

**Town of Castle Rock**  
**Application for Drought Management Plan**  
**CWCB Grant Program**

**May 19, 2017**

**Revised: June 15, 2017, June 21, 2017**

## **1 Contact Information**

The Town of Castle Rock (Castle Rock) is located south of Denver in Douglas County midway between Denver and Colorado Springs. Castle Rock was incorporated in 1881. Castle Rock currently provides water and wastewater services to about 16,500 homes, in addition to commercial users and other municipal needs.

This document is an application for grant monies offered by the Colorado Water Conservation Board (CWCB) for the development of a Drought Management Plan (Plan). The application was developed in accordance with the CWCB's Grant Guidelines for Drought Mitigation Planning Projects. Contact information for Castle Rock is provided below.

**Applicant:** Town of Castle Rock  
175 Kellogg Court  
Castle Rock, Colorado 80109  
Contact: Mark Marlowe  
Director of Castle Rock Water  
720-733-6000  
[mmarlowe@crgov.com](mailto:mmarlowe@crgov.com)

## **2 Individuals and Organizations Involved**

Castle Rock has contracted with Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) to provide professional planning and engineering services in the development of the Drought Management Plan. Contact information for Amec Foster Wheeler is provided below.

**Contractor:** Amec Foster Wheeler Environment & Infrastructure, Inc.  
1942 Broadway, Ste. 314  
Boulder, CO 80302  
Contact: Jeff Brislawn, CFM  
Senior Associate / Hazard Mitigation Lead  
303-820-4654  
[jeff.brislawn@amecfw.com](mailto:jeff.brislawn@amecfw.com)

The Castle Rock staff that will be involved in the process are presented in Table 1.

<b>Table 1 - Role of Castle Rock Staff Members in Development of Plan</b>			
<b>Staff member</b>	<b>Rate (\$/hr)</b>	<b>Position</b>	<b>Role</b>
Mark Marlowe	60	Director of Castle Rock Water	Review draft documents Selection of Drought Committee
Tim Friday	60	Assistant Director of Castle Rock Water	Meetings with Amec Foster Wheeler Review draft documents Selection of Drought Committee
Matt Benak	60	Water Resources Manager	Meetings with Amec Foster Wheeler Review draft documents Selection of Drought Committee
Kurtis Cotten	60	Water Resources Program Analyst	Provide data and technical support to Amec Foster Wheeler Meetings/correspondence with Amec Foster Wheeler Review draft documents Applicant Project Manager
Sheri Scott	60	Water Resources Program Analyst	Review draft documents Provide data Meetings with Amec Foster Wheeler
Heather Justus	60	Water Resources Program Analyst	Review draft documents Provide data Meetings with Amec Foster Wheeler
Sandra Aguilar	60	Customer Relations Program Manager	Coordinate public review and stakeholder process including the following: Arrange open house meeting facility Advertise open house to the public
Melinda Pastore	30	Senior Office Assistant	Organize information for the plan

### 3. Identification of retail water delivery of the covered entity for past five years

Water deliveries by Castle Rock for the five-year period 2012-2016 are presented in Table 2. A breakdown of water use by category for this period is presented in Table 3, and a breakdown by source is presented in Table 4.

<b>Table 2 - Retail Water Delivery (Million Gallons)</b>	
<b>Year</b>	<b>Water Delivery</b>
2012	2,397
2013	2,243
2014	2,214
2015	2,406
2016	2,641

Source: Water Demand Report

<b>Table 3 - Water Use by Sector (Million Gallons)</b>						
<b>Year</b>	<b>Residential</b>	<b>Multifamily</b>	<b>Commercial</b>	<b>Irrigation</b>	<b>Bulk</b>	<b>Total</b>
2012	1,581	191	335	263	47	2,397
2013	1,476	175	310	242	40	2,243
2014	1,456	172	306	240	40	2,214
2015	1,583	188	330	260	43	2,406
2016	1,736	206	365	286	48	2,641

Castle Rock currently gets 87% of its water supply from the Town's 54 deep Denver Basin groundwater wells, with the remainder from East Plum Creek alluvial wells and a surface diversion. Water use by source is provided in the table below. The next section describes how the Town is in the process of diversifying its water supply.

