INTRODUCTION

Purpose: Formation of a small study group to distinguish fact from fiction, to answer questions related to water rights, geology and hydrology of Emigration Canyon, and to educate ourselves and inform our neighbors.

WHAT IS THE PROBLEM?

- Inability to maintain minimum streamflows during the summer months. Complete lack of stream flow for over three months this summer.
- Reports of decreased quality and quantity of water by over 40 owners of private wells along Emigration Creek. Reports of wells going dry.
- Concerns about effects of decreased streamflow on wildlife, flora and fauna.
- Increased risk of E.coli contamination of private wells due to lack of stream flow
- Potential depletion of groundwater reservoirs as a result of commercial wells operated by EID
- Effects of climate change on water resources

OVER-ALLOCATION OF WATER RIGHTS

It has been know for a long time (over 50 years) and recognized by the Utah State Engineer that water rights in Emigration Canyon are over-allocated. There is more private land available than can ever be developed due to limits in water resources. Transfer of water rights now owned by EID from the mouth of the canyon up to Emigration Oaks exacerbated the problem.

GEOLOGY AND HYDROLOGY OF EMIGRATION CANYON

Most aquifers are found in areas of fractured bedrock and fractured limestone within the Twin Creek Limestone layer of Emigration Canyon. No impenetrable layers, like granite, are found in the canyon. Hydrologist agree all catalogued surface and groundwater aquifers are part of an integrated hydrologic system. All present and future water diversions impact the canyon's water resources and impact streamflow, including commercial wells operated by EID.

There is no proof of EID's claim their water system has no influence on groundwater movement and related streamflow in the creek. Only scientific groundwater studies can confirm their assertion.

Groundwater and streamflow in Emigration Creek are closely related. In some areas flow is lost to groundwater (effluent) while in others groundwater adds water to the stream (influent). The average annual flow is 4340 acre-feet, but streamflow can vary greatly from year to year. Only sustainable water extraction can protect the canyon's fragile aquifers. The biggest threat to streamflow is depletion of groundwater reservoirs. Since commercial wells operated by EID have a huge impact on groundwater levels, they may very well impact streamflow in the canyon. Changes in weather patterns related to climate change put an additional strain on water resources.

PRIVATE WELLS ALONG THE CREEK

There are approximately 400 home owners living along the creek who rely on private wells for their water needs. The aquifers these wells draw from do not yield water readily and are quite fragile. The capacity of the wells is very low (less than 50% compared to wells in other areas) and they are dependent on artesian pressure to maintain adequate water levels for pumping. Artesian pressure, in turn, is closely related to streamflow. Due to their low rate of production (gallons per minute of water), these wells do not significantly impact groundwater levels and do not affect other private wells nearby. Hydrologists estimate 50% of water pumped from these wells is returned to the hydrologic system in the canyon and help recharge groundwater levels and streamflow in the creek.

Private wells along the creek draw water from fragile aquifers and are dependent on streamflow and related artesian pressure to function properly.

Without streamflow there is no artesian pressure, which means water level in the well will drop. The pump starts drawing water from the bottom of the well, decreasing water quality and quantity until eventually the well will run dry.

E.COLI CONTAMINATION OF EMIGRATION CREEK AND GROUNDWATER

Emigration surface stream and shallow groundwater have long been known to be contaminated with E.coli bacteria attributed to improperly constructed or leaking septic tanks along the stream (an estimated 40% of wells exceed recommended E.coli levels for drinking water).

Lack of stream flow greatly increases the chance of further E.coli contamination of private wells along Emigration Creek and threatens the health of residents.

COMMERCIAL WELLS IN EMIGRATION OAKS

The three commercial wells operated by EID are located in Emigration Oaks, several miles up and away from the creek. Unlike private wells along the stream, these wells are quite deep (500 to 1200 feet), highly productive (up to 200 gpm) and have a significant impact on groundwater levels.

Total impact on the groundwater reservoir by EID's commercial wells is difficult to assess since EID has not complied with a memorandum decision dated December 31,1996 by the Utah State Engineer to collect data from the 5 monitoring wells installed.

All three wells draw water from aquifers formed in fractured bedrock in the Twin Creek Limestone formation. Much of the water is stored within a vast network of water distribution lines and in two (grossly over-sized) tanks with a total capacity of 1.3 million gallons. While flow-back from water pumped from these wells recharges the canyon's hydrologic system, recharge to the level of the creek may be delayed for decades and

has likely little to no effect on streamflow.

Hydrologist have long warned large-diameter wells away from the creek could significantly influence established surface water and groundwater rights.

Water extraction from aquifers by EID's commercial wells may well be at unsustainable levels. In the approximately 30 years their system has been operational EID already had to replace one of their wells at considerable cost. There have been reports of wells failing to meet Utah Health Department water quality standards. Their water system is strained to the max as evidenced by a recent annoucement about possible rationing of water to existing costumers in case of another dry summer next year. Welcome to global warming. The chances of another dry summer are pretty much guaranteed. Climate change is here to stay, which does not bode well for EID.

Climate change and related changes in weather patterns put an additional strain on the Emigration Canyon water shed and private/commercial wells in the canyon.

EMIGRATION CANYON 700 HOME BUILD-OUT LIMIT

In EID's Water Management and Conservation Plan of 1996 and 2002, EID determined the canyon's hydrology could not support more than 700 homes - connected to either EID or private wells - without impacting streamflow, which would negatively affect private wells. Minimum streamflow goals were established and EID committed to implementing water policies to protect them.

The 700 home build-out limit is supported by a professional investigation by Don Barnett and Adolph Yonkee in 2000. Predictions were based on historic streamflow data. Effects of changes in weather patterns related to climate change were not considered.

