In developing its recommendation to Council, the IAC has carefully considered the Council's willingness, expressed in its Resolution creating the WTAC, "to take an additional third party, independent look at the treatment methods, timing and hydro aspects of the project with a neutral and knowledgeable third party facilitating the discussion." The IAC, however, continues to recognize its charge by Council "to provide community and technical input and advice to the City Council and staff on issues relating to water, sewer, stormwater and transportation infrastructure". (Bend Code Section 1.20.040.A)

The IAC's recommendation takes into account that there are different costs between the three options considered by the WTAC : Membrane Filtration (MF), UV Treatment (UV) and UV Treatment Plus Additional Wells to Mitigate Watershed Fire Risk (UV + Wells). The cost of the MF option exceeds the UV + Wells option which exceed those of UV option. As is true of any cost estimates of projects the magnitude of any of the three treatments considered reflect significant variables. When estimates are made to evaluate the costs of projects which are intended to operate for fifty or more years, they are even more variable. There are many aspects of estimated costs that the "large number of the WTAC committee members" accepted as "a major reason for selecting options" (*Water Treatment Advisory Committee Recommendations).*

The costs considered by WTAC for the MF option included pretreatment and post-filtration treatment costs, which were included in the IAC November 8, 2010 recommendation. Those costs are not relevant and should not be considered since the contract documents pertaining to the MF assures that they can treat the water up to 3500 NTU. Considering the manufacture has units that have worked at levels of 2500 NTU and others have functioned at regular events that are in the hundreds of NTU's, there is no reason to believe that this unit will not function as the contracts states that it will. There are many similar cost issues that led the IAC to conclude that cost differences should not be the "major reason" for selecting an option.

The IAC strongly believes that the most significant factor that should drive selection of the right treatment option is the probability of fire and its impact on the surface water source. The WTAC Recommendations notes that "Numerous data sources and local expert opinion suggest a wildfire in the watershed has a *non-trivial probability* in the next few decades."

The IAC recognizes that such a fire would render the UV option non-operational for an extended period. It also recognizes that the UV + well option will require construction of numerous wells in the Outback facility without consideration of the impact on the area's water table, and the significant legal, environmental and cost considerations. Additionally, after a significant capital investment has been made the newly constructed wells would stand idle at the ready until such a time they would be needed. The IAC acknowledges that equipment and machinery of this nature are not designed for such use.

October 2, 2013 - IAC review of the Water Treatment Advisory Committee regarding the City's surface water system treatment options :

The IAC reiterates its recommendation made and adopted by the Council on November 8, 2010 (attached), that the City of Bend use membrane filtration water treatment for its surface water source. The IAC members' recommendation is unanimous and follows its careful study and analysis of surface water treatment options considered by the Water Treatment Advisory Committee (WTAC):

- Membrane Filtration (MF)
- Ultraviolet Treatment (UV)
- Ultraviolet Treatment Plus Additional Wells to Mitigate Watershed Fire Risk (UV +)

On September 23, 2013 the IAC convened to discuss WTAC recommendation presented in the "Water Treatment Advisory Committee Recommendations" draft 9-13-2013 (WTAC Recommendation). After careful consideration the IAC finds as follows:

<u>UV</u>

- Does not address the imminent risk of wildfire
- Cannot operate under current turbidity conditions
- High likelihood of limited use (non-operational during periods of turbidity that exceed 5 NTU)
- Potential loss of the City's filtration exemption resulting in a stranded asset investment
- Major factors associated with the UV option were not considered in WTAC Recommendation such as planning for the disposal of the water used to flush sediment in the pipe. This could result in dumping millions of gallons of water with unknown frequency.