<b>Table 4 - Water Use by Source (Million Gallons)</b>			
<b>Year</b>	<b>East Plum Creek Alluvial Wells and Surface Diversion</b>	<b>Denver Basin Wells</b>	<b>Total</b>
2012	0	2,397	2,397
2013	211	2,032	2,243
2014	292	1,922	2,214
2015	267	2,139	2,406
2016	291	2,350	2,641

#### **4. Background characterizing the water system, potential growth and any other pertinent issues that relate to the stated evaluation criteria**

The Town has been proactive in its planning efforts to ensure the community's water future and obtain a continuous, sustainable water supply. Castle Rock recently released its 2016 Water Resources Strategic Master Plan (Approved January 2017), and a 2015 Water Efficiency Master Plan (Approved July 2015). Much of the information presented in this application was obtained from these documents. The Water Resources Strategic Master Plan includes strategies for ensuring and diversifying a long-term water supply and optimizing infrastructure performance, both of which relate to long-term drought mitigation. The Town's Comprehensive Master Plan (Draft October 2015) also has goals and policies for water supply that include the recovery and reuse of treated wastewater as a key part of the long-term renewable water supply strategy.

The five largest customers in the Town of Castle Rock in terms of annual water use are:

1. Government Entity
2. Homeowner's Association
3. Government Entity
4. Rental apartment community
5. Hospital

##### **Five-Year Water Use**

Water use per capita for the five-year period 2012-2016 is presented in Table 5. Populations for the last two years were estimated based on the growth rate growth from 2012 to 2014.

<b>Table 5 - Water Use Per Capita For Last Five Years*</b>			
<b>Year</b>	<b>Population</b>	<b>Total Water Use (million gallons)</b>	<b>Per Capita Water Use (gallons per capita per day)</b>
2012	51,573	2,397	120
2013	54,283	2,243	113
2014	56,645	2,214	107
2015**	59,181	2,406	111
2016**	61,717	2,641	117

\*\*Estimated based on the average annual population increase from 2012 to 2014 of 2,536 per year.

The basis for calculation is the following:

$$\text{Per Capita Water Use} = (\text{Total Water Use (gal/day)}) / (\text{Total Population} \times 365 \text{ days})$$

#### Population

Population data from the past three decennial censuses are presented in Table 6, and projections out to the year 2055 are presented in Table 7.

<b>Table 6 - Past population per U.S. Decennial Census</b>	
<b>Census</b>	<b>Population</b>
1990	8,708
2000	20,224
2010	48,231

<b>Table 7 – Projected Population</b>	
<b>Year</b>	<b>Projected Population</b>
2020	65,786
2030	77,626
2040	89,465
2050	101,305
2055	105,200

The current population estimate is approximately 62,000 based on a 2014 population of 56,645 and an estimated growth rate of 2,536/year, rounded to the nearest thousand.

Projected future growth is based on 75% buildout, which corresponds to a 2055 projected population of 105,200. However, housing developments recently have been building out to 100%, which means the 2055 population could be as high as 155,000.

#### Water Savings Goals

The five-year average water consumption rate for 2010 to 2014 was 122 gpcd (gallons per capita per day, 2015 Water Efficiency Master Plan). Current estimates by the Town are that this rate has dropped to about 117 gpcd through conservation efforts to date. The Town has set a master planning goal of reducing this rate further to

100 gpcd. Implementation of a Drought Mitigation Plan will be part of Castle Rock's overall strategy to achieve that goal.

#### Water Source Changes

Castle Rock currently gets 87% of its water supply from the Town's 54 deep Denver Basin groundwater wells. The Denver Basin is considered to be a non-renewable water source, and the Town will ultimately not be able to meet water supply demands without shifting to more renewable sources. The Town has set a master planning goal of expanding sustainable alluvial and surface water sources, and reducing the Denver Basin supply to 25%. While these changes will provide a more reliable long-term water supply, it also subjects the Town to potentially larger effects from drought, making the implementation of a Drought Mitigation Plan all the more important.

## **5 Impacts During the 2002 Drought**

The majority of the personnel currently at Castle Rock Water were not there during the 2002 drought, and there is limited information about specific policies put in place during that time. However, there is evidence that the drought did have a significant impact on the town. The 2006 Water Facilities Master Plan shows that demand per account was 565 gal/day in 2000 and decreased to 399 gal/day by 2005. The plan notes that the reduction in water usage per account since 2002 is most likely attributable to the public's response to the drought and the Town's focus on conservation efforts.

