TOWN OF NEW CASTLE, COLORADO
RESOLUTION NO. TC-2008-22

A RESOLUTION OF THE TOWN COUNCIL OF THE TOWN OF NEW CASTLE, COLORADO, CONCERNING COMPLIANCE WITH HOUSE BILL 08-1141.

WHEREAS, the General Assembly of the State of Colorado in May of 2008 passed House Bill 08-1141 (the "Adequate Water Supply Bill"), to be codified as C.R.S. § 29-20-103 and 301, et seq., concerning sufficient water supplies for land use approval; and

WHEREAS, the Town of New Castle is a water supply entity, as defined in the Adequate Water Supply Bill; and

WHEREAS, C.R.S. § 29-20-304(1) and (2) require an applicant for a development permit for a specific project that includes new water use in an amount more than that used by fifty (50) single-family equivalents to submit estimated water supply requirements for the proposed development in a report or letter prepared by a registered professional engineer or a water supply expert acceptable to the local government; and

WHEREAS, the Town has existing Code provisions which provide the basis for sustainable water planning and ensure the dedication or acquisition of adequate water rights for new development; and

WHEREAS, the Town desires to avail itself of C.R.S. § 29-20-304(3), which provides an alternative for a water supply entity to requiring a letter or report from an applicant for a development permit.

NOW, THEREFORE, BE IT RESOLVED BY THE TOWN COUNCIL OF THE TOWN OF NEW CASTLE, COLORADO, THAT:

1. The Town Council incorporates the foregoing recitals as findings by the Town Council.

2. The Town of New Castle's Water Supply Plan, addressing its current and proposed water supply for future development projects as required under C.R.S. § 29-20-304(3), consists of the following documents, each of which is incorporated herein by this reference as if set forth in full:

A. Town of New Castle Water Supply report prepared by Zancanella and Associates, dated September 11, 2008, analyzing the ability of the Town's existing water rights to serve existing and future demand over a 20 year horizon under various growth projections and hydrologic conditions.

B. Town of New Castle Water Rights Report, written by City Attorney Loyal Leavenworth, dated November 2002, as updated by letter dated October 2006 (portions of which are redacted due to attorney-client privilege) describing the water rights owned by the Town and analyzing the legal sufficiency of the Town's water rights.

C. Town of New Castle Potable Water Production & Treatment Planning Evaluation, prepared by Schmuesser Gordon Meyer, Inc., and dated March 2008, analyzing the treatment capacity of the existing water treatment plant and providing a plan for expansion of water treatment capacity through capital improvements to meet future growth needs.

D. Town of New Castle Municipal Code, sections dealing with water conservation:

Section 13.16, Tiered water utility rates
Section 13.28, Water conservation

3. The Town, acting through its staff, consultants, and attorneys shall update the Town's Water Supply Plan as necessary and, as required by C.R.S. § 29-20-304(3)(a), at least once every ten (10) years.

Based on the foregoing, the Town Council of the Town of New Castle hereby determines that the aforementioned plans, reports, and analyses constitute a Water Supply Plan in satisfaction of the requirements of C.R.S. § 29-20-304(3). The Town Council further determines that said Water Supply Plan constitutes an exemption from the requirement that an applicant for a development permit submit a letter or report with estimated water supply requirements for the proposed development pursuant to C.R.S. §29-20-304(3).

Nothing herein shall be interpreted as or constitute a waiver or exemption from any provision in the Town Code, including the provision of the Town's Water Rights Dedication ordinance.

The Water Supply Plan shall remain on file with the Town and be publically available.

This resolution was read, passed, and adopted by the New Castle Town Council at a regular meeting held this 21st day of October, 2008.

THE TOWN OF NEW CASTLE
GARFIELD
SEAL
COUNTY
COLORADO

TOWN OF NEW CASTLE, COLORADO

By _____
Mayor

ATTEST:

_____
City Clerk

P.O. Box 1908
1011 Grand Avenue
Glenwood Springs,
CO 81602

ZANCANELLA AND ASSOCIATES, INC.
ENGINEERING CONSULTANTS

(970) 945-5700
(970) 945-1253 Fax

September 11, 2008

Michael J. Sawyer, Esq.
Leavenworth & Karp, P.C.
P.O. Drawer 2030
Glenwood Springs, CO 81602

Via email to: mjs@lklawfirm.com

Re: New Castle Water Supply

Dear Mike:

This letter is intended to address the questions you posed regarding available water rights to serve potable demand in the Town of New Castle, Colorado. Zancanella & Associates, Inc. developed much of the information relied upon in this letter during a water supply planning effort undertaken in 2006. Some new information has also been developed by Zancanella & Associates, Inc. subsequent to your recent request, and some information developed by Schmueser Gordon Meyer has also been considered.

Water Rights

The Town of New Castle controls interests in as many as 10 or more decreed water rights. Of these, 3 are of the greatest utility under present circumstances, namely, the Town's interest in the Coryell Ditch, the New Castle Water Works System & Pipeline original right, and the New Castle Augmentation Station. The first two draw from East Elk Creek, while the remaining right draws from the Colorado River. The water available for diversion in acre-feet under each of these rights is tabulated by month in the attached Table 1, which assumes average hydrologic conditions.

Under dry-year hydrologic conditions, like those experienced in 2002, less water is available due to both physical and legal considerations. In the dry-year scenario, Elk creek is under strict administration throughout the later portion of the irrigation season due to call by the Ware & Hinds Ditch and other senior irrigation rights. For this reason, the New Castle Water Works right is out of priority for a period which could possibly include the entirety of July, August, September, and October in a severe drought year. Downstream calls on the Colorado River have a similar effect on the Augmentation Station, however, the Augmentation Station may continue to divert by virtue of the Town's contract for release of water stored in priority by Ruedi Reservoir upstream. Table 2 reflects these considerations in its tabulation of available water in a dry year.

Potable Demand

Based on the Schmueser Gordon Meyer (SGM) estimate you provided us, the Town was serving 1,593 Equivalent Residential Units (EQRs) as of early 2007, with 1,725

additional EQRs approved but not yet connected. Adding the two numbers yields a total existing obligation to serve 3,318 EQRs. SGM estimated average growth over the 5 preceding years at about 78 EQRs per year, and projected that development would continue at either a moderate or rapid rate of 80 or 120 EQRs per year, respectively. Using those figures to project potable water demand 20 years into the future, results in a demand possibly ranging from 3,193 to 3,993 EQRs by the year 2027. These numbers are presented on the attached Table 3.

As a means of translating demand in EQRs into demand in acre-feet of water, the Town's water usage during the previous 5 years was reviewed. The monthly volumes used from 2002 to 2006 are tabulated in Table 4. The maximum used in each calendar month during the 5-year period was taken as a conservative baseline, and divided by 1,593 to yield usage per EQR. The results, also presented in the table, show a clear seasonal usage pattern resulting from summertime irrigation of lawns, gardens, and other landscaping. The gallon equivalence of the acre-feet values range from a low of about 250 gallons per EQR per day in February to a high of almost 780 gallons per EQR per day in July. The high July number likely indicates inclusion of park irrigation and other large green area water use. Although changes in treatment technology and water usage customs may result in future changes in the water usage per EQR per month, the conservative figures presented in the table form a baseline suitable for demand projection to ensure adequate supply. The monthly unit usage values were multiplied by various numbers of EQRs to develop a table of projected water demand in acre-feet, attached as Table 5.

Ability to Serve

Values from tables 1, 2, and 5 are also depicted by the attached Figures 1 – 4. By inspection of the figures it can be seen that limited dry-year water availability and high July demand combine to govern the Town's ability to serve potable water to its residents, resulting in a limit of 4,350 EQRs without implementing additional water conservation measures, curtailing deliveries to new standards, or expanding supplies. Even given a demand of 4,350 EQRs, surplus water is available in every month except July. In better water years, or given demands of less than 4,350 EQRs, surplus water is available in every month.

It should be noted that the timing of administrative calls cannot always be accurately anticipated due to the number and complexity of matters triggering their issuance, and it is possible that in the future a critical period could arise in a month other than July. It should also be noted that this analysis is based on availability of water under adjudicated rights, and not on availability of water through existing infrastructure. As we have been handling the Town's water rights, and as it is our understanding that SGM has been handling the Town's infrastructure, we leave the infrastructure considerations to SGM.

In a dry year, the service of 4,350 EQRs requires the Augmentation Station pumps to deliver water diverted by virtue of the Town's Ruedi Reservoir augmentation releases to the Town's potable water treatment plant. One infrastructure limitation of which we are aware is the pump capacity of the Augmentation Station. The water right is for 5 cfs, of which we believe the Town is entitled to 4 cfs (due to an agreement with Lakota Canyon

Ranch). Because it wasn't anticipated that the entire right would be needed at the time of construction, pumps were only installed to move 3 cfs, leaving room for installation of additional pumps as the need arises. Taking 2 of the 3 cfs capacity currently in place, as opposed to 4 of 5 cfs decreed, the Town's ability to serve potable water diminishes from 4,350 EQRs to about 2,700 EQRs in a dry year. The Town could grow to as many as 2,700 EQRs by as early as the year 2016 under the rapid development scenario. Therefore additional pumps need to be installed during the next 8 years to fortify the Town's supply and optimize its capacity.

Conclusion

As of the baseline for this analysis, taken as early 2007, the Town of New Castle, Colorado serves 1,593 EQRs with another 1,725 EQRs approved, for a total existing commitment of 3,318. Under a rapid development scenario, there could be as many as 3,993 EQRs in the Town 20 years on, if additional development is approved. Although water availability cannot be forecast with perfect precision or reliability, the best information currently available indicates that with all infrastructure issues adequately addressed, the Town of New Castle could serve up to 4,350 EQRs, even in a dry year, based on water rights availability.

If you have any questions, please call our office at (970) 945-5700 x 15.

Very truly yours,

Zancanella & Associates, Inc.

Thomas A Zancanella

Thomas A. Zancanella, P.E.

Collin

Collin Robinson, E.I.

Attachments

Table 1
Available Water by Right
Average Hydrologic Conditions
[acre-feet, except as noted]

Water Right	Coryell Ditch	New Castle Water Works System & Pipeline	New Castle Augmentation Station	Total Available
Rate [cfs]	2.8	2.7	4.0	9.5
Admin. No.	12205.00000	14494.00000	50038.49085	-
Jan	0.0	163.9	245.5	409.4
Feb	0.0	148.0	221.8	369.8
Mar	0.0	163.9	245.5	409.4
Apr	0.0	158.6	237.6	396.2
May	64.8	163.9	245.5	474.2
Jun	67.8	158.6	237.6	464.0
Jul	76.6	163.9	245.5	486.0
Aug	63.5	163.9	245.5	472.9
Sep	56.3	158.6	237.6	452.5
Oct	56.6	163.9	245.5	466.0
Nov	0.0	158.6	237.6	396.2
Dec	0.0	163.9	245.5	409.4

Table 2
Available Water by Right
Dry-year Hydrologic Conditions
[acre-feet, except as noted]

Water Right	Coryell Ditch	New Castle Water Works System & Pipeline	New Castle Augmentation Station *	Total Available
Rate [cfs]	2.8	2.7	4.0	9.5
Admin. No.	12205.00000	14494.00000	50038.49085	-
Jan	0.0	163.9	245.5	409.4
Feb	0.0	148.0	221.8	369.8
Mar	0.0	163.9	245.5	409.4
Apr	0.0	158.6	237.6	396.2
May	64.8	163.9	245.5	474.2
Jun	67.8	158.6	237.6	464.0
Jul	76.6	0.0	244.9	321.5
Aug	63.5	0.0	242.4	305.9
Sep	56.3	0.0	214.0	270.3
Oct	56.6	0.0	216.6	273.1
Nov	0.0	158.6	237.6	396.2
Dec	0.0	163.9	245.5	409.4

* Augmented with 400 ac-ft of releases from Ruedi Reservoir to replace depletions to the River including transit losses assessed at 10%. Augmentation release schedule [ac-ft] as follows:

Jul - 130
Aug - 120
Sep - 90
Oct - 60

Table 3
Potable Water Demand
[EQR*]

Served as of Analysis Start Date			1,593
Additional Approvals as of Same Date			1,725
Total Existing Obligations			**3,318**
Average Growth per Year Over 5 Previous			78
Projected Growth per Year -	moderate development		80
	rapid development		120
Year of Demand Projection		Moderate	Rapid
2007		1,593	1,593
2012		1,993	2,193
2017		2,393	2,793
2022		2,793	3,393
2027		3,193	3,993

* EQR = Equivalent Residential Units each representing the amount of water used to serve 350 gallons per day indoor and irrigation of 2,500 square feet of lawn.

Table 4
Monthly Potable Water Usage
[acre-feet]

	2002	2003	2004	2005	2006	Max	Per EQR	% Depletion
Jan	41.5	34.6	32.4	42.4	30.1	42.4	0.027	5.0
Feb	27.7	31.0	31.0	34.3	32.0	34.3	0.022	5.0
Mar	32.7	32.8	39.5	39.1	39.2	39.5	0.025	5.0
Apr	49.4	39.7	50.4	55.2	56.5	56.5	0.035	31.0
May	79.8	63.0	67.4	66.7	92.0	92.0	0.058	40.0
Jun	95.8	71.7	80.5	79.4	112.6	112.6	0.071	47.1
Jul	93.4	93.5	85.5	113.0	117.7	117.7	0.074	47.8
Aug	79.9	78.7	94.7	89.5	94.0	94.7	0.059	44.6
Sep	54.9	54.1	71.9	73.5	71.9	73.5	0.046	37.8
Oct	39.2	54.2	45.6	42.8	46.7	54.2	0.034	24.9
Nov	33.9	34.9	40.6	34.3	39.0	40.6	0.025	5.0
Dec	32.6	32.2	48.0	35.5	42.7	48.0	0.030	5.0

Table 5

Estimated Monthly Potable Water Usage

[acre-feet]

	EQRs						
	1,593	2,393	2,793	3,193	3,318	3,993	4,350
Jan	42.4	63.6	74.3	84.9	88.2	106.2	115.7
Feb	34.3	51.5	60.1	68.7	71.4	85.9	93.6
Mar	39.5	59.3	69.2	79.1	82.2	99.0	107.8
Apr	56.5	84.9	99.1	113.3	117.8	141.7	154.4
May	92.0	138.1	161.2	184.3	191.5	230.5	251.1
Jun	112.6	169.1	197.4	225.7	234.5	282.2	307.4
Jul	117.7	176.8	206.4	236.0	245.2	295.1	321.5
Aug	94.7	142.2	166.0	189.8	197.2	237.3	258.6
Sep	73.5	110.4	128.9	147.3	153.1	184.2	200.7
Oct	54.2	81.5	95.1	108.7	113.0	136.0	148.1
Nov	40.6	60.9	71.1	81.3	84.5	101.7	110.8
Dec	48.0	72.1	84.2	96.2	100.0	120.3	131.1

Figure 1
Available Water by Right
Average Hydrologic Conditions

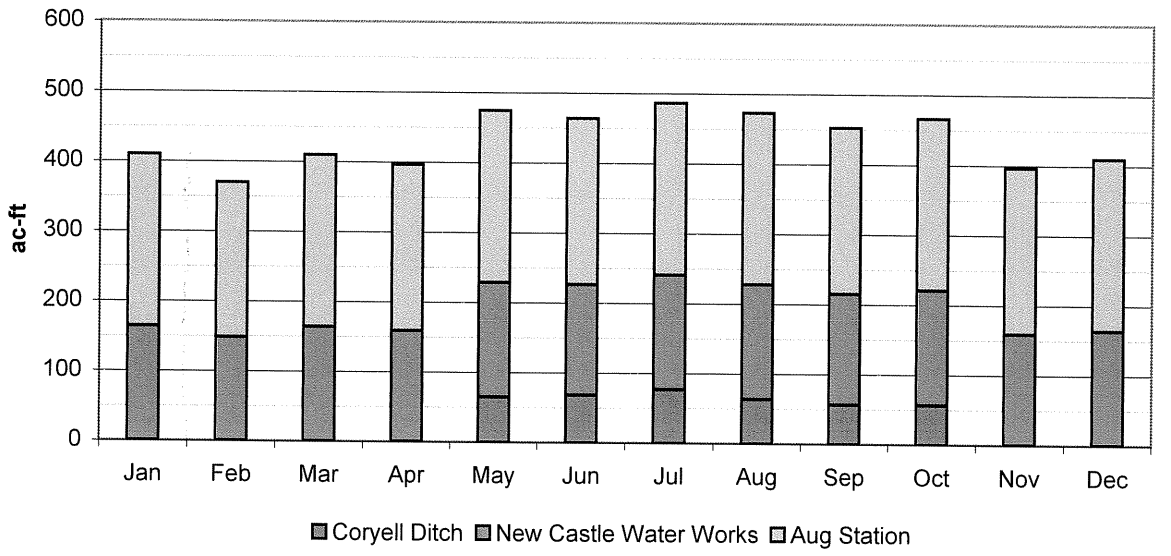


Figure 2
Available Water vs. Estimated Usage
Average Hydrologic Conditions
4,350 EQRs

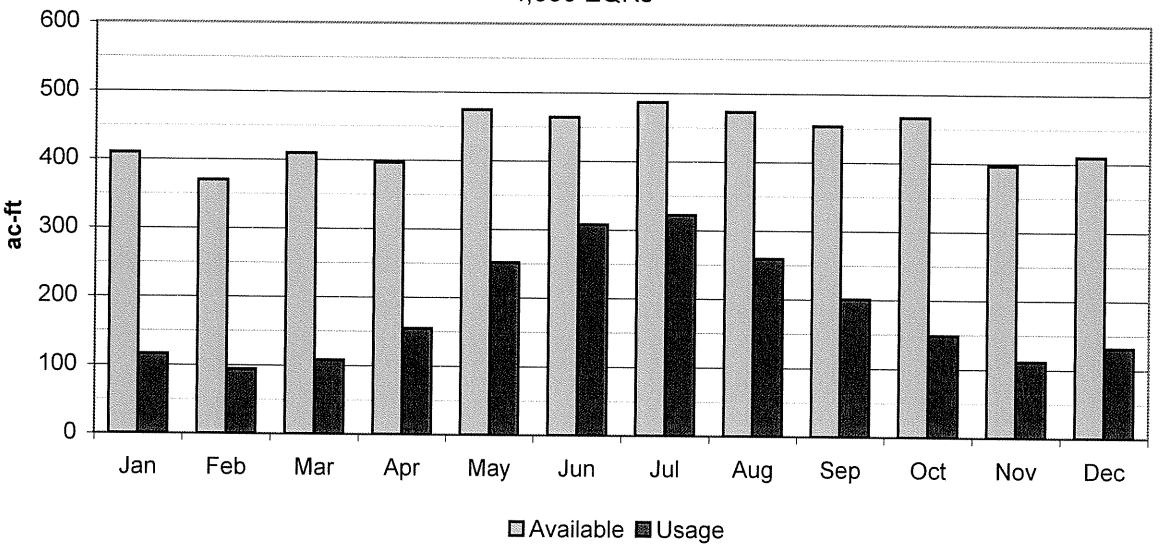


Figure 3
Available Water by Right
Dry-year Hydrologic Conditions

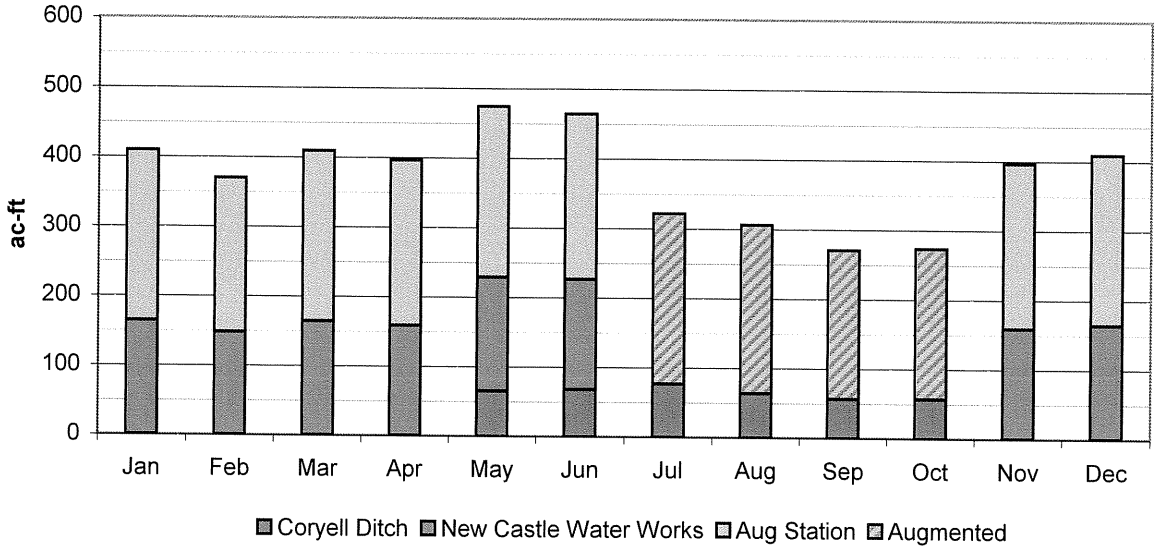
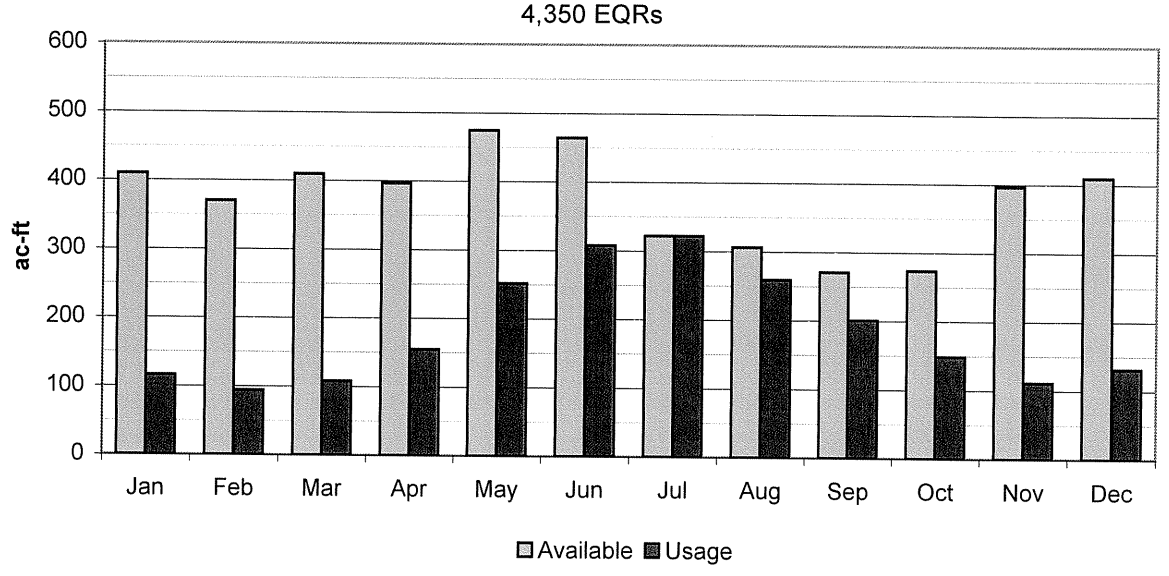


Figure 4
Available Water vs. Estimated Usage
Dry-year Hydrologic Conditions
4,350 EQRs



LEAVENWORTH & KARP, P.C.
ATTORNEYS AT LAW

LOYAL E. LEAVENWORTH
SANDER N. KARP
JAMES S. NEU
KARL J. HANLON
MICHAEL J. SAWYER

SUSAN W. LAATSCH
ANNA S. ITENBERG
CASSIA R. FURMAN
BETH E. KINNE
CASSANDRA L. COLEMAN
LAURA M. WASSMUTH

201 14TH STREET, SUITE 200
P. O. DRAWER 2030
GLENWOOD SPRINGS, COLORADO 81602
Telephone: (970) 945-2261
Facsimile: (970) 945-7336
mjs@lklawfirm.com

DENVER OFFICE:*
700 WASHINGTON ST. STE 702
DENVER, COLORADO 80203
Telephone: (303) 825-3995

(Please direct all correspondence to our Glenwood Springs Office)

October 24, 2006

REDACTED COPY

Frank Breslin, Mayor
Members of the Town Council
Town of New Castle
P.O. Box 90
New Castle, CO 81647

Re: Town of New Castle Water Rights

Dear Mayor Breslin and Members of the Town Council:

In 2002, Leavenworth & Karp prepared a water rights report regarding the Town of New Castle's legal and physical water supplies, including suggestions for developing a water supply system that will support the Town's future needs. Given recent changes in the membership of the Town Council and Town staff, together with subsequent developments involving the Town's water supply, Town Council asked Leavenworth & Karp to prepare an update of the 2002 report. This letter uses the 2002 report as a basis and includes updates and changes to the 2002 report **in bolded text.**

This letter discusses the Town's current water rights and facilities, the reliability of those rights and facilities, and recommendations to meet the Town's future legal and physical water supply needs. Specifically, this report provides the following information: (1) scope of evaluation and report limitations; (2) background information on Colorado water law; (3) information about the Town's existing water facilities; (4) description of the Town's water rights; (5) discussion of pertinent issues relating to the Town's water rights and water facilities; and (6) recommendations for a water supply to satisfy the Town's current and future water supply needs.

