



City of Homer

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Memorandum

Agenda Changes/Supplemental Packet

TO: MAYOR CASTNER AND HOMER CITY COUNCIL
FROM: MELISSA JACOBSEN, MMC, CITY CLERK
DATE: AUGUST 10, 2020
SUBJECT: WORKSESSION AGENDA SUPPLEMENTAL PACKET

WORKSESSION

Water Sewer Rates

Capital Improvement Plan information from Public Works

Master Plan Review- 2020

Phase	Project	Master Plan Recommendation	Water/ Sewer Recommendation/ Action
Phase 1	Water Supply	Conduct a study to find additional/ back up water source. An additional source would be needed in the event of a drought, catastrophic damage to the Bridge Cr. Dam or transmission line failure from the pump station to the treatment facility. An additional water source may also be valuable in improving water quality if used to blend sources prior to treatment.	In order to improve existing Water Supply reliability, the City has applied for FEMA hazard mitigation funding to replace and upgrade the current 40+ year old transmission main from the pump station to the treatment facility. Recommendation: Conduct detailed hydrological study for an alternate water source would provide redundancy of the City's most valuable resource.
Phase 2	WTP	Recommendations include: Control Algae Blooms at Source, Treatment of Algae-Laden Water with Existing Direct Filtration Process and multiple Treatment Plant Upgrades	Ultra-Filtration Treatment was constructed and put on line June of 2009. Recommendation: No Further action needed.
Phase 3	Water Storage	It is recommended that the City construct an additional 1 MG storage tank in 2007-2008. The first WST is recommended for installation between Kachemak Way and East Hill Road near the Crandall Addition subdivision. The additional 1 MG of storage should be sufficient until approximately 2010, when another 1 MG of storage would be required. The second tank would likely be installed near Linstrang Way, or around the Foothills Subdivision, A third 1-MG storage tank is recommended for installation around 2016. This tank is recommended for installation on or near Mission Avenue near the proposed Thompson Drive Main. A fourth tank may be required by 2022, depending on population growth. A recommended tank location is on a hill (essentially the highest topographic point in the area) between Garden Park Drive and Highland Road.	Master Plan Recommendations were largely based on population growth, by 2020- 9,699 and by 2025- 11,244. Population serviced currently is approximately 6800. Design has been completed for a 0.75 MG tank on the east side. The tank on the west side was removed in the summer of 2019. The tank had inadequate seismic restraints, ice damage and sever pitting due to past chlorination techniques. Recommendation - (1) Install East Trunk tank and design; (2) Install West Trunk tank on previous tank site; (3) All tanks should have aeration and mixing install during construction of tank to prevent Products of Disinfection.
Phase 4	Distribution System R&R	The 8-inch CI "west trunk" main is the only main where future deterioration of the pipeline could be a concern, primarily due to erosion and lateral movement of the bluff (and therefore the pipeline) between the Hilltop and A-frame PRV stations. Conduct biannual leak testing, to identify any water mains in need of repair or replacement. Rehab PRV stations at least one once over the next 10 to 20 years. Recommended for replacement of 4-inch and 6-inch mains during any road rehabilitation work that occurs within the City.	The West Trunk between Hill Top and the A-Frame PR stations is a weak point in the system. The four main PR Stations on the East Trunk were rehabbed in 2019. An additional 13 stations need shut off valves, pressure relief valves and pressure reducing valves replaced. Replacement cost for valving at each station will cost be approximately \$6000 - \$8000. Recommendations: (1) Replace old cast iron with HDPE. (2) Purchase the leak detection equipment authorized for FY2021, so staff can conduct leak detection. (3) Purchase valving to rehab 4 to 6 PR Stations a year. (4) Increasing water main size could negatively effect water quality. Since population growth has not occurred at the rate predicted, staff recommends performing this work on a case by case basis, taking flow demands and water quality into account.

Phase 5	Distribution Expansion	Phase 5.11- The design for a booster station to provide normal service pressures to Paintbrush Court was completed in 1998, but the station was never constructed. The development of this booster station is currently recommended because of the low (6 to 17 psi) static pressures in this area. The development of a pipeline along Skyline Drive may eventually eliminate the need for this booster station.	Paintbrush Booster Station constructed and in Service. Recommendation: No Further action needed at this time.
Phase 5	Distribution Expansion	Phase 5.26 - installation of a pressure pump station at the WTP. The new pressure zone could serve areas adjacent to Skyline Drive, such as Glacier View Court, Scenic Place, Horizon Court, Tulin Terrace Boulevard, Crestwood Circle, and Ridgeway Court. The new pressure zone could also serve Paintbrush Street, and replace the (future) booster pump station planned for installation on Paintbrush Street near Fireweed Avenue. Service to Scenic Place and Horizon Court would require a PRV station (48), which would provide a pressure drop of approximately 45 psi.	Increasing water service area could effect water quality without providing adequate revenue. The system currently has 50 miles of water distribution main. A more efficient plan would be to develop areas all ready serviced by the existing water mains. Recommendation: No further action needed at this time.
Phase 5	Distribution Expansion	Phase 5.27 -The South Peninsula Hospital currently has low-pressure problems, especially on the second floor of the hospital. This is due in part to head losses across backflow prevention device(s), and elevation head losses on the second floor.	The Hospital installed their own water storage tank on their site and the City has not received water pressure complaints since. A water main connecting the East Truck and West Truck was installed to service the West Trunk and Hospital in the event of a transmission main failure on the West side. Recommendation: No further action needed at this time.
Phase 5	Distribution Expansion	Phase 5.28 - Hydrant spacing is generally sufficient to provide coverage to most areas of the distribution system, but there are areas where hydrant coverage is lacking. A total of 53 additional hydrants are recommended for installation within the current water distribution system.	Installing additional fire hydrants is an ongoing task. Usually they are install as the system is being expanded. The City passed the last ISO inspection. Recommendation: No further action needed at this time.
Phase 5	Distribution Expansion	Phase 5.29 - Extend Heath Street to Rainbow Court. Replace the existing 6-inch main along Rainbow Court with a 16-inch main from Kachemak Way to the High School Loop.	Not completed. Recommendation: Perform flow test to verify fire flow, in-house.
Phase 5	Distribution Expansion	Water Sytem Modeling - The Homer water system model was calibrated with hydrant flow data provided by the City. These tests were conducted in June 2004. The water system modeling platform was H2OMap Water GIS 5.0. The model was used to identify static and fire flow pressures throughout existing and planned future expansion areas of the City. The model was also used to determine flow rates during fire flow conditions, and PRV setting modifications.	Recommendation: Research whether this can be done in-house.