The 2006 Water Resources Strategic Master Plan states that the single family residential use in 2003 dropped due to conservation efforts and water restrictions imposed by the Town in response to the water shortage of 2003. This trend is contradictory to the identified growth in the Town during the same time period.

The Town has a significant wildfire hazard which can be exacerbated by drought. In June 2002 the Hayman fire in unincorporated Douglas and Jefferson counties west of Castle Rock grew to be the largest documented forest fire in Colorado (217 mi<sup>2</sup>) on record. This resulted in smoke and ash in the Town and along the Front Range for several weeks.

Based on the Douglas County Hazard Mitigation Plan (2015) there have been seven significant droughts in the last 121 years (1893-2014) in the planning area. This equates to a drought every 17.2 years on average or a 5.8% chance of a drought in any given year.

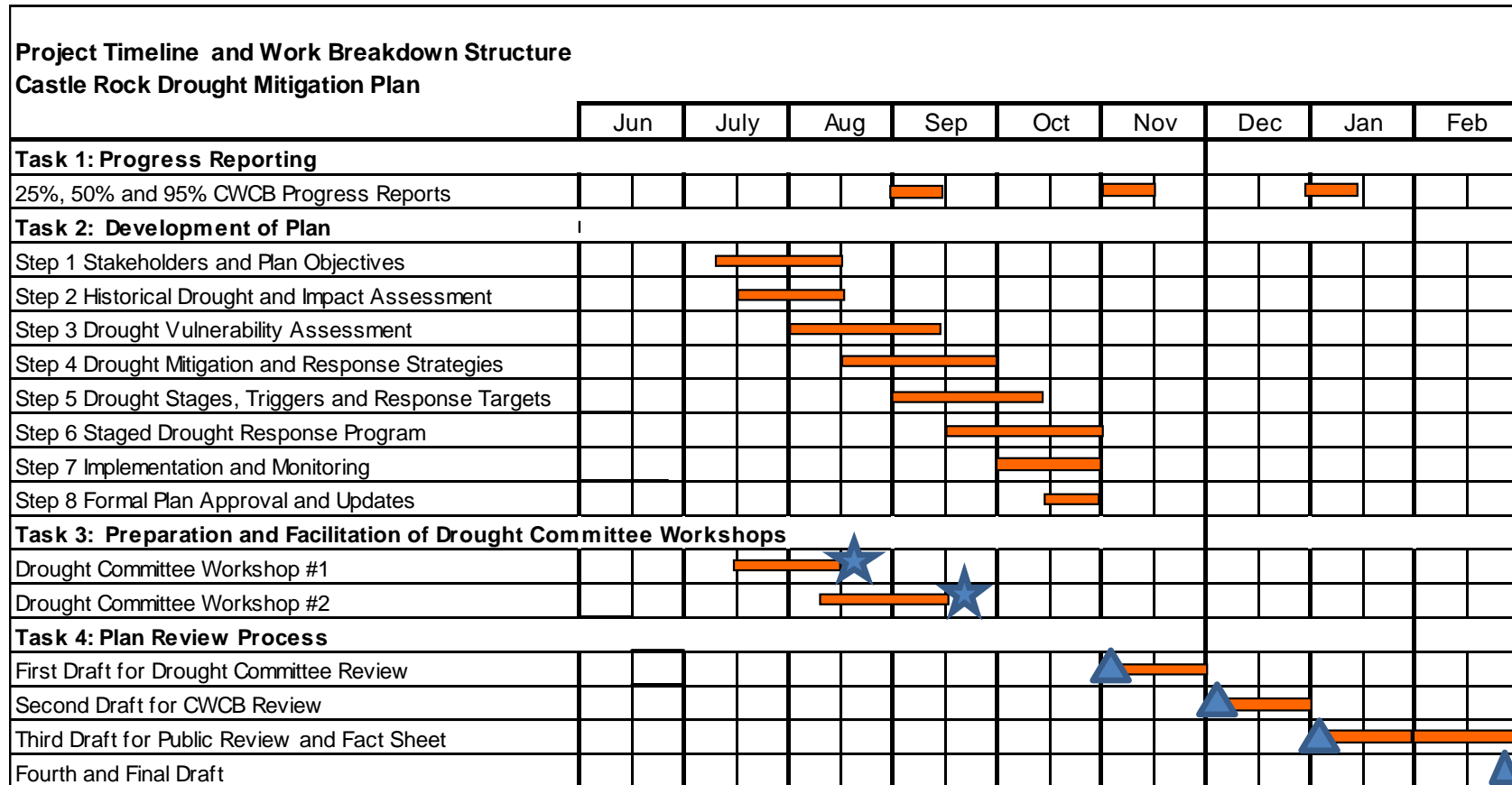
## **6 Drought Mitigation Plan Scope of Work**