I. SCOPE OF EVALUATION AND REPORT LIMITATIONS

A. This report does not constitute an opinion regarding title to the Town's water rights. Although we did not undertake a title review, we have no reason to believe the Town does not own the water rights listed below.

B. We have not completed an extensive review of the Water Court adjudications for the Town's water rights but instead have relied upon final decrees. The Colorado water right adjudication process is based upon giving public notice to provide the Water Court with jurisdiction. The relief decreed by the Water Court must be within the scope of the application published for public notice. Otherwise, the Water Court process results in a void decree. A definitive analysis of the Water Court adjudications normally is conducted in connection with an actual water right title opinion to determine whether the decrees are based upon adequate public notice.

C. In the preparation of this report, no physical inspection of the properties and facilities at issue was conducted by our office. Engineering reports have been prepared by various engineers (some of which were prepared for entities other than the Town), and those reports address certain engineering aspects of the Town's water system and structures, including the availability of water for the Town's intended uses. Several of those reports were relied upon in the preparation of this report.

D. We have not comprehensively investigated any issues relating to water quality or the potential impact of water quality laws and regulations, but we would be happy to do so at your direction.

E. This report is intended for use by the Town of New Castle only, and not for the use or reliance of any third party.

II. BACKGROUND ON COLORADO WATER LAW

The following information is perhaps tedious, but it is necessary to understand the legal framework for developing, operating and protecting a legally-reliable municipal water supply for the Town of New Castle.

A. Appropriation Doctrine

Pursuant to the Colorado Constitution, the people of the State own all of the water in Colorado. With certain exceptions which are not relevant to the Town's circumstances, mere land ownership does not give the landowner any right to water under his property or flowing through that property. However, an individual may acquire a right to divert water for beneficial use (*i.e.*, a "water right").

Colorado adheres to the "doctrine of prior appropriation," which is embodied in the Colorado Constitution, statutes, and case law. Under this legal theory, appropriative water rights are created by intent to place water to beneficial use, action to implement that intent (usually the location and construction of diversion facilities), and actual beneficial use of water. The date of the intent and action come together is the "appropriation date" of the water right and can precede the date of actual use.

A water right does not have to be decreed in the Water Court. It exists as a property right when water has been placed to use. The adjudication process confirms the existence of the right and is required in order to establish an enforceable priority for the water right. This is because, with certain exceptions, the enforceable priority of a water right against other rights is based, first, upon the court "adjudication date" of the water right and, second, upon the appropriation date. The adjudication date generally is the calendar year in which the water right application was filed. For older decrees (prior to the 1969 Water Right Determination and Administration Act), the adjudication date is the date of the Court's decree.

Priority of right is important because, in the allocation of water under the appropriation doctrine, the owner of the most senior water right is entitled to divert the full decreed amount of that water right for beneficial use before more junior appropriators from the same source are entitled to divert any water. The appropriation doctrine has been characterized as the concept of "first in time, first in right."

B. Absolute and Conditional Water Rights

The Water Courts decree rights as either "absolute" or "conditional." An absolute water right is a water right that has actually been applied to beneficial use, and no further court action is necessary to keep the water right viable so long it continues to be applied to beneficial use and is never abandoned. Absolute rights can be lost by abandonment, which arises from an unreasonable period of nonuse of the right coupled with an intent to abandon it (*i.e.*, an intention not to use it). Colorado statutes provide for a decennial listing of abandoned water rights by the Division Engineer. The owner of a right placed on the abandonment list can protest such a listing, and the Water Court then will decide whether the right has been abandoned. If no protest is made to an abandonment listing, the Water Court will decree the right abandoned.

A conditional water right represents the existence of a legitimate intent to beneficially use water and sufficient action taken to implement that intention for a water diversion project which has not been completed and with which water has not been placed to beneficial use. The intent to use water must have been formed, and action must have been taken in pursuit of that intent. A conditional water right receives a priority date when it is decreed in Water Court, but it has not actually been applied to beneficial use. For the conditional right to remain viable after it is decreed, the owner must apply to the Water Court periodically (every six years under current law) and demonstrate "diligence" – that is, continued actions and intent to apply the water to the decreed beneficial use within a reasonable period of time. Findings of diligence allow the conditional right to retain its original priority date until the water right (or some portion of it) is converted to an absolute right by use. If diligence is not established for any portion of the conditional water right, that portion will be cancelled by the Water Court. Cancellation equates to abandonment.

C. Ground Water Rights

In Colorado, most ground water use is subject to the appropriation doctrine and is subject to administration by the State Division of Water Resources (DOWR) under the authority of the Colorado State Engineer. While ground water can be appropriated, and those rights can be decreed in the Water Court process, all wells must be permitted by DOWR regardless of whether a water right has been decreed for the well.

Ground water is presumed to be hydraulically connected with the surface stream system, meaning that well pumping is assumed to affect (deplete) the stream flow and reduce the supply available to senior users of that flow. Therefore, wells are not allowed to operate if they will deprive senior rights of their legal entitlements. Because the Colorado River is over-appropriated at times and because of the delayed impact on the stream even after well pumping has been curtailed, wells that are not exempt require a plan for augmentation. An exception to this principle are the "exempt" wells, a special category of small capacity wells that are allowed to produce water for specific uses without regard to the appropriation doctrine. (The Industrial Well discussed below is an example of an "exempt" well.)

D. Changes of Water Rights and Augmentation Plans

Because Colorado is a semi-arid state, most of the river basins in Colorado are "over-appropriated." This means that during some times of the year there is no water available for diversion by more junior appropriators because the more senior rights command the entire stream flow. In such a circumstance, developing a new legally reliable water supply usually requires acquiring senior water rights for conversion to the new uses and diversions and/or acquiring reliable water storage to mitigate the effects of such new uses and diversions. The Colorado River and its tributaries, including the Elk Creek basin from which the Town derives much of its water, are over-appropriated during the irrigation season following spring runoff and during some winter periods.

The typical strategy of a junior water user to develop a legal water supply in this area is to obtain a Water Court decree approving changes of senior water rights and a "plan for augmentation." Such a plan provides a legal water supply by replacing depletions associated with out-of-priority water diversions. In simple terms, such a plan allows for continued diversions by replacing the quantity of water depleted as a result of the uses being made. Sources of replacement water typically are "consumptive use credits" associated with historically irrigated land removed from agricultural irrigation and/or water released from storage.

The concepts of consumptive use, historical consumptive use, and stream depletion are important to understand, particularly in relation to augmentation plans. Consumptive use is the quantity of water that is consumed by the use of diverted water and therefore lost to the stream as a result of that use. For example, a typical single-family home will require water diversions between 300-350 gallons per day for in-house use, but only five to fifteen percent (5 to 15%) of that quantity

is actually consumed and lost to the stream; the balance is returned to the stream through a central or individual sewer system. Similarly, water diverted for irrigation is partially consumed by the crops through the process of evapotranspiration, and the unconsumed amount returns to the stream as surface runoff or groundwater percolation. Water consumed by park, lawn, open space, and golf course irrigation and evaporation of water from lake and pond surfaces also can be other significant items of consumptive use for a municipality.

"Historical consumptive use" refers to the quantity of water that has been historically consumed under a water right. For a senior irrigation water right to be used as an augmentation replacement supply, upon proper application by the owner, the Water Court will determine the amounts of water that historically were both diverted and consumed by the irrigated crops and the timing of that consumption. When land that has been historically irrigated under a senior irrigation right is removed from irrigation, the plan for augmentation strategy will include using the consumptive use credit to offset depletions associated with new junior uses. The amount of historical consumptive use generally can be used in an augmentation plan as a credit during the same months that irrigation consumption occurred or stored in those months for later release as needed to replace junior depletions.

Changing an irrigation right to new uses also raises the issue of historical irrigation return flows. Flood irrigation, as opposed to sprinkler irrigation, typically is very inefficient, and a large portion of the water diverted returns to the stream. The historical amount and timing of return flows from the historical water use can be important factors since those return flows are a portion of the historical stream flow upon which junior rights are entitled to rely, and the amount and pattern of those return flows may have to be continued as a condition of the implementation of the change of water rights.

"Stream depletion" is a concept that is related to but is different from consumptive use. In general terms, the difference between the amount of water being diverted to use and returning to the stream system for use by others at any particular time is the "depletion." It is not the same as the gross consumptive use because return flows to the stream system, whether from surface discharges or groundwater accretion, do not always occur contemporaneously with the diversion, and delay in return flow affects the "real time"availability of water in the stream for more senior rights. When the junior water right for a given use is out-of-priority, the replacement water obligation to be met in order for the diversion to continue is the quantity of stream depletion which is reducing the calling right's entitlement for water. When the diversion for the senior calling right is located below the junior diversion but above the point of return flows from the junior use, the entire quantity diverted out-of-priority by the junior user must be replaced above the calling right if it is needed by the senior user.

E. U.S. Bureau of Reclamation's Historical Users' Pool

The U.S. Bureau of Reclamation's "Historical Users' Pool," or "HUP," is a portion of the 100,000 acre-foot "power pool," or "West Slope pool," which is stored in Green Mountain Reservoir pursuant to the terms of Senate Document No. 80. Green Mountain Reservoir is located on the Blue River, an upstream tributary of the Colorado River. The West Slope pool is a feature of the Federal Colorado-Big Thompson Project which provides for mitigation to Western Colorado water users for the effects of transmountain diversions of Colorado River water to Northeastern Colorado.

The HUP and other Western Slope uses that are made by contract from the Green Mountain West Slope pool are the subject of an "Operating Policy" adopted in January 1984 by the Bureau of Reclamation. Under that Policy, West Slope domestic and irrigation use water rights that divert from the Colorado River and its tributaries upstream from the confluence with the Gunnison River are protected free-of-charge by releases from Green Mountain Reservoir in an amount up to 66,000 acre-feet of water in any year as necessary to allow their diversions to continue. The implementation of the Operating Policy and of the HUP deliveries has been further clarified in cases such as Case No. 88CW382, which established rules to determine the priorities for diversions of HUP water by exchanges on side tributaries (such as the Town's diversions would be) and in Case No. 91CW247, which addressed the Grand Valley "Cameo Call" of irrigation rights near Grand Junction and related HUP operations. Case No. 91CW247 altered the effective priorities of the Cameo Call rights in certain situations to the benefit of upstream junior water rights. That is a complicated set of legal and technical principles.

For purposes of this report, you should know that the Town's historical diversions under the New Castle Water Works System and Pipeline right are senior to the Grand Valley Cameo Call. Therefore, even if Case No. 91CW247 were overruled (because the decree in that case may be deemed inconsistent with resume notice given in that case), the priority of the Water Works System would remain senior to the Grand Valley Cameo Call rights.

The HUP benefits the Rippy RV Ditch and Rippy RV Pond, which are discussed in more detail below. Those structures are or will be used to irrigate Riverside Park. Although the Rippy RV Ditch and Pond are relatively junior irrigation rights, they are entitled to HUP benefits which would protect them from calls by downstream senior water rights. Therefore, those rights should provide a reliable irrigation supply for the Park.

The future availability of the Green Mountain HUP supply is currently threatened. Green Mountain contains two pools: a 52,000 acre foot pool which is used by the Colorado-Big Thompson project to replace its out-of-priority diversions to the east slope, and a 100,000 acre foot "power pool" which is released for power and other beneficial uses in western Colorado and is the pool from which the 66,000 acre foot HUP is provided. Water in excess of the 66,000 acre foot HUP in the 100,000 acre foot pool is available by contract for West Slope uses and, if not needed for those

purposes, is available under the settlement in Case No. 91CW247 for release to meet the Colorado River endangered fish species' habitat needs.

The amount of the HUP was determined based upon the amount of released in water year 1977, which was the "benchmark" dry year of record before 2002. In fact, more than 66,000 acre feet was released for the West Slope beneficiaries of Green Mountain Reservoir during that year because some power release were not specifically credited for that purpose but served that need. So, approximately 70,000 acre feet of water has been historical maximum delivery for the West Slope's beneficiaries of Green Mountain Reservoir other than the contract users.

In 2002, Reclamation had a very difficult time delivering the HUP. Not only did Green Mountain Reservoir fail to fill because of the drought, but Reclamation imposed a drawdown limitation on the Reservoir which had not previously existed. Green Mountain historically has had a 7,000 acre foot "dead pool," the water beneath the outlet work which cannot be released without pumping. When it considered releasing the entire Reservoir contents other than the dead pool in 2002, Reclamation determined that a potential landslide adjacent to the Reservoir at the Town of Heeney might occur if the Reservoir was drained below 27,000 acre feet of storage. This potential landslide was first identified in the early 1960's, the last time when the Reservoir was so drawn down. In summary, Reclamation imposed a 27,000 acre foot "dead pool" on the operation of Green Mountain Reservoir and, to the consternation of the Colorado River District and other West Slope interests, announced that the entire shortage caused by that additional dead pool would be borne by the West Slope's 100,000 acre foot pool. The result of the drought and the enlarged dead pool was that none of the West Slope Green Mountain contracts could not be filled in 2002 from Green Mountain, and the HUP was delivered only because the Colorado River District made a separate arrangement with Reclamation to deliver Ruedi Reservoir water for HUP purposes in lieu of the water being held in the new dead pool.

The River District and other West Slope interests take the position that Reclamation has an obligation to deliver the full 100,000 acre foot power pool for West Slope uses and that, if necessary, they will pursue that position through litigation against the federal government. Reclamation has not yet identified technical remedies for the potential landslide. Reclamation ultimately may have to purchase the Town of Heeney.

In 2003 the Colorado River Water Conservation District and numerous irrigation districts from the Grand Junction area, among others, filed a petition in Federal Court over the Bureau's and Northern District's position that the full burden of the Heeney Slide restrictions be borne by the West Slope. In 2005, the parties entered into an interim agreement (which has no precedential value) in which the Heeney Slide restrictions are shared by the East Slope and West Slope in proportion to their respective pool amounts (i.e., 65.8% to the West Slope and 34.2% to the East Slope). The agreement is strictly an interim agreement, without precedent to any of the parties' positions and can be terminated at any time. The agreement is extremely complicated and over 1/2-inch thick.

F. CWCB Instream Flow Rights

Another factor affecting the ability to divert water under junior rights is the "instream flow" rights held by the Colorado Water Conservation Board ("CWCB"), an executive agency of the State of Colorado. CWCB appropriates, and adjudicates in Water Court, rights for minimum stream flows to ensure that the "natural environment" is protected "to a reasonable degree." These rights mostly meet the needs of fisheries. These instream flow rights operate like other water rights to require a reduction of diversions by more junior upstream water rights when the amount decreed for the instream right is insufficient.

The CWCB has appropriated instream flows on both Elk Creek and East Elk Creek. In Case No. 80CW294, the CWCB appropriated a 10 c.f.s. minimum stream flow from East Elk Creek for the period from May 1st through September 30th each year and a 6.0 c.f.s. minimum stream flow for the period from November 1st through April 30th of each year. In Case No. 80CW315, the CWCB appropriated on Elk Creek, between its confluences with East Elk Creek and the Colorado River, a 15.0 c.f.s. minimum stream flow from May 1st through September 30th and an 8.0 c.f.s. minimum stream flow from October 1st through April 30th of each year. Because the CWCB's instream flow rights must be protected according to their relative priorities, any future appropriations of water or changes of water rights in the stream system that the Town makes (*e.g.*, appropriating new water rights and/or changing rights or exchanging water) cannot harm those minimum instream flows.

II. TOWN'S WATER RIGHTS

The Town owns several valuable water rights and also some rights which have marginal, if any, value either as reliable sources of municipal supply or as economic assets. The Town's primary water rights are the senior right associated with the Water Works System, the Coryell Ditch water right which is to be dedicated to the Town for the Castle Valley Ranch development, Ruedi Reservoir water (400 acre-feet) available by contract from the U.S. Bureau of Reclamation, and the Burning Mountain wells augmentation plan.

The Town's water rights are summarized on Table 1. Comments about each of these water rights are presented following the Table.

TOWN OF NEW CASTLE
WATER RIGHTS

Structure	Tributary	Case Number	Diligence Decrees	Adj. Date	Appro. Date	Amount	Use	Comments
New Castle Water Works System and Pipeline	East Elk Creek	C.A. No. 1058	n/a	3/29/04	9/6/1889	2.67 c.f.s., absolute 1.0 c.f.s., absolute	municipal and other purposes emergency and fire protection purposes	This water right is included in POA in 87CW373, see below.
New Castle Water System First Enlargement	East Elk Creek	81CW477	86CW257 92CW222 99CW009 05CW232	10/18/1982	12/23/1981	10.0 c.f.s., conditional	municipal and other purposes	This water right is included in POA in 87CW373, see below. **Diligence due October 2012.**
Adams Lake Reservoir	Canyon Creek	C.A. 4914	W-88 W-803 W-803-76 80CW140 84CW86 89CW324 98CW160 05CW159	11/10/66	9/12/1960	763.94 AF, conditional	irrigation and other beneficial purposes	In 83CW126, the uses were changed to irrigation, municipal, domestic, industrial, fire protection, commercial and recreation uses. The point of diversion of this water right was moved to the New Castle Augmentation Station in 87CW373. **Diligence due March 2012**

Structure	Tributary	Case Number	Diligence Decrees	Adj. Date	Appro. Date	Amount	Use	Comments
Buster Pump and Pipeline	Colorado River	C.A. 4914	n/a	11/10/66	6/1/59	3 c.f.s., absolute	irrigation	In 83CW126, the uses were changed to irrigation, municipal, domestic, industrial, fire protection, commercial and recreation uses. The point of diversion of this water right was moved to the New Castle Augmentation Station in 87CW373.
Coal Ridge Park Well (infiltration gallery)	Colorado River						Irrigation	This well is not permitted by the State Division of Water Resources.
POA for Burning Mountain Well Nos. C-1 & C-2	Colorado River	94CW325		02/28/00		50 g.p.m./well (96.49 acre-feet total)		POA includes a West Divide Contract for 7.5 AF of Ruedi Reservoir water as a source of augmentation water for the wells. Decree provides for 44.9 AF of excess consumptive use credits from 96.49 total.
Rippy RV Ditch	Colorado River	92CW 256		1/29/1996	1932	0.5 c.f.s., absolute	irrigation	Used to fill and refill the Rippy Pond
Rippy Pond	Colorado River	92CW 256		1/29/1996	1932	2.0 AF, absolute	irrigation for Riverside Park	Note: The pond shall not store natural ground water.

Structure	Tributary	Case Number	Diligence Decrees	Adj. Date	Appro. Date	Amount	Use	Comments
Ruedi Reservoir Contract with BuRec						400 acre-feet	Municipal and industrial uses	Ruedi Reservoir, Round II, long term repayment contract with BuRec, Contract No. 009E6C0129 for 400 AF of water.
Case No. 87CW373 Findings of Fact, Conclusion of Law, Judgment and Decree								
New Castle Augmenta- Station	Colorado River	87CW373	97CW201 04CW62	8/22/1991	5/22/1984	5.0 c.f.s., conditional	Municipal, commercial, domestic, irrigation, industrial, for augmentation, replacement and exchange	**Diligence Due November 2010**
Adams Lake Reservoir	Canyon Creek	C.A. 4914	W-88 W-803 W-803-76 80CW140 84CW86 89CW324 98CW160 05CW159	11/10/66	9/12/1960	763.94 AF conditional	Irrigation and other beneficial purposes	In 83CW126, the uses were changed to irrigation, municipal, domestic, industrial, fire protection, commercial and recreation uses. The point of diversion of this water right was moved to the New Castle Augmentation Station in 87CW373.

