CITY OF CORPUS CHRISTI
CORPUS CHRISTI WATER

TO: Peter Zanoni, City Manager

FROM: Drew Molly, P.E., Chief Operating Officer 8/18/25

COPY: Mayor & City Council

DATE: August 18, 2025

SUBJECT: **Mary Rhodes Pipeline Utilization Update**

A few questions have been raised recently regarding the City's approach to the operations of the Mary Rhodes Pipeline (MRP). The purpose of this memo is to provide an overview of the MRP, the associated water supplies it is designed to convey, and the constraints of the system.

Corpus Christi Water (CCW) has a contract with Lavaca Navidad River Authority (LNRA) to take 31,440 acre-feet/year under a take-or-pay contract. Depending on the conditions of Lake Texana (i.e., water availability), up to 12,000 acre-feet/year of interruptible water may be offered during a calendar year.

In addition to LNRA, the City owns 35,000, acre-feet/year of water rights on the Colorado River. These two water supplies are conveyed to the City of Corpus Christi via the MRP and account for the "eastern water supplies" in the City's overall water supply.

Over the past three years, the City has maximized its use of contracted water (31,440 acre-feet) from Lake Texana, using an average of 98% of available water between 2022 and 2024 along with all of the available interruptible water offered each year (i.e. availability of interruptible water is out of the City's control) as shown below:

2022 - 100% usage (31,440 acre-feet + 9,000 acre-feet = 40,440 acre-feet)
2023 – 97% usage (31,440 acre-feet + 4,500 acre-feet = 35,940 acre-feet)
2024 - 98% usage (31,440 acre-feet + 11,000 acre-feet = 42,440 acre-feet)

In 2025, the City is projected to use all its contractual water from LNRA (Lake Texana), all of its interruptible water, and 2,500 acre-feet purchased through the Formosa contract, which is a one-time purchase of water. The purchase of Formosa water was presented and approved by City Council in March 2025 in order to proactively secure water from LNRA since the watershed was under significant drought conditions with Lake Texana below 70% at the time (i.e., March 2025) and potential curtailment occurring later in the year with BOTH the Colorado River and the City's 31,440 acre-feet of contract water from LNRA.

The City's strategy has always been to take as much water as possible from Lake Texana within each calendar year because the water not used will be charged by LNRA.

The second water supply available from the MRP is the Colorado River, for which the City owns junior water rights. This water supply is an additional 41 miles east of Lake Texana near Bay City,

Texas. Colorado River water is carefully utilized as a secondary source of water from the eastern supply, with the **priority of consuming all of Lake Texana first** because Lake Texana is charged to the city, whether the city uses all of it or none of it. The Colorado River is a higher cost option when compared to the western supplies, which include Lake Corpus Christi and Choke Canyon. If the western reservoirs exceed 50%, **the City always prioritizes water use from the western supplies in lieu of the Colorado River to reduce costs** because the costs to move Colorado River water 141 miles are significantly more expensive than utilizing Nueces River water, which is immediately adjacent to the O.N. Stevens Water Treatment Plant (ONS).

The usage from the Colorado River is provided below:

2022 – 10,900 acre-feet
2023 – 7,866 acre-feet
2024 – 9,813 acre-feet

As of July 31, 2025, the City has currently used 20,297 acre-feet and anticipates using nearly all the 35,000 acre-feet.

The entire amount of Lake Texana and Colorado River is anticipated to be fully utilized this year.

Water Contracts and Water Rights:

The Mary Rhodes Pipeline includes two sections or phases. The first one is a 100-mile pipeline from Lake Texana to ONS, and the second section is a 41-mile pipeline from the Colorado River near Bay City to Lake Texana.

In December 1993, LNRA contracted with the City to provide and deliver 31,440 acre-feet per year of raw water on a permanent basis and 10,000 acre-feet per year on a temporary basis until the Formosa facility was online. In July 2001, LNRA contracted with the City to provide up to 4,500 ac-ft/yr of water for use on an interruptible basis and, in July 2003, increased that amount to 12,000 ac-ft/yr. This wholesale water contract with LNRA was a 40-year contract, which will end in 2035, at which point an additional 50-year contract can be exercised.

In 2018, LNRA recalled the temporary use of 5,000 acre-feet of water from the City, and in September 2020, LNRA recalled the remaining 5,000 acre-feet of water. The recalls associated with these 10,000 acre-feet were expected once the Formosa facility came online.

In 1999, the City purchased the rights to 35,000 acre-feet annually of water from the Colorado River. This is a "run of the river" water right, which means that if there is no flow in the river at Bay City then no water can be diverted. The Lower Colorado River Authority (LCRA) controls the river flow for the Lower Colorado River.

Construction of the MRP:

MRP Phase-1 was completed in 1998 and delivers water 101 miles from Lake Texana to Corpus Christi. All but a small portion of the pipeline is 64-inch diameter reinforced concrete steel cylinder pipe. There are more than 15,000 joints of pipe along the route, which runs through parts of five Texas coastal counties. There were seven open-cut river crossings and two directional drilled crossings including one that set a new world record for diameter and distance. MRP Phase-

2 was completed in 2016, providing a 41-mile, 54-inch pipeline to provide water from the Lower Colorado River to Lake Texana, where the water is conveyed into the 64-inch, 100-mile pipeline to Corpus Christi.

