December 5, 2019

Ms. Joanna Williams
State Engineer's Office
1313 Sherman Street, Room 818
Denver, CO 80203

Via email: Joanna.Williams@state.co.us

Re: Application for a Substitute Water Supply Plan for Town Center Metropolitan District pursuant to C.R.S. 37-92-308(5) from March 1, 2020 through February 28, 2021

Dear Ms. Williams,

On behalf of Town Center Metropolitan District (TCMD), D2 Consultants (D2) is requesting approval of a Substitute Water Supply Plan pursuant to §37-92-308(5) to replace depletions to First Creek from pumping one well and an infiltration gallery on a tributary to First Creek, tributary to the South Platte River in former Water District 2, Division 1. Approval is being requested for a period of one year starting March 1, 2020. This SWSP is being submitted without an application for approval of the proposed augmentation plan. TCMD will file a Water Court application for the proposed augmentation plan in the future, and at that time will request approval of this SWSP pursuant to C.R.S. 39-92-308(4). A copy of the written notice that was provided to all parties on the Division 1 Substitute Water Supply Plan notification list is included in Attachment A.

Summary

Town Center Metropolitan District (TCMD) will be responsible for filling and maintaining water levels in two aesthetic ponds in the Green Valley Ranch, East (GVR East) community which is currently under construction. GVR East is located in Sections 13 and 24 of Township 3 South, Range 66 West, Sixth Meridian. The centroid of the two ponds will be located adjacent to a tributary to First Creek, in the NW 1/4 of the NW 1/4 of Section 24, Township 3 South, Range 66 West, approximately 250 ft from the North section line and 631 feet from the West section line (see Figure 1). The ponds will be hydraulically connected via pipeline with water flowing from the East Pond to the West Pond. The West Pond will have an outlet structure to overflow excess water back to the First Creek tributary. Both ponds will be lined and will have a combined surface area of 1.83 acres and combined volume of 7.6 af. After the initial fill, water demand will be limited to the evaporative losses from the ponds. Installation of the ponds will begin in 2019 and will continue into 2020. The initial fill is estimated to begin March 1, 2020.

The plan seeks approval to offset depletions with return flows from nontributary ground water used to irrigate the Green Valley Ranch Golf Course and surrounding streetscape, or, if necessary, nontributary

ground water pumped directly to First Creek. The return flows proposed to replace depletions were adjudicated under the Decree for case number 2004CW28 (Attachment B). The nontributary ground water pumped directly to First Creek to replace depletions (if necessary) will be withdrawn from eight (8) existing wells which were adjudicated in Case Nos. 82CW488 and 84CW030 (Attachment B). This report outlines the proposed plan of operation and the method for calculating depletions. The purpose of the Substitute Water Supply Plan is to 1) maximize TCMD's water resources, 2) meet demands from construction at the Green Valley Ranch, East development and 3) provide operational flexibility.

Proposed Pond Evaporation

The estimated monthly evaporation from the proposed ponds was calculated using the State-approved method for shallow lakes with elevations below 6,500 ft msl as described in the Colorado Division of Water Resources General Administrative Guidelines for Reservoirs (Amended February 2016) and described by Dick Wolfe and Richard Stenzel in their 1995 paper on lake evaporation. The estimated monthly evaporation summarized in Table 1 is based upon average annual evaporation atlases in NOAA Technical Report NWS 33 for shallow lakes and total surface area of 1.83 acres. The annual evaporation is estimated to be 6.87 acre-feet (AF).

Table 1 – Estimated Monthly Evaporation from the Proposed Ponds (in acre-feet)

Month	SEO Evaporation <6,500 ft	Estimated Annual Evaporation (inches)	Net Pond Evaporation (AF)
		45in	1.83 acres
January	3.0%	1.35	0.21
February	3.5%	1.58	0.24
March	5.5%	2.48	0.38
April	9.0%	4.05	0.62
May	12.0%	5.40	0.82
June	14.5%	6.53	1.00
July	15.0%	6.75	1.03
August	13.5%	6.08	0.93
September	10.0%	4.50	0.69
October	7.0%	3.15	0.48
November	4.0%	1.80	0.27
December	3.0%	1.35	0.21
Total	100.0%	45.00	6.87

Proposed Alluvial Wells and Infiltration Gallery

TCMD proposes to pump alluvial ground water from an existing well (Permit No. 313629) which will be converted to a production well upon approval of this SWSP, and a proposed infiltration gallery, both of which will be completed in the alluvial aquifer of a tributary to First Creek. The well and the infiltration gallery are located within 100 feet of the First Creek tributary; therefore, per Attachment to Policy 2003-2 *General Guidelines for Substitute Water Supply Plans Submitted to the State Engineer Pursuant to Section 37-92-308, CRS (2003)* depletions are assumed to be instantaneous.