Structure	Tributary	Case Number	Diligence Decrees	Adj. Date	Appro. Date	Amount	Use	Comments
Buster Pump and Pipeline	Colorado River	C.A. 4914	n/a	11/10/66	6/1/59	3 c.f.s., absolute	irrigation	In 83CW126, the uses were changed to irrigation, municipal, domestic, industrial, fire protection, commercial and recreation uses. The point of diversion of this water right was moved to the New Castle Augmentation Station in 87CW373.
New Castle Water Works System and Pipeline	East Elk Creek	C.A. 1058	n/a	9/6/1889	9/6/1889	2.67 c.f.s., absolute 1.0 c.f.s., absolute	municipal and other purposes emergency and fire protection purposes	
New Castle Water System First Enlargement	East Elk Creek	81CW 477	86CW257 92CW222 99CW009 05CW232	10/18/1982	12/23/1981	10.0 c.f.s., conditional	municipal and other purposes	
Coryell Ditch (1.3057 cfs owned by Town) (1.4943 cfs owned by Williams)	East Elk Creek	C.A. 103	n/a	5/11/1889	6/1/1883	2.8 c.f.s., absolute	Irrigation	To be used within Castle Valley Ranch for augmentation of depletions from out-of-priority diversions from New Castle Water Works System & Pipeline

Structure	Tributary	Case Number	Diligence Decrees	Adj. Date	Appro. Date	Amount	Use	Comments
Coryell Ditch Third Enlargement (2.2850 cfs owned by Town) (2.615 cfs owned by Williams)	East Elk Creek	C.A. 3431	n/a	1/11/1943	3/4/1921	9.9 c.f.s., absolute* (Only 4.9 c.f.s. applies to this application.)	Irrigation	To be used within Castle Valley Ranch for augmentation of depletions from out-of-priority diversions from New Castle Water Works System & Pipeline. *Only 4.9 c.f.s. is included in this plan for augmentation.
Red Rock Ditch (owned by Williams)	East Elk Creek	C.A. 941	n/a	12/16/1901	5/1/1901	3.7 c.f.s., absolute	Irrigation	To be used within Castle Valley Ranch for augmentation of depletions from out-of-priority diversions from New Castle Water Works System & Pipeline.
Red Rock Ditch First Enlargement (owned by Williams)	East Elk Creek	C.A. 1690	n/a	2/26/1914	4/10/1903	0.3 c.f.s., absolute	Irrigation	To be used within Castle Valley Ranch for augmentation of depletions from out-of-priority diversions from New Castle Water Works System & Pipeline

Structure	Tributary	Case Number	Diligence Decrees	Adj. Date	Appro. Date	Amount	Use	Comments
Red Rock Ditch Second Enlargement (owned by Williams)	East Elk Creek	C.A. 3431	n/a	1/11/1943	3/4/1921	6.2 c.f.s., absolute	Irrigation	To be used for augmentation of depletions from out-of-priority diversions from New Castle Water Works System & Pipeline.

A. New Castle Water Works System and Pipeline

1. Senior Right:

The New Castle Water Works System and Pipeline (hereinafter "Water Works System") is the primary water right water supply structure for the Town of New Castle. It was adjudicated on March 29, 1904 in Civil Action No. 1058 and has an appropriation date of September 6, 1889. It is an absolute water right for 2.67 c.f.s. for municipal and other uses and an additional 1.0 c.f.s. for emergency and fire protection purposes. However, according to the records of the State Division of Water Resources (DOWR), the maximum diversion through the Water Works System each year, at any one time, is only 1.0 c.f.s., and it is usually less than that (whereas the Town could divert up to 2.67 c.f.s at any one time). Town Staff indicated to us 1.6 cfs was diverted this summer.

The Water Works System diverts water from East Elk Creek, a tributary of Elk Creek and the Colorado River. This water right has an 1889 priority date and is the most senior **domestic** use right in the Elk Creek drainage; however, several irrigation rights that divert in the Elk Creek drainage are senior to the Water Works System, including some of the Ware and Hinds Ditch and the Coryell Ditch, among others.

2. Enlargement Right:

The Town has a junior conditional right for municipal diversions from East Elk Creek. The Water Works System First Enlargement was decreed in 1982 in Case No. 81CW477 and has a December 31, 1982 adjudication date and an appropriation date of December 23, 1981. (The water right has a later adjudication date because the application, although filed in 1981, was amended in 1982.) It is a conditional water right for 10.0 c.f.s. for municipal and other uses. In order to maintain the Enlargement, the Town must file an application to make the conditional water right absolute or apply for a finding of reasonable diligence by November of 2005.

An application for finding of reasonable diligence was filed by the Town in April 2004 and a decree has been entered finding that the Town has been reasonably diligent in the development of the New Castle Augmentation Station.

REDACTED

B. Case No. 87CW373: Plan for Augmentation and New Castle Augmentation Station

1. Plan for Augmentation – Castle Valley Ranch:

In Case No. 87CW373, the Town obtained a decree for a plan for augmentation to augment diversions through the Water Works System. The plan for augmentation was developed due to increased water needs resulting from the Castle Valley Ranch development (hereinafter "CVR"). Under the decree, most of the water used to augment diversions at the Water Works System is made available pursuant to the Town's Agreement with CVR regarding the acquisition of water rights. The Coryell Ditch water rights dedicated for augmentation purposes currently are owned 46.4% by the Town and 53.4% by Eric C. Williams, developer of CVR.[1]

As decreed, the plan to augment diversions at the Water Works System calls for the dry-up of land historically irrigated within the CVR property with water from the Coryell Ditch and the Red Rock Ditch rights. However, subsequent arrangements between the Town and CVR have eliminated the Red Rock Ditch water rights as a source of augmentation supply. The Coryell Ditch rights were estimated to provide a legal water supply for up to 1,400 EQR of development. Under the new agreement, if CVR exceeds 1,400 EQR, the Developer will pay a water rights dedication fee to the Town instead of dedicating Red Rock Ditch rights.

The Coryell Ditch rights will be used to support the development in CVR in three ways: (1) dry-up of irrigated land and dedication of Coryell Ditch rights to the Town so that the consumptive use credits may be applied to augment diversions at the Water Works System point of diversion; (2) dedication of Coryell Ditch rights for continued irrigation uses for open space, parks, and other "public" raw water irrigation uses, on an acre-per-acre basis (*i.e.*, a portion of the ditch rights would continue to irrigate the same amount of acreage that has historically been

[1] Of the 2.8 c.f.s. in the Coryell Ditch water right dedicated to the augmentation plan, Town has been deeded 1.3057 c.f.s. so far, and Eric Williams continues to own 1.4943 c.f.s. Of the 4.9 c.f.s. in the Coryell Ditch Third Enlargement water right dedicated to the augmentation plan, Town has been deeded 2.285 c.f.s. so far, and Eric Williams continues to own 2.615 c.f.s.

irrigated); and/or (3) dedication of Coryell Ditch rights to a homeowners' association for "private" raw water irrigation. The agreement provides that the full 2.8 c.f.s. of the senior Coryell rights owned by Eric Williams will be used for these three purposes, and only for those purposes. To the extent that the developer provides for raw water irrigation under options (2) or (3), this will reduce the demand for treated water for irrigation and will thus reduce CVR's impact on the need for diversions at the Water Works System.

Under the plan for augmentation, Eric Williams shall dedicate 0.02 c.f.s. of the senior Coryell Ditch rights and 0.035 of the junior Coryell Ditch rights for each acre of land that is dried up to support development by relying on the historic consumptive use credits. One acre must be dried up for each 10 EQRs of development. For raw water irrigation by flood methods, the same amount of water will be dedicated as has historically been used for that purpose. If an automatic sprinkler irrigation system is used, Eric Williams shall dedicate water rights equivalent to 0.4 EQR for each 6,000 square feet of land irrigated using the sprinkler system.

Before Coryell Ditch rights may be used to augment diversions for use on property other than CVR, the Town must obtain court approval for a change of water right and/or an amended augmentation plan. A further agreement with the Developer would also be necessary, as the present agreement provides that all water dedicated by CVR shall be used exclusively within CVR.

Any water dedicated to raw water irrigation on the CVR property (whether to the Town or to an HOA) will continue to be diverted through the Coryell Ditch and, therefore, may not be diverted through the Water Works System.

The 2.8 c.f.s. Coryell Ditch water right was adjudicated in 1889 in Civil Action No. 103 and has an appropriation date of June 1, 1883. This water right enjoys the number three priority in the East Elk Creek drainage and is a valuable water right. It was never called out during the 2002 drought and East Elk Creek had water physically available to satisfy this priority; there should always be sufficient water to satisfy the 2.8 c.f.s. water right.

The Coryell Ditch Third Enlargement was adjudicated in 1943 in Civil Action No. 3431. It is an absolute water right for 9.9 c.f.s. (of which the Town may become entitled to 4.9 c.f.s.) and has an appropriation date of March 4, 1921. The Coryell Ditch Third Enlargement has a much lower priority in the Elk Creek drainage, which makes this a less reliable and less valuable augmentation source for the Town. This water right is junior to the Town's right and subject to Elk Creek calls after the runoff ends.

2. New Castle Augmentation Station:

In Case No. 87CW373, the Town obtained a decree for a conditional water right for the New Castle Augmentation Station (hereinafter "Augmentation Station"). The decree confirms a 5.0 c.f.s. conditional water right to be used for municipal, commercial, domestic, irrigation, industrial, augmentation, replacement and exchange purposes. The water right was decreed in

1991 and has a December 31, 1987 adjudication date and an appropriation date of May 22, 1984.

The Augmentation Station was decreed to provide Colorado River water to the Ware and Hinds Ditch or other water rights on Elk Creek at times when the Red Rock Ditch is out of priority because of calls by senior Elk Creek rights.

REDACTED

Under the terms of the Second Amendment to the Castle Valley Ranch Annexation Agreement, the developer is no longer required to construct this facility. The 2002 Second Amendment provided for the full dedication (or use for irrigation as described above) of the senior priority of the Coryell Ditch (which will allow approximately 1,400 EQR to be built) and the right to pay cash in lieu of water right dedication fee (the fee in effect at this time) in the event development exceeds 1,400 EQR.

C. Ruedi Reservoir

The Town has a Ruedi Reservoir, Round II, long-term repayment contract with the U.S. Department of the Interior, Bureau of Reclamation, Contract No. 009E6C0129, for up to 400 acre-feet of water to be released from Ruedi Reservoir annually. Pursuant to the Contract, the water may be used for municipal and industrial purposes through augmentation. The Contract has a term of 25 years and is subject to renewal at the end of 2025. Under the Contract, the Town will have the right to renew the arrangement for its contracted amount subject to the provisions of Federal law in effect at that date (2025).

The Contract water released from Ruedi Reservoir can be used to augment diversions from the Colorado River if the Town develops such diversions.

REDACTED

Until recently, the Town also held a water allotment contract from the West Divide Water Conservancy District (Contract No. 900315-BMA) for 7.5 acre-feet of annual releases from Ruedi Reservoir. That water was dedicated to augment depletions from the Burning Mountain Wells No. C-1 and C-2 pursuant to Water Court Case No. 94CW325. Because the Town's separate contract with the Bureau of Reclamation provides sufficient water to augment these wells, we recommended that the Town cancel its water allotment contract with the West Divide Water Conservancy District. Accordingly, that contract was cancelled in February.

The Town has, since 2002, commenced use of its Ruedi Reservoir contract. Because Case No. 02CW395 (the Augmentation Plan for the Colorado River Pump Station) is still pending, we have requested releases totaling the full 400 acre feet for the months of July through October to augment diversions (as opposed to consumption as requested in the Augmentation Plan).

D. Miscellaneous Rights

1. Adams Lake Reservoir:

On December 30, 1986 the Town obtained from Brinkley B. Brown, via quit claim deed, a conditional water right for 763.94 acre-feet of storage of natural spring and runoff water tributary to Canyon Creek in the Adams Lake Reservoir. The water right was originally decreed in 1966 in Civil Action No. 4914 for irrigation and other beneficial purposes, and it has an appropriation date of September 12, 1960. Because this is a conditional water right, in order to maintain that right the Town must file an application to make the conditional water right absolute or apply for a finding of reasonable diligence by August of 2005.

Pursuant to a change in water right decree issued in Case No. 83CW126, use of the Adams Lake Reservoir water right was limited to 460 acre-feet per year for irrigation, municipal, domestic, industrial, fire protection, commercial and recreation purposes. A later change in water right decree, issued in Case No. 87CW373, changed the point of diversion for the Adams Lake Reservoir to the New Castle Augmentation Station. Under that decree, the water now may be used for augmentation and exchange purposes, in addition to the uses listed above.

This water right has some value for Colorado River diversions during the runoff and during the winter; however, augmentation will be required when it is out of priority.

2. Buster Pump and Pipeline:

By quit claim deed dated December 30, 1986, the Town also received from Brinkley B. Brown an absolute water right for diversion of 3 c.f.s. of Colorado River water using the Buster Pump and Pipeline. This right was decreed in 1966 in Civil Action No. 4914 and has an appropriation date of June 1, 1959. The water right was originally decreed for irrigation use, and it is a Green Mountain Reservoir "HUP" beneficiary right.

Pursuant to the change in water right decree issued in Case No. 83CW126, use of the Buster Pump and Pipeline was changed to irrigation, municipal, domestic, industrial, fire protection, commercial and recreation purposes. Because the water was historically used for irrigation purposes, however, water was only available for the new uses during the irrigation season, between April 15th and October 15th of each year. A subsequent change in water right decree issued in Case No. 87CW373 changed the point of diversion for the Buster Pump and Pipeline to the New Castle Augmentation Station. Under that decree, the water right now may be used for augmentation and exchange purposes, in addition to the uses listed above; however, the period of use is limited to between May and October of each year.

This water right has value for Colorado River diversions during the irrigation season.

3. Coal Ridge Park Well:

According to information we gathered, the Coal Ridge Park Well is an infiltration gallery used for irrigation at the Coal Ridge Park.

We have very limited information about this well. More research about this structure is recommended, which may require the assistance of Town's water engineers.

4. Spion Kopp Ditch Rights and Burning Mountain Wells No. C-1 and No. C-2:

By Quit Claim Deed dated April 17, 1996, Burning Mountain Associates transferred the title to Burning Mountain Wells No. C-1 and No. C-2 to the Town. Following that transfer of title, the Town completed a Water Court proceeding (Case No. 94CW325) to decree a plan for augmentation for the wells.

In Case No. 90CW48, Burning Mountain Well Nos. C-1 and C-2 were made alternate points of diversion for up to 0.11 c.f.s. (50 g.p.m.) of the 830 c.f.s. originally decreed to the Avalanche Canal and Siphon in Civil Action No. 4613. In Case No. 94CW325, a plan for augmentation was decreed to augment depletions from the Burning Mountain Wells. The court has retained jurisdiction to consider injury to other water users caused by the Town's plan for augmentation for a period of six years, ending February 2006.

Under the plan for augmentation, irrigation season depletions are augmented by bypassing diversions at the Williams Canal, which is the point of diversion for the Town's water right decreed to the Spion Kopp Ditch.

The Ditch was originally decreed in Civil Action Nos. 3104 and 4004, and the Town's interest in the Ditch totals 1.0 c.f.s. The Town

received a total of 67.33 acre-feet of consumptive use credits from the dry-up of lands historically irrigated using its interest in the Spion Kopp Ditch. The plan for augmentation allows for diversions of 96.5 acre-feet per year based upon use of 22.43 acre-feet per year consumptive use credits of the 67.33 acre-feet per year that is available.

Non-irrigation season depletions from the Burning Mountain Wells were to be augmented by the release of water stored in Ruedi Reservoir pursuant to West Divide Water Conservancy District Water Allotment Contract No. 900135-BMA for up to 7.5 acre-feet of annual releases, or by releases of water the Town obtained under a Ruedi Reservoir, Round II, long-term repayment contract with the Bureau of Reclamation for 400 acre-feet of water annually. Because the Town cancelled its West Divide Water Allotment Contract, it will rely on its Ruedi contract to augment these wells if needed.

To date, the Burning Mountain Wells have never been drilled, and the Town has no need to implement the 94CW325 augmentation plan. However, when the Town does (hopefully) construct viable wells, the well rights and the plan for augmentation can be transferred to the new wells.

5. Rippy RV Ditch and Rippy Pond:

In 1996 the Rippy RV Ditch and the Rippy Pond (located in the Riverside PUD) were decreed in Case No. 92CW256, each with a 1932 appropriation date. Because of the adjudication date of the rights, these are very junior water rights notwithstanding their appropriation date. But, the rights are entitled to HUP benefits which would protect them from calls by downstream senior water rights, so they should be reliable for irrigation of the Park and to keep the Pond full.

The Rippy RV Ditch is an absolute water right in the amount of 5 c.f.s. from the Colorado River and is decreed for irrigation use and to fill and refill the Rippy Pond. Because of the latter right (fill and refill), augmentation of evaporative losses is not required. The Rippy Pond is an absolute water right in the amount of 2.0 acre-feet and is decreed for irrigation use. It is our understanding these structures are located in and are used to irrigate Riverside Park.

REDACTED

III. ISSUES RELATING TO TOWN'S WATER RIGHTS AND WATER FACILITIES

A. Relative Priority of the New Castle Water Works System and Pipeline

As discussed under Section III above, the New Castle Water Works System and Pipeline is the primary municipal water diversion structure for the Town.

The Colorado State Engineer's Office ("SEO") tabulation of water rights and their priorities reflects the priority of the Water Works System according to its adjudication status. The Water Works System is tabulated as being junior to several other water rights on the Elk Creek drainage.

Some of the senior rights and the CWCB rights that are most pertinent to the relative priority of the Water Works System's 2.67 c.f.s. right are summarized below. Because the SEO tabulation ranks priorities of water rights using "administration numbers" (or "Admin. Nos."), we have presented that information below from the SEO 1996 tabulation of rights on Main Elk and East Elk Creeks. Under this tabulation concept, the most senior right is the one with the **lowest** "Admin. No."

	Structure	Amount	Stream	Admin. No.	Use	Appropriation Date
1.	Thomkins Ditch	0.8 c.f.s.	Main Elk Creek	12122	Irrigation	03/10/1883
2.	Coryell Ditch (Part of CVR plan for augmentation)	2.8 c.f.s.	East Elk Creek	12205	Irrigation, municipal, augmentation	06/01/1883
3.	Ware & Hinds Ditch	5.0 c.f.s.	Main Elk Creek	12327	Irrigation	10/01/1883
4.	CO & CP Pierson Ditch	3.0 c.f.s.	Main Elk Creek	12464	Irrigation	02/15/1884
5.	Connally Ditch	1.6 c.f.s.	East Elk Creek	12540	Irrigation	05/01/1884

6. Coryell Ditch	1.7 c.f.s.	East Elk Creek	12578	Irrigation	06/08/1884
7. Ware & Hinds Ditch	10.3 c.f.s.	Main Elk Creek	13209	Irrigation	03/01/1886
8. Duncan Ditch	0.70 c.f.s.	Main Elk Creek	13593	Irrigation	03/20/1887
9. Benson Pierson Nelson Ditch	4.0 c.f.s.	Main Elk Creek	13915	Irrigation	02/05/1888
10. Ware & Hinds Ditch	5.5 c.f.s.	Main Elk Creek	14001	Irrigation	05/01/1888
11. O'Leary Well No. 2	0.033 c.f.s.	East Elk Creek	14488	Domestic	08/31/1889
12. New Castle Water Works System	2.67 c.f.s.	East Elk Creek	14494	Municipal, domestic, fire protection	09/06/1889

* * * (Numerous additional rights exist that are senior to the CWCB instream flows.)

13. CWCB Instream Flow	8.0 c.f.s. (Winter) 15.0 c.f.s. (Summer)	Main Elk Creek (Lower)	47609	Minimum stream flow	05/07/1980
14. CWCB Instream Flow	6.0 c.f.s. (Winter) 10.0 c.f.s. (Summer)	East Elk Creek	47609	Minimum stream flow	05/07/1980

* * * (Several additional rights exist that are senior to the Water Works System First Enlargement.)

15. Water Works System First Enlargement	10.0 c.f.s.	East Elk Creek	48212	Irrigation, municipal	12/23/1981

The foregoing tabulation of water rights is the product of the principles set forth in Colorado Statute C.R.S. § 37-92-401(1)(b). The relative priorities are also demonstrated on the two (2) attached straight line diagrams. Under that statute, the decreed date of initiation of appropriation determines the relative priorities of all water rights decreed in any of the various original

adjudication suits of the same water division. *Id.* at § 401(1)(b)(IV). Therefore, the priority of any water right decreed in an **original** adjudication suit is based upon the date of appropriation for that water right, not the date on which the water right was decreed.

Under the statutory provision, the Water Works System Right, which was decreed in 1904, has a priority date relating back to its appropriation date in 1889. Water rights used for purposes other than irrigation were not allowed to be adjudicated until 1904, even though irrigation rights could be adjudicated as early as 1889. Therefore, rights that were decreed in the original adjudications for "purposes other than irrigation" were treated as though they had been decreed in the original irrigation adjudication suit, and the priority of those rights is based on their date of appropriation.

Therefore, the Water Works System's appropriation date of September 6, 1889 is the date on which the relative priority of the Water Works System is based.

The tabulation complies with the statutory priority ranking system. The tabulation assigns the Water Works System Administration No. 14494. That administration number gives the Water Works System a lower priority than the irrigation water rights that were decreed in the 1889 irrigation adjudication, but a higher priority than water rights that were decreed in supplemental (*i.e.*, not "original") irrigation and non-irrigation adjudication suits.

REDACTED

REDACTED

The Town's water right was subject to call during the summer of 2002. As you know, Colorado experienced a severe drought in 2002. In August 2002, the Division Engineer's Office for Water Division No. 5 gave the Town 48-hours notice that diversions at the Town's headgate would be curtailed due to a call placed on the Elk Creek drainage by the Ware and Hinds Ditch.

