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May 24, 2016

Tom Fayram, Deputy Director
Water Resources Division
Public Works Department
County of Santa Barbara
123 E. Anapamu Street
Santa Barbara, CA 93101

**Subject: Groundwater Investigations and Development,
North Fork Ranch, Cuyama, California**

Dear Mr. Fayram:

Cleath-Harris Geologists (CHG) has been working with the owners of North Fork Ranch to explore and develop groundwater resources near Schoolhouse Canyon Road and Hwy 166 in Northern Santa Barbara County. For your information, we would like to provide you with a history of this effort.

In Fall 2013, CHG was engaged to explore the feasibility of sustainable groundwater development in this area by Brodiaea, Inc., which was interested in potentially acquiring a property in this area for the development of wine-grape vineyards. The property was known as the "North Fork Ranch" and consisted of roughly 9,000 acres as depicted in the attached map. CHG initially reviewed published reports and maps of the geology and hydrogeology of the ranch and information on the wells on the ranch. Based on these initial studies, exploratory wells were sited, drilled, constructed and tested to verify the findings of our initial studies. The verified findings led to a well drilling program to develop the groundwater resources. The studies and exploratory activities developed significant findings related to groundwater in this area of the Cuyama Valley, which are discussed in the following paragraphs.

The geologic reports and maps of the area show that near flat-lying alluvial deposits are beneath the flood plain and stream channel of the Cuyama River and are unconformably underlain by folded and faulted older sedimentary formations including the terrestrial beds (Plio-Pleistocene age Morales Formation), and at greater depth, more consolidated sedimentary formations that are characterized as nonwater-bearing by the US Geological Survey Water Supply Division (Open File Report 1947-66). The geologic maps prepared by T.W. Dibblee (1:125,000 scale USGS Miscellaneous Geologic Investigations Map I-757 and 1:24,000 scale Dibblee Foundation Maps DF-178, 181 and 183) show that the lower portion of the Morales Formation is mostly limestone and lacustrine clay beds and is mapped as Tmol or Tmoc. The upper portion of the Morales Formation is mostly conglomerates and



sandstone is mapped as a separate member (Tmos). The contact between the upper and lower members of the Morales Formation was identified as the base of the permeable sediments.

The folding and faulting of the Morales Formation on and adjacent to the ranch has resulted in a synclinal structure southwest of the Russell fault and associated other faults (including the Whiterock and the Turkey Trap Ridge fault). These faults have offset the Morales Formation and, as a result, separate this portion of the Cuyama Valley from the main groundwater basin area. The axis of the synclinal structure is mapped by Dibblee north of the Cuyama River and the contact between the upper and lower members of the Morales Formation on the southern limb of this syncline is south of State Route 166.

Based on our geologic mapping and review of published maps, the upper member of the Morales Formation was determined to hold potential for groundwater development. CHG conducted an extensive documentary review to further define the groundwater-bearing upper member of the Morales Formation, including an analysis of geophysical surveys and exploratory oil well logs from the immediate area. We observed and oversaw the drilling of 4 test wells, including an analysis of down-hole geophysical logs. These investigations were used to define the areal extent and base of the permeable sedimentary beds within the synclinal fold and individual aquifers within the upper Morales Formation.

Following this review and the resulting development of a hydrogeologic model of the northern portion of the ranch, CHG concluded that the Russell and Whiterock faults are impediments to groundwater flow from the Cuyama Valley Groundwater Basin east of the North Fork Ranch. Tectonic activity of faulting and folding have created a shallow, synclinal basin, which we reference as the "Ruby Star Basin" (an old name for the ranch), underlying a surface area of approximately 2,000 acres. The confines of this small basin are completely contained within the North Fork Ranch.

CHG estimated that the Ruby Star Basin: A) has 54,000 acre-feet of groundwater in storage; B) the available operational groundwater in storage is 8,000 acre-feet; and C) about 2,000 acre-feet of average annual recharge with significant recharge, mostly occurring when there are flows of sufficient volume and duration in the Cuyama River and its tributary streams.