- The well is located in the NW 1/4 of the NW 1/4 of Section 24, Township 3 South, Range 66 West, approximately 250 ft from the North section line and 631 feet from the West section line.
- The infiltration gallery will be located in the NW 1/4 of the NW 1/4 of Section 24, Township 3 South, Range 66 West, approximately 610 ft from the North section line and 943 feet from the West section line.

A well permit application to convert the well to a production well (up to 20 gpm production capacity) and a well permit application for the infiltration gallery (production to be determined after construction) will be submitted shortly in conjunction with this SWSP. There are no alluvial wells within a 600-foot radius of the proposed diversion points; therefore, consent of adjacent well owners is not an issue.

Replacement Water

The plan seeks approval to offset depletions with return flows from nontributary ground water used to irrigate the Green Valley Ranch Golf Course and surrounding streetscape, or, if necessary, nontributary ground water pumped directly to First Creek. The return flows which are proposed to replace depletions were adjudicated under the decree for case number 2004CW28 which is provided in Attachment B. Return flows from the golf course irrigation are calculated using a glover analysis and rely on estimated deep percolation percent which is updated annually and is based upon a rolling average of the most recent three years. Return flows from the streetscape irrigation are estimated based upon two percent (2%) overspray and fifteen percent (15%) deep percolation which are lagged using a glover analysis. Historically, approximately 60 AF per year of return flows go unused by TCMD and are available to offset depletions from the proposed pond(s) evaporation and initial fill. The average unused return flows for the past five years are summarized in Table 2 below.

Table 2 – Historical Monthly Augmentation Credit to First Creek from TCMD Irrigation (in acre-feet)

AVG AUGMENTATION CREDIT TO FIRST CREEK 2014 to 2019 (AF)	
Month	**Average**
January	2.26
February	2.99
March	3.36
April	3.74
May	5.98
June	5.58
July	5.11
August	4.88
September	8.28
October	7.62
November	5.73
December	4.61
Total	60.14

If irrigation return flows are insufficient to meet the depletion (for example for the initial fill), TCMD will pump nontributary ground water directly to First Creek to offset depletions. The water rights withdrawn from TCMD's eight (8) existing nontributary ground water wells were adjudicated in Case Nos. 82CW488 and 84CW030. Table 3 summarizes the current production capability of the existing wells. TCMD releases water directly to First Creek from Pond 12, located on the Green Valley Ranch Golf Course. There are no intervening water rights in the approximately 1.5 miles between where the proposed alluvial diversions will occur and where the replacements will be released back to First Creek. Therefore, no water rights are adversely impacted. (See Figure 1).

Table 3 – Production Capacity of TCMD's Existing Nontributary Wells

Well #	Aquifer	Permit #	Rate (gpm)	Monthly (AF)
1	Lower Arapahoe	053881-F	50	6.6
2	Upper Arapahoe	053883-F	50	6.6
3	Lower Arapahoe	053882-F	50	6.6
4	Upper Arapahoe	053884-F	75	9.9
5	Upper Arapahoe	055266-F	25	3.3
6	Laramie-Fox Hills	055863-F	100	13.3
7	Laramie-Fox Hills	059200-F	95	12.6
8	Lower Arapahoe	060703-F	50	6.6
		Total	495	65.6

Summary and Accounting

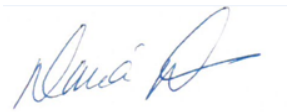
TCMD proposes to maximize its irrigation return flows and nontributary ground water resources by using irrigation return flows from nontributary ground water applied to the Green Valley Ranch Golf Course and surrounding streetscape to offset out-of-priority depletions to the tributary to First Creek from a proposed alluvial well and infiltration gallery which will be used to maintain water levels in two proposed ponds. Nontributary irrigation return flow credits (IRF) will be calculated per the terms and conditions of the Decree for Case No. 2004CW28. Out-of-priority depletions from the diversions to the tributary to First Creek alluvium will be replaced on a monthly basis with nontributary return flow credits or, to the extent required by the water commissioner, by pumping nontributary water directly into First Creek.

Accounting of water use by TCMD will be provided monthly to the Division Engineer and to the Water Commissioner. All diversions used by TCMD will be metered. The proposed accounting will occur monthly on the draft form provided in Attachment C. The contact person for the water rights accounting is as follows:

Daria Drago, P.E., PMP
D2 Consultants, LLC
8252 Union Street
Arvada, CO 80005
(303) 564-0509
drago@d2consultants.com

Sincerely,

D2 Consultants, LLC



Daria Drago, P.E., PMP

Figure 1 – Green Valley Ranch SWSP Location and Features

Attachment A – Notification Distribution List

Attachment B – Water Court Cases / Water Rights

Attachment C – Proposed Accounting Form

ATTACHMENT 1

SWSP NOTIFICATION DISTRIBUTION LIST

ATTACHMENT 2

WATER RIGHTS DECREES

ATTACHMENT 3

DRAFT ACCOUNTING FORM