<u>UV plus additional wells</u>

- Operational cost of wells over time may supersede any potential upfront cost savings.
- Does not address environmental impact of additional wells
    - Impact on localized drawdown (i.e. no yield study to confirm available supply of groundwater within the Outback facility and associated impact on existing wells)
    - Carbon footprint
- Does not consider the issues associated with having idle wells for extended periods of time (These would only be used in the event the Bridge Creek water is no longer available)
- UV still subject to limited use due to existing turbidity conditions
- Potential loss of filtration exemption resulting in a stranded asset
- Costs associated with dumping millions of gallons of water to flush pipes after turbidity events

Membrane Filtration

- Can operate under all current conditions of turbidity; including spring runoff, thunderstorm runoff and unexpected disturbances in the Bridge Creek watershed.
- Manufacturers guarantee membranes will operate under very high conditions of turbidity
- Current contracts guarantee that the membrane will continue to be operational up to 3500 NTU without pretreatment
- Reduced reliance on groundwater allows a more balanced portfolio of water sources allowing aquifer periods of recovery (Recent USGS update on Deschutes Aquifer identifies declining groundwater levels)
- Reduced reliance on groundwater is consistent with recently approved Water Master Plan producing significant annual savings from reduced energy needs
- Reduced carbon footprint due to less dependency on wells
- Proven long term performance with Pall Membranes under some extreme conditions

In addition to the above, the IAC recognizes that the membrane versus UV treatment option was reviewed by multiple firms over a period of years that are experts in the area of treatment. These firms include:

- Brown and Caldwell
- Black and Veatch
- HDR, Inc.
- Robinson Stafford & Rude (value engineering study)
- MWH

All firms were consistent in their findings of MF being the most appropriate treatment solution for the City of Bend.

Therefore, the IAC reaffirms the following as stated in the Nov 8, 2010 recommendation to council regarding the City's surface water system treatment:

The IAC recommends that the Council approve membrane filtration water treatment for the surface water source. The IAC identified the following key benefits associated with membrane filtration:

- *Provides a more reliable surface water supply that reduces risks, accommodates long-term regulatory compliance needs and supports economic development.*
- *Reduces time when surface water system needs to be shut down due to turbidity.*
- *Ensures that surface water source can be used after a fire in the watershed.*

November 8, 2010 IAC recommendation regarding City's surface water system treatment:

The IAC recommends that the Council approve membrane filtration water treatment for the surface water source. The IAC identified the following key benefits associated with membrane filtration:

- Provides a more reliable surface water supply that reduces risks, accommodates long-term regulatory compliance needs and supports economic development.
- Reduces time when surface water system needs to be shut down due to turbidity.
- Ensures that surface water source can be used after a fire in the watershed.
- Provides opportunity to utilize the $10 million Collaborative Forest Landscape Restoration Grant and implement a more robust forest management program to reduce fire risk in the watershed.

In addition, the IAC recommends that the structural elements that are needed for post and pre treatment be built with the initial construction, omitting the installation of the mechanical systems associated with pre and post treatments. However, the IAC recommends that the mechanical systems associated with pre and post treatment be included in the initial construction if project cost savings are realized. If the mechanical systems for pre and post treatment are not installed during initial construction, then the city should:

- Ensure adequate reserves are maintained in the Water Fund to allow the prompt installation of the additional treatment measures in the event of an emergency.
- Incorporate the additional treatment measures into the Water Capital Improvement Program (CIP) with a reasonable timeline set for installation, rather than waiting for a fire to occur.

To sum up, the IAC recommends the following:

1. **The Council should approve membrane filtration water treatment for the surface water source.**
2. **The structural elements that are needed for post and pre treatment should be built with the initial construction, omitting the installation of the mechanical systems associated with pre and post treatments.**
3. **The mechanical systems associated with pre and post treatment should be included in the initial construction if project cost savings are realized.**
4. **If the mechanical systems associated with pre and post treatment are not installed during initial construction the city should ensure prompt installation by maintaining adequate reserves and incorporating the pre and post treatments in the Water Capital Improvement Program.**

This recommendation assumes that the rate model includes the reserve funds needed to install the pre and post treatment and that the rate impact has been considered.