Amec Foster Wheeler will be working closely with Castle Rock to develop the Drought Management Plan. Castle Rock will provide Amec Foster Wheeler with the data/information necessary to develop the Plan and will coordinate efforts with a Drought Committee which will serve as a stakeholder steering committee during the development and implementation of the Plan.

The Plan will be developed in accordance to CWCB's Municipal Drought Management Plan Guidance Document and to the Scope of Work provided as Attachment A. The Scope of Work in Attachment A provides a more detailed description of the work plan.

## Project Schedule

The preliminary project schedule identifying key activities and milestones is presented in the graphic below. These dates are contingent on receipt of the grant funds by early July.



★ Drought Committee Workshop ▲ Plan Deliverable

## 7 Budget

The budget cost estimate is provided in Table 9. This estimate provides information on consultant costs, Castle Rock's in kind contributions with staff time, and anticipated allocation of costs based on anticipated grant funding from CWCB. The total grant request from the CWCB \$35,000 which will be needed to partially cover the consultant fees. Castle Rock will provide \$9,120 in cash match and \$14,940 of in-kind match with staff time as detailed below.

Table 9 - Budget		Amec Foster Wheeler		Castle Rock Water Staff										
	STAFFING	Consultant Hours	Consultant Labor Costs	Director Castle Rock Water	Assistant Director Castle Rock Water	Water Resources Manager	Water Resources Program Analyst (x3)	Customer Relations Program Manager	Senior Office Assistant	Staff Hours	Staff Labor Costs - in kind match	Direct Expenses	Total Project Costs	CWCB Grant Request
	HOURLY RATE			\$60	\$60	\$60	\$60	\$60	\$30					
<b>Task 1: Progress Reporting</b>														
	25%, 50% and 95% Progress Reports	10	\$1,400	0	0	0	6	0	0	6	\$360	\$0	\$1,760	
	Phase Total	10	\$1,400	0	0	0	6	0	0	6	\$360	\$0	\$1,760	\$0
<b>Task 2: Development of Plan</b>														
2.1	Introduction, Stakeholders and Objectives	6	\$860	2	2	2	6	0	2	14	\$780	\$0	\$1,640	
2.2	Historical Drought and Impact Assessment	12	\$1,520	0	2	2	6	0	0	10	\$600	\$0	\$2,120	
2.3	Drought Vulnerability Assessment	38	\$4,280	0	2	2	10	0	0	14	\$840	\$0	\$5,120	
2.4	Drought Mitigation and Response Strategies	26	\$3,860	0	4	8	16	0	0	28	\$1,680	\$0	\$5,540	
	Drought Stages, Trigger Points and Response													
2.5	Targets	40	\$5,720	0	4	8	16	0	0	28	\$1,680	\$0	\$7,400	
2.6	Staged Drought Response Program	40	\$5,640	0	4	6	16	0	0	26	\$1,560	\$0	\$7,200	
2.7	Implementation and Monitoring	4	\$640	0	4	6	16	2	0	28	\$1,680	\$0	\$2,320	
2.8	Formal Plan Approval and Updates	2	\$320	0	2	4	4	0	0	10	\$600	\$0	\$920	
	Phase Total	168	\$22,840	2	24	38	90	2	2	158	\$9,420	\$0	\$32,260	\$22,840
<b>Task 3: Preparation and Facilitation of Drought Comm</b>														
	Coordination and debrief on two workshops	8	\$1,280	0	0	0	4	0	0	4	\$240	\$0	\$1,520	
	Drought Committee Workshop #1	24	\$3,600	2	4	4	4	4	0	18	\$1,080	\$0	\$4,680	
	Drought Committee Workshop #2	24	\$3,600	2	4	4	4	4	0	18	\$1,080	\$0	\$4,680	
	Phase Total	56	\$8,480	4	8	8	12	8	0	40	\$2,400	\$0	\$10,880	\$8,480
<b>Task 4: Plan Review Process</b>														
	First Draft for Town Staff and Committee Review	54	\$6,940	4	4	4	4	2	0	18	\$1,080	\$0	\$8,020	
	Second Draft for CWCB Review	11	\$1,780	2	2	2	4	0	0	10	\$600	\$0	\$2,380	
	Third Draft for Public Review, Fact Sheet	13	\$1,800	2	2	2	2	2	0	10	\$600	\$0	\$2,400	
	Fourth and Final Draft for Board Review	8	\$880	2	2	2	2	0	0	8	\$480	\$0	\$1,360	
	Phase Total	86	\$11,400	10	10	10	12	4	0	46	\$2,760	\$0	\$14,160	\$3,680
Total Hours		320		16	42	56	120	14	2	250			570	
Total Cost			\$44,120	\$960	\$2,520	\$3,360	\$7,200	\$840	\$60		\$14,940	\$0	\$59,060	\$35,000
Cost Share Allocation														
	Total Cost to Prepare Plan (Castle Rock and AmecFW)		\$59,060.00											
	Castle Rock in-kind contribution		\$14,940.00											
	Castle Rock cash contribution		\$9,120.00											
	Total Local Match		\$24,060.00											
	Total Castle Rock contribution as percent of total		40.7%											
	<b>CWCB Grant Request</b>		<b>\$35,000.00</b>											