The "Construction of 3-D Geologic Framework and Textural Models for Cuyama Valley Groundwater Basin, California" (Scientific Investigations Report 2013-5127) report and the "Geology, Water Quality, Hydrology, and Geomechanics of the Cuyama Valley Groundwater Basin, California 2008-2012" (Scientific Investigations Report 2013-5108) published by the USGS and the Santa Barbara County Water Agency were prepared during the same year as our studies. The USGS 3-D Model study provided a broader overview of the the Cuyama Valley groundwater basin. Two significant portions of the report relate to the characterization of the Morales Formation and to the bounding effects of the Russell fault. Important discussions related to the Dibblee mapped contact of the upper and lower members of the Morales Formation are provided in this report. Other geologists have



defined the upper member of the Morales Formation as Older Alluvium. Whether the deformed sand and gravel beds are considered as upper Morales Formation or Older Alluvium, the top of the underlying clayey Morales Formation member can be considered the base of the permeable sediments. The Russell fault is shown on the maps in the report (Figures 4 and 15 in particular) to be a significant structural feature in the basin. Southwest of this fault, the top of bedrock is at a much higher elevation (as much as 500 meters offset) than to the northeast. More definitively, the USGS Scientific Investigations Report 2013-5108 Figure 1 identifies the Russell fault as the boundary of the Cuyama Valley groundwater basin. This boundary is different than the boundary established by the California Department of Water Resources Bulletin 118.

The conclusion reached from these investigations was that there should be a sustainable safe yield from the Ruby Star Basin of approximately 2,000 acre feet annually. Based on this conclusion, Brodiaea, Inc., purchased the North Fork Ranch and began development of groundwater production wells.

Brodiaea, Inc., has planned a phased development of approximately 1,000 acres of vineyard on this property, which should require average extractions of less than the estimated safe yield.

Eleven production wells have been drilled within the Ruby Star Basin, as shown in the attached aerial map. The depth to groundwater within this basin was found to be very shallow. Depth to water varies from 0 to 37 feet (several wells had artesian flow). The fact that these levels are so shallow while the groundwater levels in the Cuyama area are very deep is further evidence that groundwater extractions in the Cuyama Valley Groundwater Basin has no significant impact on the Ruby Star Basin and that the overdraft conditions do not exist in the Ruby Star Basin.

Because of the impediments to groundwater flow (the faults upstream and north of the property) and the areal limit of the aquifer to the south and west, extractions from wells tapping the Ruby Star Basin on the North Fork Ranch will not impact the Cuyama Valley Groundwater Basin or properties south, north and west of the North Fork Ranch. The base of permeable sediments in the Ruby Star Basin rapidly gains elevation to the west and the south, terminating this basin well before it reaches the North Fork property boundary. The properties south of the North Fork Ranch are more than 3.5 miles from the wells constructed in the Ruby Star Basin along the Cuyama River and at least 600 feet higher in elevation. Extractions from these wells on the North Fork Ranch will have no effect on wells at these properties. If anything, the extractions of these landowners would reduce recharge to the Ruby Star Basin due to reduced surface water runoff from that portion of the Cuyama River watershed.