In order to prevent Town's diversions at the Water Works System from being curtailed, the Town entered into a temporary lease agreement with Eric C. Williams, whereby Mr. Williams leased to the Town 0.30 c.f.s. of the Coryell Ditch water right adjudicated in Civil Action No. 103, Priority No. 11, with an appropriation date of June 1, 1883. Town used its 1.3 cfs and the leased water and implemented the Castle Valley Ranch plan for augmentation and permitted the Town to continue diverting water at the New Castle Water Works System.

Because the water lease with Eric Williams was temporary and by its express terms expired at the end of the 2002 irrigation season, the Town may not rely on that water as a source of augmentation supply in the future. Therefore, in order to prevent the Town's water right from being curtailed during future drought conditions, we recommend that the Town acquire additional sources of augmentation water and/or develop a new, alternative water source that is not located on East Elk Creek.

B. Water Flow and Availability on Elk Creek and East Elk Creek

We have reviewed this water report with Tom Zancanella, P.E., the Town's water rights engineering consultant, and Jeff Simonson, P.E., the Town's civil engineer, and they provided certain opinions regarding stream flow, diversion capacity and water rights priorities and administration. Also, prior engineering reports concerning the Town's water rights situation contain important information regarding the existing and potential yield of the Town's existing diversion on East Elk Creek. Some of the more important engineering opinions are summarized below.

1. **Elk Creek is over-appropriated by existing rights in mid to late irrigation season of every year.** The primary calls are from the Ware and Hinds Ditch downstream on main Elk Creek, and there are calls on East Elk Creek by the Connally Ditch. The senior rights that divert from East Elk Creek have diversions at or below the Town's intake.

REDACTED

3. **East Elk Creek winter flows typically range between 4.5 and 7.0 c.f.s.**, with a low flow of 4.11 c.f.s. (February 1991), having a flow pattern typical of base flow conditions in similar basins. The 1997 Resource Engineering study estimated the physical water available at the Town's intake on East Elk Creek under "dry year virgin flow conditions" in order to determine what amount of additional water could be diverted by the Town to serve future development. The study was based upon only six years of gauging information (1991-1996) but was concluded to be reliable based on correlation with another basin's records. (The earlier Wright Water Engineer's report had explained that there were problems with the sporadically maintained Elk Creek gauging records.)

4. **The available physical supply in East Elk Creek would allow for expansion of the Town's historical diversions, if the Town's 2.67 cfs right remains in priority or is augmented.**

The Town's existing and committed demands (including a portion but not all of Castle Valley Ranch) as of August 1995 equated to a 0.92 c.f.s. peak summer diversion and a 0.61 c.f.s. winter season diversion. Peak diversions in the summer of 2002 were 1.6 cfs. With future additional Castle Valley Ranch demand (2.79 c.f.s. in the summer and 1.86 c.f.s. in the winter) total existing and committed future diversion demands would be 3.71 c.f.s. in the peak summer and 2.57 c.f.s. in the winter.

C. Capacity of the New Castle Water Treatment Facility

Superceeded by 2007 Schmeiser, Gordon & Meyer.

D. Elk Creek / East Elk Creek Instream Flows

As discussed above, the Colorado Water Conservation Board ("CWCB") has appropriated instream flows on both Elk Creek and East Elk Creek. In Case No. 80CW294, the CWCB appropriated on East Elk Creek a 10 c.f.s. minimum stream flow from May 1st through September 30th and a 6.0 c.f.s. minimum stream flow from November 1st through April 30th of each year. In Case No. 80CW315, the CWCB appropriated on Elk Creek, between the confluences with East Elk Creek and the Colorado River, a 15.0 c.f.s. minimum stream flow from May 1st through September 30th and a 8.0 c.f.s. minimum stream flow from October 1st through April 30th of each year.

The CWCB's instream flow rights must be protected according to their relative priorities. Therefore, any future changes of water rights affecting the Elk Creek / East Elk Creek stream system that the Town makes (*e.g.*, appropriating new water rights and/or adjudicating changes of rights or rights of exchange) cannot harm those minimum instream flows.

E. Compact Call Issues

During the 2002 drought, significant concerns were raised about the possibility of a compact call from the lower basin. The issues related to a potential compact call by the states in the lower basin are complex and beyond the scope of this memo. Suffice it to say that both the New Castle water works system water right (appropriation 1889) and the Coryell Ditch water rights are senior to any compact call.

REDACTED

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REDACTED

REDACTED

Very truly yours,

LEAVENWORTH & KARP, P.C.

Loyal E. Leavenworth

LEL:bsl
Enclosure
cc: Jeff Simonson, P.E.
Tom Zancanella
David McConaughy, Esq.
Steve Rippy, Manager

Town of New Castle
Colorado

» » » » ◉ « « « «

Potable Water Production & Treatment Planning Evaluation

March 2008

Prepared for
Town of New Castle
PO Box 90
New Castle, CO 81647

Prepared by:

Schmueser Gordon Meyer, Inc.
118 West 6th Street, Suite 200
Glenwood Springs, CO 81601

SCHMUESER GORDON MEYER

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Executive Summary

On behalf of The Town of New Castle, SGM conducted the following analysis to determine the Town's ability to serve water to its existing customers and identify needed improvements to address water demands of its future customers. The purpose of this report is to document the conclusions determined as a result of this analysis. The major findings of this analysis are as follows:

- Results from the analysis of existing and predicted demands indicate that the Town's demands will more than double in the next 20 years. The Town's Elk Creek Water Treatment Plant currently serves water to an estimated 1,600 EQRs (3,900 people). EQR totals are predicted to increase to 3,800 EQRs in the next 20 years. Present and future EQR estimates equate to production capacity requirements at peak day demands of 1.6 MGD in 2006, and 4.1 MGD by 2027.

- An analysis of the Town's water rights show that raw water to supply the Town's demands has historically been obtained from East Elk Creek exclusively (except under 2002 drought conditions). Through development agreements and service area expansion, the Town may gain enough water rights on East Elk Creek to supply the Town's buildout demand needs during normal and wet years. However, during drought conditions, like that of 2002, and therefore for planning purposes, the Town will have to supplement East Elk Creek water with a predicted maximum of 1.6 MGD obtained from the Colorado River.

- SGM evaluated the Town's existing infrastructure and found that its intake structures on the Colorado River are adequate, but that East Elk Creek's sedimentation pond is undersized to accommodate loading rate of future demands.

- The Town's existing WTP is currently able to treat 2.1-MGD at full capacity, under summer water quality conditions; under spring water quality conditions at firm capacity it drops to 1.2-MGD. Therefore, treatment expansion should occur to bring the Town's firm treatment capacity up to predicted 4.1-MGD peak day demands. Furthermore, expansions should address the need to treat variable water quality associated with Colorado River water.

- As part of the treatment capacity expansion, the existing WTP should also increase the capacity of its disinfection basin and residuals handling system, neither of which are capable of meeting predicted buildout demands.

To address future system demands, SGM has conducted cost analysis of its recommended alternative, installation of two 2-MGD Actifloc packaged treatment units at the existing WTP, and has determined planning-level estimated total capital cost is $8 million. This cost estimate, described in Section 7 and itemized in Appendix A, includes recommended consideration of the following (in addition to treatment unit purchase and installation):

- Phasing

- Construction Timing and Sequencing
- Demolition and Removal
- Building Expansion
- Chemical Feed and Storage
- Contact Basin Expansion
- Site Access Road Improvements
- Additional Pumps
- Residuals Handling

1. Existing EQR Summary

The Town of New Castle (the Town) is located in Garfield County at the confluence of the Colorado River and Elk Creek. Figure 1 shows the existing area served by the Town of New Castle's potable water system. Except for minor expansions to the existing service area this is the geographical extent of the study area. This area was defined as the study limits because the Town's water supply and delivery system has been planned and installed to provide effective service for this area. It has been envisioned for some time that if the Town expands significantly to the east, the new development would require new additional water supply and rights, likely in Canyon Creek, and a new water production or treatment facility to serve it. This report focuses on the Elk Creek WTP and its service area only.

Colorado's Department of Local Affairs published the Town's population in July 2005 as 3,148. Since that time, the population has increased to approximately 3,974, based on recorded tap and building permit data (7/2005 to 6/2007) and assuming 2.81 ca. per tap. The Town assesses tap fees based on assignment of an appropriate number of Equivalent Residential Units (EQR) for each service connection. Future development is projected in EQRs in this report.

SGM estimated historical EQR values beginning with a Town-supplied EQR tally for February 2006 (approximated as the 2005 end of year value). SGM then used annual building permit totals issued during each year for 2002 through mid-June 2007. New permits were each assigned an EQR value based on building type (Single Family, Multi-Family and Commercial) and the Town's EQR classification system. These EQR values were then added and subtracted from the 2005 tally to approximate historical values for each year. Table 1 below shows historical and existing end of year EQR estimates for 2001 through June 2007.

Table 1 Historical EQR Summary

Year	Total EQR *(EQR Addition)*	Residential[4,5] EQR *(EQR Addition)*	Commercial[6] EQR *(EQR Addition)*
2001[1]	1,105	1,013	120
	(EQR addition not available for 2001)		
2002[1]	1,188 *(83)*	1,093 *(80)*	123 *(3)*
2003[1]	1,241 *(53)*	1,146 *(53)*	123 *(0)*
2004[1]	1,319 *(78)*	1,218 *(72)*	129 *(6)*
2005[2,3]	1,378 *(59)*	1,275 *(57)*	131 *(2)*
2006[2]	1,499 *(120)*	1,388 *(113)*	138 *(7)*
2007[2]	1,593	1,480	140

Year	Total EQR *(EQR Addition)*	Residential[4,5] EQR *(EQR Addition)*	Commercial[6] EQR *(EQR Addition)*
(thru June)	*(94)*	*(92)*	*(2)*

1. Town of New Castle Building Permit 2002-2004
2. Town of New Castle Building Permit 2005-2007
3. 2005 End of Year Values from client-supplied February 2006 Summary
4. Residential EQR Assignment = 1 EQR per single family unit
5. Residential EQR Assignment = 0.8 EQR per multi family unit
6. Commercial EQR Assignment based on Town of New Castle Classification System

2. Projected EQR Summary

EQR projections for the Town of New Castle were made for the purpose of projecting future demand. The first step was to project the total number of EQRs anticipated at build-out. Build-out for this study is defined as previously identified build-out values for specific existing or proposed developments plus estimated build-out values for other potential service area expansions or annexations. The results of the analysis are:

- 2007 EQR Total = 1,593
- Projected Build-out EQR Total = 3,872

Projections are made by development: Lakota Canyon Ranch, Castle Valley Ranch, and Other Miscellaneous Projects and Annexations. The following is a summary of each project's contribution to the predicted value above.

A. Lakota Canyon Ranch - 739 EQR at Build-out

The portion of Lakota Canyon Ranch's development that will be served by the Town includes Phases 1-8. The development is located northeast of the Town center in an area formerly known as West Faas (Figure 1). One cubic foot per second (CFS) of non-potable irrigation water is supplied to Lakota from the Colorado River, and is not included in the projected demand analysis. By January 2007, 100 EQRs of Lakota's total 739 EQRs had been developed.

B. Castle Valley Ranch - 1,400 EQR at Build-out

The Castle Valley Ranch subdivision is located directly north of the Town center (Figure 1) and will be served entirely by the Town's potable water system. The development has an established build-out value of 1,400 EQRs, and includes a planned commercial area and school, in addition to residential units. By January 2007, 586 EQRs had been developed.

C. Other Miscellaneous - 1,148 EQR at Build-out

In addition to the two primary developments summarized above, numerous smaller developments or annexations are included in this planning study, contributing to the build-out EQR. These are listed in Table 2.

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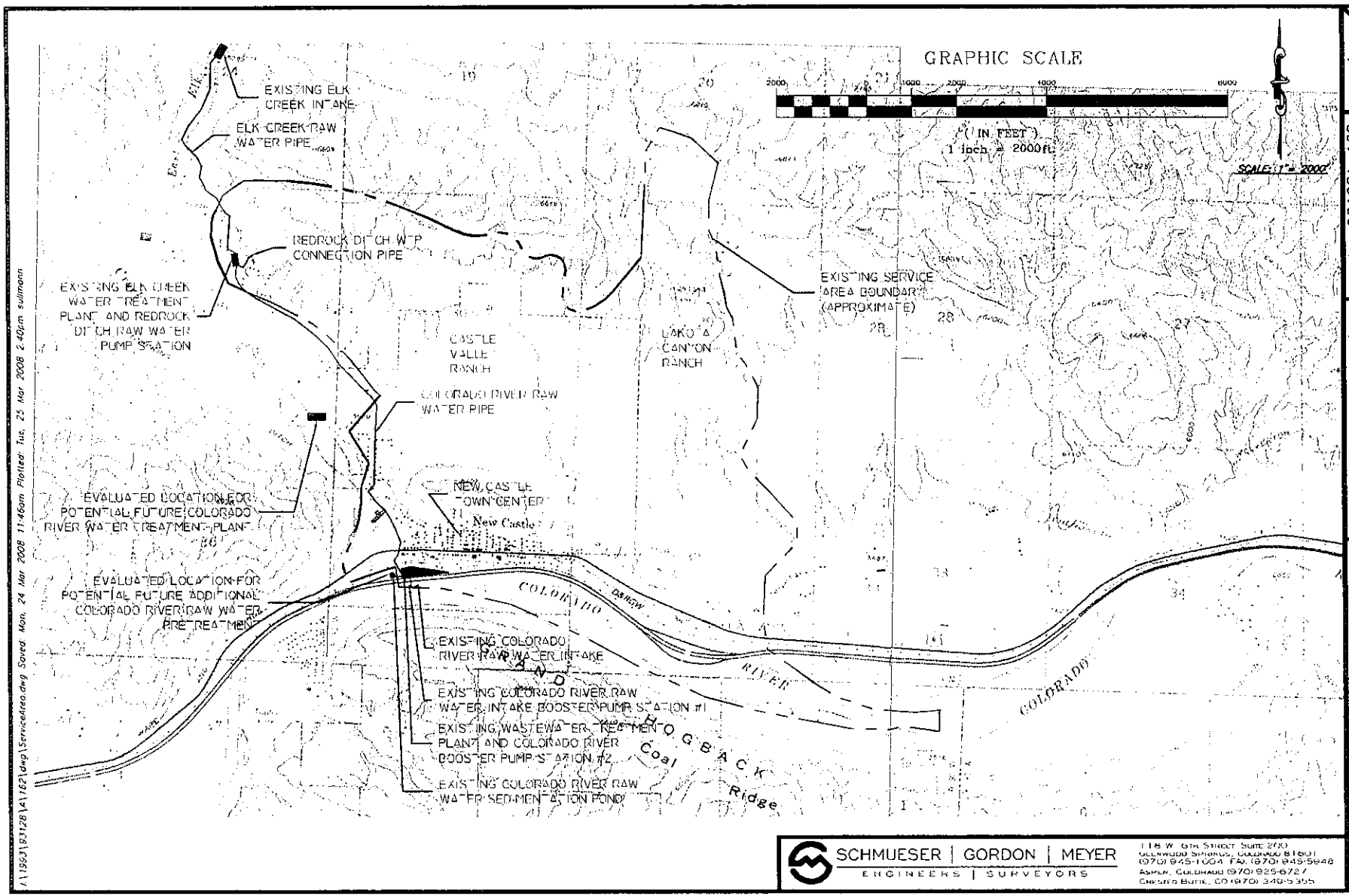

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118 W. 6th Street Suite 200
Glenwood Springs, Colorado 81601
(970) 945-1004 FAX (970) 945-5948
Aspen, Colorado (970) 925-6727
Crested Butte, CO (970) 349-5355

Figure 1
Existing Water Service Area

Town of New Castle
Potable Water & Production Eval.

Job No.	931284-162
Drawn by:	SKU
Date:	3/2008
Appr. by:	
File:	SERVICEAREA.DWG

1 OF 1

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Table 2 EQR Buildout Contribution by Development

Project Name	EQR Existing	EQR Build-Out	EQR Remaining
Castle Ridge Town homes	6.4	53.6	47.2
River Park	0	122.4	122.4
Shibui Condominiums	38.4	48	9.6
Old Town	116	126	10
Spencer	76	87	11
Coryell	60	72	12
Sylvan	20	21	1
Ruple	1	7	6
Sparks	3	4	1
Walters	0	7	7
East Elk Creek Planning Area[1] (Service Area Expansion)	0	600	600
Total	320.8	1,148.0	827.2

1. East Elk Creek Planning Area is a currently built-out development that lies outside of the existing East Elk Creek WTP service area. Potential annexation of this development is considered in this study.

D. EQR Rate of Growth

Upon establishing build-out EQR projections, SGM then estimated the time for these values to be achieved. Historical annual EQR additions reported in Table 1 range from 53 (2003) to 120 (2006) EQR additions per year. SGM used a range of growth rate values, which agree with historical estimates and are as follows:

- 120 EQR/year Rapid Growth Estimate – Recommended to use for infrastructure development timing
- 80 EQR/year Modest Growth Estimate – Recommended to use for projecting revenue from, and setting values of, tap and service fees

Figure 2 shows the historical and existing EQRs from 2001 to 2007 and the range of projected EQR growth from 2007 to 2030. Based on the assumed growth rates, a conservative estimate of time to build-out is approximately 20 to 29 years.

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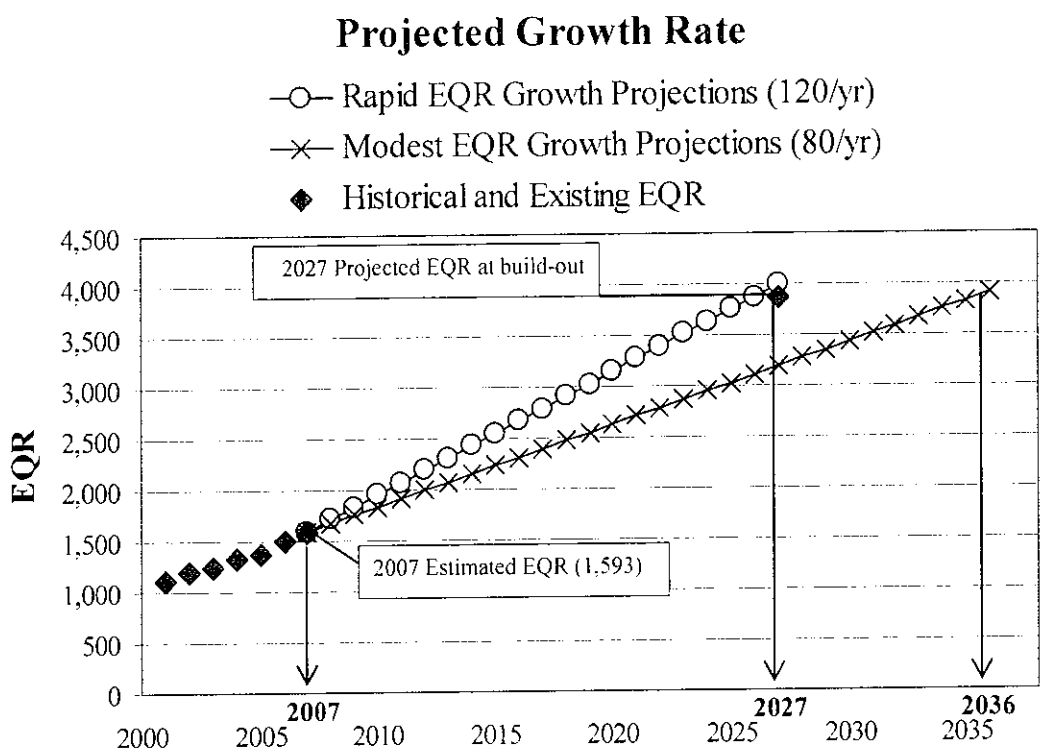
Figure 2 Projected EQR Growth Rate



3. Potable Water Production Requirements

A. Unit Demands

SGM estimated the volume of water consumed per EQR using the Town's billing records. The Town supplied billing records for the period January through December, 2006. Because calculations are based on metered data, no losses are yet taken into account using this method. A typical value of 10% was assumed for the fraction of water lost in the Town's distribution system through system leaks, unmetered users, etc. Assuming an additional 10% production requirement to address losses in the system, the average day water production requirement is 483 Gallons per day (GPD) / EQR

B. Seasonal Peaking Factors

Potable water production requirements are determined using the above average daily values only as a starting point. Plant production must be capable of meeting demands during the most challenging seasonal conditions. Seasonal peaking factors, applied to the average demand, define maximum production requirements and what plant capacities must be. For this analysis, two critical conditions dictate potable water production requirements. They are spring runoff, when water demands are increasing and water quality is poor, and summer peak when water demands are at their greatest.

1. Spring Runoff – The Town's primary water source is a surface water diversion located on East Elk Creek. Its quality is influenced by the influx of spring snowmelt in the creek's drainage basin when average temperatures increase. The resulting water quality impact is increased turbidity, which slows down finished water production. While production is still diminished, ambient temperatures rise and demands increase. Thus, the water production challenge is characterized by poor raw water quality and modest to high water demands.

2. Peak Summer Demand – During the summer months, when average temperatures are highest and irrigation is taking place, water demands are at their peak. Raw water quality in the summer is better than that associated with spring runoff and the treatment process can be run effectively near its peak rate. Thus, the production challenge in July and August is primarily one of keeping pace with demand alone.

The Town also supplied historical, daily raw water intake records for the East Elk Creek Water Treatment Plant from 2001 through 2006. Using these data, SGM determined typical peak production rates during these challenging seasonal conditions. Tables 3 and 4 summarize the historical peak spring (April through June) and peak summer (June through August) raw water flow rates into the Town's existing water treatment plant. Peaking factors versus average day demand were determined from these data. The results show that peaking factors of 1.95 and 2.21 apply to spring and summer demand in New Castle, respectively.

