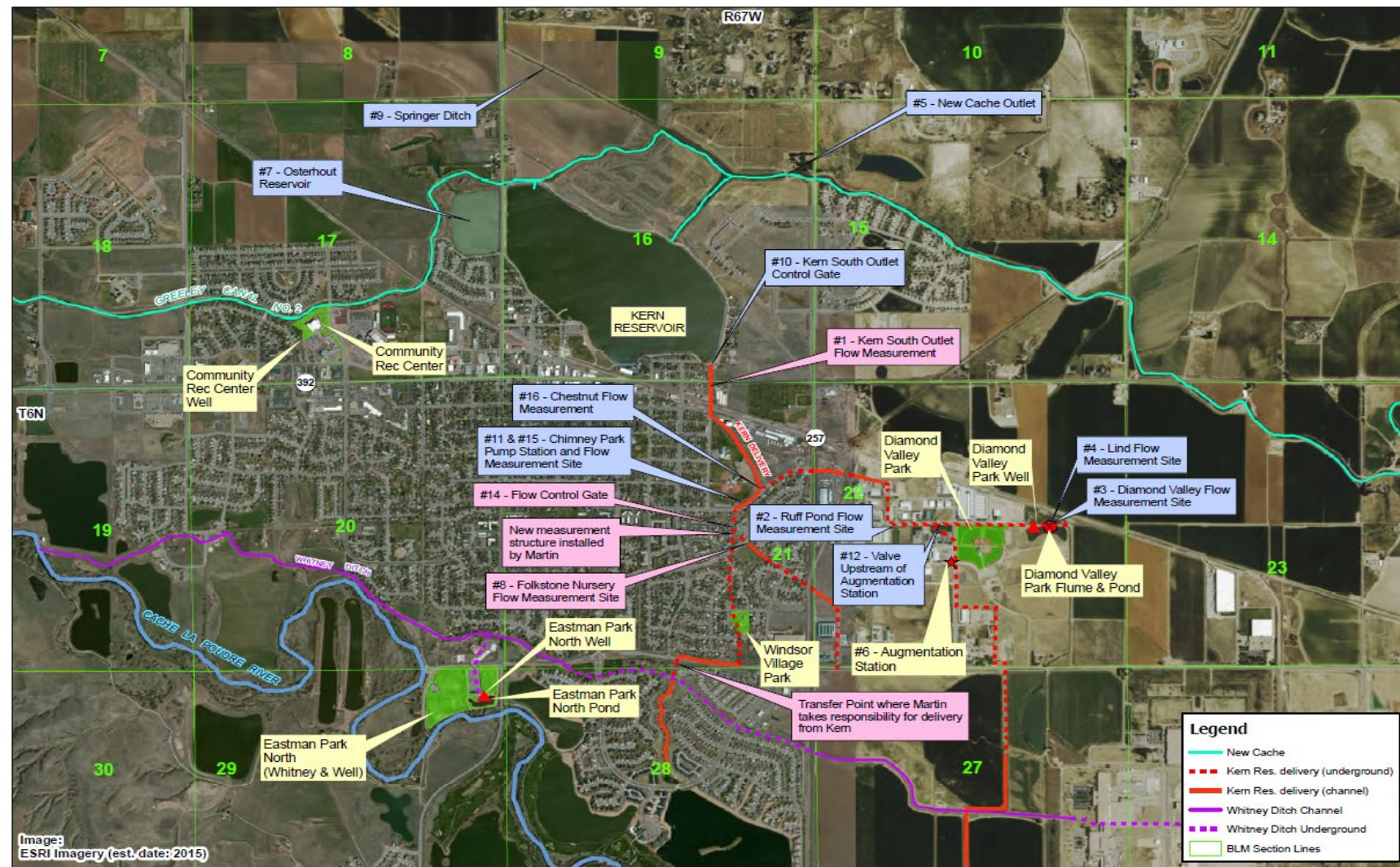
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0 395 790 1,580
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- BLM Section Lines