## 8 Signature Authority

Castle Rock Water is committed to water resource sustainability, conservation, and drought management. Staff understands the needs and benefits to complete a Drought Management Plan to ensure the town is prepared to deal with and respond to a drought in a timely and sufficient manner to reduce economic, social and environmental impacts. We are committed to completing the Drought Management Plan in its entirety and have made available necessary matching funds and in-kind resources for the CWCB grant money requested.

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Mark Marlowe, Director of Castle Rock Water

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Date

## 9 Description of the Public Review Process

The Town will send out emails to homeowners associations, use social media and post on its website that a draft Drought Management Plan is available for the public to review and comment. We plan to include notice on our "Town Talk" publication that is included with water bills, a notice on the message block on the water bills, and this will be sent through our community relations group who will assist in developing notifications. The public will have 60 days to review and comment.



## **ATTACHMENT A: CASTLE ROCK DROUGHT MANAGEMENT PLAN SCOPE OF WORK**

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## Scope of Work

This scope of work outlines the work to be performed for the Town of Castle Rock (Castle Rock) by Amec Foster Wheeler (Consultant) to develop a Drought Management Plan (Plan) and grant application. Amec Foster Wheeler is already under contract with Castle Rock through a competitive bid process and poised to begin work. Castle Rock will work closely with the Consultant in developing a Plan that provides an appropriate level of guidance for Castle Rock to plan and manage water supplies during droughts.