Table 3 Historical Spring Demand Peaking Factors

Peak Spring Day	Raw Water Turbidity (NTU)	Peak Spring Raw Water Flow Rate (MGD)	Spring Peaking Factor (Peak Day Flow / Average Day Flow)
6/6/2001	1.2	1.1	2.1
5/8/2002	3.9	1.1	1.9
5/31/2003	14.7	1.0	1.9
5/24/2004	1.0	1.1	1.8
6/23/2005	2.0	1.3	2.1
5/17/2006	4.9	1.3	1.9
Average			**1.95**

Table 4 Historical Summer Demand Peaking Factors

Peak Summer Day	Max. Raw Water Flow Rate (MGD)	Summer Peaking Factor (Peak Day Flow / Average Day Flow)
6/24/2001	1.3	2.3
8/1/2002	1.2	2.0
7/19/2003	1.2	2.1
7/24/2004	1.3	2.1
8/2/2005	1.5	2.4
7/7/2006	1.6	2.3
Average		**2.21**

C. Seasonal Production Requirement Projections

Using the results summarized in the previous sections, SGM estimated the production rate required to meet water demand per EQR for several demand conditions:

- Average Daily Demand: 1.9 MGD (480 GPD per EQR)
- Peak Spring Daily Demand: 3.7 MGD (940 GPD per EQR)
- Peak Summer Daily Demand: 4.1 MGD (1,070 GPD per EQR)

Figure 3 shows projected long-term peak spring and peak summer demands for both Rapid and Modest annual EQR growth rates identified in Section 2.

Figure 3 Projected Water Production Requirements

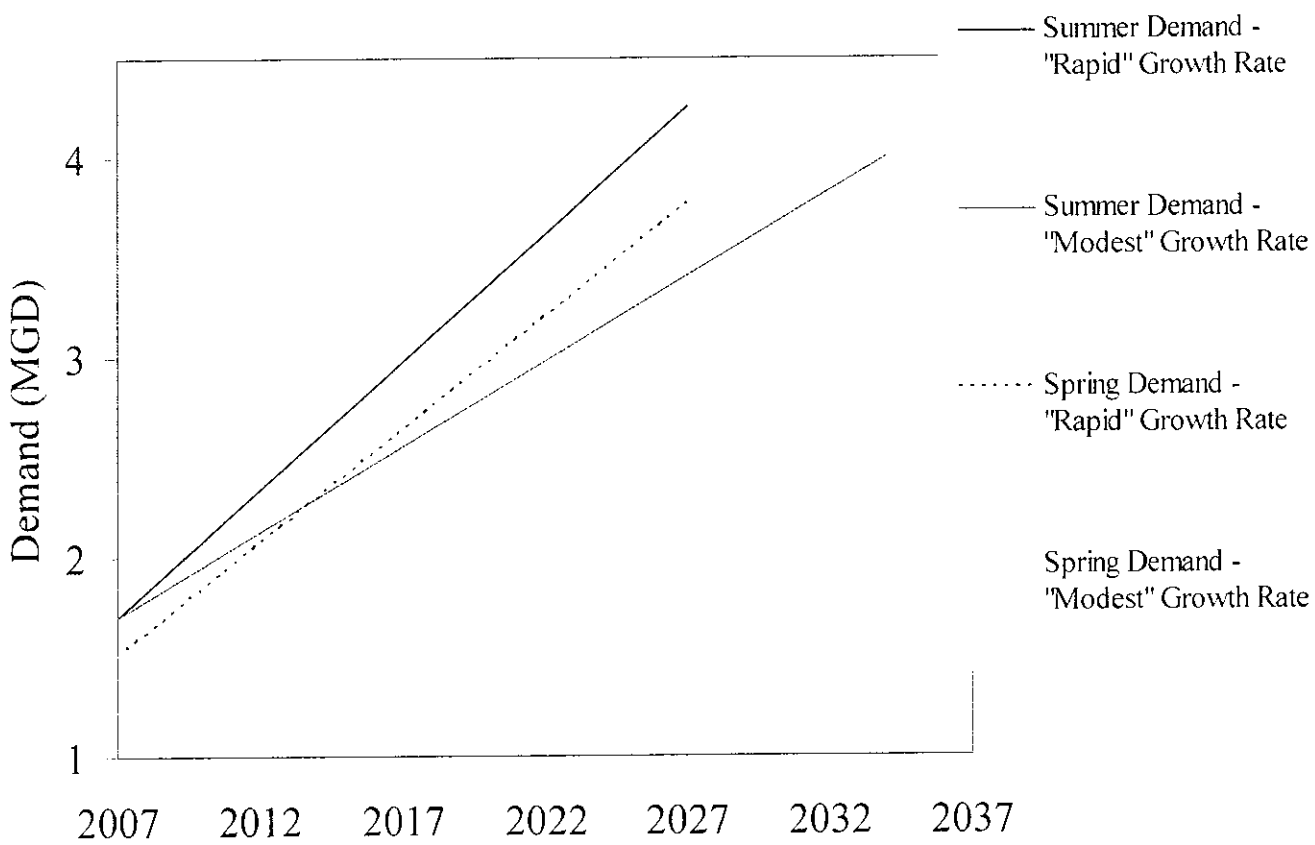


Figure 4 shows the near-term projected seasonal demand curves superimposed on lines representing the production capacity of the existing water treatment plant. Plant capacity reduction due to poor water quality during spring runoff may occur during any time between mid-April and mid-June and typically lasts approximately 2 weeks.

Figure 4 includes two lines representing plant capacity, labeled "Full Capacity" and "Firm Capacity." Treatment plants like New Castle's are typically designed with "Firm Capacity" able to meet water demands with their largest treatment unit out of service. This is because plant production depends on proper functioning of many electrical and mechanical systems, which are inherently prone to periodic failure. Furthermore, operators need to take equipment off-line for routine preventative maintenance and cleaning while still being able to produce sufficient water. When plants have to rely on all treatment units running at capacity to meet demands, the margin for error or failures is diminished and the likelihood of water service interruptions or restrictions increases. Figure 4 clearly shows that the existing plant's firm capacity falls far short of production needs through the entire spring and summer while the full capacity is barely able to meet water needs.

From Figure 4 the most challenging condition facing the water treatment plant in the near future is that in which spring runoff occurs at the latest probable time. Runoff could occur as late as early June to mid-June. At this time, demands will be at their greatest during a time at which the plant is still only capable of running at about 75% of full capacity due to poor water quality. In this case, the anticipated production shortage as a percent of the daily demand at the plant's full capacity is as follows:

- 2008 = 9%
- 2009 = 14%
- 2010 = 26%

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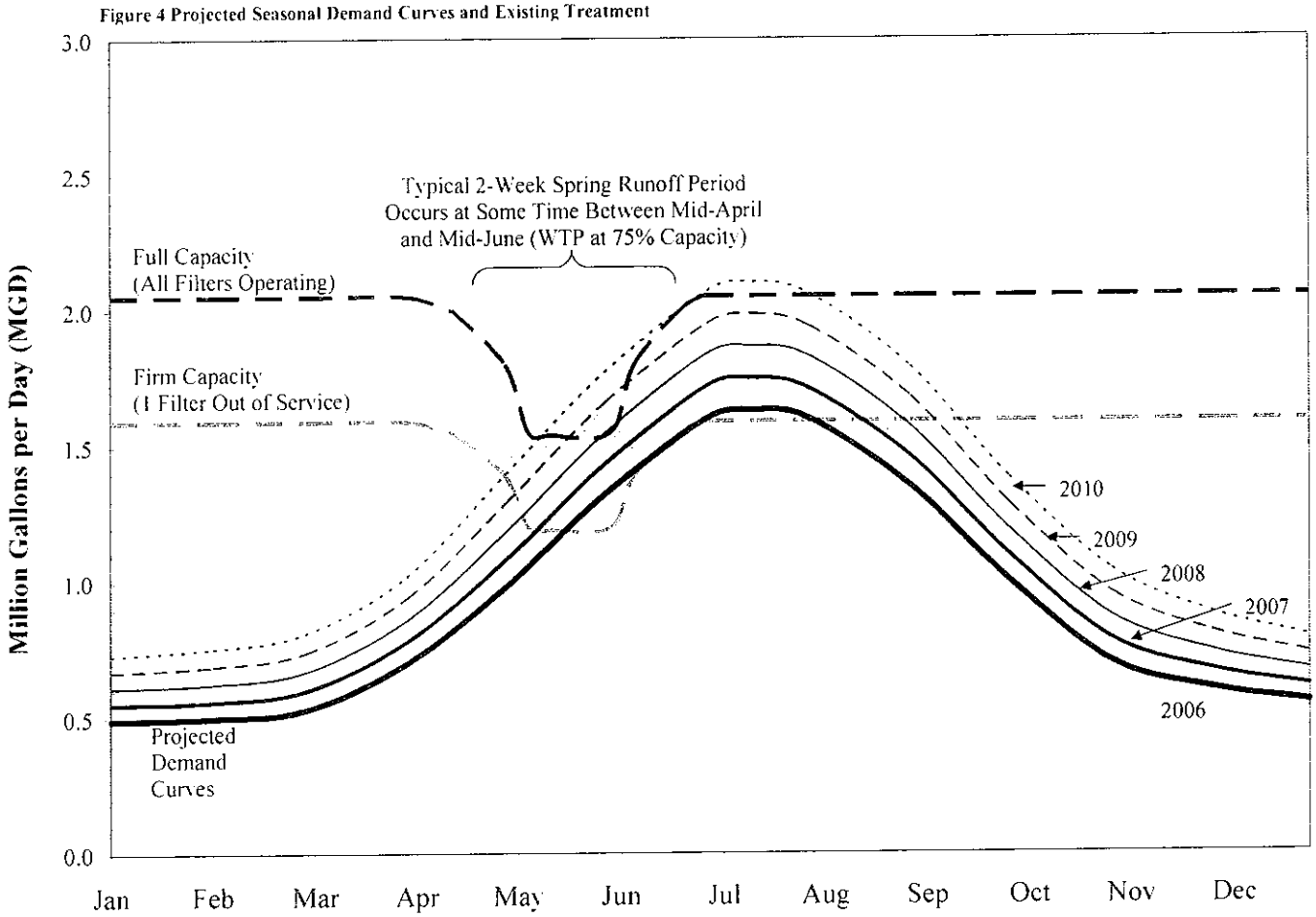
Figure 4 Projected Seasonal Demand Curves and Existing Treatment



4. Water Rights Evaluation

This section outlines the Town's water rights and addresses logistics the Town must address to properly and legally supply water to its customers.

A. Existing Water Rights

Normal "Wet Year" Conditions

The Town of New Castle currently obtains all of its potable water from East Elk Creek. Its historical water right is 2.67 cubic feet per second (CFS) during the irrigation season (April 15 through October 15) and 10.0 CFS during non-irrigation months. Based on the seniority of the right and the physical availability of the water, this supply is reliably available during all but the driest years.

The Town's historical senior water right on East Elk Creek is now being supplemented through the development of Castle Valley Ranch (CVR). CVR has agreed to transfer water to the town from two historical water rights, both from Coryell Ditch, fed by East Elk Creek. These two rights are being transferred to the Town as CVR develops (CVR's defined density is 10 EQRs per acre). Coryell Ditch Third Enlargement is transferred to the Town at a rate of 0.035 CFS per acre of CVR development. This right is low in priority and is not a reliable water source even during wet years. Coryell Ditch Senior Priority is transferred to the Town at a rate of 0.02 CFS per CVR developed acre (0.002 CFS per EQR). This right is among the highest in priority on East Elk Creek and is the most reliable water right the Town owns. However, the Town's decree for this water states that all CVR-transferred water must be used within the CVR development. The transfer volume defined in the decree is greater than the actual unit demand determined in this analysis:

- Decree Defined Unit Demand
  - 0.002 CFS per EQR
  - 1,290 GPD per EQR
- Historically Determined Unit Demand
  - 0.0017 CFS per EQR
  - 1,070 GPD per EQR

Despite this excess, water from the Coryell Ditch Senior Priority right currently may not be used throughout the Town's remaining system. Actions are in place to amend the decree such that this water may be used throughout the entire town.

The Town also owns 3 CFS from the Colorado River (known as New Castle Augmentation Station). Currently this water is used solely as non-potable irrigation

water supply – 1 CFS designated to Lakota Canyon Ranch, and the remaining 2 CFS to be used in the Town's irrigation system. This water is legally and physically available for the Town to use as back-up/emergency raw water source for the existing WTP. However, the existing WTP process might have to be significantly de-rated in order to effectively process the river water which can be more turbid than the creek water supply.

Drought "Dry Year" Conditions

The Town's legal right to use water from East Elk Creek is dependent on the amount of physical water in the creek and the State of Colorado Division of Water Resources' administration of the priority water right system. During drought, as occurred in 2002, the Town must first ensure that downstream, higher priority users are provided with water, and that the minimum stream flows are first met. Among the Town's existing water rights, 2.67-CFS historical East Elk Creek and Coryell Ditch Third Enlargement are not reliable during drought conditions. The remaining water available to the Town during dry years includes Coryell Ditch Senior Priority (currently 1.20 CFS) and Colorado River Water (3.0 CFS). Table 5 summarizes the Town's existing water rights.

Table 5 Existing Water Rights Summary

Right Name	Source	Designated Use	Amount (CFS)	Season	Availability in Dry Years	Notes
New Castle Wtr Wk Sys Pl	East Elk Creek	Municipal Fire Domestic	2.67	Irrigation April 15 – Oct 15	0	Lower priority to Ware and Hinds Ditch diversion
		Irrigation Municipal Reservoir Industrial Fire Domestic	10.0	Non-Irrigation	10.0	
Coryell Ditch Senior Priority	East Elk Creek	Irrigation *(Reassigned to Augment as Irrigation "Dry Up" Occurs)*	0.97 For CVR *1.2 Total if Needed in CVR* (Current January 2007)	Year Round	0.97 For CVR *1.2 Total if Needed in CVR* (Current January 2007)	Transferred through Castle Valley Ranch 0.02 CFS per 10 units; 2.8 CFS to be transferred at "buildout;" Decree states water may only be used in CVR; values reflect unit demands determined for this analysis
Coryell Ditch Third Enlargement	East Elk Creek	Irrigation *(Reassigned to Augment as Irrigation "Dry Up" Occurs)*	2.1 (Current January 2007)	Year Round	0	Not a reliable source of water even in wet years

Right Name	Source	Designated Use	Amount (CFS)	Season	Availability in Dry Years	Notes
New Castle Augmt Station	Colorado River	Irrigation Municipal Reservoir Industrial Recreation Fire Domestic	3.0	Year Round	3.0	1 CFS must be supplied to Lakota Canyon Ranch for Irrigation
Water Diversion Available During Irrigation Season Wet Year = 3.64 CFS (2.35 MGD) East Elk Creek 3.0 CFS (1.9 MGD) Colorado River Dry Year = 0.97 CFS (0.775 MGD) East Elk Creek 0.63 CFS (1.94 MGD) Colorado River						

B. Future Water Rights

Section 2 described known development and potential additions contributing to the service area's projected buildout of 3.872 EQR. Section 3 defined projected future water demands associated with those EQR additions (1.9 MGD – Average Daily Demand; 4.1 MGD – Peak Daily Demand). Among the known developments, CVR and LCR have entered agreements to contribute to the Town's legal right to water. If the Town annexes the East Elk Creek planning area (projected water demands include this annexation), it expects to acquire water rights in the Connally Ditch. In so doing, the town expects to acquire water from the Connally ditch if this annexation takes place. The water that is not part of the Town's existing supply and may potentially be obtained to meet projected demands is shown in Table 6 and summarized below. Figure 5 shows the projected demands throughout the year 2027 with water right availability from East Elk Creek, indicating the amount of Colorado River water that will be needed under each of the conditions shown.

Table 6 Projected Future Water Rights Summary

Right Name	Source	Designated Use	Amount (CFS)	Season	Availability in Dry Years	Notes
Coryell Ditch Senior Priority	East Elk Creek	Irrigation *(Reassigned to Augment as Irrigation "Dry Up" Occurs)*	1.34 For CVR *2.8 Total if Needed in CVR* (After January 2007)	Year Round	1.34 For CVR *2.8 Total if Needed in CVR* (After January 2007)	Transferred through Castle Valley Ranch 0.02 CFS per 10 units; 2.8 CFS to be transferred at "buildout;" Decree states water may only be used in CVR
Connally Ditch	East Elk Creek	Irrigation *(Must be reassigned for domestic use if East Elk Creek subdivision is annexed)*	1.6	Year Round	1.6	Current point of diversion is not affected by minimum stream flow requirements. Diversion point cannot be moved without consideration of loosing minimum stream flow priority and water will have to be pumped to the WTP.
Water Diversion Available During Irrigation Season Wet Year = 4.98 CFS (3.22 MGD) Elk Creek 3.0 CFS (1.9 MGD) Colorado River Dry Year = 2.31 CFS (1.5 MGD) Elk Creek 3.0 CFS (1.9 MGD) Colorado River						

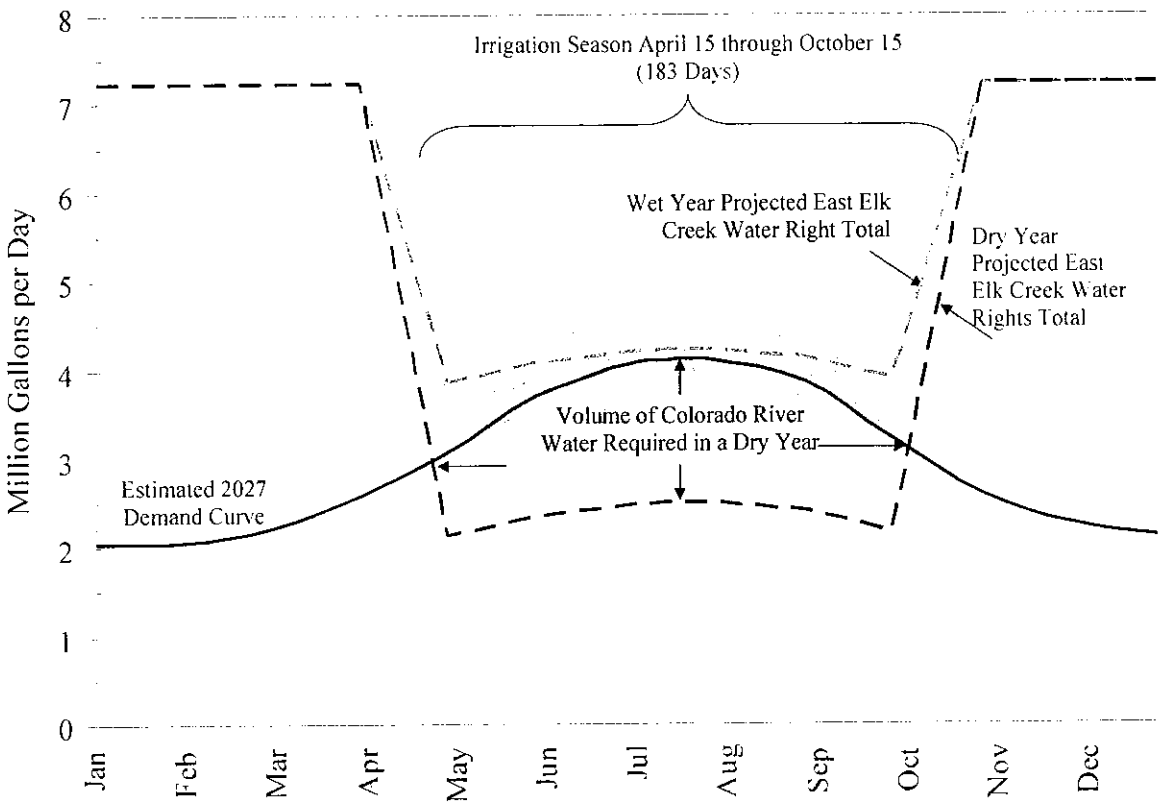
Normal "Wet Year" Conditions

Given the constraints associated with the Coryell Ditch Senior Priority water right, water legally available depends on CVR demand. Assuming demands determined in this analysis, the projected water available from East Elk Creek during a wet year on peak day is 6.58 CFS (4.25 MGD). The projected demand on Peak Day is 4.1 MGD. Therefore, the Town's entire potable water demand at buildout is projected to be able to be legally fulfilled using water solely from East Elk Creek during wet years.

Drought "Dry Year" Conditions

During dry years, the water available from East Elk Creek can be obtained through the Coryell Ditch Senior Priority and possibly Connally Ditch, 2.5 MGD (3.9 CFS) on peak day. Dry year conditions will require the Town to supplement East Elk Creek water with Colorado River water. The supplement duration will be based on when its 2.67-CFS "New Castle Wtr Wk Sys Pl" water right is called out, potentially the entire irrigation season (183 days, April 15 through October 15). At buildout, the maximum amount of Colorado River water needed is projected to be 1.6 MGD (2.5 CFS), or 39%, of the 4.1-MGD peak daily demand value.

Figure 5 Projected East Elk Creek Water Rights and 2027 Demand



5. Existing Infrastructure

The Town of New Castle currently operates one water treatment plant located in the northwest corner of the existing service area. Currently, raw water comes to the plant from East Elk Creek, and infrastructure is in place to bring water from the Town's back up source, the Colorado River. The following is an analysis of the Town's existing potable water intake and production capacities.

A. Raw Water Intake Infrastructure

East Elk Creek

The Town's current source for potable water production is East Elk Creek. The East Elk Creek intake is located adjacent to County Road 241 approximately 2 miles upstream of the creek's confluence with Main Elk Creek. The existing East Elk Creek intake has three components: a turnout, settling pond and conveyance pipe. These are described below.

The turnout is a series of three stilling basins, all of which are 3-ft. wide and 2- to 4-ft. long. Transitions between the basins include a 2 ft. by 2 ft. sluice gate between the first and second basin and 1 ft diameter circular sluice gate between the second and third basin. From the third basin a buried 10" PVC pipe coveys water by gravity approximately 50 ft. to a settling pond. The capacity of this section of the Elk Creek intake structure depends on water level in the stream.

The second component of the Elk Creek intake is the settling pond. The pond is approximately 200 ft. long, 40 ft. wide and has a design depth of 5 ft. At this depth the pond volume is 0.27 million gallons with an estimated surface of 8,000 ft^2. Table 7 provides current and projected holding time and surface loading rates for the settling pond. These values indicate a relatively high hydraulic loading rate under current, and especially, buildout peak day flow conditions. Its clarification performance would be expected to deteriorate over time given these values.