SCADA

	A	B	C	D	E	F	G	H	I	J	K	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	A	
1	Phase I Input	Automatic		Automatic		Automatic		Automatic		Manual		Automatic		Automatic		Automatic		Automatic		Automatic		Automatic				Automatic		Automatic		
2	Site #	1		2		3		4		5		6		7		8		9		13		15								
		Kern South Outlet		Ruff Pond		Diamond Valley		Lind Property		Kyger Reservoir		Aug. Meter		Osterhout Outlet Flow		Folkstone Nursery Flow		Springer Ditch Flow		Folkstone Diversion Meter		Chimney Park Irrigation Flow						Boardwalk 8" Irrigation Meter		
3	Site Name																											Boardwalk Well		
4	Site Description	2' Parshall Flume at HWY 392 & Chimney Park Rd		Rated Channel at E. Garden Dr & Technology Cir.		1/5 mile east of dead end of E. Garden Dr		1/5 mile east of dead end of E. Garden Dr				1 Block South of Academy Ct on Diamond Valley Dr		1/4 mile North of Cedar Ct on HWY 257		Between Columbine and Cornerstone Dr on E. Garden Dr.		1/4 mile south of Ventana Way and HWY 257		Between Columbine and Cornerstone Dr on E. Garden Dr.		1/8 mile north of Ponderosa Dr on E. Chestnut St.		Lake Level						
5		Ave. Daily Flow (cfs)	Daily Volume (ac-ft)	Ave. Daily Flow (cfs)	Daily Volume (ac-ft)	Ave. Daily Flow (cfs)	Daily Volume (ac-ft)	Ave. Daily Flow (cfs)	Daily Volume (ac-ft)	Ave. Daily Flow (cfs)	Daily Volume (ac-ft)	Ave. Daily Flow (cfs)	Daily Volume (ac-ft)	Ave. Daily Flow (cfs)	Daily Volume (ac-ft)	Ave. Daily Flow (cfs)	Daily Volume (ac-ft)	Ave. Daily Flow (cfs)	Daily Volume (ac-ft)	Ave. Daily Flow (cfs)	Daily Volume (ac-ft)	Ave. Daily Flow (cfs)	Daily Volume (ac-ft)	Feet	Ave. Daily Flow GPM	Daily Volume Gallons	Ave. Daily Flow GPM	Daily Volume Gallons		
6	6/1/2019	1.05	2.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.21	Bad	#VALUE!	1.12	2.22	0.00	0.00	0.42	0.82	25.48	0.00	0	6.90	9930	
7	6/2/2019	1.00	1.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.10	Bad	#VALUE!	1.24	2.46	0.00	0.00	0.42	0.84	25.41	0.00	0	41.70	60051	
8	6/3/2019	0.99	1.95	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.20	Bad	#VALUE!	1.28	2.54	0.00	0.00	0.43	0.85	25.39	0.00	0	0.29	413	
9	6/4/2019	0.92	1.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.15	Bad	#VALUE!	1.56	3.10	0.00	0.00	0.38	0.75	25.23	0.00	0	0.00	0	
10	6/5/2019	0.97	1.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.11	Bad	#VALUE!	0.73	1.44	0.00	0.00	0.40	0.78	25.51	0.00	0	0.00	0	
11	6/6/2019	0.93	1.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.09	0.00	0.00	0.38	0.75	0.00	0.00	0.38	0.76	25.80	0.00	0	0.00	0	
12	6/7/2019	0.97	1.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.12	0.06	0.12	0.67	1.32	0.00	0.00	0.38	0.76	25.80	0.00	0	2.77	3984	
13	6/8/2019	1.04	2.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.11	0.21	4.04	8.01	0.00	0.00	0.36	0.71	25.80	0.00	0	21.15	30462	
14	6/9/2019	1.05	2.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.92	11.74	0.00	0.00	0.41	0.82	25.88	0.00	0	28.58	41150	
15	6/10/2019	0.92	1.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.68	9.29	0.00	0.00	0.32	0.63	25.83	0.00	0	47.07	67779	
16	6/11/2019	0.93	1.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.06	0.00	0.00	4.45	8.84	0.00	0.00	0.30	0.59	25.69	7.47	10761	65.33	94077	
17	6/12/2019	0.93	1.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.30	0.00	0.00	3.22	6.40	0.00	0.00	0.31	0.61	25.68	25.54	36772	58.57	84342	
18	6/13/2019	0.95	1.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.45	0.00	0.00	1.97	3.90	0.00	0.00	0.30	0.60	25.63	11.99	17267	36.26	52216	
19	6/14/2019	1.73	3.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.19	0.20	0.40	0.00	0.00	3.48	6.89	0.00	0.00	0.52	1.03	25.51	0.00	0	9.98	14374		
20	6/15/2019	2.01	3.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.22	0.07	0.15	0.00	0.00	4.80	9.53	0.00	0.00	0.55	1.09	25.42	0.00	0	29.94	43108		
21	6/16/2019	2.02	4.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.10	0.00	0.00	3.26	6.46	0.00	0.00	0.63	1.25	25.39	0.00	0	51.54	74211	
22	6/17/2019	2.09	4.15	0.00	0.00	0.41	0.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.16	0.00	0.00	2.77	5.49	0.00	0.00	0.51	1.01	25.42	8.51	12261	67.31	96930	
23	6/18/2019	2.08	4.12	0.00	0.00	0.64	1.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.22	0.00	0.00	2.94	5.83	0.00	0.00	0.43	0.85	25.49	17.75	25566	31.86	45878	
24	6/19/2019	2.07	4.10	0.13	0.26	0.56	1.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.35	0.00	0.00	3.09	6.13	0.00	0.00	0.46	0.90	25.53	2.65	3820	6.68	9616	
25	6/20/2019	2.07	4.11	0.23	0.46	0.49	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.31	0.00	0.00	1.65	3.26	0.00	0.00	0.00	0.00	25.66	17.31	24929	30.74	44263	
26	6/21/2019	2.09	4.14	0.26	0.52	0.51	1.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.25	0.00	0.00	3.25	6.44	0.00	0.00	0.00	0.00	25.75	2.90	4180	6.59	9483	
27	6/22/2019	1.93	3.83	0.24	0.49	0.54	1.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.65	0.00	0.00	5.78	11.46	0.00	0.00	0.54	1.08	25.76	8.77	12624	16.72	24080	
28	6/23/2019	1.92	3.82	0.20	0.40	0.52	1.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.59	1.18	0.00	0.00	4.47	8.87	0.00	0.00	0.44	0.87	25.78	12.77	18384	26.71	38465	
29	6/24/2019	1.48	2.94	0.11	0.21	0.27	0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.97	1.93	0.00	0.00	4.28	8.49	0.00	0.00	0.39	0.77	25.76	21.32	30706	56.10	80786	
30	6/25/2019	1.12	2.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.21	2.39	0.00	0.00	2.27	4.50	0.00	0.00	0.42	0.83	25.86	20.68	29786	43.64	62847	
31	6/26/2019	1.13	2.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.66	3.30	0.00	0.00	3.34	6.63	0.00	0.00	0.38	0.76	25.75	13.02	18743	0.00	0	
32	6/27/2019	1.11	2.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.78	3.54	0.00	0.00	4.40	8.72	0.00	0.00	0.44	0.88	25.62	0.81	1165	1.44	2069	
33	6/28/2019	1.09	2.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.85	3.66	0.01	0.01	3.40	6.74	0.00	0.00	0.39	0.77	25.61	0.30	438	3.68	5293	
34	6/29/2019	1.10	2.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.86	3.68	0.00	0.00	1.35	2.67	0.00	0.00	0.34	0.68	25.49	18.68	26895	73.45	105765	
35	6/30/2019	1.18	2.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.91	3.78	0.00	0.00	1.17	2.32	0.00	0.00	0.44	0.87	25.47	18.70	26922	39.02	56194	
36	7/1/2019	1.46	2.89	0.31	0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.79	3.54	0.00	0.00	3.18	6.31	0.00	0.00	0.39	0.78	25.55	18.49	26631	47.11	67836	
37	7/2/2019		83.94		2.98		7.84		0.00		0.00		0.41		31.37		#VALUE!		178.76		0.00		23.96				327851		1225603	
38																														



Irrigation Use

Monthly Park Irrigation (values in acre-feet)