Phase 6	WWTP	<u>Short term (next 5 years)- Wet Weather Flow control and treatment options-</u> I/I (In flow and Infiltration) control and elimination, Off-line equalization, wet weather flow treatment	Recommendations: (1) Purchase inspection camera to identify sources of infiltration. (2) Conduct systematic smoke testing to detect inflow. (3) Implement repairs as necessary with in-house staff. May need funds for materials.
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Phase 6	WWTP	Year 2025- Waste Solids Management- Sludge dewatering, solids disposal, Wastewater Treatment Capacity Upgrades	Master Plan recommendations were based on increased population. Solids management study, performed in 2012-14, found that current operation is the most efficient technique for solids management. I/I reduction is more cost effective than increasing treatment capacity. Recommendations: Do not increase treatment capacity at this time. Treatment capacity could be addressed when future EPA regulation changes necessitate system adjustment.
Phase 7	Collection System R&R	It is expected that all the lift stations will require a complete rehabilitation of the pumps, electrical systems, and associated rails at least once over the next 20 years. At a minimum, most pumps will have to be rebuilt or replaced in the next 5 years. Assuming no significant deterioration of the wet wells occurs, wet well capacities should be adequate until 2025. There is a possibility that the wet well for Lift Station 8 (Launch Ramp) may need to be upgraded by 2025 for increased capacity, depending on the ultimate development of the Homer Spit.	Capacities have not increased as was assumed by Master Plan. Recommendations: (1) Continue on-going preventive maintenance program including pump rebuilding, rail replacement and electrical repairs when needed. (2) The Launch Ramp Lift Station is adequate at this time - continue preventative maintenance only. (3) The Beluga Lift Station is in need of a major rehabilitation, possibly including the addition of a wet well
Phase 7	Collection System R&R	Phase 7.1- I/I Reduction- It is recommended that the City enact an I/I reduction program. The development of this program is essential because overloaded sanitary sewers can cause basement flooding, and increase the amount of wastewater that has to be treated at the WWTP. In general, a reduction in I/I can result in capital and O&M savings due to reduced treatment and pumping costs, and reduced main sizes. As the sewer system continues to age, the City will face a growing problem with increased infiltration from deteriorating mains. The City should consider enacting an annual pipe replacement program that identifies key areas of leakage, and provides an annual budget and schedule for pipe replacements. This will at reduce the potential for large scale infiltration to create a significant burden on the WWTP.	Recommendations: (1) Purchase inspection camera to investigate and identify sources of infiltration. (2) Conduct smoke testing to identify sources of inflow. (3) Implement repairs as necessary. Implement repairs as necessary.

Phase 8	Collection System Expansion	<p><u>Phase 8.12- KACHEMAK DRIVE PHASES I, II, AND III-A</u> conventional gravity/force main system is recommended to serve Kachemak Drive and Beach Road between Airtaxi Place and East Road. Phase I of this project is currently being designed and constructed. Approximately 16,100 LF of gravity main and 2,150 LF of force main would be installed, and would connect to existing sewer mains on Kachemak Drive and East End Road.</p>	<p>Completed in 2018-19 . Recommendations: Continue preventative maintenance.</p>
Phase 8	Collection System Expansion	<p><u>Phase 8.34-STERLING HIGHWAY DUAL FORCE MAIN</u> - Although not required, an additional force main could be installed along the Sterling Highway from Lift Station 2 to Lake Street. The force main would provide redundancy for Homer Spit services, and would be used to accommodate peak flows during high summer demands. Approximately 1,000 LF of force main would be installed, and would parallel the existing 6-inch DI force main. It is not expected that this main would be required until approximately 2021 through 2025.</p>	<p>Recommendation: Install a redundant force main to create a more resilient system. This work could be done in conjunction with the a Beluga Lift Station rehabilitation project.</p>
Phase 8	Collection System Expansion	<p><u>Wastwater Modeling-</u> The sewer system modeling platform was H20Map Sewer GIS 6.0. The modeling effort identified mains that would develop insufficient capacity within the planning period, during peak flows and typical storm events. The model provided a basis for calculating replacement main sizes, as well as sizing requirements for new mains in the system.</p>	<p>Recommendation: Research whether this can be done in-house.</p>

City of Homer
Sewer Capital Improvement Plan
July 30, 2020

Summary:

Projects:

• Replace Deep Shaft Air Compressor	Urgent	\$ 85,000
• Upgrade SCADA for Seven Sewer Lift Stations	Urgent	\$210,900
• Portable Generator for Sewer Collection System	Urgent	\$ 58,000
• Waste Water Treatment Plant – Digester Blowers	Urgent	\$189,000
• Ceiling Replacement at Waste Water Treatment Plant	Urgent	\$ 65,000
• Small Works I & I Remediation Program	Moderate	\$ 50,000
• Electronic Pay Station for RV Dump Station	Low	<u>\$ 55,000</u>
Total Estimated Project Costs		\$712,900

Fleet Replacements:

- “Dung Beetle”
- trucks

Project Title: Replace Deep Shaft air compressor

Project Description and Benefits:

Homer's Waste Water Treatment Plant consists of two "deep shafts" in which sewage is held and treated with oxygen. This is a biological process, the efficiency of which depends largely on the efficiency of the air compressors providing the oxygen. The compressor in one of the shafts is original 35-year old equipment and has fallen into disrepair because it is the one that is used most of the time. For example, the shaft leaks oil, which could eventually interfere with the biological process and cause equipment failure. Further, that compressor no longer represents state-of-the-art equipment; more energy efficient equipment is available.

The subject project would provide a new air compressor for one of the deep shafts. This would not only improve operational reliability, but would reduce energy costs and impacts. For example, the electrical bill for the WWTP is \$200,000 a year, with much of this cost attributed to the plant's blowers and air compressors.