Table 7 Elk Creek Intake Settling Pond Characteristics

2007			2027		
Demand (MGD)	Detention Time (Hours)	Loading Rate (gpd/ft^2)	Demand (MGD)	Detention Time (Hours)	Loading Rate (gpd/ft^2)
1.6	4.0	202	4.1	1.6	518

The third component to the existing Elk Creek intake is the conveyance pipe that brings water from the settling pond to the WTP. The pipe is 16-in. diameter PVC and is approximately 5,350 ft. long. The estimated elevation change from the design surface of the settling pond to the pipe invert to the water level in the treatment units is approximately 18 ft.

Of the three components that make up the East Elk Creek intake, the sedimentation pond will likely require hydraulic (baffling) and/or chemical feed upgrades to maintain low

raw water turbidity to the WTP. The timing and extent of these upgrades should be based on monitored pond influent and effluent turbidities.

Colorado River

The Town has existing infrastructure to convey water from the Colorado River to the Town's WTP. The infrastructure has been designed to accommodate the Town's full 3-CFS (1.94 MGD) Colorado River water right, which the Town currently uses for non-potable irrigation only. Unlike the Elk Creek intake, Colorado River water cannot be conveyed to the WTP by gravity; two pump stations are used to bring the water to the WTP. The Colorado River intake is located south of the Town's existing wastewater treatment facility, upstream of the confluence of Elk Creek and the Colorado River (Figure 1).

The first pump station is located approximately 175 ft. from the river intake structure. Water is gravity fed to the pump station through 18-in. PVC. Three pumps send water through 12" PVC to a settling pond approximately 560 ft. to the west. The pump station's firm capacity is 4.2 CFS (2.7 MGD) with one pump out of service, and 5.0 CFS (3.2 MGD) when all pumps are operating.

The settling pond is designed to hold approximately 0.31 million gallons. At maximum flow rate, 3-CFS, it has an average 3.9-hour detention time and a surface loading rate of 390gpd/ft^2. This pond was initially constructed to fulfill a state permitting requirement and would need to be expanded or modified to provide meaningful pre-treatment of Colorado River water for any downstream treatment process which would require pre-treated water.

The second pump station conveys water from the sedimentation pond to the Town's WTP through approximately 8,600 ft. of 12" PVC. Pump station number 2 has three pumps and a capacity of 3.0 CFS (1.9 MGD) firm, 4.1 CFS (2.7 MGD) full.

B. Water Treatment Plant Capacity

The overall capacity of the Town's existing water treatment plant is dependent on that of three individual process components:

- Particle Removal Process
- Disinfection Process
- Backwash / Wastewater Handling Process

Particle Removal Process

Five operational treatment units housed at the existing water treatment plant have a combined nominal capacity of 2.3 Million Gallons per Day (MGD), two WaterTech units at 0.4 MGD each, and three MicroFloc units at 0.5 MGD each. The nominal capacity, however, does not represent actual finished water production rates. All units undergo periodic flushing and backwashing, and seasonal conditions (high turbidities at spring runoff) can further reduce the plant's treatment capacity. In addition, "firm" capacity

values represent anticipated production rates in the event that one (largest) treatment unit is out of service. The net effective capacities are shown in Table 8.

Table 8 Particle Removal Process Capacity

Season	Firm Capacity (MGD)	Full Capacity (MGD)
Spring	1.2	1.6
Summer	1.6	2.1

Disinfection Process

The Town's water treatment plant has a below-grade disinfection basin through which chlorinated filtered water passes before distribution. The Colorado Department of Health and Environment regulates filtered water residence time based on residual chlorine concentration, pH, temperature and basin hydraulics. Contact time calculations indicate that the existing contact basin's capacity is as follows, given the design conditions indicated.

- Spring and Summer = 2.55 MGD
  (pH = 8.5, Temp = 10°C, 1.0 mg/L residual Cl_2)
- Winter = 1.55 MGD
  (pH = 8.5, Temp = 2.2°C, 1.0 mg/L residual Cl_2)

Since winter demands are always less than 60% of spring/summer demands, the spring/spring condition will define disinfection process capacity needs.

Backwash / Wastewater Handling Process

The existing plant uses an unlined earthen settling pond with an influent energy dissipation baffle wall and a perforated effluent collector pipe. Settled residual solids are removed several times per year for onsite drying and ultimate disposal in a sanitary landfill. No water is recycled to the head of the plant. Effluent water, when present, is discharged to an off-site drainage along the west side of the plant. During normal operations, the plant filters must be flushed and backwashed on a daily basis. Though this process differs for each filter type (WaterTech vs. MicroFloc), total backwash volumes represent approximately 9% of the plant's raw water intake in the spring, and 7% in the summer. Based on these percentages and a one-to two-day desired minimum hydraulic retention time in the pond, the equivalent capacity of finished water that can be produced at the plant without overloading the pond is given below.

- Spring = 0.8 to 1.6 MGD
- Summer = 1.0 to 2.0 MGD

These calculated values indicate that the backwash pond is currently overloaded, which has been confirmed through observations made by plant staff. Any plant improvements will need to address this shortcoming.

C. Existing Capacity vs. Future Demand

Figure 4 previously illustrated the implications of the end result of the analyses presented above. The existing plant can barely keep pace with current spring and peak summer demands. Filtration process capacity and reliability is the controlling factor. Backwash handling needs to be improved to prevent the possibility of either discharge permit violations or production curtailments. The chlorine contacting process is the only one with excess capacity. All major processes need capacity improvements to meet projected future demands even if no annexations are made to the service area. Furthermore, the existing plant processes are not equipped to reliably treat the intended back-up raw water source, the Colorado River.

6. Alternatives Analysis

As previous sections indicate, the Town of New Castle is faced with expanding their potable water production capacity in the near future. Furthermore, future improvements must include provision of effectively reliable treatment processes for Colorado River water. Colorado River water differs from East Elk Creek water. It has potential for much higher turbidity and organics loading and will require additional infrastructure and/or different treatment techniques than the Town has historically used. In order to meet projected demand, considerations should include where Colorado River water will be treated and how treatment will be achieved.

A. Location Alternatives

Alternatives Description

The need to treat Colorado River water presents new challenges related to the quality of the water as well as its location with respect to the WTP. As it relates to water quality, Colorado River water will require either additional pre-treatment or a different treatment method. Pretreatment location options were considered and include a site near the Colorado River at the existing raw water intake pump station or at the existing WTP. Cost and operational considerations eliminated the option of pretreatment near the Colorado River intake pump station.

The next location option to consider is where Colorado River water should be treated. While Elk Creek gravity-feeds the existing water treatment plant, Colorado River water will have to be pumped to the WTP. Raw water pumping infrastructure is already in place, a different treatment facility location could reduce pumping costs by reducing the distance that raw Colorado River water must travel. Location alternatives are:

- Alternative 1 – Treat Colorado River water at the existing WTP location (as shown on Figure 1)
- Alternative 2 – Treat Colorado River water at a 2nd WTP location (shown on Figure 1 and described below)

The proposed location for Alternative 2 is east of Elk Creek near the Ware and Hinds diversion, 0.2 miles west of the intersection of Midland Ave. and Castle Valley Ranch Blvd. Table 9 defines some of the characteristics and distinctions associated with each location alternative.

Table 9 Water Treatment Location Alternatives

	Alternative 1 – 1 WTP at Elk Creek	Alternative 2 – 2nd WTP at Colorado River
Location:	Treat both Elk Creek and Colorado River water Located at the existing WTP site	Treat Colorado River water and additional Elk Creek water New WTP near Ware & Hinds diversion
Primary Improvements Required:	- Disconnect and remove WaterTech treatment units -Expand Elk Creek WTP building -Install new treatment units to treat water from both sources -Upgrade backwash handling system -Expand finished water disinfection basin	-Disconnect, remove and replace WaterTech treatment units -Install new intake structure near Ware & Hinds ditch on Elk Creek -Construct new facility including sitework, electrical service, structures and treatment system -Install about 2,500-lf of new raw and finished water piping

Location Alternatives Comparison

Each site alternative has unique implementation requirements that must be considered, and which affect costs. These considerations include:

Pretreatment – Some primary treatment processes (described in succeeding sections) will require installation of an upstream pretreatment system to reduce Colorado River influent water turbidity. Other primary treatment processes will not require this.

- Alternative 1 Existing WTP Site – If pretreatment is to take place at the existing WTP location, the site layout becomes critical. The available onsite area is limited. Pretreatment equipment placement must allow access to other equipment and chemical delivery. Capacity would be selected to match maximum Colorado River diversion amount, though the new process could be used also for Elk Creek water, as needed.
- Alternative 2 New WTP Site – If a new WTP is constructed on a new site, pretreatment, if needed, would likely more easily be able to be fit into a site plan developed from scratch. The pretreatment process would be sized similarly to that in Alternative 1, but would not be available for use in treating Elk Creek water.

Construction Impacts on Operations – All process alternatives will require logistical planning to ensure potable water demands are met during the construction phase. However, some important differences exist.

- Alternative 1 Existing WTP Site – The level of logistical planning to install new units at the existing WTP site will be greater than for constructing a new plant on a new site. Removal of WaterTech units will reduce temporarily the WTP's capacity until the new unit(s) are installed

and operational. A significant portion of the project construction, therefore, may need to take place during low demand season. Expansion at the existing WTP also includes enlarging the disinfection basin. This must be done prior to installation of the new treatment units. Finally, the existing building will need to be expanded to accommodate the larger size of the new treatment units. These activities will have to be coordinated with existing WTP operations.

- Alternative 2 New WTP Site – New treatment units will be able to be installed without significant impacts on operation of the existing system, making construction timing less critical. However, despite addition of a new off-site WTP, WaterTech units at the existing WTP have reached the end of their useful life and will need to be replaced. This will still result in coordination of construction and operations of the existing plant; however, the WaterTech filters could be replaced once the new plant is on-line, which would ease timing constraints.

Installed Treatment Capacity – The two alternatives considered here also differ in the amount of treatment capacity required.

- Alternative 1 Existing WTP Site – The new treatment units to replace the WaterTech units would provide both effective Colorado River water treatment and Elk Creek water treatment on a regular basis, as needed. Thus, the addition would be sized to approximately handle predicted build-out peak water demand of 4.1 MGD. With removal of the WaterTech filter units, the existing plant would have a total nominal capacity of 1.5 MGD. Two new 2-MGD treatment units will bring the plant's total capacity to 5.5 MGD and firm capacity to 3.5 MGD.
- Alternative 2 New WTP Site – The firm capacity of a new WTP would be selected to match the Town's Colorado River water right, 2 MGD (3 CFS). This firm capacity would be achieved using three 1-MGD treatment units. The new plant could treat both Colorado River water and East Elk Creek water; creating an alternative point of diversion near the new WTP on East Elk Creek would provide the Town with the flexibility to treat Elk Creek water at the new plant, if needed, during non-drought years when Colorado River water is not needed. The Town could then expand the existing WTP, as demands dictate in the future, replacing the WaterTech units with phased installation of two new 1-MGD units.

Residuals Handling – Residuals handling facilities would not differ significantly for the two different plant site alternatives because the existing WTP site's settling pond is so undersized. Significant improvements would be required for both alternatives.

- Alternative 1 Existing WTP Site – Residuals streams at the existing WTP are sent to a sedimentation pond. This pond is undersized for the existing maximum day production rates. Because of limited site area, the existing pond cannot simply be expanded to accommodate a further increase in plant production capacity. New, engineered residuals treatment processes will be needed. Such processes can be designed to reduce the amount of

discharged waste flow, resulting in more efficient use of the Elk Creek water supply.

- Alternative 2 New WTP Site – Backwash handling for a new WTP will be needed. Given the space available on a new site, it may be possible to treat residuals stream with sedimentation ponds. Modest backwash handling improvements are still needed in Alternative 2 at the existing WTP given its current poor performance.

Other Considerations –

- Structural – For Alternative 1, the existing WTP building can be used for the new treatment units and expanded to accommodate increased unit size as well as additional items such as chemical feed and storage, additional pipes, pumps and mixers. This is in contrast to construction of an entirely new WTP structure associated with Alternative 2.
- Power/Site Access – While power and access to the existing WTP site already exist for Alternative 1, construction of a new WTP in Alternative 2 will result in additional costs for these items.
- Additional Infrastructure – Both site alternatives will have significant costs associated with yard and plant piping. For Alternative 2, connective piping must also be installed from the existing raw and potable water mains on Midland Ave. A new intake may also be installed to obtain raw water from Elk Creek close to the new WTP site.
- Cost - A preliminary analysis of construction costs was performed to compare site alternatives (a final cost comparison associated with treatment technology selection is provided in a later section). The purpose of this analysis was to determine if one alternative is more economically feasible than another. Results indicate that, at a minimum, Alternative 2 (construction of a WTP at a new location) will cost 40% to 60% more than Alternative 1. Furthermore, centralizing the treatment facilities on a single site will provide long-term benefits to the Town in operations efficiency and reduced equipment replacement costs. Based on these comparisons, SGM recommends that the Town of New Castle upgrade and expand the existing WTP on its current site.

B. Treatment Technology Alternatives

In addition to evaluating different water treatment facility locations in the Town, this project also evaluated different treatment processes. Three technologies to use in upgrading/expanding the existing WTP were examined. Primary selection criteria are given below.

- Performance/Reliability – Given the highly variable and often challenging nature of Colorado River water, the treatment technology selected needs to be robust. For some of the primary technologies examined, additional pretreatment of Colorado River water is required before the units can treat the water efficiently and effectively.

- Ease of Operation – For numerous reasons, Western Slope water systems are chronically understaffed and/or have high staff turnover. For the Town of New Castle, the right treatment technology will not only produce ample, safe drinking water meeting all regulations, but also will be reliable and operationally straightforward. The best process will be simple to learn, similar in principle to the existing Microfloc process, and stable in its performance.
- Cost – Capital costs were calculated for all alternatives and long-term O&M costs considered qualitatively in this analysis.
- Energy Consumption – Each treatment process considered has a unique set of process equipment, including pumps, mixers and separators. The energy required for these pieces of equipment has long-term implications associated with operational costs, carbon emissions, and thus sustainability.
- Footprint - The existing WTP site has limited space for expansion. Space requirements were determined and conceptual layouts developed for each treatment process.
- Similarity to Existing Process – As noted under "Ease of Operation," processes that are similar in operating principle to the existing Microfloc process will be given preference due to the benefit of simplified operation.

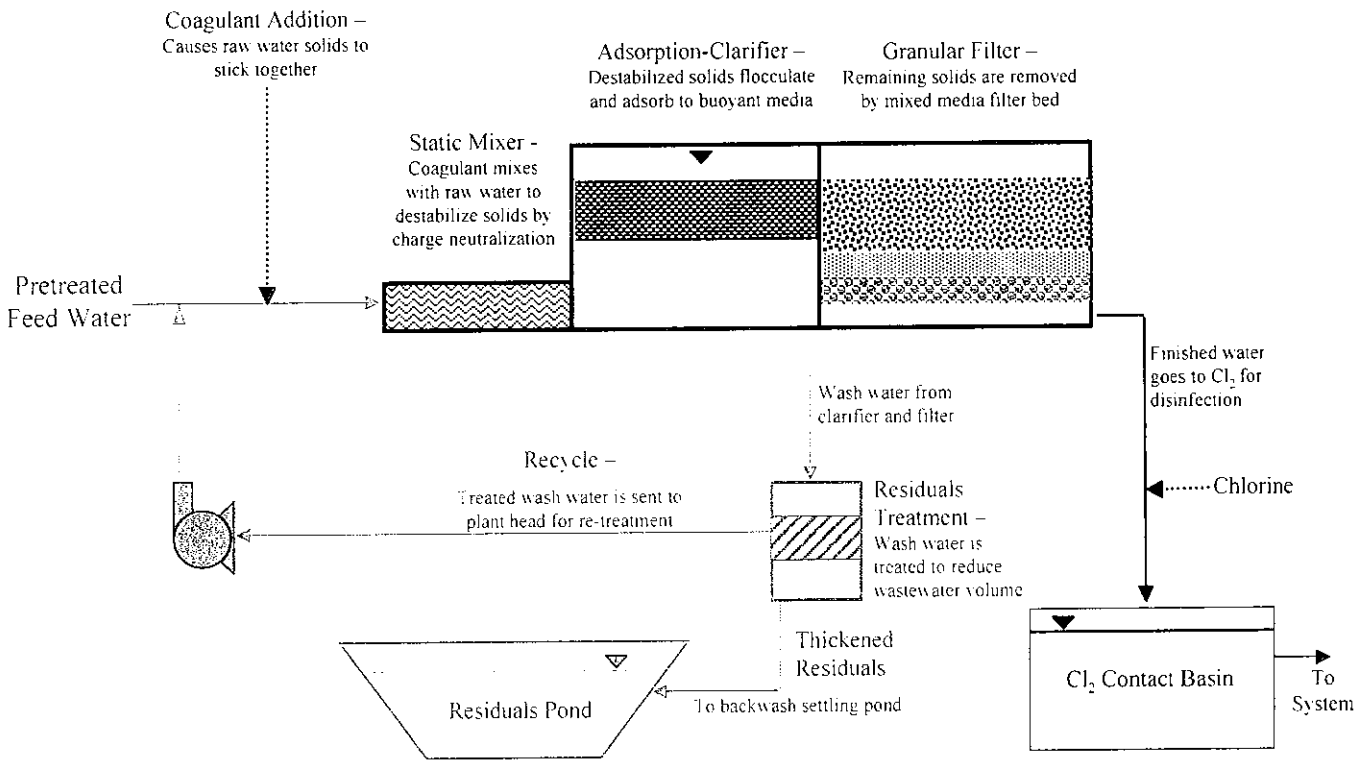
Microfloc Treatment with Actiflo Pretreatment

This treatment option would consist of replacing the existing WaterTech filters at the Elk Creek WTP with two 2-MGD Microfloc treatment units. These new units would be larger versions of the plant's three existing 0.5-MGD Microfloc units. With Microfloc (see Figure 6), raw water is dosed with coagulant and mixed through an in-line, rapid mixer. The process combines conventional flocculation and clarification into a single adsorption-clarification process where coagulated water flocs adsorb to a proprietary floating media. This is followed by filtration through a bed of mixed granular media.

The plant's existing Microfloc technology has shown sensitivity to raw water turbidity levels. Spring runoff turbidity levels in Elk Creek can reach 20 NTU and routinely require reducing plant throughput by about 25% during this period. Furthermore, there are many periods during the year when a Microfloc process would be unable to effectively and efficiently treat Colorado River water due to its solids loadings. As such, if Microfloc technology is to be considered, the plant must also be fitted with pretreatment. Different forms of pretreatment were considered. Micro-sand ballasted flocculation and high-rate clarification was selected as the recommended pretreatment process in this scenario. This process is marketed under the name "Actiflo." It is similar to traditional coagulation/flocculation/sedimentation but incorporates additional features that allow it to very effectively handle sharp influent water quality variations and high turbidity loadings in a small footprint. This treatment differs in that "floc" formation is not the primary goal. Instead, high-density, high surface area sand is added as an adsorptive media allowing raw water solids to stick to, and settle with, the sand. Inclined lamella-type plates in the clarifier reduce its design footprint. The Actiflo process is represented by the unit processes upstream of the granular media filtration step depicted in Figure 7.

Though there are many full-scale Actiflo installations in the U.S. and Colorado, it is one of the newer potable water treatment technologies currently being applied. As part of this evaluation, SGM staff visited the Town of Eagle Actiflo-based WTP. That plant treats water from Brush Creek, a source that has 1,000 + NTU turbidities in some spring runoff and summer thunderstorm events. The operator in responsible charge (Bryon McGinnis, 970-328-6678) is very pleased with the process's performance and ease of operation. Coagulant dose is automatically adjusted by computer via a manufacturer-supplied algorithm based on raw water turbidity. The process rarely produces clarified water with turbidity greater than 1.0 NTU.

Figure 6 Microfloc-based Process



Actifloc Treatment (no Pretreatment)

In this option, the two existing WaterTech filters at the East Elk Creek WTP would be replaced by two 2-MGD Actifloc treatment units. No additional pretreatment would be required. Actifloc is a trade name for a product that couples the Actiflo microsand-ballasted, high-rate flocculation/clarification process (described in the previous option) to a mixed media filter in a single, pre-fabricated packaged treatment unit.