			WELLS										KERN											
			Commun ity Rec Center (3.3 Acres)	Diamond Valley Town of Windsor 63110-F 3-5676	Eastman Park Town of Windsor 63109-F 3-5661	Main Park East 8.3 Acres Poudre Plan 13410RF 3-5150	Main Park South Poudre Plan 13413RF 3-6907	North Cemeter y (13.1 Acres) Poudre Plan 13414	South Cemeter y Poudre Plan 13412RR	Windsor Village (1.8 Acres) Town of Windsor	Windsor West (2.2 Acres) Poudre Plan 2704-FR													
Mo-Yr	Month	Year	Town of Windsor	3-5676	3-5661	3-5150	3-6907	13414	13412RR	Town of Windsor	3-5671	2704-FR	Covenant (3.0)	Tacinala	15th and Walnut	Diamond Valley (10)	Greenspi re (23.6)	Boardwal k (8.8)	Chimney South	Folkston e	Martin Lind	Ruff Pond	Broe	
Apr-13	4	2013	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
May-13	5	2013	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			4.67	1.83	2.72	0.00	0.00	0.00	4.76	0.00	
Jun-13	6	2013	0.58	0.00	0.00	1.01	0.47	0.00	0.13	0.86	0.00	0.00	0.00			9.08	3.57	8.17	0.18	1.26	0.00	8.11	0.00	
Jul-13	7	2013	3.60	0.00	0.00	2.89	5.20	0.00	1.34	1.03	1.25	0.00	0.00			6.35	4.64	8.77	0.00	0.00	58.45	6.54	0.00	
Aug-13	8	2013	3.32	0.00	0.00	2.42	4.11	0.00	4.32	2.44	1.89	0.00	0.00			8.27	4.08	6.94	0.34	2.66	15.37	6.31	0.00	
Sep-13	9	2013	2.88	0.00	0.01	1.60	2.58	0.00	3.35	1.34	0.81	0.00	0.00			9.40	2.35	0.00	0.00	0.00	0.00	2.16	0.00	
Oct-13	10	2013	0.68	0.00	0.00	0.83	1.45	0.00	1.27	0.33	0.43	0.00	0.00			0.00	1.02	0.75	0.00	0.00	0.00	0.00	0.00	
Nov-13	11	2013	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Dec-13	12	2013	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Annual Total			11.06	0.00	0.01	8.74	13.81	0.00	10.41	5.99	4.38	0.00	0.00			37.77	17.49	27.35	0.52	3.92	73.82	27.89	0.00	205.82
			3.35				2.72		0.79	3.33	1.99					3.78		3.11						
Jan-14	1	2014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
Feb-14	2	2014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
Mar-14	3	2014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00											
Apr-14	4	2014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
May-14	5	2014	0.63	0.00	0.00	0.01	0.67	0.00	0.00	0.00	0.00	0.00	0.00			5.10	3.23	7.64	0.13	3.29	61.58	10.58	0.00	
Jun-14	6	2014	1.46	0.00	0.00	0.74	1.22	0.00	1.16	1.70	0.59	0.00	0.00			19.17	2.98	4.45	0.19	3.18	0.00	10.50	0.00	
Jul-14	7	2014	3.28	0.00	0.00	0.89	3.68	0.00	4.04	2.10	1.64	0.56	0.00			12.22	3.24	3.83	0.17	0.00	0.00	8.94	40.35	
Aug-14	8	2014	3.51	0.00	0.00	2.70	13.66	0.00	0.99	1.15	1.57	1.89	0.00			8.86	3.33	3.05	0.16	0.00	0.00	6.66	25.32	
Sep-14	9	2014	2.97	0.00	0.00	6.28	21.94	0.00	0.89	0.56	1.19	1.62	0.00			13.75	4.15	1.70	0.12	0.00	0.00	8.73	8.76	
Oct-14	10	2014	1.06	0.00	0.00	8.13	12.84	0.00	1.26	0.46	0.72	1.07	0.00			1.37	0.00	0.00	0.12	0.00	0.00	2.09	0.00	
Nov-14	11	2014	1.00	0.00	0.00	3.31	9.15	0.00	2.88	0.06	0.00	0.02	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Dec-14	12	2014	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Annual Total			13.92	0.00	0.00	22.07	63.16	0.00	11.24	6.03	5.71	5.16	0.00			60.46	16.93	20.67	0.90	6.48	61.58	47.50	74.43	308.89
			4.22				10.27		0.86	3.35	2.60					6.05		2.35						



Decree Accounting

% loss per mile in Kern delivery channel =	0.25%
Kern delivery channel dist (mi) =	1.3
% loss per mile in CLP River =	0.50%
CLP transit dist from Louden to Kern (mi) =	7.7
CLP transit dist from Kyger Outlet to Kern (mi) =	7.0

Daily values have been adjusted for call

		DEPLETIONS												REPLACEMENTS										DEPLETIONS + ACCRETIONS	
		Well Pumping			KRDC #1 Return Flow Obligations						Louden Return Flow Obligations														
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U			
Date	Water Year	Windsor pumping depletions	FRE augmentati on depletions	Total Pumping Depletions	Surface return flow obligations	Subsurface return flow obligations	Kern Lateral ditch loss return flow obligations	Inside KRDC service area irrigation return flow credit	Outside KRDC service area irrigation return flow credit	Total Net Return Flow Obligations s/Credits	Louden Surface return flow obligations	Louden Subsurface return flow obligations	Total Louden Return Flow Obligations	KRDC junior & free river deliveries to Kern Aug Station	KRDC priority #1 deliveries to Kern Aug Station	Kern Augmentati on delivery channel loss	Louden deliveries to Aug Station	Louden Augmentati on delivery transit loss	Kyger Reservoir deliveries to CLP River for Augmentati on	Kyger Reservoir delivery transit loss	Total Net Accretions	Net River Effect			
11/1	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	3.4	0.0	0.0	0.0	0.6	0.0	3.9	1.2			
11/2	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.6	0.0	4.1	1.4			
11/3	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.6	0.0	4.0	1.3			
11/4	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.6	0.0	4.0	1.4			
11/5	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.6	0.0	4.0	1.3			
11/6	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	3.5	0.0	0.0	0.0	0.6	0.0	4.0	1.3			
11/7	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	3.4	0.0	0.0	0.0	0.6	0.0	3.9	1.3			
11/8	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.6	0.0	3.9	1.2			
11/9	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.0	2.5	0.1	4.1	1.5			
11/10	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.1	3.7	1.1			
11/11	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.1	3.7	1.1			
11/12	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.1	3.7	1.1			
11/13	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.1	3.7	1.1			
11/14	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.1	3.7	1.1			
11/15	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.1	3.7	1.1			
11/16	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.1	3.7	1.1			
11/17	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.1	3.7	1.1			
11/18	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.1	3.7	1.1			
11/19	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.1	3.7	1.1			
11/20	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.1	3.7	1.1			
11/21	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.1	3.7	1.1			
11/22	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.1	3.7	1.0			
11/23	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.1	3.7	1.1			
11/24	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.1	3.7	1.1			
11/25	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.1	3.7	1.1			
11/26	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.1	3.7	1.0			
11/27	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.1	3.7	1.1			
11/28	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.1	3.7	1.1			
11/29	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.1	3.7	1.0			
11/30	2019	-0.38	-0.9	-1.2	0.0	-1.2	-0.20	0.04	0.01	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.1	3.7	1.1			

Questions?





WaterSense® New Home Specification

Effective July 24, 2014

WATERSENSE® NEW HOME SPECIFICATION

EFFECTIVE JULY 24, 2014

1.0 SCOPE AND OBJECTIVE

This specification establishes the criteria for water-efficient new homes under the U.S. Environmental Protection Agency's (EPA's) WaterSense® program. It is applicable to newly constructed homes that are:

- Single-family homes and townhomes.
OR
- Residential units in multi-family buildings, three stories or less in size.
OR
- Residential units in multi-family buildings, including mixed-use buildings that have independent heating, cooling, and hot water systems separate from other units.¹

A new home must be built by a [WaterSense builder partner](#) and meet all of the relevant criteria to become a WaterSense labeled new home.

The intent of this specification is to reduce indoor and outdoor water usage in new residential homes, thereby lowering consumers' utility bills and encouraging water and wastewater infrastructure savings. EPA's goal is that WaterSense labeled new homes will use approximately 20 percent less water than a typical new home by using a combination of prescriptive and performance-based approaches identified in this specification.