Total Estimated Project Cost: \$85,000

Priority: Urgent

Project Title: Upgrade SCADA for Seven Sewer Lift Stations

Project Description and Benefits:

The City transfers sewage from various locations around town to the Waste Water Treatment Plant (“WWTP”) with seven sewage lift stations, which are basically large sewage pumps installed in manholes at strategic locations in the sewer lines. Six of these sewer lift stations are monitored by instrumentation, which “talks” to the operators at the Waste Water Treatment Plant (“WWTP”) via a SCADA system. The SCADA system is programmed to perform a variety of functions, such as: detecting an abnormality in the treatment process, sending an alarm to an operator, and even, automatically calling operators when a human touch is needed. The SCADA also enables the operators to adjust controls in the lift stations remotely.

The existing SCADA in these six lift stations is 15 years old, which in computer-age terms, means it is ancient and obsolete as well as a challenge to maintain because repair parts are no longer available.

One of the lift stations, at Beluga Lake, doesn’t have a SCADA system at all. It must be manually monitored and controlled.

The subject project would acquire, program and install a new SCADA system for all seven of the City’s sewage lift stations. This will require a sole-source contract to SNB Inc., which has been the systems integrator for all the other SCADA equipment in the City’s existing systems.

Total Estimated Project Cost: \$210,000

Priority: Urgent

Project Title: Portable Generator for Sewer Collection System

Project Description and Benefits:

The City transfers sewage from various locations around town to the Waste Water Treatment Plant (“WWTP”) with four sewage lift stations, which are basically large sewage pumps installed in manholes at strategic locations in the sewer lines. Obviously, these pumps only work when they have electricity. When the power goes out, the pumps don’t work, which can cause sewage to back-up in the system and sewage overflows.

The Sewer Department had two portable generators but lost one when it was re-purposed to provide the Airport with back-up power. One portable generator is not enough to keep up with the four sewage lift stations. The Sewer Department needs another portable generator. Indeed, a back-up generator is listed as Priority 1 equipment in the City’s Emergency Operations Plan.

The subject project would provide a portable generator.

Total Estimated Project Cost: \$58,000

Priority: Urgent

Project Title: Waste Water Treatment Plant - Digester Blowers

Project Description and Benefits:

Sewage treatment is primarily a biological process where oxygen is mixed with sewage to encourage the growth of bacteria that “eat” the sewage and digest it. This process takes place in a piece of mechanical equipment called a “digester”. Since oxygen is a crucial part of the process, there needs to some way of introducing oxygen into the digester. This is done with large fan-devices, called “blowers”, which are installed in each of the City’s two digester units.

The City’s blowers are 25 years old and represent old technology. For example, the operators don’t have much control over how much oxygen is delivered to the digester. This means the operators have little control over the digestion process and can often observe adverse consequences of this lack of control. For example, a byproduct of the digestion process is a sludge-type material known as the “solids. When the blowers aren’t working properly, the solids build up, which triggers other operation and maintenance concerns.

The City’s digesters need new blowers that will operate more reliably and with greater energy efficiency. For example, the electric bill for the Waste Water Treatment Plan is \$200,000 a year, with much of the load attributable to the blowers.

The subject project would replace the City’s two existing “blowers”.

Total Estimated Project Cost: \$189,000

Priority: Urgent

Project Title: Restore Sludge Drying Beds

Project Description and Benefits:

Sewage treatment is primarily a biological process where oxygen is mixed with sewage to encourage the growth of bacteria that “eat” the sewage and digest it. A by-product of this process is “sludge”. At the City of Homer, this sludge, also called “bio solids”, is dried in an open, covered shed, called the “drying bed”, and when dried, taken to the Kenai Borough’s landfill and used to cover garbage.

The City’s drying bed consists of structural steel posts holding up a roof that covers a series of compartments, like raised beds in a garden, in which the sludge is spread to dry. The whole structure is about ½ the size of a football field. Over time, the structural steel posts have deteriorated. The steel has corroded and pitted. Further, the original coating has flaked off. This deterioration will over time, cause the steel posts to fail, triggering more damage. Some preventative maintenance is required to prolong the life of this unglamorous, but essential, facility.

The subject project would clean and re-coat the steel structure and make other repairs to the drying beds.

Total Estimated Project Cost: \$225,000

Priority: High

Project Title: Ceiling Replacement at Waste Water Treatment Plant

Project Description and Benefits:

Some years ago, the lack of adequate ventilation in the Waste Water Treatment plant caused condensation to intrude the ceiling in the top floor of the plant and cause damage. For example, the ceiling buckles in places.

The subject project would replace water-damaged areas of the ceiling.

Total Estimated Project Cost: \$65,000

Priority: High

Project Title: Repair of WWTP Pond Liner

Project Description and Benefits:

One of the elements of Homer's Waste Water Treatment Plant is a "pond" in which treated sewage rests for a period of time, thereby allowing the solids, which are a by-product of the sewage treatment process, to settle out. This pond is lined with a water-proof membrane, which has been compromised over time with tears, rips and holes.

It is possible to repair the holes by fusing patches, made of a similar material as the existing membrane, to the liner.

The subject project would acquire the necessary materials and tools necessary to repair the existing pond membrane.

Total Estimated Project Cost: \$25,000

Priority: High

Project Title: Electronic Pay Station for the RV Dump Station at the Public Works campus

Project Description and Benefits:

The City has two RV Dump Stations – one at the Fishing Hole Campground on the Spit and the other at the Public Works Campus. These facilities are very popular in the summer, used by visitors who want to empty their holding tanks before they head away from Homer to go back home. No one wants to make the trip home with a full holding tank on their RV! The Dump Stations also have water hoses – one for non-potable water for tank flushing and one for potable water, to fill a water tank.

The City charges fees to use the Dump Stations - \$15 to dump a holding tank and \$5 for potable water. The Fishing Hole Dump Station has an automatic pay station, which accepts credit cards. This eliminates the need to handle cash, which is good for both the customers and fee collectors. Plus, research has shown that when people can pay by credit card, they are more likely to actually pay the fees than to simply drive away if they don't have cash.

The subject project would install an automatic Pay Station at the RV Dump Station at the Public Works Campus.