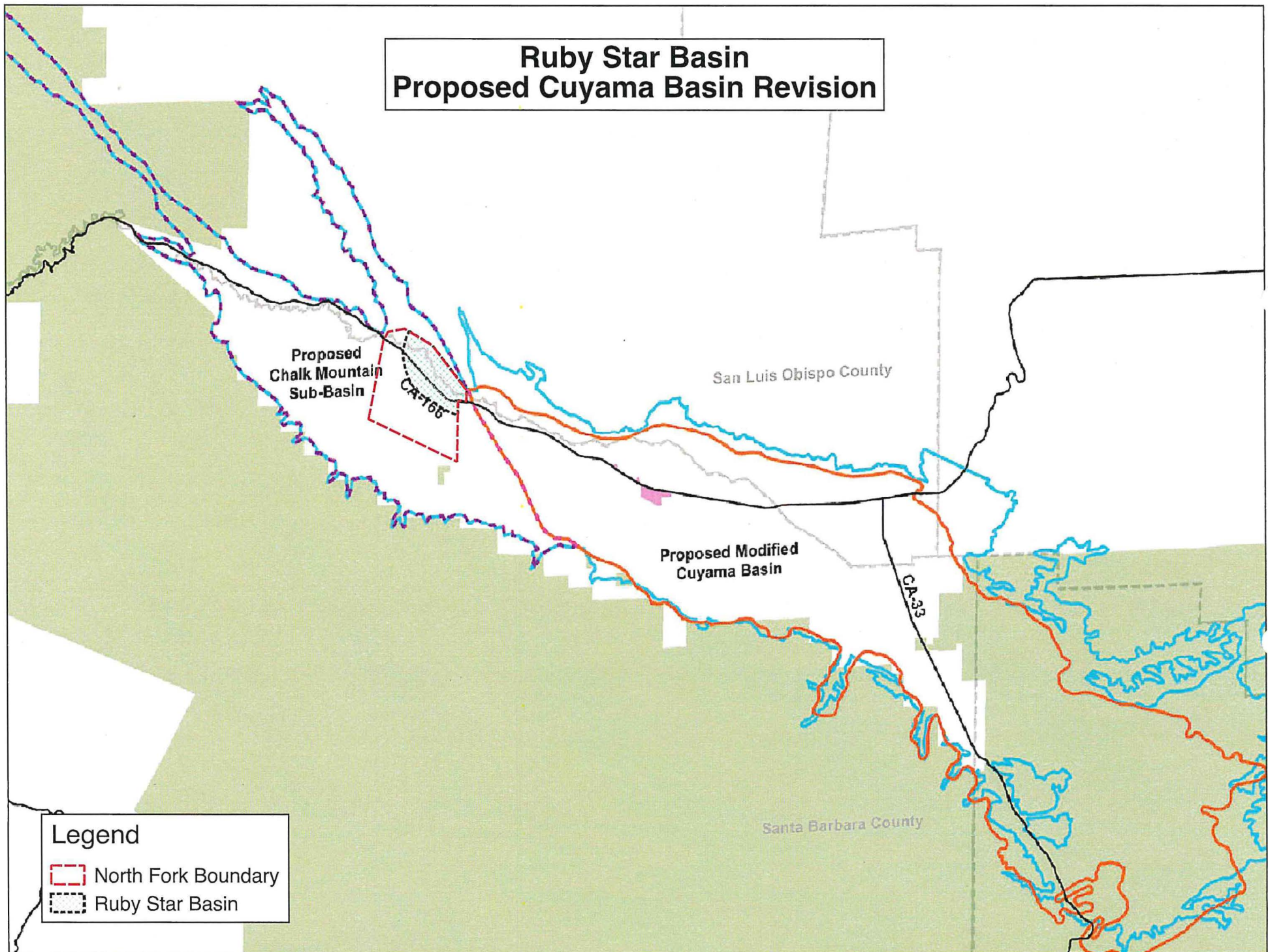
In summary, Cleath-Harris Geologists is guiding the development of groundwater on the North Fork Ranch in such a way as to be a model of sustainable development. The Ruby Star Basin is distinct and separate from other proximate sites of groundwater in storage, including the Cuyama Valley Groundwater Basin (as defined by the USGS) and properties to the south of the North Fork Ranch including any properties accessible from Cottonwood Canyon Road. The responsible development of groundwater resources on the North Fork Ranch will have no undesirable effects on groundwater supplies in Cuyama Valley.

Sincerely,
CLEATH-HARRIS GEOLOGISTS

A handwritten signature in cursive script, reading "Timothy S. Cleath".