This specification is not intended to contravene state or local codes and requirements. All homes, landscapes, and irrigation systems shall meet all applicable national, state, and local regulations. In addition, plumbing and irrigation installers shall meet all applicable state and local licensing requirements. Unless indicated, criteria for the individual components or products detailed in this specification do not constitute criteria to earn the WaterSense label for that component or product category. Individual component criteria are valid only in the context of this specification.

2.0 SUMMARY OF CRITERIA

New homes must meet criteria in three areas:

1. Indoor water use, including plumbing, plumbing fixtures and fittings, appliances, and other water-using equipment.
2. Outdoor water use, including landscape design. Irrigation systems are not required. Irrigation systems that are installed must meet the criteria in this specification.
3. Homeowner education.

For units in a multi-family building to be eligible for the WaterSense label, certain prerequisites must be met in all common-use areas and systems as described within the specification and summarized in [Appendix D](#).

¹ Units in buildings that utilize central hot water systems powered by alternative energies, such as solar or geothermal, for domestic hot water are allowed if the alternative energy source provides at least 50 percent of the hot water needs for the residential units.

3.0 INDOOR WATER EFFICIENCY CRITERIA

- 3.1 Leaks – There shall be no detected leaks from any water-using fixtures, appliances, or equipment. Compliance shall be verified through pressure-loss testing and visual inspection.
- 3.2 Service Pressure – The static service pressure shall be a maximum of 60 pounds per square inch (psi) (414 kilopascal [kPa]). Compliance for homes supplied by groundwater wells shall be achieved by use of a pressure tank. Compliance for single-family homes with publicly supplied water shall be achieved by one of the following methods:
- Use of a pressure-regulating valve (PRV) downstream of the point of connection. All fixture connections shall be downstream of the PRV.
 - Determination that the service pressure at the home is 60 psi or less at the time of inspection and documentation from the public water supplier that the service pressure is unlikely to regularly exceed 60 psi at the home on a daily or seasonal basis.

For units in multi-family buildings, the service pressure within each unit shall be at a maximum of 60 psi.

Piping for fire sprinkler systems is excluded from this requirement and should comply with state and local codes and regulations.

- 3.3 Hot Water Delivery System – To minimize water wasted while waiting for hot water, the hot water delivery system shall store no more than 0.5 gallons (1.9 liters) of water in any piping/manifold between the hot water source and any hot water fixture. To account for the additional water that must be removed from the system before hot water can be delivered, no more than 0.6 gallons (2.3 liters) of water shall be collected from the hot water fixture before hot water is delivered. Recirculation systems must be demand-initiated. Systems that are activated based solely on a timer and/or temperature sensor do not meet this requirement.

See Appendix B to determine the approximate volume of water in piping systems.

3.4 Toilets and Flushing Urinals

- 3.4.1 Toilets – All toilets shall be WaterSense labeled tank-type toilets. A listing of labeled toilets can be found at www.epa.gov/watersense/product_search.html.
- 3.4.2 Flushing urinals – All flushing urinals, if installed, shall be WaterSense labeled flushing urinals. A listing of labeled urinals can be found at www.epa.gov/watersense/product_search.html.

3.5 Bathroom and Kitchen Faucets

- 3.5.1 Bathroom sink faucets – All bathroom sink faucets shall be [WaterSense labeled bathroom sink faucets or faucet accessories](#) (e.g., aerators). A list of labeled faucets and accessories can be found at www.epa.gov/watersense/product_search.html.
- 3.5.2 Kitchen sink faucets – All kitchen sink faucets shall comply with federal standards for a maximum flow rate of 2.2 gallons per minute (gpm) (8.3 liters per minute [lpm]).

3.6 Showerheads and Shower Compartments

- 3.6.1 Showerheads – All showerheads shall be [WaterSense labeled showerheads](#). This includes fixed showerheads that direct water onto a user (excluding body sprays) for bathing purposes and hand-held showers. A list of labeled showerheads can be found at www.epa.gov/watersense/product_search.html. In cases where more than one showerhead or hand-held shower is provided in combination with others in a single device intended to be connected to a single shower outlet, the entire device must meet the maximum flow requirement in all possible operating modes.
- 3.6.2 Shower compartments – The total allowable flow rate of water from all showerheads flowing at any given time, including rain systems, waterfalls, body sprays, and jets, shall be limited to 2.0 gpm per shower compartment, where the floor area of the shower compartment is less than or equal to 2,160 square inches (in²) (1.4 meters² [m²]). For each increment of 2,160 in² (1.4 m²) of floor area thereafter or part thereof, additional showerheads are allowed, provided the total flow rate of water from all flowing devices is equal to or less than 2.0 gpm per shower compartment, and the additional showerheads are operated by controls that are separate from the other showerheads in the compartment.

3.7 Appliances – If the following types of appliances are financed, installed, or sold as upgrades through the homebuilder, they shall meet these criteria:

- 3.7.1 Dishwashers – Dishwashers shall be ENERGY STAR® qualified. A listing of qualified dishwashers can be found at www.energystar.gov/index.cfm?fuseaction=dishwash.search_dishwashers.
- 3.7.2 Clothes washers – Clothes washers, including those in common-use laundry rooms of multi-family buildings, shall be ENERGY STAR qualified with a [water factor](#) (WF) of less than or equal to 6.0 gallons of water per cycle per cubic foot of capacity. A listing of qualified residential clothes washers can be found at www.energystar.gov/index.cfm?fuseaction=clotheswash.search_clotheswashers and a listing of qualified commercial clothes washers can be found at

www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=CCW.

- 3.8 Other Equipment – If the following pieces of equipment are financed, installed, or sold as upgrades through the homebuilder, they shall meet these criteria:
- 3.8.1 Evaporative cooling systems – Individual [evaporative cooling systems](#) (i.e., swamp coolers) shall use a maximum of 3.5 gallons (13.3 liters) of water per ton-hour of cooling when adjusted to maximum water use. Blowdown shall be based on time of operation, not to exceed three times in a 24-hour period of operating (every 8 hours). Blowdown shall be mediated by conductivity or basin water temperature-based controllers. Once-through or single-pass cooling systems, systems with continuous blowdown/bleedoff, and systems with timer-only mediated blowdown management shall not be used to meet these criteria.
- 3.8.2 Water softeners – All self-regenerating water softeners shall be certified to meet [NSF/ANSI 44 Residential Cation Exchange Water Softeners](#),² including the voluntary efficiency rating standards in Section 7 – *Mandatory testing for elective claims* for efficiency rated systems, which states that water softeners shall:
- Be a demand-initiated regeneration system (i.e., it must use a flow meter or water hardness sensor to initiate regeneration; devices that use time clock-initiated regeneration [fixed time schedule] do not qualify for the efficiency rating).
 - Have a rated salt efficiency of not less than 3,350 grains of total hardness exchange per pound of salt, based on sodium chloride (NaCl) equivalency (477 grams of total hardness exchange per kilogram of salt).
 - Not generate more than 5.0 gallons of water per 1,000 grains of hardness removed during the service cycle (18.9 liters per 64.8 grams of total hardness removed).
- 3.8.3 Drinking water treatment systems – Drinking water treatment systems must be certified to meet applicable NSF/ANSI standards, which are:
- NSF/ANSI 42 Drinking Water Treatment Units – Aesthetic Effects
 - NSF/ANSI 53 Drinking Water Treatment Units – Health Effects
 - NSF/ANSI 55 Ultraviolet Microbiological Water Treatment Systems
 - NSF/ANSI 58 Reverse Osmosis Drinking Water Treatment Systems
 - NSF/ANSI 62 Drinking Water Distillation Systems
- Such systems shall yield at least 85 gallons of treated water for each 100 gallons of water processed.
- 3.9 Metering – In multi-family buildings, each unit must be individually metered, submetered, or equipped with an alternate technology capable of tracking water use and making the information available to the residents of the individual unit.