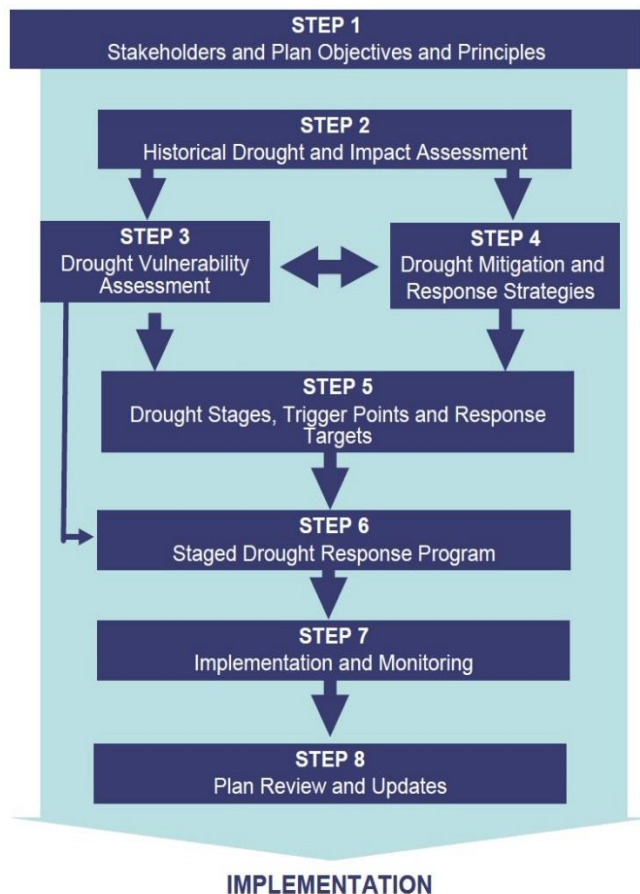
The goal of the project is to develop an implementable drought mitigation plan that will allow the Town to mitigate and respond to drought conditions in an effective and coordinated manner. Amec Foster Wheeler will approach this project according to the project tasks identified below. The plan will be developed to be consistent with the CWCB Municipal Drought Management Plan Guidance Document (Guidance Document).

### Task 1: Progress Reporting

Input on progress reports at 25%, 50% and 95% completion is required by CWCB for Drought Management Plan grant recipients. Castle Rock will submit the progress reports to CWCB per the grant agreement with assistance from the Consultant where needed.

### Task 2: Development of Plan

**Approach:** The plan will be developed according to the template provided in CWCB's Municipal Drought Management Plan Guidance Document which provides a drought plan framework and content. The drought planning process consists of eight planning steps, illustrated in the following figure and summarized below. Following award of the grant, Castle Rock will begin working on these steps with Consultant assistance.



### Step 1: Stakeholders and Plan Objectives and Principles

– Step 1 focuses on the preliminary steps necessary to initiate the development of a drought mitigation plan. Castle Rock, with guidance from the Consultant, will work on developing a planning team (Drought Committee), securing stakeholder involvement, and developing plan objectives and operating principles. The Drought Committee will consist of employees within the Town of Castle Rock who will be responsible for monitoring, mitigation and responding to drought. One or two decision makers (i.e. Castle Rock Council members) may also be included on the Committee. It will be important to identify water use priorities in this step, e.g. essential uses for the health and safety of the community vs outdoor irrigation. This will be a topic of discussion at Drought Committee Workshop #1.

### Step 2: Historical Drought and Impact Assessment

– Step 2 will consist of an evaluation of the severity of historic droughts and corresponding effects on Castle Rock’s water supply system and service area demands. Information gathered during the grant preparation in Task 1 will provide a baseline for this step. This step also includes the identification of specific drought-related impacts

and an evaluation of historic drought mitigation measures and response strategies. This information will be useful for the screening and selection of future drought mitigation and response strategies in Step 4.

**Step 3: Drought Vulnerability Assessment** – Castle Rock staff and the Consultant will review past water supply reliability planning efforts, as information from water supply reliability planning may be useful in identifying drought trigger mechanisms and response targets in Step 5. This step also includes the identification of potential drought impacts and perceived severity of impacts and builds on the historic drought impact information uncovered in Step 2. This information will be used when identifying drought mitigation and response strategies in Step 4.

**Step 4: Drought Mitigation and Response Strategies** – The Consultant will facilitate a process with Castle Rock staff at Drought Committee Workshop #2 to review a range of potential mitigation and response strategies with the Drought Committee. Drought mitigation is to be implemented prior to a drought to avoid and/or reduce potential future drought impacts. The preliminary list of mitigation strategies will be developed using CWCB’s Drought Management Guidance Document and accompanying worksheets, as well as incorporation of Castle Rock’s water supply reliability and efficiency/conservation planning efforts. The preliminary mitigation list will be screened and further refined using the following criteria: technical feasibility, perceived benefits, cost effectiveness, public acceptance, and environmental considerations.

Initial drought response strategies will be identified with further refinement in Step 6 in accordance with individual drought stages (severity). These could include supply and demand-sided response strategies and would take into account the Town’s water conservation planning. This step also includes guidance for the development of a public education and awareness strategy.