Total Estimated Project Cost: \$55,000

Priority: Moderate

Project Title: Small Works Infiltration & Inflow Remediation Program

Project Description and Benefits:

The City's Infiltration & Inflow ("I & I") study, conducted in 2003 by the engineering consulting firm, USKH, showed that the City's sewer system suffers from considerable volumes of "Infiltration" and "Inflow". "Infiltration" is where ground water enters the sewer system through cracks in the pipe, connections that have separated over time, ground settlement, and so forth. "Inflow" is where the sewer's collection system allows storm water to flow into sanitary sewer system, through broken manhole covers or roof drains/foundation drains that are connected to the sanitary sewer system. The extra volume of water that comes into the sanitary sewer system from I & I stresses every part of the system – the pipelines, the sewer lift stations and the Waste Water Treatment Plant ("WWTP"). The City spends money for electricity, chemicals, and operational labor to treat this clean water. Further, by treating this clean water, the City is diminishing its capacity to treat waste water.

The 2006 study estimated the volume of water flowing into the City's sanitary sewer includes:

- Waste water 61%
- Inflow 23%
- Infiltration 16%

Water intrusion from **Inflow** is relatively easy to remediate and the City has already taken steps towards this goal. For example, the City purchased smoke testing equipment and has about 1/3-1/2 of the sanitary system surveyed. This work will continue until we have the whole system assessed. We know we have inflow from City buildings. For example, the roof drains from the HERC building are connected directly to the sanitary sewer system. This will be corrected. Further, we are replacing and rebuilding manholes that currently allow storm water to flow into the sanitary system.

Infiltration is largely due to the deteriorating condition of the City's remaining AC sewer pipes. This pipe, largely installed in the 1970's becomes brittle and subject to cracking over time, particularly in the types of corrosive soils Homer is known for.

The City has a small camera but, the lead line is only 100 feet long. Sometimes, the distance between manholes is 300 feet, so we can't see the whole system. We need to purchase a longer camera line, which allows us to see into all the pipes in the City and address problematic areas.

We also need to acquire some sewage flow meters so we can better monitor neighborhoods with high rates of infiltration. This will enable us to identify deteriorating conditions that need repair and then make the repairs.

We propose to create a Small Works I & I Remediation Program that enables us to systematically take proactive and/or reactive measures to address I & I issues.

Total Estimated Project Cost: \$50,000/year

Priority: High to Moderate, depending on the Sewer Basin

City of Homer
Water Capital Improvement Plan
July 2020

Summary:

Total Estimated Costs

• Million Gallon Water Tank Aeration System	Urgent	\$ 210,000
• Tesoro Water Vault Upgrade	Urgent	\$ 100,000
• Raw Water Transmission Line Replacement, Phase I - Design	Urgent	\$ 215,000
• Raw Water Transmission Line Replacement, Phase II – Construction	Urgent	\$1,785,000
• Pressure Reducing Valve Replacement, West Trunk Water Line	Urgent	\$ 25,000
• West Trunk Main Replacement	High	\$ 825,000
• New Water Storage Tank – West – .25 million gallons	High	\$1,105,000
• New Water Storage Tank – East – .75 million gallons	High	\$2,583,000
• Hydrology Study for Supplemental Water Supply	Moderate	\$ 150,000
• Spit Water Line Replacement	Moderate	\$ 624,000
• Update 2006 Water and Sewer Master Plan	Low	<u>\$ 50,000</u>

Total Estimated Costs	\$7,672,000
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Project Title: Million Gallon Water Tank Aeration

Project Description and Benefits: After raw water is treated in the City's state of the art membrane water filtration system and chlorinated, it is stored in a 1-million gallon water storage tank at the Water Treatment Plant. From this storage tank, water is piped to the City's customers.

While the water sits in the tank, a chemical reaction takes place between the residual chlorine that is left in the water after the chlorination process and any organic material that may be in the tank. For example, there might be what is called "bioslimes" in the tank or some minute organic material in the water that is not taken out by the membrane filters. Research in the water industry has shown that this chemical reaction creates what are called, Disinfection By-Products or DBP. Research has further shown that these DBPs are potentially cancer-causing elements.

Removing the DBPs is simple – aerating the water causes the DBPs to volatilize to the atmosphere where they can be removed by ventilation. Installing a mechanical aerator system, for stirring the water around and ventilation, removes a large portion of the DBPs.

The subject project would install mechanical mixers and a ventilation system in the City's 1-million gallon water storage tank, located at the Water Treatment Plant.

Total Estimated Project Cost: \$210,000

Priority: Urgent

Project Title: Tesoro Water Vault Upgrade

Project Description and Benefits:

All water delivered to the Homer Spit must pass through the same chokepoint in the water distribution line, a meter vault located at a former Tesoro Gas Station location. The equipment in this vault has aged and is under-sized for the volumes of water they are now conveying. This interferes with the City's ability to provide reliable flows of water to the Spit to meet normal and emergency demands.

The subject project would update the equipment in this vault to increase its hydraulic capacity and reliability.

Total Estimated Project Cost: \$100,000

Priority: Urgent

Project Title: Raw Water Transmission Line Replacement

Project Description and Benefits:

The City transfers water from the Bridge Creek Reservoir to the Water Treatment Plant (“WTP”) through two 45-year old cast iron water transmission mains, about 5,000 feet each. These pipes are undersized for the volume of water they carry. Further, they are fragile due to their age and the corrosive soils that surround Homer. This fragility makes the water mains susceptible to damage from an earthquake. In fact, numerous repairs have been made in the past.

If these pipes failed, the City’s ability to deliver water to the City for domestic service and fire flow would be severely limited. We would need to drain down the water in the water storage tank and otherwise develop a work-around until repairs could be made.

The subject project would replace the two cast iron pipes with High Density Polyethylene Pipe (“HDPE”), which is extremely durable.

An application has been made for FEMA mitigation money and scored high in the evaluation process. We are awaiting further word on that grant opportunity.

In the meantime, we could move forward by executing the project in phases, as follows

- Phase I – Design/Permitting \$ 215,000
- Phase II – Construction \$1,785,000

Total Estimated Project Cost: \$2,000,000

Priority: Urgent

Project Title: Pressure Reducing Valve Replacement, West Trunk Water Line

Project Description and Benefits:

As the City's water travels from the Water Treatment Plant ("WTP") down to our customers in town, it drops over 1000 feet in elevation. This elevation drop creates water pressure in the pipes, which if it builds up excessively, can damage the transmission pipes as well as service lines at customers' houses/businesses. To manage this build-up of water pressure, the City has installed a series of 19 "Pressure Reducing Stations", where excess water pressure is "bled" out of the system before the water continues on its way. This water pressure management process involves carefully balancing to make sure the pressure isn't so high that it creates damage but it isn't so low that it can't make it out to the City's lower lying areas.