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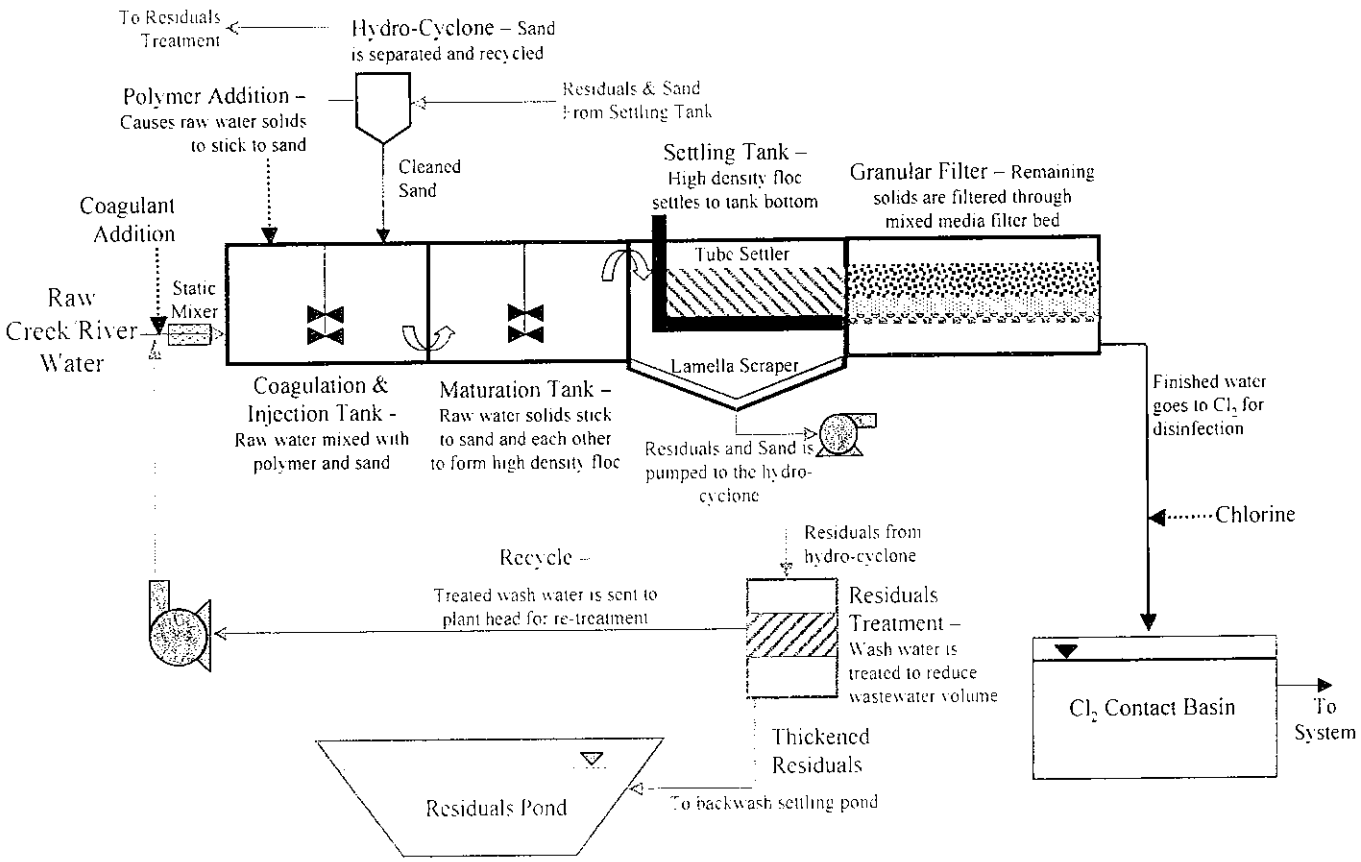
Figure 7 Microsand Ballasted Actifloc Process



Membrane Filtration with Pretreatment

A membrane filtration-based East Elk Creek WTP upgrade/expansion option would consist of replacing the existing WaterTech units with a 2-MGD membrane filtration system with pretreatment. Membranes filter water using a synthetic material with engineered pore sizes of very small diameter, typically in the range of 0.01 to 0.1um. A membrane filter system typically consists of membrane material configured as hollow fibers bundled into modules, grouped together into an array with pressure-driven feed water or vacuum-driven filtered water. Membrane filtration is a treatment technology that has gained increased attention and application in the global water industry over the past 10 to 15 years. The process's popularity stems from its ability to provide an (almost) absolute barrier to particles and pathogenic microorganisms greater in size than the membrane's pores. This characteristic makes particle/pathogen removal efficiency virtually independent of raw water quality or chemical pretreatment and almost assures compliance with state/federal filtered water turbidity regulations. It also makes it an option for compliance with the latest filtration/disinfection regulations, should these be determined to apply to New Castle (based on future sampling results of Elk Creek and Colorado River water). Figure 8 shows a process schematic of the membrane system.

As with the Microfloc process, certain aspects of membrane filtration performance are functions of raw water quality. Membranes alone are not able to fully and efficiently treat Colorado River water under all conditions. First, an additional step to remove dissolved organic carbon (DOC) is needed, as membrane filters are unable to remove this precursor to regulated disinfection byproducts on their own. Second, membrane filter throughput can be significantly reduced by high feedwater turbidities, such as those associated with the Colorado River water. To address these problems, experience has found reducing turbidity and DOC loadings prior to the membrane can increase membrane element life and reduce membrane system size. One successful example can be seen locally at the nearby Town of Silt WTP in which a pretreatment process is used prior to membrane filtration to treat Colorado River water. Therefore, this alternative conceptually includes an Actiflo pretreatment process, though any membrane pretreatment process would ultimately be selected in consultation with the filter system supplier.

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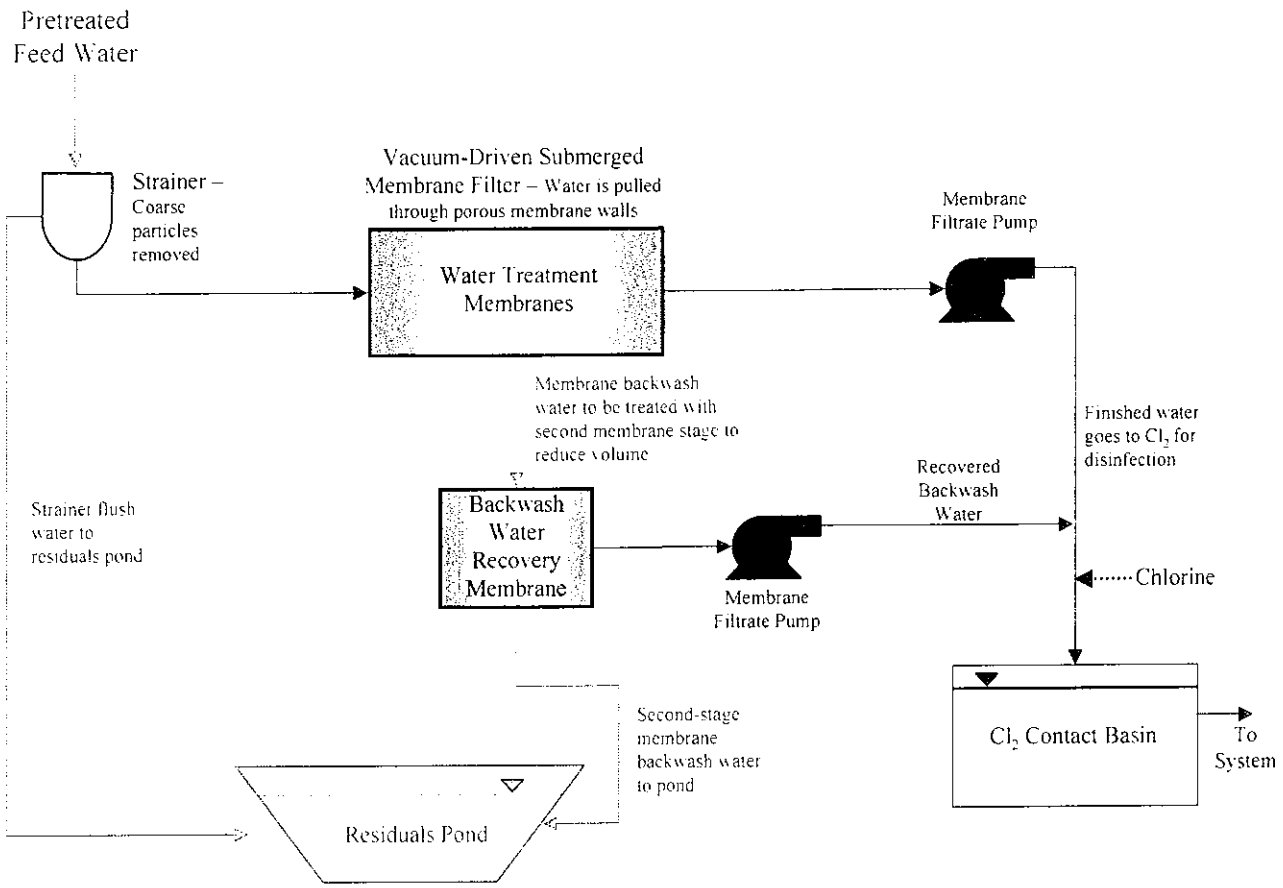
Figure 8 Membrane Filtration Process



Advantages and Disadvantages

Table 10 Treatment Process Advantages and Disadvantages

Treatment Process	Advantages	Disadvantages
Microfloc with Pretreatment	-Familiarity: Current and regional operators have experience with this process -Base Process Simplicity: Maintains the same treatment process throughout the plant -Flexibility: Operators can choose when to run the pretreatment process, thereby creating the potential for operational cost savings. -Minimal Equipment: Large pumps and mixers are not required, minimizing capital and long-term costs as well as energy consumption	-Additional Treatment Required: Microfloc is sensitive to turbidity loading and will require for Colorado River water -Pretreatment Startup/Shutdown: Pretreatment units must be properly maintained when they are not in service - Overall Facility Complexity: Separate pre-treatment and main treatment processes require a facility with more pumps, pipes, and controls - Future Possible Regs Not Addressed Additional disinfection process could be required depending on future source water microbial quality characterization
Actifloc	-Robust: Capable of producing high quality water despite large variations in influent raw water quality -No Separate Pretreatment: No pretreatment reduces facility complexity, space requirements, and capital costs - Similarity of Fundamental Principles Actifloc is still a coagulation-based process with granular media filters, just like Microfloc	-Lack of Operator Familiarity: New Castle operators have not used this technology before; thus, education and training will be required -Abrasive Material: Use of sand in daily operation of pumps and separators will undoubtedly result in a greater degree of preventative maintenance -Additional Residuals Handling Required: Residuals from this process will require addition of conditioning chemicals to enhance their treatment - Future Possible Regs Not Addressed Additional disinfection process could be required depending on future source water microbial quality characterization
Membrane with Pretreatment	-Fail-Safe: Produces high-quality, regulatory-compliant filtered water independent of feedwater quality without delicate chemical-based process reliance. Very reliable. -Addresses Projected Future Regulations: Provides the greatest likelihood of meeting any future microbial/disinfection-related drinking water regulations.	-Life-cycle Cost: Highest capital and long-term O&M costs -Additional Treatment Required: Needs pretreatment for disinfection byproduct control and efficient operations Most Complex Facility: Pretreatment, plus two different filtration technologies creates an overly complex facility.

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7. Recommend Plant Improvements

Based on the results of the analysis presented in Section 6, SGM recommends that the Town upgrade and expand the existing WTP to treat Elk Creek water, and when necessary, Colorado River water. Furthermore, SGM recommends Actifloc as the new treatment technology to replace the existing WaterTech filters and to provide capacity expansion. SGM's planning-level estimated total capital cost (including engineering, survey, permitting, etc.) is $8 million, which also includes capacity/reliability improvements to the East Elk Creek intake. Appendix A provides an itemized cost estimate breakdown. This recommendation is made with input from and agreement with Town staff. The reasons supporting this recommendation are:

1) Replacement of the aging WaterTech equipment will allow the Town to continue to reliably meet water demands and potable water quality standards.

2) Capacity expansion to achieve firm capacity at least equal to peak demands will improve service reliability and equipment preventative maintenance opportunities by allowing a treatment unit to be taken out of service when necessary.

3) The new Actifloc process will allow the Town to effectively and efficiently process Colorado River water, should it be needed in times of drought or emergencies. The current process is not designed to handle all Colorado River water conditions.

4) Capacity expansion is required to meet projected demands additional in-house and irrigation water service demands associated with growth of previously-approved developments within the existing water service area.

5) Improvements to the existing WTP will facilitate the possible future addition of treatment processes, which may be required to meet future drinking water regulations.

6) Improvements to the existing WTP's residuals handling facilities will reduce the magnitude of water plant waste streams and allow for more efficient use of the Elk Creek supply.

7) The new Actifloc process will allow the WTP to effectively treat Elk Creek water during spring runoff conditions and/or conditions arising from surface runoff in wildfire-impacted watershed lands.

Implementation of this project will increase the reliability and capacity of the Town's water production infrastructure to meet the needs of current and future customers within the existing service area. The improvements will increase the Town's ability to provide a safe, consistent potable water supply in the face of future possible droughts, deteriorated raw water quality events, and mechanical failures.

The remainder of this section provides additional details regarding the nature and implementation of the recommended alternative. Figure 9 presents a process flow diagram for the improved plant and Exhibit 1 presents a conceptual facility layout.

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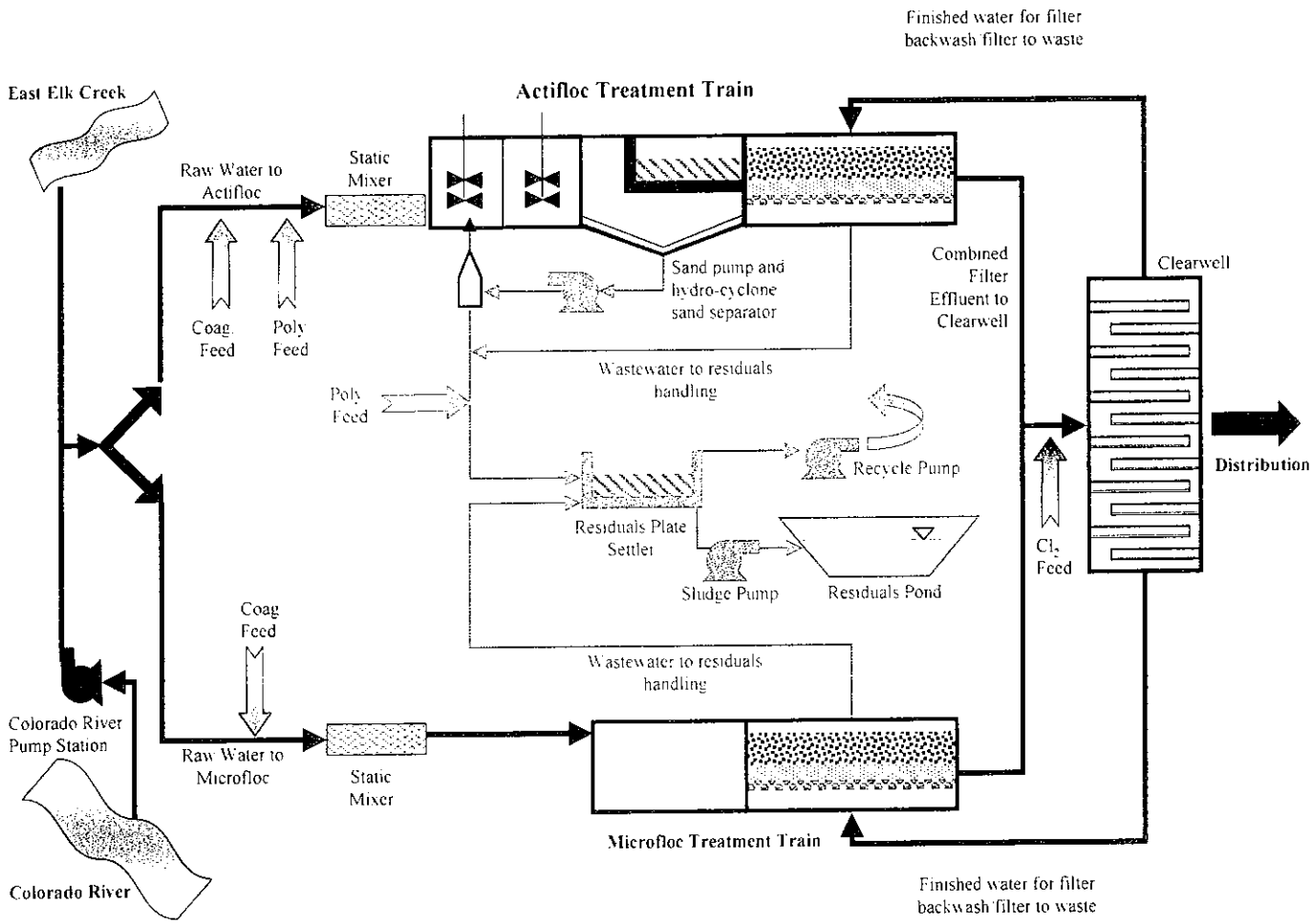
Figure 9 Recommended WTP Process Flow Diagram



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A. *Phasing*

Phasing options for the recommended approach include one phase (2 x 2-MGD units installed immediately to bring the plant capacity up to buildout capacity) or two phases (1 x 2 MGD unit installed at a time to bring the plant capacity up to buildout in stages). Firm capacity requirements define SGM's recommendation for WTP expansion to occur in one phase. Single-phase expansion will immediately improve WTP reliability by providing adequate firm capacity. As stated in Section 5, "firm" capacity represents the plant's capacity with its largest unit out of service. The existing firm capacity of the WTP is 1.2 MGD during spring runoff conditions (as shown in Table 8) and 1.6 MGD during the summer. Under the two-phase option, before phase two is complete, firm plant capacity would be only 1.1 MGD during spring runoff and 1.5 MGD in the summer, less than the existing WTP's firm capacity.

B. Construction Timing and Sequence

Installation of new treatment process equipment at the existing WTP will first require demolition and removal of the existing WaterTech filters. Together these filters produce a nominal 0.55 MGD. Replacement of these filters will likely need to take place during winter months when demands are low and the WaterTech filters are not required to meet demands. With their capacity eliminated, the plant's firm capacity is 1 MGD, nominally. Peak winter production in 2004 and 2005 exceeded 1 MGD, and was 0.8 MGD in 2006. Plant expansion should not be delayed given the plant's limited capacity which will soon make it difficult and more costly to meet demands if treatment problems arise during construction.

Prior to demolition and removal of the WaterTech filters, the plant's sub-grade disinfection contact basin improvements should be completed. These improvements are described in Section F below, and are a pivotal first-step as they will underlie recommended structural and process expansions.

C. Process Demolition and Replacement

Once off-line, the WaterTech filters must be removed and Actifloc filters installed. Backwash pumps south of the existing WaterTech filters must remain in operation during construction to be used by the TM-350s. Therefore removal and replacement must take place via the north side of the plant.

D. WTP Building Expansion

The existing WTP structure will not be large enough to accommodate the installation of the proposed Actifloc treatment units. The existing structure was built in two phases, the first to house the two WaterTech units and the second to house the three TM-350 units. While tight, the width of the WaterTech section of the building is sufficient for the new Actifloc units. SGM recommends that the filtration portion of the new Actifloc units be housed in the existing WaterTech structure, which will be expanded to the north. The structure addition should be approximately 52 ft. wide, 37 ft. long and 18 ft. tall, accommodating not only the mixing and settling processes of the Actifloc units, but also an expanded chemical feed area. Further improvements to this side of the WTP are

recommended to reduce long-term energy consumption and costs. This includes installation of high-efficiency lighting and providing better insulation.

E. Chemical Feed and Storage

Chemical storage at the water treatment plant is located at the plant's northwest corner and will have to be moved in order to accommodate the new Actifloc units. The current system uses individual metering pumps for each of the five treatment units and feed rates to each unit are manually adjusted by plant operators. Chemical storage must be expanded to handle additional chemical needs of the Actifloc system. In so doing, the feed system should also be upgraded with auto-feed capabilities that would be based on raw water flow rates and set dosages. Furthermore, metering and injections points should be reduced to a single point for each of the two treatment technologies at the plant.

In addition to pretreatment chemical feed system upgrades, the chlorine disinfection storage and feed system will also require modifications to accommodate the new plant layout and higher production rate. Chlorine system changes include:

1. Modifying the injection point to accommodate re-routed filtered water piping and chlorine contact basin expansion
2. Integrating the feed controls with the new process
3. Adding a third chlorine-gas feeder ("Auto-Valve") capable of controlling the chlorine feed for larger flow rates
4. Adding a 2nd dual 150-lb. chlorine gas cylinder scale with regulators to reduce change-out frequency and accommodate higher feed rates

F. Contact Basin Expansion

The existing chlorine contact basin is a baffled concrete tank located beneath the existing floor slab supporting the WaterTech units. As indicated in Section 5B of this document, the basin's existing spring/summer capacity is 2-6 MGD. In order to treat the required future peak day production flow rate of 4.1 MGD, and accommodate additional flow required for filter backwash and filter to waste supply, the contact basin needs to be expanded. Although the existing basin has ample capacity now, this expansion needs to occur with the overall plant upgrades required in the near-term due to construction sequencing considerations. Under the buildout conditions described above and including sufficient volume for filter cleaning, approximately 12.5 ft. of additional length is needed.

G. Site Access Road Improvements

Building expansion and relocation of the chemical storage tanks necessitate improvements to vehicular site access. Chemical delivery trucks may be required to drive around the WTP building in order to turn around. While a driveway currently exists at the site, a completed route around the expanded building will be required. This may also require adding or moving the location of the existing access gate, though such details are beyond the scope of this analysis.

H. Additional Pumps

New backwash supply pumps are required for the Actifloc filters. Backwash water comes from the clearwell and is currently pumped to any existing 0.5-MGD Microfloc

filter by two backwash pumps (one duty, and one backup). Installation of two additional pumps is required as the existing pumps will not be large enough to accommodate the new 2-MGD filter units. New pumps will be installed next to the existing ones.

Additionally, low head pumps will also be required to lift raw water into the existing and new packaged treatment units when demands approach that of buildout. This pump station does not need to be installed as part of this project, however, because lower flow rates through the East Elk Creek intake do not yet warrant the need for such a station. SGM recommends that site layout, piping design, hydraulic profile and electrical/control systems be designed to accommodate an easy future addition of this pump station.

I. Expanded Backwash Handling

As described in Section 5, the current residuals settling pond has reached its capacity. Significant upgrades to the WTP's residuals handling system are required to accommodate current and future production rates. Furthermore, space on the WTP site is limited and upgrades cannot consist of simply expanding the size of the existing settling pond. SGM recommends the use of an engineered settling basin with possible chemical pretreatment addition and mixing. This will reduce the volume of residuals and provide the opportunity to recycle the supernatant to the head of the plant for a more efficient use of available water. The thickened residuals will be sent to a settling pond. Some reconstruction of the settling pond will be required to better utilize site area, and provide more vehicle space. Settling pond baffles and piping should also be upgraded at this time. The need for a liner, per CDPHE input will be considered during final design.

J. Future Advanced Disinfection

SGM recommends that consideration be made towards anticipation of regulation changes associated with the Long-Term 2 Enhanced Surface Water Treatment Rule. Possible requirements resulting from this rule includes addition of UV disinfection, and overall design should accommodate such an addition if it is needed in the near future.

K. Intake Improvements

The current East Elk Creek intake, as described in Section 5A, including diversion turnout, settling pond and conveyance pipe was designed to lower plant influent turbidities. The settling pond's predicted loading rate under buildout, peak-day conditions warrant upgrades to aid in its turbidity reduction capability. While this is out of the scope of this design, SGM recommends planning for this upgrade.