The MRP Phase-1 pipeline could conceivably accommodate 100 MGD of flow; however, the City does not have access to a raw water supply that would support the pumping of 100 MGD for an entire year. If a new water supply becomes available, major upgrades to the electrical and mechanical systems would be necessary. There are also two locations (i.e. Victoria Barge Canal and Guadalupe River) where the pipeline is restricted to 48-inch diameter pipe, which, at 100 MGD, the flow rates would create velocities greater than 12 feet/second, which is on the high side of standard design practices.

The pipeline currently exceeds acceptable pressure ratings at schedule 2 and 3 at multiple locations; and exceeds these ratings with or without a new water supply like Evangeline. Assuming these exceedances can be addressed, pumping equipment at all the pump stations would need to be redesigned, additional pumps would need to be installed, balancing/suction tanks would need to be expanded, and the electrical system would need to be upgraded to handle the increased pump sizes. In summary, increasing capacity to 100 MGD would require significant upgrades at each of the pump stations, in addition to addressing hydraulic constraints of the pipeline.

MRP Operations:

From 1999 until 2016, the MRP Phase-1 operated at near capacity, taking all the contracted water from Lake Texana.

In 2016, the City completed the second section or phase of the MRP. From 2017 to 2018, staff were developing protocols to ensure that water quality and mixing of the different water supplies did not cause unintended changes to the overall water quality of the treated water. Additionally, the City worked closely with LCRA to coordinate water diversions from the Colorado River system.

In late 2021, the combined reservoirs were over 60% and continued to remain over 50% into 2022. At these levels, operational protocols consist of utilizing all LNRA water and balancing the remainder supply with Colorado and Nueces River water.

It should be noted that the City has increased flows at times to schedule 3, as opportunities afforded, however, frequent failure of the pipeline would occur, which ultimately resulted in outages of the pipeline and corrective repairs. It has been brought to the attention of the City that the pipeline was constructed quickly back in 1998, and construction workmanship has been a concern, as noted by multiple field observations over the years. Approximately 35 failures have occurred on the pipeline over its 25-year history. Failures on the pipeline, especially during more restrictive stages of drought, like stage 2 or 3, translates to significant consequences for the City and these consequences of failure need to be considered.

To address the concerns of repeated pipeline failures, an RFQ was advertised in the fall of 2022 to assess the condition of the MRP Phase-1 water transmission main. A professional services contract was awarded to HDR in June 2023.

On May 21, 2024, CCW presented the findings and recommendations from the HDR condition assessment, which was completed ahead of schedule. The assessment provided valuable information that allowed CCW to make data-driven decisions and associated improvements to limit the vulnerabilities associated with higher pipeline velocities. Accordingly, the City increased flow from schedule 2 to schedule 3 (~42 MGD to 55 MGD) on June 24, 2024, with minimal issues, although some rather small setbacks occurred, resulting in downtime and repairs to the pipeline.

The assessment also recommended several protective appurtenances and electrical improvements to the two pump stations in order to safely operate at Schedule 4. These enhancements were incorporated into an emergency contract as well as an existing contract with H&S Constructors. This work was expedited, and in March 2025, CCW increased the flow of the MRP to schedule 4 or approximately 70 MGD. Spare pumping equipment for the Bloomington and Woodsboro pump stations is anticipated to arrive in September 2025. However, the installation of spare pumping equipment with variable frequency drives, new flow meters, and associated piping modifications have not yet been completed at the Bloomington and Woodsboro pump stations because they require the shutdown of these respective pump stations.

Conclusion:

The MRP continues to be one of the most important assets the City owns. The 141-mile pipeline and associated pumping system has been run efficiently over its entire history, and careful analysis has been utilized anytime changes have been recommended. A pipeline or pump failure could jeopardize our entire regional water supply, especially since there is no redundancy built into this water supply. The system today runs at 100% with every pump operational, which is not sustainable.

The proposed new Evangeline supply can be incorporated into the existing pipeline at 12 MGD without reducing water from Lake Texana and/or the Colorado River; however, at 24 MGD, based on current modeling, some reduction of water from Lake Texana/Colorado River would occur. It is important to note that the addition of any water from the Evangeline well field, under schedules 2 or 3 flow conditions, would exacerbate pressure exceedances that already exist at multiple locations. The City is evaluating a second pipeline parallel to the existing pipeline as a means to provide some redundancy and ability to provide raw water to ONS under ANY flow conditions.

The MRP system continues to be maintained and operated in accordance with best practices and operational protocols. These best practices include utilizing pipeline experts to evaluate the condition of the pipeline and to make recommendations for improvements. To date, all recommendations have been incorporated, and furthermore, new best practices have been implemented, including utilizing pump optimization software to ensure that all of the pumping equipment is continuously optimized.