Part of the process of managing the pressure involves the utilization of flow control and isolation valves in the Pressure Reducing Stations. One of the things they do is help the water distribution operators manage events where the water flow needs to be high, such as in case of a fire or when the operators are flushing the water mains.

The three valves at the Pressure Reducing Station on the West Trunk water main have aged to the point they are barely operable. They stick in the open position, causing the water pressure to either remain high, which cause pipe damage from excessive pressure. They can also get stuck in the closed position, causing the pressure to remain at a reduced level, which would impede fire flow. Either situation creates risk for the integrity of the City's water system as well as for the workers who enter these Pressure Reducing Valves for maintenance.

The subject project would replace these aging valves.

Total Estimated Project Cost: \$25,000

Priority: Urgent

Project Title: West Trunk Main Replacement.

Project Description and Benefits:

One of the elements of the City’s water distribution system is the West Trunk Main Line. Thirty-one percent of the City’s water flows through this 2,140 LF, 8-inch diameter cast iron pipeline, which was built in 1965-66. It runs down the hill from the Hilltop Pressure Reducing Station to the A-Frame Pressure Reducing Station, near the hospital. This line is at risk because it experiences lateral movement of the steep bluff and being old cast iron pipe, is already fragile and the water flows through that pipe with excessive velocity. The 2006 Water and Sewer Master Plan recommended that this line be replaced.

Further, having the project “shovel ready” would enhance its chances for receiving grant funding. The subject

project would develop this new water line in phases:

Design and permitting	\$ 90,000
Construction	<u>\$735,000</u>

Total Estimated Project Cost: \$825,000

Priority: High

Project Title: New Water Storage Tank – West – .25 million gallons

Project Description and Benefits:

The City’s 2006 Water and Sewer Master Plan recommended the City maintain an adequate water storage capacity to accommodate population growth, address fire flow and maintain ISO ratings.

One of the City’s water storage tanks corroded over time, had asbestos coatings, didn’t have proper seismic restraints and otherwise became unusable. It was demolished in August 2019. The tank’s pad and connection piping remain, so everything we need to connect a replacement tank to the City’s water distribution system is in place.

The project could be developed in phases as follows:

- Design & Permitting \$ 80,000
- Site Work \$ 200,000
- Tank fabrication/erection \$ 700,000

Total Estimated Project Cost: \$ 980,000

Priority: High

Project Title: New Water Storage Tank – East – .75 million gallons

Project Description and Benefits:

The 2006 Water and Sewer Master Plan recommended increasing the City’s water storage capacity to accommodate population growth, address fire flow and maintain ISO ratings.

A new water storage tank was sited and designed by the City about 10 years ago on the east side of the City’s boundaries. Everything is in place to connect this tank to the City’s water distribution system

The subject project would move the tank from the back burner and start making progress to execute it. The project could be phased, as follows:

• Phase I – Update Design & Permitting	\$ 13,000
• Phase II – Site work	\$ 500,000
• Phase III – Tank fabrication/erection	<u>\$2,070,000</u>
Total Estimated Project Cost	\$2,583,000

Proceeding with Phase I and II would make the project more “shovel ready”, which would facilitate grant funding.

Total Estimated Project Cost: \$2,583,000

Priority: High

Project Title: Hydrology Study for Supplemental Water Supply

Project Description and Benefits:

The 2006 Water and Sewer Master Plan concluded the City would “*face increased demands on the current reservoir’s ability to provide reliable, low turbidity water...*” as the City’s population grows. The Master Plan recommended that a detailed hydrology be started to (1) better define the flows from other potential sources of surface water that could be captured for a supplemental water supply and (2) define a potential impoundment area.

The City’s population has not increased at the rate projected in the 2003 Master Plan, but climate change could be adversely affecting the Bridge Creek watershed. Regardless of the cause, water levels in the reservoir have decreased over time. It would be wise to start thinking about a back-plan.

Once this work was done, a plan could be devised to develop a conceptual design and cost estimate for the new supplemental water source, over time.

The subject project is for a Hydrology Study for a supplemental water supply.

Total Estimated Project Cost: \$150,000

Priority: Moderate

Project Title: Spit Water Line Replacement

Project Description and Benefits:

The water line along the Spit was originally cast iron pipe and subject to extensive corrosion. The City has replaced most of this with HDPE piping, with the exception of about 4,800 LF of cast iron pipe at the end of the Spit (on the Spit Road, Fish Dock Road and Ice Dock Road). The condition of that pipe is unknown, but it is probably badly corroded. We propose to investigate the condition of that pipe, using specialized equipment that can detect the pipe thickness. Then, we can identify problematic areas and take preventative measures. This strategy was recommended in the 2006 Water and Sewer Master Plan.

Having the project “shovel ready” would enhance its chances for receiving grant funding.

The subject project would implement this strategy in two phases:

- | | |
|--|------------------|
| 1. Assess Pipe Condition to identify problematic areas | \$ 60,000 |
| 2. Design and permitting | \$ 85,000 |
| 3. Construction | <u>\$479,000</u> |

Total Estimated Total Project Cost: \$624,000

Priority: Moderate

Project Title: Update 2006 Water and Sewer Master Plan

Project Description and Benefits:

The City's Water and Sewer Master Plan was written in 2006 and designed for a 20-year design life, which means its expiration date is 2026.

The subject project would engage a consulting engineering firm to update the 2006 plan.

Total Estimated Total Project Cost: \$50,000

Priority: Low



City of Homer

www.cityofhomer-ak.gov

Public Works

3575 Heath Street
Homer, AK 99603

publicworks@cityofhomer-ak.gov

(p) 907- 235-3170

(f) 907-235-3145

Memorandum

TO: City Council

THROUGH: Rick Abboud, Acting, City Manager

FROM: Jan Keiser, PE, JD, Director of Public Works

DATE: July 30, 2020

SUBJECT: Proposal for Sewer Capital Improvement Plan

Issue: The City's sewer system needs some rehabilitation and upgrades to protect the City's investment in this vital infrastructure.