**Step 5: Drought Stages, Trigger Points, and Response Targets** – Identification of drought stages and corresponding drought trigger points and response targets will occur in this step, based on information gathered during the planning process in the previous steps. These may be specific criteria adhered to during a drought or simply guidelines that Castle Rock can incorporate into the drought monitoring and response efforts. Typically these trigger points are based on a combination of supply indicators such as reservoir storage, snowpack, streamflow and drought indices. It will be important to note that the drought trigger points are only general guidelines and that multi-year droughts could require a significant modification to the drought triggers based on the duration and severity of the drought. Staff historical experience managing the Town’s water supply system will also be taken into account.

**Step 6: Staged Drought Response Program** – This step will entail development of the specific drought response measures for each drought stage using the response strategies developed in Step 4. These response measures should describe the actions that Castle Rock and customers will need to take to reduce water demand and enhance water supplies during each individual drought stage. Specific supply-side and demand-side measures will be identified with the goal of conserving the available supplies during the drought. Items for consideration will include water restrictions, reservoir management, water rights management, and public awareness campaigns. Initial input for the plan from this step and Step 5 will be developed through facilitation at Drought Committee Workshop #2.

**Step 7: Implementation and Monitoring** – Implementation of the drought mitigation plan will be covered in this step, which includes an action plan for: mitigation; monitoring of drought indicators; drought declaration protocol; implementation and enforcement of the staged drought response program; revenue planning; and monitoring of the drought response effort.

**Step 8: Plan Review and Updates** – A formal processes to review, approve, and update the drought mitigation plan will be established and captured in the document. This will include a public review process, review and approval by Castle Rock Town Council, adoption of necessary policy, and a plan for future updates

A first draft of the Plan for review by Castle Rock staff and the Drought Committee will be developed by the Consultant, based on the information developed in the eight step process. The specific format of Castle Rock’s Plan and content will be consistent with the CWCB Municipal Drought Management Plan Guidance Document and Sample Plan.

### **Deliverables:**

The Consultant will complete a first draft of the Plan for review by Castle Rock staff and the Drought Committee

### **Task 3: Preparation and Facilitation of Drought Committee Workshops**

**Purpose:** Two drought committee workshops will be held during the drought plan development process to obtain stakeholder feedback necessary to develop an effective plan. The primary attendees at the workshop will be the Town staff and key stakeholders. The workshops will be accomplished with an interactive, collaborative stakeholder process for incorporating the diverse operational and managerial knowledge of Castle Rock staff responsible for mitigating and responding to drought.

**Approach:** Castle Rock in coordination with the Consultant will organize and facilitate the following two Drought Committee workshops:

- Drought Committee Workshop #1: The first workshop will focus on the Drought Committee’s role and obtaining feedback on the following key elements of the Plan: planning objectives, operating

principles, and water use priorities; historical and current drought impacts; drought vulnerability; drought mitigation and response strategies; and preliminary feedback on drought stages and triggers.

- ▶ Drought Committee Workshop #2: The second workshop will focus on finalizing the drought stages, trigger points and response targets; developing the staged drought response program; a general framework for public outreach and messaging during droughts; and developing a strategy for the Plan implementation and drought monitoring.

#### **Task 4: Plan Review Process**

**Purpose:** Several draft reviews of the Plan are necessary for Castle Rock to officially adopt a final Plan and receive Plan approval from CWCB. This includes a 60-day public review period for the public to review and provide feedback on the draft Plan. This is required for all CWCB grant recipients.

**Approach:** The Town will develop a single page fact sheet in support of the public review process with input from the Consultant. The 60-day public review period will consist of advertisement of the Plan on Castle Rock’s website. The Plan and fact sheet will be posted on Castle Rock’s website and the public will be encouraged to provide comments.

Additionally, a brief PowerPoint presentation summarizing the Drought Mitigation Plan to support a presentation to the Town Council will be developed. Four drafts of the plan will be developed to address applicable comments from the following reviews:

#### **Deliverables:**

- ▶ First Draft Plan following the Drought Committee and Castle Rock staff review
- ▶ Second Draft for the CWCB Review
- ▶ Electronic copy of one-page Fact Sheet for Castle Rock’s distribution during the public review period
- ▶ 3rd Draft Plan for the public review
- ▶ Fourth and Final Draft for the Castle Rock Town Council Review and approval in Word, PDF and hardcopy