² References to these and other NSF and ANSI standards apply to the most current version of those standards.

4.0 OUTDOOR WATER EFFICIENCY CRITERIA

- 4.1 Landscape – All landscape criteria for single-family homes apply to the [front yard](#). In addition, the criteria apply to all areas improved upon by the builder for single-family and multi-family buildings, including common-use areas of multi-family buildings intended or made available for the use of building residents. This includes areas with vegetation beyond temporary stabilization measures, irrigation systems, permeable hardscape or softscape features, pools, spas, and/or water features.

Temporary landscapes (e.g., straw over bare soil) may be installed if permanent landscapes cannot be installed due to climate conditions or because occupancy of units in multi-family buildings occurs before common-area landscapes are installed. Homes or buildings with temporary landscapes can be inspected for compliance with indoor criteria and may be sold or occupied before a permanent landscape is installed. The WaterSense label designation (including use of stickers and certificates) may not be issued until the permanent landscape is installed, inspected, and certified to comply with all applicable criteria.

- 4.1.1 Landscape design – Design of the [landscaped area](#) shall be developed using the WaterSense Water Budget Tool. The tool and *WaterSense Water Budget Approach* can be found at www.epa.gov/watersense/water_budget. In single-family homes, pools, spas, and other water features shall be treated as turfgrass.

Lots with total landscapable areas equal to or less than 1,000 square feet are exempt from Criterion 4.1.1: *Landscape design*.

For multi-family buildings, common-use pools/spas and all areas that are reserved for private use of a particular residence/unit (e.g., areas deeded, identified as limited-use common elements, or otherwise restricted by building management) are excluded from the landscapable area. Additional criteria apply to pools/spas in Criterion 4.1.4: *Pools/spas*.

- 4.1.2 Slopes – Slopes in excess of 4 feet of horizontal run per 1 foot vertical rise (4:1) shall be vegetated.
- 4.1.3 Mulching – All exposed soil shall be covered with a 2- to 3-inch layer of [mulching material](#).
- 4.1.4 Pools/spas – Pools and spas financed, installed, or sold as upgrades by the homebuilder in single-family homes shall have an appropriate cover.

Common-use pools/spas in multi-family buildings must have the following features:

1. Be independently metered such that water use attributable to the pool and/or spa can be tracked and leaks can be readily identified.
2. Be equipped with a gutter or grate system to catch water splashes or drag-outs.

3. Be equipped with either sorptive media or cartridge filtration.
- 4.1.5 Ornamental water features – [Ornamental water features](#) financed, installed, or sold as upgrades by the homebuilder must recirculate water and serve a beneficial use.
- 4.2 Irrigation System – Irrigation systems are not required. Irrigation systems that are financed, installed, or sold through the homebuilder must meet the following criteria:
 - 4.2.1 Design and installation – All irrigation systems shall be designed or installed by an [irrigation professional](#) certified by a WaterSense labeled program..

Waivers from this requirement may be available if there are an insufficient number of available certified irrigation professionals. See [Appendix C](#) for details on determining whether there are a sufficient number of available certified irrigation professionals in your area.
 - 4.2.2 Post-installation audit – All irrigation systems shall be [audited](#) by a certified irrigation professional. Auditing procedures are described in the *Guidelines for Irrigation Audits on WaterSense Labeled New Homes* at www.epa.gov/watersense/docs/home_irr-audit-guidelines508.pdf.

Waivers from this requirement may be available if there are an insufficient number of available certified irrigation professionals. See [Appendix C](#) for details on determining whether there are a sufficient number of available certified irrigation professionals in your area.
 - 4.2.3 Leaks – There shall be no detected leaks during the operation of the irrigation system. The system shall be checked for leaks during the post-installation audit.
 - 4.2.4 Runoff/overspray – Irrigation systems shall be designed and installed to sustain the landscape without creating runoff or direct overspray during a minimum operating duration.

Runoff and direct overspray shall be measured during the post-installation audit. The certified irrigation professional shall determine the minimum operating duration based on landscape conditions and irrigation system design.
 - 4.2.5 Distribution uniformity – Irrigation systems shall achieve a [lower quarter distribution uniformity](#) (DU_{LQ}) of 65 percent or greater. Distribution uniformity shall be measured on the largest spray-irrigated area during the post-installation audit.
 - 4.2.6 Rainfall shut-off device – Irrigation systems shall be equipped with technology that inhibits or interrupts operation of the irrigation system

during periods of rainfall or sufficient moisture (e.g., rain sensors, soil moisture sensors).

4.2.7 Irrigation controllers – Irrigation systems shall be equipped with [WaterSense labeled weather-based irrigation controllers](#) or soil moisture sensor-based irrigation controllers that contain the following capabilities in both smart and standard mode:

1. The controller shall be capable of preserving the contents of the irrigation program settings when the power source is lost and without relying on an external battery backup.
2. The controller shall either be capable of independent, zone-specific programming or storing a minimum of three different programs to allow for separate schedules for zones with differing water needs.
3. The controller shall be capable of indicating to the user when it is not receiving a signal or local sensor input and is not adjusting irrigation based on current weather or soil moisture conditions.
4. The controller shall be capable of interfacing with a rainfall device.
5. The controller shall be capable of accommodating watering restrictions as follows:
 - Operation on a prescribed day(s)-of-week schedule (e.g., Monday-Wednesday-Friday, Tuesday-Thursday-Saturday; any two days; any single day).
 - Either even-day or odd-day scheduling, or any day interval scheduling between two and seven days.
 - The ability to set irrigation runtimes to avoid watering during a prohibited time of day (e.g., between 9:00 a.m. and 9:00 p.m.).
 - Complete shut-off (e.g., on/off switch) to accommodate outdoor irrigation prohibition restrictions.
6. The controller shall include a percent adjust (water budget) feature.³
7. If the primary source of weather or soil moisture information is lost, the controller shall be capable of reverting to either a proxy of historical weather data or a percent adjust (water budget) feature.
8. The controller shall be capable of allowing for a manual operation troubleshooting test cycle and shall automatically return to smart mode within some period of time as designated by the manufacturer, even if the switch is still positioned for manual operation.

A list of labeled weather-based irrigation controllers can be found at www.epa.gov/watersense/product_search.html.