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Exhibit 1 – Conceptual Layout of Recommended Alternative

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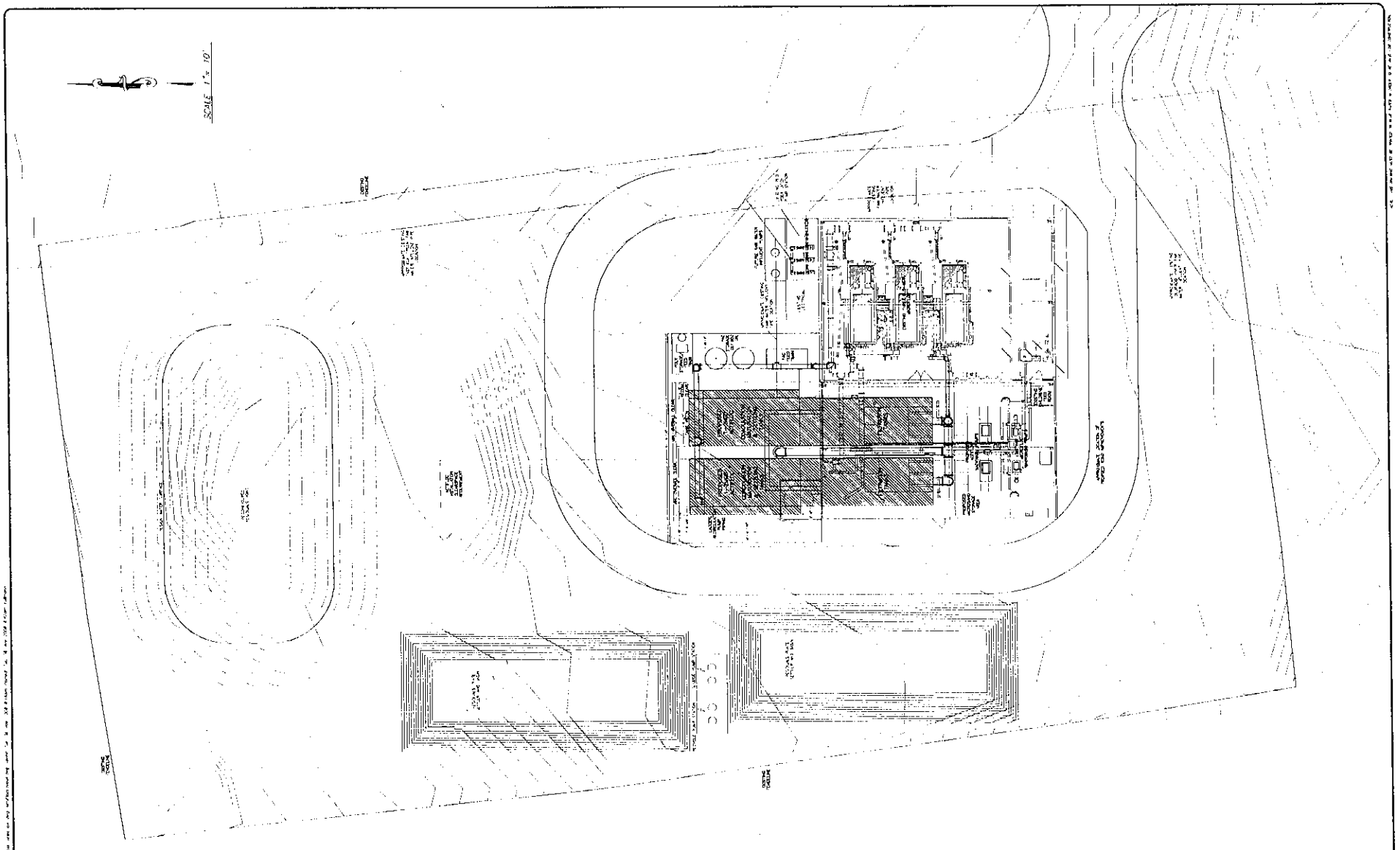

PRELIMINARY
NOT
FOR
CONSTRUCTION

SCHMUESER GORDON MEYER

Town of New Castle
Potable Water Evaluation

Exhibit 1
Conceptual Layout for
Recommended Alternative

1
1

Appendix A – Recommended Alternative Cost Summary

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	Total Cost
Pretreatment Cost	$ -
Treatment Cost	$ 5,991,727
Backwash Cost	$ 2,093,981
Total Cost Estimate	$ 8,085,708
Construction Only	$ 7,219,382
Engineering Only	$ 866,326

Treatment Cost = $ 5,991,727

Description
- Survey existing exterior piping
- Remove 2 WaterTech Filters
- Expand Clearwell Basin 12 S at effluent end
- Expand WaterTech Building for Actiflow Treatment Units
- Install 2 new 2 mgd ActiFloc Filters
- Install New Raw Water Flow Meter to TM-350 and ActiFlocs
- Install New Finished Water Flow Meter to TM-350 and ActiFlocs
- Install New Backwash Flow Meter to ActiFlocs
- Install 2 new Raw Water Low Head Pump with VFD
- Replace/Expand Chemical Holding/Feed System
- Install New Backwash Pumps (2) For 2-MGD Filters
- Miscellaneous Chlorine System Labor and Supplies
- Improve Access Road Around Site
- Additional ActiFloc Capacity = 2.0 mgd From 4 mgd at Capacity

Add 4.0-mgd of ActiFloc in existing Elk Creek WTP Building
Planning-Level Capital Costs

Item Description		Qty.	Units	Unit Cost	Line Cost
Building Expansion					
	Foundation excavation, bedding, backfill	1	ls	$ 12,000	$ 12,000
	Foundation footer	52	cy	$ 750	$ 38,889
	Slab on Grade	52	cy	$ 750	$ 46,750
	Metal Building (frame, walls, roof, insulation, paint)	2444	sf	$ 80	$ 195,520
	Doors, windows (including overhead door)	1	ls	$ 20,000	$ 20,000
	Plumbing/Mechanical/HVAC	1	ls	$ 35,000	$ 35,000
	Electrical and lighting (non-process)	1	ls	$ 30,000	$ 30,000
	Replace existing lighting with energy efficient fixtures	1	ls	$ 20,000	$ 20,000
Old Treatment Process Equipment Demo					
	Disconnect and remove old process units and piping	1	ls	$ 20,000	$ 20,000
	Haul and dispose of old process units and piping	1	ls	$ 10,000	$ 10,000
Expand Contact Basin					
	Excavation	1	ls	$ 7,500	$ 7,500
	Backfill/Bedding	1	ls	$ 5,000	$ 5,000
	Basin Slab	8.4	cy	$ 750	$ 6,308
	Basin Walls	31.7	cy	$ 750	$ 23,795
	Basin Walls	3.4	cy	$ 850	$ 2,849
	Basin Deck	2	ea	$ 500	$ 1,000
	Penetrations	1008	sf	$ 25	$ 25,200
	Baffle Purchase / Installation	1	ls	$ 20,000	$ 20,000
	Upsize outlet pipe capacity	1	ls	$ -	$ -
New Treatment Process Equipment					
	Static Mixer for ActiFlocs, installed	1	ea	$ 10,000	$ 10,000
	Pump Injection Mixer for TM-350s	1	ea	$ 20,000	$ 20,000
	2-MGD ActiFloc Treatment unit	2	ea	$ 875,000	$ 1,750,000
	Filter installation labor & materials	2	ea	$ 35,000	$ 70,000
	Master control panel	1	ls	$ 50,000	$ 50,000
	Raw Water Flow Meter (for New ActiFloc's)	1	ea	$ 10,000	$ 10,000
	Finished Water Flow Meter (for New ActiFloc's)	1	ea	$ 10,000	$ 10,000
	Backwash Flow Meter (for New ActiFloc's)	1	ea	$ 10,000	$ 10,000
	Raw Water Flow Meter (for Ex'st TM-350's)	1	ea	$ 10,000	$ 10,000
	Piping	1	ls	$ 200,000	$ 200,000
	Platforms/Walkways	1	ls	$ 15,000	$ 15,000
	Trolley and hoist system for motors	1	ls	$ 10,000	$ 10,000
	Pipe Coating/lagging	1	ls	$ 30,000	$ 30,000
	Layout accomodations for future UV disinfection	1	ls	$ 30,000	$ 30,000
New Low Head Raw Water Pump Vault					
	Raw Water Low Head Pump	2	ea	$ 25,000	$ 50,000
	VFD	2	ea	$ 7,500	$ 15,000
	Vault Concrete installed	1	ls	$ 20,000	$ 20,000
	Piping	1	ls	$ 10,000	$ 10,000
	Control Panel	1	ls	$ 10,000	$ 10,000
Replace and Expand Coag/Poly Storage and Feed Systems w/Piping					
	SternPac Chemical Tank	2	ea	$ 7,000	$ 14,000
	SternPac Feed Pumps, Piping and Appurtances	1	ls	$ 14,000	$ 14,000
	Concrete Spill Containment	1.0	ls	$ 2,000	$ 2,000
	Polymer storage and feed, installed	1	ls	$ 15,000	$ 15,000
Additional Backwash Pumps					
	Backwash Pump	2	ea	$ 20,000	$ 40,000
	VFDs	2	ea	$ 10,000	$ 20,000
	Pump Trolly Hoist, Beam Assembly and Installation	1	ls	$ 10,000	$ 10,000
	Utility Door	1	ea	$ 4,000	$ 4,000
	Clearwell penetration, disinfection, etc	1	ls	$ 2,000	$ 2,000
Sitework					
	Clearing/grubbing, grading, driveway etc. around exist bu	1	ls	$ 15,000	$ 15,000
Electrical/Controls					
	Process Electrical	1	ls	$ 60,000	$ 60,000
	New electrical service	1	ls	$ 30,000	$ 30,000
	Additional electrical space contingency	1	ls	$ 30,000	$ 30,000
	Controls integration	1	ls	$ 75,000	$ 75,000
Elk Creek Diversion Capacity Expansion					
	Labor and Miscellaneous Supplies	1	ls	$ 125,000	$ 125,000
Chlorine System Capacity Expansion					
	Piping to new feed point	1	ls	$ 3,000	$ 3,000
	3rd Auto Valve	1	ls	$ 7,500	$ 7,500
	New dual 150-lb scale set and regulators	1	ls	$ 5,000	$ 5,000
Mobilization/Demobilization @ 15% Labor & Mat. excluding MicroRac units)		1	ls	$ 227,342	$ 227,342
	Subtotal				$ 3,842,953
Contractor O&P @ 20% and 10% on MicroRac units and MCP		1	ls	$ 732,886	$ 732,886
	Subtotal				$ 4,245,838
Planning Const. Cost Contingency @ 20%		1	ls	$ 849,168	$ 849,168
	Construction Total				$ 5,095,006
One Year of Construction Cost Inflation @ 5%		1	ls	$ 254,750	$ 254,750
	Inflated Construction Total				$ 5,349,756
Engineering Design & Construction @ 10%		1	ls	$ 641,971	$ 641,971
Total Capital Cost					$ 5,991,727

Backwash Handling Cost = $ 2,093,981

Drying Basin

Description:
- Install Actiflo residuals handling mixer and basin
- Install 2.75% capacity floating plate settler and concrete tank
- Install pump vault sludge to discharge pond
- Install holding vault with submersible pumps and meter for backwash supernatant recycle
- Replace Backwash and Return Flow Piping
- Reconfigure Discharge Pond in New Configuration

Backwash treatment basin (700gpm sludge collector + equalization basin
Planning-Level Capital Cost:

Item Description		Qty.	Units	Unit Cost	Line Cost
Site Preparation					
	Clear/Grub	1.00	ls	$ 2,500	$ 2,500
	Finished Grading	-	ls	$ 15,000	$ 15,000
	Erosion Control	1.00	ls	$ 7,500	$ 7,500
Actiflo Residuals Conditioning					
	Polymer storage, aging, and feed system	-	ls	$ 20,000	$ 20,000
	Injection and mixing in pretreatment building	-	ls	$ 7,500	$ 7,500
	30-gpm, 20-minute Slow-Mix Contact Basin	1.0	ls	$ 25,000	$ 25,000
Plate Settler and Tank					
	Excavation - First Unit	1028	cy	$ 20	$ 20,551
	Excavation - 2nd Unit	822	cy	$ 20	$ 16,441
	Bedding/Backfilling	2	ea	$ 10,000	$ 20,000
	Concrete Basin - Walls - First Unit	101	cy	$ 750	$ 75,556
	Concrete Basin - Slab - First Unit	32	cy	$ 750	$ 24,083
	Concrete Basin - Walls - 2nd Unit	67	cy	$ 750	$ 50,000
	Concrete Basin - Slab - 2nd Unit	32	cy	$ 750	$ 24,083
	Floating plate unit with sludge collector, 700 gpm	2	ea	$ 200,000	$ 400,000
	Unit installation labor & materials	2	ea	$ 25,000	$ 50,000
Sludge Pump and Vault					
	Sludge Pumps	2	ea	$ 10,000	$ 20,000
	Vault Concrete installed	-	ls	$ 30,000	$ 30,000
Recycle Pump and Vault					
	Recycle Pumps	2	ea	$ 10,000	$ 20,000
	Vault Concrete installed	-	ls	$ 20,000	$ 20,000
	Flow Meter	1	ea	$ 10,000	$ 10,000
Reconfigure Discharge Pond					
	Earthwork	-	ls	$ 50,000	$ 50,000
	Baffles	-	ls	$ 25,000	$ 25,000
	Piping	-	ls	$ 10,000	$ 10,000
Yard Piping					
	Recycle, sludge discharge, overflow, etc.	-	ls	$ 75,000	$ 75,000
Electrical/Controls					
	Electrical	-	ls	$ 30,000	$ 30,000
	Controls	-	ls	$ 50,000	$ 50,000
Mobilization/Demobilization (15% Labor & Mat. excluding Settling Units)		-	ls	$ 104,732	$ 104,732
	Sub-total				$ 1,202,946
Contractor O&P @ 30% (only 10% on settling units)		-	ls	$ 280,884	$ 280,884
	Sub-total				$ 1,483,830
Planning Const. Cost Contingency @ 20%		-	ls	$ 296,766	$ 296,766
	Construction Total				$ 1,780,596
One Year of Construction Cost Inflation @ 5%		-	ls	$ 89,030	$ 89,030
	Inflated Construction Total				$ 1,869,626
Engineering Design & Construction @12%		-	ls	$ 224,355	$ 224,355
Total Capital Cost					**$ 2,093,981**

CHAPTER 13.16 UTILITY CHARGES

13.16.010 Definitions.
As used in this chapter:

"Disabled person" means a person whose physical or mental condition prevents him or her from performing substantial gainful work, which condition is expected to last for twelve (12) months or more, or a person receiving social security benefits as a disabled person.

"Equivalent residential unit" ("EQR") means a number related to the volume of water used by a single-family residential unit housing a statistical average of three and one-half persons and having not more than two thousand five hundred (2,500) square feet of irrigated lawn or garden. The volume of water used by all other uses is considered to bear the same ratio to the water use of an average single-family residence as the EQR value assigned to such uses in the table of EQR's as set forth in Section 13.20.060 bears to the EQR value assigned to the single-family residence in such table.

"Residential unit" means one or more rooms in a building or portion thereof used for residential occupancy, occupied by one family, living independently of any other family.

"Senior citizen" means a person sixty-five (65) years of age or older. (Ord. 2002-6 § 2 (part): prior code § 11-14-010)

13.16.020 Water rates.
A. Monthly rates for water service are:

	Rate per EQR for up to fifteen thousand (15,000) gallons consumed per EQR
Users within town limits other than "special users" identified below	$25.00
Users outside town limits other than "special users" identified below	$37.00
Special Users	
Users within town limits in owner-occupied residences occupied by one or more senior citizens	$18.00
Users outside town limits in owner-occupied residences occupied by one or more senior citizens	$26.00
Schools	$12.50

B. For consumption in excess of fifteen thousand (15,000) gallons per EQR, users shall be charged the following amounts in addition to the charges stated in subsection A of this section:

	Rate per gallon
Users within town limits	
For each gallon from 15,001 to 25,000	$.00225
For each gallon from 25,001 to 35,000	$.00350
For each gallon from 35,001 to 45,000	$.00700
For each gallon in excess of 45,000	$.02100
Users outside town limits	
For each gallon from 15,001 to 25,000	$.00325
For each gallon from 25,001 to 35,000	$.00525
For each gallon from 35,001 to 45,000	$.01000
For each gallon in excess of 45,000	$.03000

C. Summer Surcharge for Nonmetered Users. The rates set forth in subsection B of this section shall apply only to users with water meters equipped with remote readouts installed and maintained in locations that are convenient to the town's meter readers as determined by the town in its sole discretion. All other users shall be considered "nonmetered users" and shall be assessed a surcharge for the period from May first through September thirtieth of each year equal to seventy-five dollars ($75.00) per EQR per month in addition to the applicable minimum monthly charge set forth in subsection A of this section. Nothing in this subsection shall relieve any user of the requirement to have and maintain an operational meter in accordance with Section 13.12.030.

D. Broken Meters. In the event that a water user's meter becomes broken or ceases to function, such user shall be charged an estimated amount based upon the amount of water used by such user during the same month of the prior year. If no such data is available, or if the meter remains broken or nonfunctional for three consecutive months, such user shall be treated as a nonmetered user in accordance with subsection C of this section. Nothing in this subsection shall relieve any user of the requirement to have and maintain an operational meter in accordance with Section 13.12.030.

E. Water Theft. Any person using town water without proper authorization or without the payment of a tap fee shall be liable to the town for the use of such water at the rate of ten dollars ($10.00) per one thousand (1,000) gallons. This fee shall be in addition to any civil or criminal penalties otherwise provided by law.

F. Tanker Rates. The town administrator shall have the discretion to permit water tankers to fill mobile tanks with town water on an occasional, temporary basis. Such users shall be charged at the rate of nine dollars ($9.00) per one thousand (1,000) gallons.

G. Reserve for Capital Improvements. One dollar ($1.00) per month of water service charges collected by the town from all users except senior citizens is reserved for capital improvements to the water treatment facilities of the town. (Ord. 2007-E-4 § 2)

Chapter 13.28 WATER CONSERVATION

13.28.010 Wasting of water prohibited.

A. Prohibition. Consumers of water supplied by the town shall prevent unnecessary waste of water and shall keep all water outlets closed when not in actual use. Hydrants, urinals, water closets, bathtubs and other openings must not be left running for any purpose other than the use for which they were intended, and all such fixtures must be kept in good repair. The escape of water from the premises upon which water is being utilized shall be prima facie evidence of wasting of water.

B. Rationing. At any time the water available to the town is insufficient to provide unlimited usage to all consumers, the town administrator or town council shall be authorized and empowered to ration and limit the usage of water for other than in-house uses for such periods of time and under such rules and regulations as the town administrator or town council shall from time to time adopt. Rationing and limitation of usage shall become effective on the day following the publication in a legal newspaper of general circulation in the town of the regulations governing the rationing and limitation upon such water usage.

C. Suspension of Service. Water service shall be discontinued to all persons who waste water or who violate any rule or regulation governing the rationing or limitation of usage of water. Such service shall not be restored until the cause of waste has been corrected or the violation of such rules and regulations has been abated and until the consumer has paid the sum of five dollars ($5.00) to cover the cost of reestablishing service.

D. Penalties. A person found guilty of violating any provision of this section shall be punished by a fine of not more than three hundred dollars ($300.00) or by imprisonment not to exceed ninety (90) days, or by both such fine and imprisonment. Upon first conviction, the fine imposed shall not be less than five dollars ($5.00); upon second conviction, the fine imposed shall not be less than ten dollars ($10.00); and on the third conviction, the fine imposed shall not be less than fifteen dollars ($15.00). A person shall be guilty of a separate offense for each and every day during any portion of which a violation of any provision of this section is committed, continued or permitted by such person. (Ord. 2002-5 § 4 (part); prior code § 11-16-010)

13.28.020 Summer water use restrictions.

Due to high flow demands through the town's water distribution system during summer irrigation months and the town's limited water supply, the following watering restrictions shall apply each year:

A. Restriction Period. The watering restrictions shall be in effect yearly commencing at twelve a.m. on May first and continuing until twelve a.m. on October first.

B. Application. The watering restrictions only apply to use of the town's potable water. Property owners who have a private well, raw water system, or some other alternative water source are not restricted in their use of that water.

C. Irrigation Restrictions. Summer irrigation watering shall be limited to four hours per day, between the hours of twelve a.m. to ten a.m. and six p.m. to midnight, and shall be limited to every other day based on odd and even address numbers. Addresses ending in odd numbers may irrigate on odd days, and addresses ending in even numbers may irrigate on even days. The irrigation restriction applies only to the irrigation of lawns, trees, shrubs and other vegetation planted in the ground.

D. Exemption Permit. An exemption permit may be issued to a customer during one calendar year. The town may issue no greater than one exemption permit to a customer for the purpose of watering newly installed landscaping, lawns, and trees. The customer shall prominently display a copy of the exemption permit in the area to be watered. The exemption permit shall authorize the customer to water during the no use period. The exemption shall be issued by the town for a period of thirty (30) days.

E. Recreational Water Use. Water use restrictions shall not apply to children's games or activities that utilize water so long as at least one child is actively participating in the game or activity while the water is being used. Unattended running sprinklers or water toys shall be subject to fines applicable to unauthorized irrigation.

F. Restrictions on Town. The town government shall abide by the watering restrictions and exemptions set forth in this section, except that the town is not restricted in its use of water for street cleaning or emergency purposes.

G. Construction Water. Town water may be used for construction purposes from a hydrant or otherwise, including but not limited to tire washing, dust suppression, and to clean construction debris from streets, only with a valid permit from the town or pursuant to an authorized sale of bulk water.

H. Fine Schedule. The following fines shall be issued for violations of this section:
1. First offense during a calendar year: written warning;
2. Second offense during a calendar year: twenty-five dollar ($25.00) fine;
3. Third offense during a calendar year: one hundred dollar ($100.00) fine;
4. Additional offenses during the same calendar year: two hundred dollar ($200.00) fine, plus the town may disconnect water service until the fine is paid and the offender has provided written assurances of future compliance. The town may assess a reconnection fee as set by the town's fee schedule.

Parties may avoid paying a fine by submitting proof to the town administrator that they have set up a watering system with a timer, either with aboveground hoses or a permanent buried system, sufficient to ensure future compliance with the provisions of this section. (Ord. 2007-11 § B(17); Ord. 2003-6 § 2: prior code § 11-16-020)