Background: The City's Waste Water Treatment Plant ("WWTP") was constructed over 35 years ago and was, at that time and even now, a unique design. It involves two Deep Shafts into which highly concentrated oxygen is pumped to sustain natural bacteria, whose biology is uniquely adapted to digest the organic matter in municipal waste water. The City's sewer system also includes a network of sewage collection pipes, manholes and sewage lift stations, which allow users in the lower-lying areas of town to be served, by pumping their waste water to the plant. The City's waste water system has performed its job admirably, allowing the City to meet and even exceed the regulated criteria for discharging treated waste water into Kachemak Bay. Over time, various mechanical elements of the system need to be maintained, refurbished, and even replaced to keep them operating properly. Further, new mechanical devices are more energy efficient than the equipment that was available 35 years ago, so upgrading equipment can often result in energy savings.

The City maintains a Sewer Reserve, built from the user fees paid by the City's customers. The value of the Sewer Depreciation Reserve Account, as of March 31, 2020, was \$2,018,059. There is no plan that systematically programs how these monies will be spent. A plan is needed to ensure the City maintains sufficient reserves to fund legitimate needs, while keeping the sewer rates affordable for the customer. The Proposed Sewer Capital Improvement Plan addresses that need.

To create Plan, we did the following:

- a. Reviewed the City's 2006 Water and Sewer Master Plan, which is the most recent detailed planning document related to the City's water/sewer infrastructure.
- b. Compared the City's current population, sewage production trends to the trends that were projected in 2006. For example the 2006 Water and Sewer Master Plan projected the City's population would

be 11,244 people in 2025. In 2020, the population is about 5,700 people. It is unlikely to almost double in the next five years.

- c. Looked at the capital improvements recommended in the 2006 plan to identify work that had already been done.
- d. Identified current maintenance needs – critical repairs or upgrades that were needed to protect existing infrastructure.
- e. Made a list of projects that were required to upgrade existing facilities or develop new facilities and ranked those projects in order of urgency.

The Proposed Plan describes the following projects:

Projects	Ranking	Estimated Cost
• Replace Deep Shaft Air Compressor	Urgent	\$ 85,000
• Upgrade SCADA for Seven Sewer Lift Stations	Urgent	\$210,900
• Portable Generator for Sewer Collection System	Urgent	\$ 58,000
• Waste Water Treatment Plant – Digester Blowers	Urgent	\$189,000
• Ceiling Replacement at Waste Water Treatment Plant	Urgent	\$ 65,000
• Small Works I & I Remediation Program	Moderate	\$ 50,000
• Electronic Pay Station for RV Dump Station	Low	<u>\$ 55,000</u>
Total Estimated Project Costs		\$712,900

The Sewer Depreciation Reserve, as of March 31, 2020, had a balance of \$2,018,059. This is sufficient to fund the projects marked “Urgent”, \$607,900, and leave sufficient reserve for emergency purposes. Indeed, spending this \$607,900 now will extend the life of the City’s sewerage systems.

Recommendations:

1. We recommend the City Council adopt the proposed Sewer Capital Improvement Plan, which will be updated as part of the City’s budget cycle.
2. We further recommend the City Council authorize the implementation of the projects ranked as “Urgent”. We will start with these projects to protect the City’s investment in the WWTP. Later, as the Urgent projects are developed, we will request authorization to move forward on other projects proactive reactive in nature.

The Urgent Projects include:

- Replace Deep Shaft Air Compressor \$ 85,000
- Upgrade SCADA for Seven Sewer Lift Stations \$210,900
- Portable Generator for Sewer Collection System \$ 58,000
- Waste Water Treatment Plant – Digester Blowers \$189,000
- Ceiling Replacement at Waste Water Treatment Plant \$ 65,000

Total value of Urgent Projects \$607,900

The City’s Sewer Depreciation Reserve fund has sufficient monies to cover all of the City’s most urgent needs. Implementing these projects would, as a collective affect, decrease energy costs and extend the life of the WWTP as a whole.

The balance of the Sewer Depreciation Reserve fund, \$1,410,159, is an appropriate level of reserve for a WWTP system as complex as Homer’s, to maintain as an emergency reserve.

Recommendation: That the City Council (a) adopt the Sewer Capital Improvement Plan, dated July 30, 2020, and (b) authorize the implementation of the Urgent projects, including:

- Replace Deep Shaft Air Compressor \$ 85,000
- Upgrade SCADA for Seven Sewer Lift Stations \$210,900
- Portable Generator for Sewer Collection System \$ 58,000
- Waste Water Treatment Plant – Digester Blowers \$189,000
- Ceiling Replacement at Waste Water Treatment Plant \$ 65,000

Total value of Urgent Projects \$607,900



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(f) 907-235-3145

Memorandum

TO: City Council

THROUGH: Rick Abboud, Acting, City Manager

FROM: Jan Keiser, PE, JD, Director of Public Works

DATE: July 30, 2020

SUBJECT: Proposal for Water Capital Improvement Plan

Issue: The City's water system needs some rehabilitation and upgrades to protect the City's investment in this vital infrastructure.

Background: The City's Water Treatment Plant ("WTP") was, at the time of its construction and even now, a state-of-the-art design. It involves the use of a membrane filter to trap organic material from the water. Water from the WTP is distributed to the City's water customers through a network of pipelines and because there is such a high elevation difference between the WTP and sea level, where many of the City's customers reside, the water must pass through Pressure-Reducing Stations to prevent the high pressures from damaging the pipeline network. Over time, various mechanical elements of the water system need to be maintained, refurbished, and even replaced to keep them operating properly. Further, new mechanical devices are more energy efficient than the original equipment, so upgrading equipment can often result in energy savings.

The City maintains a Water Depreciation Reserve fund, built from the user fees paid by the City's customers. The value of the Water Depreciation Reserve Account, as of March 31, 2020, was \$2,656,863. There is no plan that systematically programs how these monies will be spent. A plan is needed to ensure the City maintains sufficient reserves to fund legitimate needs, while keeping the water rates affordable for the customer. The Proposed Water Capital Improvement Plan addresses that need.

To create Plan, we did the following:

- a. Reviewed the City's 2006 Water and Sewer Master Plan, which is the most recent detailed planning document related to the City's water/sewer infrastructure.
- b. Compared the City's current population, water use trends to the trends that were projected in 2006. For example the 2006 Water and Sewer Master Plan projected the City's population would be 11,244 people in 2025. In 2020, the population is about 5,700 people. It is unlikely to almost double in the next five years.