Timothy S. Cleath PG CEG CHG
President

Ruby Star Basin Proposed Cuyama Basin Revision



Ruby Star Basin

Hwy 166

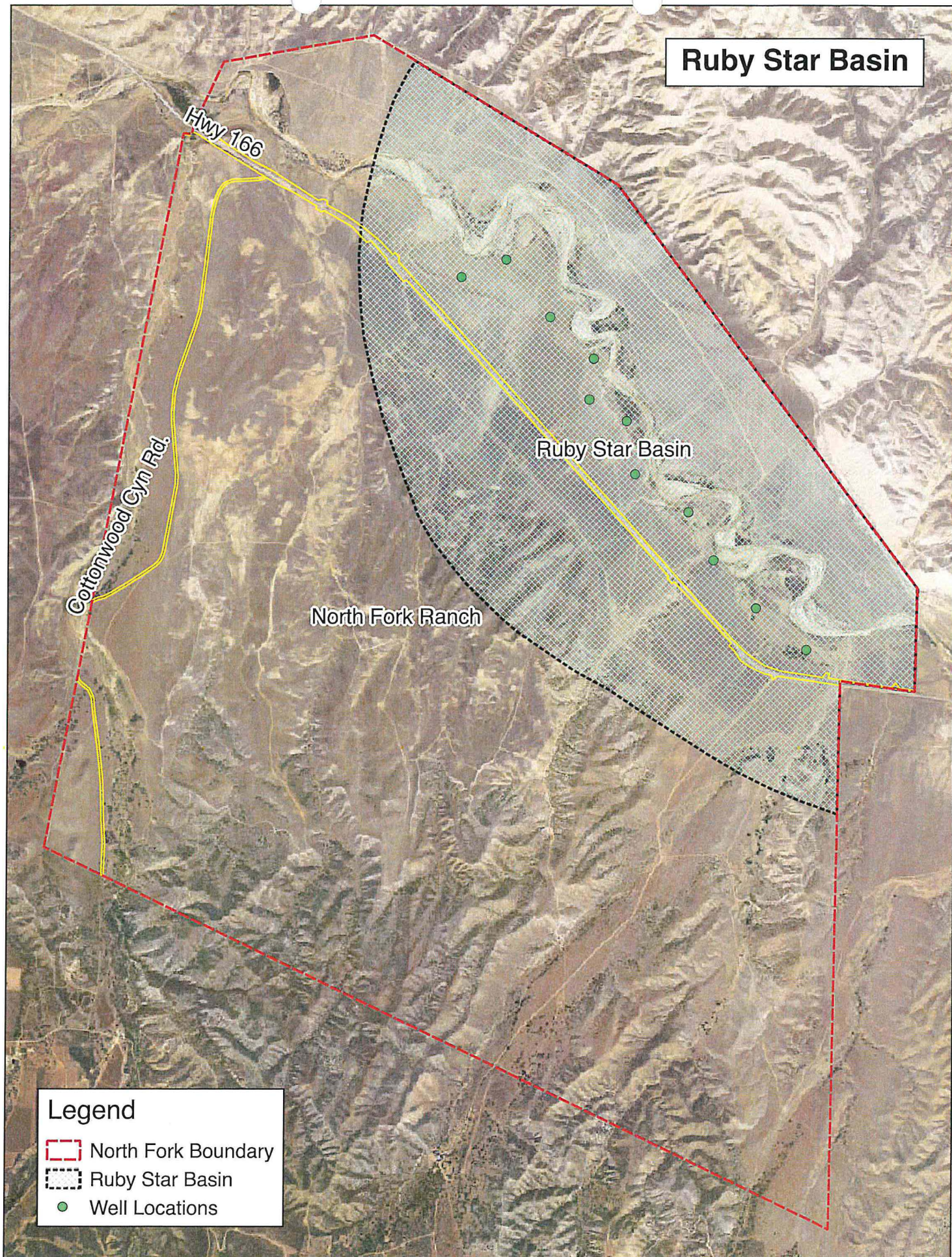
Cottonwood Cyn Rd.

Ruby Star Basin

North Fork Ranch

Legend

- North Fork Boundary
- Ruby Star Basin
- Well Locations



Pamela McNemar

From: Ernest Conant
Sent: Monday, July 25, 2016 3:36 PM
To: Pamela McNemar
Subject: FW: 00044272.000.MSG - Re: Harvard Properties Water
Attachments: letter to county of santa barbara may 24.pdf; Ruby Star Basin 2.pdf; Ruby Star Basin.pdf

pp

From: Matt Turrentine [mailto:matt@grapevinecap.com]
Sent: Tuesday, May 24, 2016 8:11 PM
To: Tom Fayram <Tfayram@cosbpw.net>
Cc: Ernest Conant <econant@youngwooldridge.com>
Subject: 00044272.000.MSG - Re: Harvard Properties Water

Hi Tom,

Please find the attached letter and two maps. Let's connect briefly on the phone once you have had a chance to review. Thanks!

Regards,

Matt Turrentine
Grapevine Capital Partners
805-312-1828
matt@grapevinecap.com

On May 24, 2016, at 9:45 AM, Matt Turrentine <matt@grapevinecap.com> wrote:

Hi Tom,

I've been promised that letter today, and will send it along asap.

Regards,

Matt Turrentine
805-312-1828

On May 24, 2016, at 9:18 AM, Fayram, Tom <Tfayram@cosbpw.net> wrote:

Hello Matt -

Following our discussion a few weeks ago, you were going to provide me a letter from your Hydrologist / Geologist on the location of your production wells you