4.2.8 Sprinkler irrigation – [Sprinkler irrigation](#), other than as a component of a [micro-irrigation system](#), shall not be used to water plantings other than maintained turfgrass. Sprinkler heads shall have a 4-inch or greater pop-up height and matched precipitation nozzles. Sprinkler irrigation shall not be used on strips of turfgrass less than 4 feet wide, nor on slopes in excess of 4 feet of horizontal run per 1 foot vertical rise (4:1).

³ The percent adjust (water budget) feature is defined as having the means to increase or decrease the runtimes or application rates for zones by means of one adjustment without modifying the settings for each individual zone.

- 4.2.9 Micro-irrigation systems – At a minimum, micro-irrigation systems shall be equipped with pressure regulators, filters, and flush end assemblies.
- 4.2.10 Schedule – Two watering schedules, developed by the certified irrigation professional as part of the post-installation audit, shall be posted at the controller. One schedule shall be designed to address the initial grow-in phase of the landscape, and the second schedule shall be designed to address an established landscape. Both schedules shall vary according to the seasons.
- 4.2.11 Metering – If an irrigation system is installed in a multi-family building, the system shall be independently metered, submetered, or equipped with an alternate technology capable of tracking water used for outdoor irrigation.

5.0 HOMEOWNER AND BUILDING MANAGEMENT EDUCATION

- 5.1 Operating Manual (for single-family homes) – The builder shall develop and provide to the single-family homeowner a written operating and maintenance manual for all water-using equipment or controls installed in the house and yard, including all relevant WaterSense materials on indoor and outdoor water use. This may be a chapter or folder in an existing manual. If clothes washers or dishwashers are not provided, general information about water-efficient appliances shall be included.
 - 5.1.1 Irrigation system – If an irrigation system is installed, the builder shall provide the single-family homebuyer with a record drawing (e.g., schematic) of the system, an itemized list of irrigation components, copies of the irrigation schedules, and information about reprogramming the schedule after establishment of the landscape. This information should be included in the operating manual.
- 5.2 Occupant Operating Manual (for homes in a multi-family building) – For multi-family buildings, the builder shall develop and provide to the occupant of each labeled unit a written operating and maintenance manual for all water-using equipment or controls installed in the unit, including all relevant WaterSense materials on indoor water use. This may be a chapter or folder in an existing manual. If clothes washers or dishwashers are not provided but hookups are present, general information about water-efficient appliances shall be included. In addition, the manual shall include relevant information on water-saving features of the building outside the unit, including landscape, pools, and laundry facilities.
- 5.3 Building Operating Manual – For multi-family buildings, the builder shall provide to the building management an operating and maintenance manual for all water-using equipment and controls outside of individual dwellings or inside of individual dwellings that are maintained by building management.
 - 5.3.1 Irrigation systems – If an irrigation system is installed, the builder shall provide building management with a record drawing (e.g., schematic) of

the system, an itemized list of irrigation components, copies of the irrigation schedules, and information about reprogramming the schedule after establishment of the landscape.

- 5.3.2 Pools/spas – If pools and/or spas are present, the builder shall include detailed information regarding filtration equipment and the manufacturer's recommended maintenance schedule, as well information on monitoring pools/spas for leaks.

6.0 FUTURE SPECIFICATION REVISIONS

EPA reserves the right to revise this specification should technological and/or market changes affect its usefulness to consumers, industry, or the environment. Industry partners and other interested parties will be notified in advance of anticipated changes. Revisions to the specification would be made following receipt of comments from and discussions with industry partners and other interested parties.

7.0 DEFINITIONS

ANSI – American National Standards Institute

ASME – American Society of Mechanical Engineers

CSA – Canadian Standards Association

EPA licensed certification provider – An organization licensed by EPA to hire or contract with inspectors, oversee new home inspections, and provide builder partners of certified new homes with the WaterSense new home label certificate. More information concerning the licensed certification provider's roles and responsibilities can be found in the [WaterSense New Home Certification System](#).

Evaporative cooling system – System that cools the air using water evaporation. There are two types of evaporative cooling systems: direct and indirect, both called "two-stage." In a direct evaporative cooling system, a blower forces air through a permeable, water-soaked pad. As the air passes through the pad, it is filtered, cooled, and humidified. An indirect evaporative cooling system has a secondary heat exchanger that prevents humidity from being added to the airstream that enters the home. Cooling systems are defined by the temperatures they can "hold," either in the space and/or the process or equipment, and the amount of heat they can remove at full capacity. This heat removal is normally expressed in tons of cooling (i.e., refrigeration) capacity. One ton of cooling equals precisely 12,000 British thermal units of heat removal per hour (Btu/h).

Front yard – Use local code definitions when available. Otherwise, the front yard means the portion of the lot extending across the full width of the lot between the front lot line and the front walls of the house.

Hand-held shower – A subset of showerheads that are moveable devices for directing water onto a user and are connected to the shower valve via a hose. Hand-held showers can be installed on a support to function as a showerhead.

Hot water source – The container in which water is stored and/or heated, such as a hot water heater or a demand-controlled recirculation loop.

Irrigation professional certified by a WaterSense labeled program (i.e., certified irrigation professional) – A professional certified by a WaterSense labeled program who has demonstrated expertise in water-efficient irrigation technology and techniques. The specifications for professional certification programs can be found at www.epa.gov/watersense/partners/product_program_specs.html, and WaterSense’s Directory of Certified Professionals can be found at www.epa.gov/watersense/findapro. For irrigation professionals interested in obtaining a certification, a complete list of WaterSense labeled certification programs can be found at www.epa.gov/watersense/outdoor/cert_programs.html.

Landscaped area – The designed area of landscape excluding the footprint of the home and permanent hardscape areas, such as driveways, sidewalks, and patios. Septic drainage fields and public right-of-ways should also be excluded from this calculation.

Lower quarter distribution uniformity (DU_{LQ}) – The measure of uniformity of irrigation water applied over an area. DU_{LQ} is the ratio of the average of the lowest 25 percent of measurements to the overall average measurement.

Micro-irrigation system – The frequent application of small quantities of water on or below the soil surface as drops, tiny streams, or miniature spray through emitters or applicators placed along a water delivery line. Micro-irrigation encompasses a number of methods or concepts, such as bubbler, drip, trickle, mist, or spray and subsurface irrigation.⁴ For purposes of this specification, micro-irrigation includes emission devices that have flow rates less than 30 gallons per hour (113.6 liters per hour).

Mulching material – A permeable arrangement of organic and/or inorganic materials that will help to retain soil moisture, suppress weeds, and allow free movement of oxygen into and out of the soil.

NSF – NSF International

Ornamental water feature – Includes fountains, ponds, waterfalls, man-made streams, and other decorative water-related constructions. To meet the criteria, these features shall recirculate water and serve a beneficial use (e.g., habitat for wildlife, stormwater management, cooling properties).