- c. Looked at the capital improvements recommended in the 2006 plan to identify work that had already been done.
- d. Identified current maintenance needs – critical repairs or upgrades that were needed to protect existing infrastructure.
- e. Made a list of projects that were required to upgrade existing facilities or develop new facilities and ranked those projects in order of urgency.

The Proposed Plan describes the following projects:

• Million Gallon Water Tank Aeration System	Urgent	\$ 210,000
• Tesoro Water Vault Upgrade	Urgent	\$ 100,000
• Raw Water Transmission Line Replacement, Ph 1- Design	Urgent	\$ 215,000
• Raw Water Transmission Line Replacement, Ph 11- Constr.	Urgent	\$1,785,000
• Pressure Reducing Valve Replacement, West Trunk Line	Urgent	\$ 25,000
• West Trunk Main Replacement	High	\$ 825,000
• New Water Storage Tank – West – .25 million gallons	High	\$1,105,000
• New Water Storage Tank – East – .75 million gallons	High	\$2,583,000
• Hydrology Study for Supplemental Water Supply	Moderate	\$ 150,000
• Spit Water Line Replacement	Moderate	\$ 624,000
• Update 2006 Water and Sewer Master Plan	Low	<u>\$ 50,000</u>
Total Estimated Costs		\$7,672,000

The value of the Water Depreciation Reserve Account, as of March 31, 2020, was \$2,656,863. This is sufficient to fund at least Phase I of the projects marked “Urgent”, \$550,000, and leave \$2,106,863, which would serve as a reserve for emergency purposes. Indeed, spending this \$550,000 now is a necessary part of (a) protecting the public health and (b) preserving the integrity of the City’s water system.

Recommendations:

1. We recommend the City Council adopt the proposed Water Capital Improvement Plan, which will be updated as part of the City’s budget cycle.
2. We further recommend the City Council authorize the implementation of at least Phase I, \$1,450,000, of the projects deemed “Urgent”. We will start with these projects to protect the City’s investment in the WTP and water distribution system. Later, as the Urgent projects are developed, we will request authorization to move forward on other projects.

1 **CITY OF HOMER**
2 **HOMER, ALASKA**

3 City Manager/
4 Public Works Director

5 **ORDINANCE 20-xx**

6
7 AN ORDINANCE OF THE CITY COUNCIL OF HOMER, ALASKA,
8 AMENDING THE 2020 CAPITAL BUDGET AND AUTHORIZING
9 EXPENDITURE OF \$607,900 FROM THE SEWER DEPRECIATION
10 FUND FOR DESIGNATED PROJECTS IN THE 2020 SEWER CAPITAL
11 IMPROVEMENT PLAN.
12

13 WHEREAS, The City maintains a Sewer Depreciation Fund, for the purpose of paying for
14 capital improvements and repairs that need to be made to the City’s sewage collection and
15 treatment infrastructure; and
16

17 WHEREAS, The City Council accepted the 2020 Sewer Capital Improvement Plan, dated
18 August 2020, which identifies capital improvement and repair projects required to keep the
19 City’s sewer collection and treatment infrastructure in good repair; and
20

21 WHEREAS, The 2020 Sewer Capital Improvement Plan serves as a systematic means to
22 identify projects and program funding from the Sewer Depreciation Fund; and
23

24 WHEREAS, The 2020 Sewer Capital Improvement Plan has identified multiple projects
25 ranked as “Urgent”, which address repairs/rehabilitations that are so extensive they cannot
26 be addressed through the City’s regular preventative maintenance program and which, if not
27 addressed immediately, could endanger City staff, compromise the public health or put the
28 City’s investment in its sewer works at risk.
29

30 NOW, THEREFORE, the City Council of Homer ordains:
31

32 Section 1. The City of Homer’s 2020 Capital Budget is hereby amended by appropriating
33 \$607,900 from the Sewer Depreciation Fund for the following projects:
34

- | | | |
|----|--|------------------|
| 35 | • Replace Deep Shaft Air Compressor | \$ 85,000 |
| 36 | • Upgrade SCADA for Seven Sewer Lift Stations | \$210,900 |
| 37 | • Portable Generator for Sewer Collection System | \$ 58,000 |
| 38 | • Waste Water Treatment Plant – Digester Blowers | \$189,000 |
| 39 | • Ceiling Replacement at Waste Water Treatment Plant | <u>\$ 65,000</u> |

40
41 Total Urgent Project Costs \$607,900

42 ENACTED BY THE CITY COUNCIL OF HOMER, ALASKA, this ___ day of _____, 2020.

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CITY OF HOMER

KEN CASTNER, MAYOR

ATTEST:

MELISSA JACOBSEN, MMC, CITY CLERK

YES:

NO:

ABSTAIN:

ABSENT:

First Reading:

Public Hearing:

Second Reading:

Effective Date:

Reviewed and approved as to form:

~~Rick Abboud, Acting Katie Koester~~, City Manager
~~Gatti~~, City Attorney

~~Holly Wells, Michael~~

Date: _____

Date: _____

1 **CITY OF HOMER**
2 **HOMER, ALASKA**

3 City Manager/
4 Public Works Director

5 **ORDINANCE 20-xx**

6
7 AN ORDINANCE OF THE CITY COUNCIL OF HOMER, ALASKA,
8 AMENDING THE 2020 CAPITAL BUDGET AND AUTHORIZING
9 EXPENDITURE OF \$550,000 FROM THE WATER DEPRECIATION
10 FUND FOR DESIGNATED PROJECTS IN THE 2020 WATER CAPITAL
11 IMPROVEMENT PLAN.
12

13 WHEREAS, The City maintains a Water Depreciation Fund, for the purpose of paying for
14 capital improvements and repairs that need to be made to the City's water supply, treatment
15 and distribution infrastructure; and
16

17 WHEREAS, The City Council accepted the 2020 Water Capital Improvement Plan, dated
18 August 2020, which identifies capital improvement and repair projects required to keep the
19 City's water supply, treatment and distribution infrastructure in good repair; and
20

21 WHEREAS, The 2020 Water Capital Improvement Plan serves as a systematic means to
22 identify projects and program funding from the Water Depreciation Fund; and
23