Current built-out stands at 686 homes (EID provides water to 286 homes). While the 700 home build-out limit has not been reached, a report by Hansen, Allen & Luce in 2015 determined minimum streamflow could only be maintained in 6 of the previous 14 years.

If Emigration Creek is struggling to maintain adequate streamflow at the current housing density, projected 700 home build-out limits need to be adjusted and a moratorium on further development needs to be implemented to protect water resources.

SCIENTIFIC STUDY REQUIRED

In recent years EID distanced themselves from policies set out in their Water Management and Conservation Plan and denied validity of established home build-out limits. They also denied their commercial wells had anything to do with loss of streamflow for over three months this past summer and instead blamed dry weather conditions.

There is no question that changes in weather patterns related to climate change -

recognized this fall by the governor and the State of Utah - are a huge contributing factor and may be the reason why the estimated 700 home build-out limit proved to be inaccurate. Longer growing seasons and related irrigation cycles, decreased precipitation and increased temperatures and evaporation levels have a big influence on overall water use and put a strain on water resources. However, water extraction levels by EID's commercial wells and related influence on groundwater reservoirs likely have an effect on streamflow as well and cannot be ignored.

A scientific study is required to evaluate water resources in Emigration Canyon and guide decisions on future water policy and water management. Questions that need to be addressed are to what extent decreased streamflow of Emigration Creek can be attributed to decreased groundwater reservoirs as a result of commercial wells operated by EID and what the impact is on water resources as a result of changes in weather patterns related to climate change.

EID PLANS FOR 5 ADDITIONAL WELLS IN PINECREEK CANYON

On September 12, 2018 EID submitted permanent change application a44045, which includes plans for 5 additional wells in Pinecreek Canyon. These wells are a lot close to private wells in the canyon than the ones in Emigration Oaks and affect the Burr Fork drainage. The Burr Fork drainage feeds the upper part of Emigration Creek, the only part of the stream that still had some water left this summer.

The Utah State Engineer in his memorandum decision of October 8,1982 specifically denied diversion of water from the Burr Fork drainage due to potential interference problems.

These 5 wells will have a huge impact on water quality and quantity of private wells - there are a lot of small lots and homes at the top of Pinecrest - and will further strain streamflow and related groundwater levels. It will allow for further development in the canyon and is incompatible with the Emigration Canyon General Plan of 1999, the most extensive planning document written about Emigration Canyon, and EID's Water Management and Conservation Plan of 1996 and and 2002.

Considering potential impact on water resources and infringement on surface and ground water rights, the 5 additional wells sites in permanent change application a44045 should be denied.

CONCLUSION

The water shed in Emigration Canyon is clearly under stress. There is a limit to water available for domestic use, irrigation, wildlife, flora and fauna. Climate change will further strain the fragile ecosystem and available water resources in the future. When allowed to fully use the water under its two water rights, it is estimated EID would be able to provide water to a total of nearly 1000 domestic connection. Water resources, already clearly strained, cannot support further development in the canyon.

Unlike private wells, EID's water system affects groundwater reservoirs and over time will further undermine the fragile aquifers along Emigration Creek private wells owners rely on. The Utah State Engineer has a clear duty to prevent impairment of surface water and groundwater rights proved prior to EID's water system and use its authority to protect Emigration Canyon water resources.

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IN REGARDS TO WATER RIGHTS:

We urge the Utah State Engineer to use his authority to ***DENY PERMANENT CHANGE APPLICATION a44045*** *filed by EID on September 12, 2018 in its current form.*

We request the Utah State Engineer:
1. Find that the proposed five additional well sites mentioned in EID's application pose a clear threat to streamflow and available water resources in Emigration Canyon and should be denied.

2. Find that EID's water right has been approved for domestic use and irrigation only and does not extend to commercial developments like the Walsh proposal.

3. Find that surface water rights at the bottom of Emigration Canyon and water rights of owners of over 40 private wells along the main canyon have been impaired.

4. Find that impairment is partly due to depletion of groundwater reservoirs as a result of commercial wells operated by EID.

IN REGARDS TO STREAM FLOW:

We urge the Utah State Engineer to protect the quality and quantity of water in private wells at risk of both impairment and E.coli contamination by taking ***MEASURES TO ENSURE MINIMUM STREAM FLOW*** *of Emigration Creek during the summer months.*

We request the Utah State Engineer:
1. Recognize that lack of stream flow eliminates artesian pressure which is required for the proper functioning of private wells.

2. Recognize that lack of stream flow poses a health threat to owners of private wells due to increased chance of E.coli contamination.

3. Recognize that lack of stream flow has a detrimental effect on wildlife, flora and fauna in the canyon and may lead to irreversible changes to the ecosystem.

IN REGARDS TO SCIENTIFIC INQUIRY:

We request the Utah State Engineer:
1. Enforce collection and publication of data from the five monitoring wells connected to the commercial wells operated by EID, as required in your memorandum decision of December 31,1996, to provide data on the total amount of water extracted from the different aquifers.

2. Order a scientific study to evaluate water resources in Emigration Canyon and guide decisions on future water policy and water management. This study should answer questions on the effect of commercial wells on groundwater reservoirs and stream flow of Emigration Creek and the effects of changes in weather patterns related to climate change on water resources in Emigration Canyon.

While waiting for the outcome of this study, ***EID SHOULD BE PREVENTED FROM ISSUING ANY ADDITIONAL WATER LETTERS*** for development in Emigration Canyon. Every additional home makes this problem worse and will make it more difficult to provide adequate water to all residents (human and animal alike) in Emigration Canyon.

Salt Lake City and Salt Lake County Planning Departments and the Emigration Canyon Township Planning Commission should ***ENFORCE A MORATORIUM ON BUILDING PERMITS*** in Emigration Canyon until more information on sustainable water extraction is available.