Post-installation irrigation system audit – Procedure to collect and present information concerning the uniformity of application, precipitation rate, and general condition of an irrigation system and its components.⁵

Sprinkler irrigation – Type of irrigation using mechanical devices with nozzles (sprinklers) to distribute the water by converting water pressure to a high-velocity discharge stream or streams.⁶

⁴ American Society of Agricultural Engineers, ASAE EP405.1 FEB03 Design and Installation of Microirrigation Systems. 2003.

⁵ Irrigation Association. *Landscape Irrigation Scheduling and Water Management*. 2005.

⁶ Irrigation Association. *Landscape Irrigation Scheduling and Water Management*. 2005.

Static service pressure – The pipeline or municipal water supply pressure when water is not flowing.

Water factor – The quotient of the total weighted per-cycle water consumption divided by the capacity of the clothes washer. Lower numbers indicate more efficient use of water.

WaterSense builder partner – A homebuilder who has committed to building new homes in accordance with the *WaterSense New Home Specification*. The builder must signify such commitment by signing a WaterSense partnership agreement with EPA.

WaterSense labeled bathroom sink faucet – A faucet that has been certified to meet the WaterSense specification for bathroom faucets. The faucet must have a flow rate that does not exceed 1.5 gallons per minute (gpm) (5.7 lpm) at a pressure of 60 psi (414 kPa) at the inlet when water is flowing and is not less than 0.8 gpm (3.0 lpm) at a pressure of 20 psi (138 kPa) at the inlet when water is flowing. The *High-Efficiency Lavatory Faucet Specification* can be found at www.epa.gov/watersense/products, and a list of WaterSense labeled faucets and faucet accessories can be found at www.epa.gov/watersense/product_search.html.

WaterSense labeled flushing urinals – A urinal that has been certified to meet the WaterSense specification for urinals. These urinals have a flush volume that does not exceed 0.5 gallons (1.9 liters), comply with existing standards for flushing urinals, and are tested for trap seal restoration and flush effectiveness. The *WaterSense Specification for Flushing Urinals* can be found at www.epa.gov/watersense/products, and a list of labeled urinals can be found at www.epa.gov/watersense/product_search.html.

WaterSense labeled showerhead – A showerhead that has been certified to meet the WaterSense specification for showerheads. The showerhead must have a flow rate that does not exceed 2.0 gpm (7.6 lpm) at flowing pressures of 20, 45, and 80 ± 1 psi (140, 310, and 550 ± 7 kPa). The *WaterSense Specification for Showerheads* can be found at www.epa.gov/watersense/products, and a list of WaterSense labeled showerheads can be found at www.epa.gov/watersense/product_search.html.

WaterSense labeled tank-type toilet – A toilet that has been certified to meet the WaterSense specification for tank-type toilets. These toilets have a flush volume that does not exceed 1.3 gallons (4.8 liters), solid waste removal of 350 grams or greater, and can conform to the adjustability and other supplementary requirements included in the *WaterSense Specification for Tank-Type Toilets*. This specification can be found at www.epa.gov/watersense/products, and a list of labeled toilet models can be found at www.epa.gov/watersense/product_search.html.

WaterSense labeled weather-based irrigation controller – An irrigation controller that has been certified to meet the WaterSense specification for weather-based irrigation controllers. It applies to stand-alone controllers, add-on devices, and plug-in devices that use current weather data as a basis for scheduling irrigation. The *WaterSense Specification for Weather-Based Irrigation Controllers* can be found at www.epa.gov/watersense/products, and a list of labeled weather-based irrigation controllers can be found at www.epa.gov/watersense/product_search.html.

APPENDIX A

Informative Annex for WaterSense Labeling

The following requirements must be met before a new home may earn the WaterSense label.

1.0 WATERSENSE PARTNERSHIP

The homebuilder must have a signed partnership agreement in place with EPA.

2.0 CONFORMITY ASSESSMENT

Conformance to this specification must be certified by an [EPA licensed certification provider](#) in accordance with the [WaterSense New Home Certification System](#).

APPENDIX B

Determining Volume of Piping Systems

Internal Volume of Various Water Distribution Tubing⁷

Ounces of Water Per Foot Length of Hot Water Tubing								
Nominal Size (Inches)	Copper M	Copper L	Copper K	CPVC CTS SDR 11	CPVC SCH 40	PEX-AI-PEX ASTM F 1281	PE-AL-PE	PEX CTS SDR 9
3/8	1.06	0.97	0.84	N/A	1.17	0.63	0.63	0.64
1/2	1.69	1.55	1.45	1.25	1.89	1.31	1.31	1.18
3/4	3.43	3.22	2.90	2.67	3.38	3.39	3.39	2.35
1	5.81	5.49	5.17	4.43	5.53	5.56	5.56	3.91
1 1/4	8.70	8.36	8.09	6.61	9.66	8.49	8.49	5.81
1 1/2	12.18	11.83	11.45	9.22	13.20	13.88	13.88	8.09
2	21.08	20.58	20.04	15.79	21.88	21.48	21.48	13.86

Conversions: 1.0 gallon (3.8 liters) = 128.0 ounces
 1.0 ounce = 0.00781 gallons (0.0296 liters)
 0.5 gallons (1.9 liters) = 64.0 ounces
 0.6 gallons (2.3 liters) = 76.8 ounces

⁷ Modified from 2009 International Plumbing Code Table E202.1. International Code Council. January 2009.

APPENDIX C

Identifying Available Certified Irrigation Professionals

WaterSense has labeled certification programs for irrigation professionals in three categories: designers; installation and maintenance professionals; and auditors. Criteria 4.2.1: *Design and installation* and 4.2.2: *Post-installation audit* require the use of an irrigation professional who is:

- A certified designer, to design the irrigation system, or a certified installation/maintenance professional, to install the irrigation system (4.2.1).
AND
- A certified auditor, to audit the irrigation system (4.2.2).

If there are fewer than three available irrigation professionals who are certified designers *and* fewer than three available irrigation professionals who are certified installation/maintenance professionals that provide services to the city, county, or metropolitan area where the home is located, an exemption from criterion 4.2.1 may apply.

If there are no available certified irrigation professionals who are certified auditors that provide services to the city, county, or metropolitan area where the home is located, an exemption from criterion 4.2.2 may apply.

The following steps should be followed to determine if there are a sufficient number of available certified irrigation professionals to comply with criteria 4.2.1 and 4.2.2.

4.2.1 – Design and installation

1. Go to WaterSense's Directory of Certified Professionals at www.epa.gov/watersense/findapro and review the list of certified irrigation professionals by location.
2. If there are three or more irrigation professionals who are certified designers or three or more irrigation professionals who are certified installation/maintenance professionals that perform irrigation services in the city, county, or metropolitan area where the home is being built, contact the individuals to determine if they are accepting new residential work. If at least three certified irrigation professionals in one of the categories are accepting new residential work, there is no exemption.
3. If there are fewer than three irrigation professionals who are certified designers and fewer than three irrigation professionals who are certified installation/maintenance professionals that identified the city, county, or metropolitan area where the home is being built as areas in which they work, but there are additional irrigation professionals with the appropriate certification indicating they perform work throughout the state, either:
 - Contact the individual certified irrigation professionals to determine if they perform irrigation services in the city, county, or metropolitan area where the home is being built and are available to take on additional residential work.OR

- Contact the WaterSense Helpline to ask for assistance in determining if there are three or more available irrigation professionals with the appropriate certifications that perform irrigation services in the area where the home is being built.