24 WHEREAS, The 2020 Water Capital Improvement Plan has identified multiple projects
25 ranked as "Urgent", which address repairs/rehabilitations that are so extensive they cannot
26 be addressed through the City's regular preventative maintenance program and which, if not
27 addressed immediately, could compromise the public health or put the City's investment in
28 its water works at risk.
29

30 NOW, THEREFORE, the City Council of Homer ordains:
31

32 Section 1. The City of Homer's 2020 Capital Budget is hereby amended by appropriating
33 \$550,000 from the Water Depreciation Fund for the following projects:
34

- | | | |
|----|--|------------|
| 35 | • Million Gallon Water Tank Aeration System | \$ 210,000 |
| 36 | • Tesoro Water Vault Upgrade | \$ 100,000 |
| 37 | • Raw Water Transmission Line Replacement, Ph I – Design | \$ 215,000 |
| 38 | • Pressure Reducing Valve Replacement, West Trunk Water line | \$ 25,000 |

39
40 Total Urgent Project Costs \$ 550,000

41 ENACTED BY THE CITY COUNCIL OF HOMER, ALASKA, this ___ day of _____, 2020.
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CITY OF HOMER

KEN CASTNER, MAYOR

ATTEST:

MELISSA JACOBSEN, MMC, CITY CLERK

YES:

NO:

ABSTAIN:

ABSENT:

First Reading:

Public Hearing:

Second Reading:

Effective Date:

Reviewed and approved as to form:

~~Rick Abboud, Acting Katie Koester~~, City Manager

~~Gatti~~, City Attorney

~~Holly Wells, Michael~~

Date: _____

Date: _____

1 **CITY OF HOMER**
2 **HOMER, ALASKA**

3 City Manager/
4 Public Works Director

5 **RESOLUTION 20-xx**

6
7 A RESOLUTION OF THE CITY COUNCIL OF HOMER, ALASKA,
8 ACCEPTING THE 2020 SEWER CAPITAL IMPROVEMENT PLAN AND
9 DECLARING IT SHOULD BE UPDATED AS PART OF THE CITY'S
10 BUDGET CYCLE.

11
12 WHEREAS, The City Council adopted the 2006 Water & Sewer Master Plan, which
13 describes various capital improvements and repairs that need to be made to the City's water
14 and sewer infrastructure; and

15
16 WHEREAS, The City maintains a Sewer Depreciation Fund, for the purpose of paying for
17 capital improvements and repairs that need to be made to the City's sewage collection and
18 treatment infrastructure; and

19
20 WHEREAS, The City needs a systematic means to identify projects and program funding
21 from the Sewer Depreciation Fund; and

22
23 WHEREAS, The City has prepared a Sewer Capital Improvement Plan, dated August
24 2020, which is based on needs and recommendations set forth in the 2006 Water & Sewer
25 Master Plan as well as from data, records and research compiled by the City staff related to
26 operational issues experienced during maintenance work; and

27
28 NOW, THEREFORE, BE IT RESOLVED that the City Council of Homer

29
30 (a) accepts the 2020 Sewer Capital Improvement Plan, dated August 2020, as a means
31 to guide the development of capital improvement and repair projects; and

32
33 (b) declares the Sewer Capital Improvement Plan should be updated as part of the
34 City's budget cycle.

35
36 PASSED AND ADOPTED BY THE CITY COUNCIL OF HOMER, ALASKA, this ____ day of
37 _____, 2020.

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39 CITY OF HOMER

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41 _____
42 KEN CASTNER, MAYOR

43 ATTEST:

44

45 _____

46 MELISSA JACOBSEN, MMC, CITY CLERK

47

48

49 YES:

50 NO:

51 ABSTAIN:

52 ABSENT:

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55 First Reading:

56 Public Hearing:

57 Second Reading:

58 Effective Date:

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60 Reviewed and approved as to form:

61

62 _____

63 ~~Rick Abboud, Acting Katie Koester~~, City Manager

64 ~~Gatti~~, City Attorney

65

66 Date: _____

_____ ~~Holly Wells, Michael~~

Date: _____

1 **CITY OF HOMER**
2 **HOMER, ALASKA**

3 City Manager/
4 Public Works Director

5 **RESOLUTION 20-xx**

6
7 A RESOLUTION OF THE CITY COUNCIL OF HOMER, ALASKA,
8 ACCEPTING THE 2020 WATER CAPITAL IMPROVEMENT PLAN AND
9 DECLARING IT SHOULD BE UPDATED AS PART OF THE CITY'S
10 BUDGET CYCLE.

11
12 WHEREAS, The City Council adopted the 2006 Water & Sewer Master Plan, which
13 describes various capital improvements and repairs that need to be made to the City's water
14 and sewer infrastructure; and

15
16 WHEREAS, The City maintains a Water Depreciation Fund, for the purpose of paying for
17 capital improvements and repairs that need to be made to the City's water supply, treatment
18 and distribution infrastructure; and

19
20 WHEREAS, The City needs a systematic means to identify projects and program funding
21 from the Water Depreciation Fund; and

22
23 WHEREAS, The City has prepared a Water Capital Improvement Plan, dated August
24 2020, which is based on needs and recommendations set forth in the 2006 Water & Sewer
25 Master Plan as well as from data, records and research compiled by the City staff related to
26 operational issues experienced during maintenance work; and

27
28 NOW, THEREFORE, BE IT RESOLVED that the City Council of Homer

29
30 (a) accepts the 2020 Water Capital Improvement Plan, dated August 2020, as a means
31 to guide the development of capital improvement and repair projects; and

32
33 (b) declares the Water Capital Improvement Plan should be updated as part of the
34 City's budget cycle.

35
36 PASSED AND ADOPTED BY THE CITY COUNCIL OF HOMER, ALASKA, this ____ day of
37 _____, 2020.

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39 CITY OF HOMER

40
41 _____
42 KEN CASTNER, MAYOR

43 ATTEST:

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46 MELISSA JACOBSEN, MMC, CITY CLERK

47

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49 YES:

50 NO:

51 ABSTAIN:

52 ABSENT:

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55 First Reading:

56 Public Hearing:

57 Second Reading:

58 Effective Date:

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60 Reviewed and approved as to form:

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62 _____

63 ~~Rick Abboud, Acting Katie Koester~~, City Manager

64 ~~Gatti~~, City Attorney

65

66 Date: _____

_____ ~~Holly Wells, Michael~~

Date: _____