If at least three certified irrigation professionals in one of the categories are accepting new residential work, there is no exemption.

4. If there are neither three irrigation professionals who are certified designers *nor* three irrigation professionals who are certified installation/maintenance professionals that perform residential work in that state, the home is exempt from the requirement(s) to have the irrigation system designed and/or installed by a certified irrigation professional. Contact the WaterSense Helpline to request a waiver from the requirement(s).

4.2.2 – Post-installation audit

1. Go to WaterSense's Directory of Certified Professionals at www.epa.gov/watersense/findapro and review the list of certified irrigation professionals by location.
2. If there is at least one irrigation professional who is a certified auditor that performs irrigation services in the city, county, or metropolitan area where the home is being built, contact the individual to determine if he/she is accepting new residential work. If at least one certified irrigation professional is accepting new work, there is no exemption.
3. If no irrigation professionals who are certified auditors identified the city, county, or metropolitan area where the home is being built as areas in which they work, but there is at least one irrigation professional who is a certified auditor indicating he/she performs work throughout the state, either:
 - Contact the individual certified irrigation professional(s) to determine if they perform irrigation services in the city, county, or metropolitan area where the home is being built and are available to take on additional residential work.
 - OR
 - Contact the WaterSense Helpline to ask for assistance in determining if there is an available irrigation professional who is a certified auditor that performs irrigation services in the area where the home is being built.

If at least one irrigation professional who is a certified auditor is accepting new residential work, there is no exemption.

4. If there are no irrigation professionals who are certified auditors that perform residential work in that state, contact the WaterSense Helpline. The WaterSense Helpline will identify a professional who can perform the audit or will grant a waiver from the requirement(s).

APPENDIX D

Summary of Additional and Adjusted Criteria for Multi-Family Buildings

The following is a summary of criteria specific to units in multi-family buildings. In addition to requirements that apply to products, features, and systems within the unit(s), certain prerequisites must be met in a multi-family building for any unit to be eligible for the label. For the full criteria, please refer to the *WaterSense New Home Specification* (the specification). The summary below refers to criteria in the sections of the specification as noted.

SECTION 1: SCOPE AND OBJECTIVE

- 1.0 For homes in a multi-family building to be eligible for the WaterSense label, they must be in a building that meets all the prerequisites outlined in the *WaterSense New Home Specification* and is:
- A building three stories (above grade) or less in size.
OR
 - A building of any height provided the units have independent heating, cooling, and hot water systems separate from other units.⁸

Section 3: INDOOR WATER EFFICIENCY CRITERIA

Except where specifically noted or modified, any home or unit in a multi-family building must meet all of the indoor criteria in the specification.

- 3.2 Service Pressure and Pressure Loss Test – For units in multi-family buildings, the service pressure within the unit must be 60 pounds per square inch (psi) or less.
- 3.7.2 Laundry facilities – All equipment in common-use laundry rooms shall meet the criteria outlined in section 3.7.2 of the *WaterSense New Home Specification*:
- Clothes washers shall be ENERGY STAR qualified with a [water factor](#) (WF) of less than or equal to 6.0 gallons of water per cycle per cubic foot of capacity. A listing of qualified clothes washers can be found at www.energystar.gov/index.cfm?fuseaction=clotheswash.search_clotheswashers for residential clothes washers and www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=CCW for commercial clothes washers.
- 3.9 Metering – Each unit must be individually metered, submetered, or equipped with an alternate technology capable of tracking water use and making that information available to the homeowner.

⁸ Units in buildings that utilize central hot water systems powered by alternative energies, such as solar or geothermal, for domestic hot water are allowed if the alternative energy source provides at least 50 percent of the hot water needs for the residential units.

SECTION 4.0: OUTDOOR WATER EFFICIENCY CRITERIA

Units in multi-family buildings will only be eligible for the WaterSense label if all common-use outdoor areas meet the following criteria.

- 4.1 Landscape – In instances where specific units are occupied prior to others and landscaping is infeasible due to ongoing construction activity, temporary landscapes (e.g., straw over bare soil) may be installed. Units can be inspected for compliance with indoor criteria and may be occupied before a permanent landscape is installed. However, the WaterSense label may not be issued until the permanent landscape is installed, inspected, and certified to comply with the outdoor criteria.
 - 4.1.1 Landscape design – The landscape design criteria outlined in *Section 4: Outdoor Water Efficiency Criteria* of the *WaterSense New Home Specification* will apply to all common-use outdoor areas.
 - Landscapable area – The landscapable area for multi-family buildings will be defined as the area improved upon by the builder and intended or made available for the use of building residents. Such areas will include all areas with vegetation beyond temporary stabilization measures, irrigation systems, permeable hardscape, and softscape features.
 - Private-use areas – Areas that are reserved for private use of a particular residence (e.g., areas deeded, identified as limited-use common elements, or otherwise restricted by building management) are excluded from the landscapable area.
 - 4.1.4 Pools/spas – Common-use pools/spas in multi-family buildings are excluded from the landscapable area. Pools/spas shall have the following features:
 1. Be independently metered such that water use attributable to the pool and/or spa can be tracked and leaks can be readily identified.
 2. Be equipped with a gutter or grate system to catch water splashes or drag-outs.
 3. Be equipped with either sorptive media or cartridge filtration.
- 4.2 Irrigation System – An irrigation system is not required. If an irrigation system is installed, it shall be independently metered and meet all the requirements discussed in *Section 4.2: Irrigation System* of the *WaterSense New Home Specification*.

5.0 Resident and Building Management Education

- 5.2 Occupant Operating Manual – The builder shall develop and provide to the occupant of each labeled unit a written operating and maintenance manual for all water-using equipment or controls installed in the unit, including all relevant WaterSense materials on indoor water use. This may be a chapter or folder in an existing manual. If clothes washers or dishwashers are not provided but hookups are present, general information about water-efficient appliances shall be

included. In addition, the manual shall include relevant information on water saving features of the building outside the unit, including landscaping, pools, and laundry facilities.

- 5.3 Building Operating Manual – The builder shall provide to the building management an operating and maintenance manual for all water-using equipment and controls outside of individual dwellings or inside of individual dwellings that are maintained by building management.
- 5.3.1 Irrigation systems – If an irrigation system is installed, the builder shall provide building management with a record drawing (e.g., schematic) of the system, an itemized list of irrigation components, copies of the irrigation schedules, and information about reprogramming the schedule after establishment of the landscape.
- 5.3.2 Pools/spas – If pools and/or spas are present, the builder shall include detailed information regarding filtration equipment and the manufacturer's recommended maintenance schedule, as well as information on monitoring pools/spas for leaks.